DESIGN AND DEVELOPMENT OF MINI SUGAR CANE LIFTER

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ABSTRACT

The Indian sugar industry ranks eleventh in size out of 200 sugar-producing countries; and continuous advancement is essential to ensure that this industry remains competitive. The transfer system from field to mill includes sugarcane being moved, loaded, Trans-loaded and off-loaded and amounts to more than 25 % of the total production cost of sugarcane, hence small adjustments can have significant economic benefits. Payload variability is a current problem making the loading operation a leverage point for improvement. As a consequence of poor management and the under-utilization of equipment, loading has been identified as an inefficient and costly operation. Studies have shown that technology and management can contribute to improved loading accuracy

1. INTRODUCTION

Sugar from sugarcane is a commodity which impacts on many economies including India. The sugar industry in India faces many challenges, which need to be addressed in order to remain competitive. Profitability in the international sugar industry has been strained by increasing agricultural input costs, with one of the main factors being transport costs. This component accounts for approximately 20 – 25 % of the total cost of sugarcane production in India, which equates to Rs. 750 million per annum. Harris et al. (2010) illustrated that the sugarcane input costs are rapidly raising compared to the relatively stable income generated.

Sugarcane in Indian is mainly grown in the rural regions of Maharashtra and Uttar Pradesh which had an annual production increase from 500 000 tons in 1950 to 21 million tons in 2000. This indicates that sugarcane production has rapidly increased. The vehicles differ with respect to their management, design and capabilities. The Indian sugar industry is large and ranks 11th amongst the 200 sugar producing countries in the world which are managed by 6 companies.

The sugarcane transfer system comprises sugarcane being moved, loaded, trans loaded and off-loaded, which amounts to more than 25 % of the total production cost of sugarcane, hence small improvements can have significant economic benefits. An improvement in the transfer system can be achieved by the modification of various components within the system. Load cells on transporting units offer a means of achieving accurate loads; however the initial capital costs and the increased management requirements often make it less utilized. Weighing devices can be mounted onto loading equipment, such as grab- loaders and cranes, to improve loading accuracies, however, these devices become unreliable when used under inclined conditions. Weighing pads were found to be affordable and reliable with 1 % accuracy error..

1.1 PROBLEM STATEMENT

The sugar factories works in the season of October to march, during season lot of sugarcane is collected and stored in an open place. Loading of whole sugarcane to the trolley has become a very difficult task due to dust coming out of it and it creating a lot of health hazards to human beings. As it is injurious to health and too much time consuming, labors are unable to work it that environment, sometimes they avoid to do work. Hence a mechanical system must be developed for the loading of sugarcane.

1.2 Objectives

1. To suggest the development of an economic new mechanism for sugar industries in India to load the sugarcane to the trolley.
2. To be economical, consume less labor and lesser time than conventional methods.
3. To create a human hazardous free mechanism covering under safety norms.
4. To create a flexible and multipurpose mechanism.

2. COMPONENTS

1: Structural C-Channel
2: Pulley
.3: Sprocket
.4: Pedestal Bearing Block
5: Reduction Gear Box
.6: Engine
7: Belt Conveyor
8: Chain Conveyor

2.1 Experimental Setup

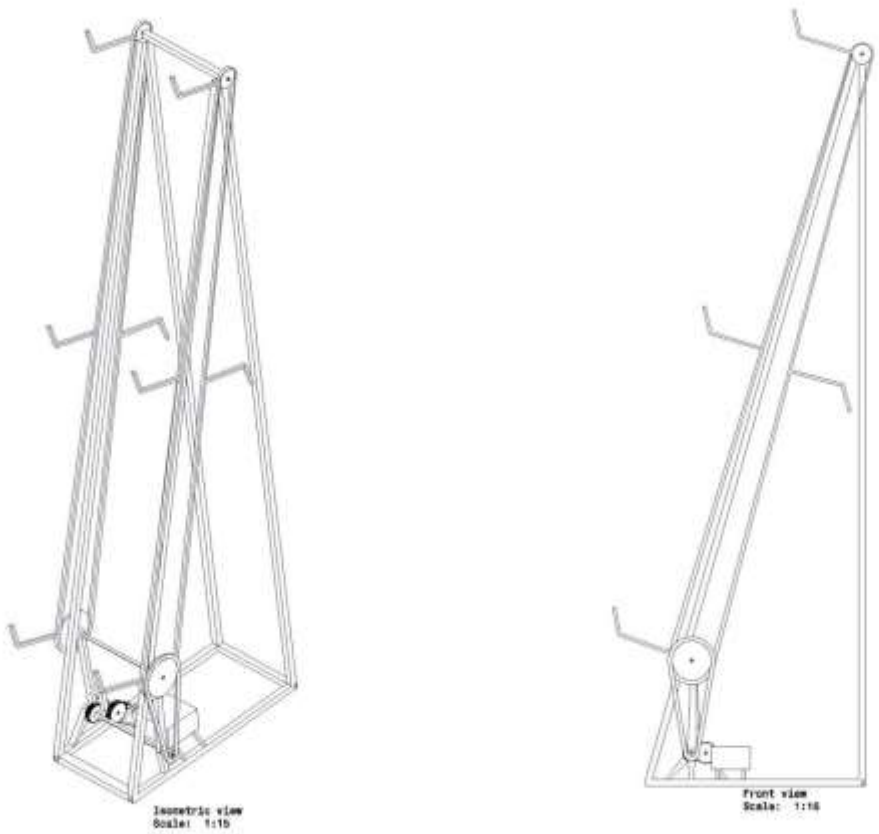

Fig -1 Experimental setup

3. RESULT

By this, above suggested real time application will be best to suit the company requirements and prevents human labours from hazardous environment.

4. CONCLUSIONS

Considering all the design parameters, real-time calculations, safety norms, cost efficiency, material life time and labour availability, it can be concluded that the Mechanism that is suggested is the most appropriate for conduction and transportation of sugarcane. The sugar plant is bounded by a limitation of utilizing an excavator for 10 hrs. Per day; henceforth the use of this mechanism which can be fabricated at a onetime investment can serve the plant when needed, eliminating the cost expenses.

The mechanism is flexible in terms of motion due to the presence of a driving mechanism which makes it to collect the sugarcane covering the whole plant area over which the it is spread. By varying the size of the pallets, the amount of sugarcane that can be collected can also be increased correspondingly. The total number of links present in the mechanism is considerably less making the maintenance cost of the mechanism lesser. By this, above suggested real time application will be best to suit the company requirements and prevents human labours from hazardous environment

5. REFERENCES

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