

STUDY AND MODIFICATION OF RICE THRESHING MACHINE

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Abstract: This paper has been study and modification of rice threshing machine for automation in threshing. We connect conveyor belt system at the back side of machine so it is easily immerse the rice plant at its one side and throw out the other side of belt. It is the fast working process so It is save the time and human effort due to its automation. The main modification of this system is conveyor belt system which is create the automation in the system and reduce human effort.

Keyword: fast threshing, automatic threshing, rice thresher, conveyor operated, mobile cylinder thresher

1. INTRODUCTION

Today there are various machines for performing various kinds of operations in farm as well as for doing every work, where considering our research we have found for study i.e.” Rice Threshing, here we found various problems that has to be noted and can be worked on. So this problems can be framed as the machines that are used for rice threshing are required more man power for threshing i.e. if one labour standing with rice plant for threshing behind the thresher it’s difficult to rotate rice plant continuously in standing position with rice plant. So there need to develop new technique or machine that can be used solve the problem mentioned above. Currently, Ghana spends about 450 million US dollars annually on rice importation to argument local demand. The country’s self-sufficiency in rice production stands at about 30 per cent, leaving a shortfall of 70 percent (Amanor, 2012). However, local farmers involved in rice production in Ghana still use outmoded means of threshing. Thus using wood logs as implement to aid in the threshing. Aside from being labour intensive, the post-harvest losses is huge. Studies has shown that threshing losses were higher (6.14%) when threshing was done using the “Bambam” box (a big locally made wooden box) than when bag beating method (2.45%) was used (Ramatoulaye,2010).

The rice is one of the important crop in the word which is cultivated at the extensive area of Iran. Yield of crop is factor which is investigated in the breeding researches.usually for threshing of crop at these studies, single part thresher is used.

Koji Yamaguji,The result of research work is impressive .in order to achieve the extension of thresher JEP in west Africa , a participatory research project is of universe de lame in Togo and the local manufacturer ,UPROMAH.Regarding the small scale farmer condition and result of design and the technical test of the thresher JEP we recommended that the side edge cover of the grain should be raised to avoided falling of grain and chaff in the grain outlet more test should be conducted to ascertain why there was decrease in threshing capacity as speed went up ,the spring speed should be doubled to avoid future breakages, very wet paddy ,moisture up to 21% should not be used as it stuck and does not allow free exit of chaff ,more different rice varieties

under different condition should focused on designing a low cost thresher.

Bahir dar, The financial analysis showed that utilization of pedal and modified rice threshers have a net benefit margin of ETB 28098 and ETB 23358 in the first year of investment. Fogera Woreda is one the most intensive agricultural production system where three to four crop productions are undertaken. The promotion and utilization of the modified rice thresher reduces the threshing labour demand of an average Fogera farmer by 77.08%. Besides, farmers appreciated for home consumption and the avoidance of hay breakage used for thatching. However, they considered it as a low priority where weeding and planting are recently considered as major bottlenecks.This is due to low awareness by farmers that necessitates for awareness creation and subsequent promotion of the technology for wider adoption. Hence, wider scale promotion of the technology is paramount importance to increase adoption and subsequently enlarge households’ income, marketable yield and hence increase national food availability and accessibility.Hence, future promotions should consider these limitations and incorporate the physical and quality loss to bring to light the opportunities for adoption. Further, it could be advisable to see longer period experiments on the thresher as fatigue may decrease optimum threshing capacity of individuals

Chakrabarti, The design and fabrication of a rice threshing machine has been successfully carried out by this work. The machine is capable of threshing, separation of stalk from rice and reduction in number of broken rice, thereby, giving a better method of threshing than the traditional methods. All the materials used were locally sourced.

Deepak gupta, A belt conveyor system with two rollers can be developed for handling the weight. The belt conveyor system is designed with high degree of automation, loading, movement and unloading efficiency. These are very flexible, safe, with low initial, and maintenance cost. We are find out the maximum handling

weight 17 Kg by using of Distance between two axes of shafts.

Ahmad Hanafie, Grain will be separated from the stalks or straw through a blower that produces wind. These winds can make a power to separate the rice from the straw. The rice will come out under the thresher and the empty hay and grain will be separated from the grain that contains rice. Regulators used to modify the speed (rpm) are adjusted based on the type of rice. To obtain a more detailed picture of the Thresher Machine system design.

a) Rice thresher using break down system consists of 4 main parts namely frame, thresher, cylinder, and cover. Thus carrying the thresher will be easier and only needs 3 people and the time needed is quicker.

b) Farmer productivity result using the thresher with the break down system is 21.84 minutes/100kg or a daily working hour can reach 1900 kg.

J. B. K. Das, The design of the belt conveyor must begin with an evaluation of the characteristics of the conveyed material and in particular the angle of repose and the angle of surcharge. The angle of repose of a material, also known as the "angle of natural friction" is the angle at which the material, when heaped freely onto a horizontal surface takes up to the horizontal plane. For designing a conveyor belt, some basic information e.g. the material to be conveyed, its lump size, tonnage per hour, distance over which it is to be carried, incline if any, temperature and other environmental conditions is needed.

