

DESIGN AND FABRICATION OF SUGARCANE HARVESTER USING SAW CHAIN (SOLAR OPERATED)

INTRODUCTION

Indian sugar industry, second largest agro-based processing industry after the cotton textiles industry in country, has a lion's share in accelerating industrialization process and bringing socio-economic changes in under developed rural areas. Sugar industry covers around 7.5% of total rural population and provides employment to 5 lakh rural people. About 4.5 crore farmers are engaged in sugarcane cultivation in India. Sugar mills (cooperative, private, and public) have been instrumental in initiating a number of entrepreneurial activities in rural India. Present paper is an attempt as to review progress of sugar industry in India, understand its problems and challenges in context of on-going liberalization process. Indian sugar industry can be a global leader provided it comes out of the vicious cycle of shortage and surplus of sugarcane, lower sugarcane yield, and lower sugar recovery, ever increasing production costs and mounting losses. It needs quality management at all levels of activity to enhance productivity and production. Attention is required on cost minimization and undertaking by product processing activities.

The world demand for sugar is the primary driver of sugarcane agriculture. Cane accounts for 80% of sugar produced; most of the rest is made from sugar beets. Sugarcane predominantly grows in the tropical and subtropical regions, and sugar beet predominantly grows in colder temperate regions of the world. Other than sugar, products derived from sugarcane include falernum, molasses, rum, *cachaça* (a traditional spirit from Brazil), bagasse and ethanol. In some regions, people use sugarcane reeds to make pens, mats, screens, and thatch. The young unexpanded inflorescence of *tebu telor* is eaten raw, steamed or toasted, and prepared in various ways in certain island communities of Indonesia.

Mechanical harvesting uses a combine, or sugarcane harvester. The Austoft 7000 series, the original modern harvester design, has now been copied by other companies, including Cameco / John Deere. The machine cuts the cane at the base of the stalk, strips the leaves, chops the cane into consistent lengths and deposits it into a transporter following alongside. The harvester then blows the trash back onto the field. Such machines can harvest 100 long tons (100 t) each hour; however, harvested cane must be rapidly processed. Once cut, sugarcane begins to lose its sugar content, and damage to the cane during mechanical harvesting accelerates this decline.

FABRICATION OF DIFFERENT PARTS OF SUGARCANE HARVESTER

Chassis frame is the main base of the vehicle on which body is mounted with wheels and machinery. As per the design, marking has been done on each angle. As per the marking, angles are cut by cutting machine and holes are drilled on angles by using drilling machine for fixing saw chain assembly and DC motor. L-angles have been weld as per marking and finally the chassis is fabricated as per the required dimensions. Two wheels are attached to each other through the pipe and connected to the frame for the movement of the harvester in the field. L-angle is weld to pipe to make handle and welded to the chassis for pushing the vehicle in the field. At handle l-shape angle plate is weld to place the solar panel.

L-angle is cut to the required dimension and DC motor is fitted to it; and then it is welded to the front portion of the frame. A shaft from the DC motor is connected to drive sprocket. Guide bar is mounted in front part of the chassis by using nuts and bolts and weld as per the requirement. Proper alignment is made between the drive sprocket and guide bar for the rotation of the saw chain properly. Distance between the guide bar and ground is done as per the requirement. DC motor is connected to the battery through switch and solar panel is connected to the battery for power generation.

Sheet metal is cut by a cutting machine as per the chassis dimensions and it is weld on chassis frame for carrying load on the vehicle.

CONCLUSION

The small scale sugarcane harvesting machine is designed and fabricated. After testing small scale sugarcane harvester in the field it is found that the front wheels are struck in mud, due to that the machine was not moving so one more spoke wheel is fixed at the front for the proper and smooth movement of the machine. The cost of the machine is about Rupees 10,000 and if the farmer buys this machine, farmer can recover the invested money back by harvesting two and half acre. High end lubrication should be provided to the saw chain to avoid foreign particles. By using this machine problem of the labour crises can be reduced. Comparing with manual harvesting only 28% of labours are required. It makes the process faster hence reduces most of the harvesting time and labour required to operate the machine is also less. The machine is used by maximum number of farmers definitely farmer can overcome the labour crises problem. The productivity is also increased.

- Power can be produced from the solar panel and saved in battery.
- Harvesting machine can be used as a load carrying vehicle to carry the harvested sugarcane from the field to the required destination.

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