Purushothaman Surendran, In the paper, plated based water sensor is evaluated on both rainfall and after rainfall condition to obtain accurate result without false wiping under different scenarios. This system is developed with low cost high performance electronic components to fit in all low cost vehicles. The cost to implement is approximately 7\$, which is less than any other wiping system in the vehicles. A vertical/horizontal placement of plates give better result compare to any another arrange of plates. The copper/aluminum plates can be fixed on to plastic board and affix on the vehicles instead of placing directly on the windshield.

Chabrol, Chimwala, The design and fabrication of a rice threshing machine has been successfully carried out by this work. The machine is capable of threshing, separation of stalk from grains and reduction in number of broken grains, thereby, giving a better method of threshing than the traditional methods. All the materials used were locally sourced.

2. DESIGN METHODOLOGY

We have designed our machine in solid works software; here we have attached some images of the machine which we have designed.

Our machine should be 45 cm. Long, width 41.55 cm and height is 45 cm.

We have designed our machine according to our requirements. But we are ready to apply the changes in design which we get as a result from the trial & error method. As per the design the working procedure of the machine is as follows:

Initially when we switched ON the power supply; the motor start and the thresher and conveyor belt rotate.

The conveyor belt rotate with the help of gear motor and thresher will rotate with the help of electric motor.

The rice plant applied on the conveyor belt and conveyor belt thought the rice plant other side of the machine.

The rice plant can passed over the thresher then the rotating motion of the thresher can removed the rice seeds from the plant.



Fig 2.1 rice thresher (side view)

Applied plant on thresher can remove the seeds from the plant this removed seeds thought the front side of the machine.



Fig2.2 rice thresher (front view)

The removed seed can collected then process can be stopped. After work done then operator turn OFF the switch and clean the our machine.

We can do reprocess then Turn ON the switch of the main power supply and machine will start and threshing again..

3 Circuit Diagram:**2.1 DESIGN ANALYSIS**

For our made model/ prototype we analyzed/ Calculated many things which we share here. But It's fully depends on our prototype.

First we introduce dimensions of our prototype.

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Motor used for conveyor:-

Amperage : 2 amps
 Operating Voltage: 12V
 Shaft length : 3.25"
 Thread type : RH male
 Shaft dia. : 0.235"
 Speed : 55 rpm
 Torque : 10A
 Type : DC motor
 Power : 120W
 Diameter of gear box : 70Ø mm
 Length of motor: 198 mm
 Width of motor : 103 mm
 Diameter of gear screw : 12Ø mm

Motor used for cylinder rotating:-

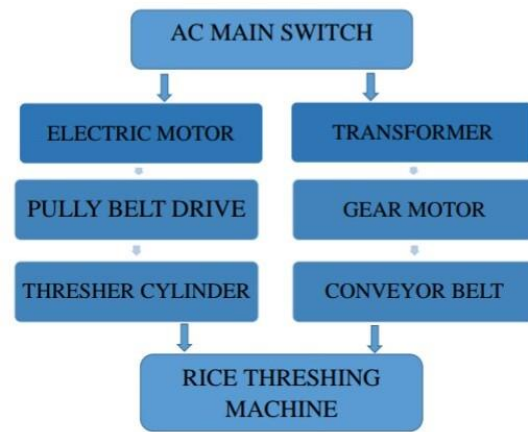
Speed : 1440 RPM
 Voltage : 220-240V
 Phase : single phase
 Power : 0.5 HP
 Pole : 4
 Power output : 0.37 kw
 Casing : Wound rotor
 Body : Rolled Sheet

Frame

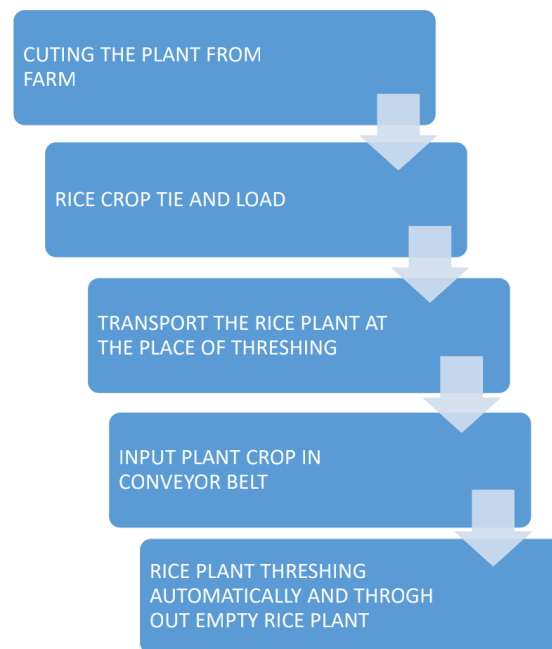
Material : mild steel
 Height : 45 cm
 Length : 60cm
 Width : 82.5 cm

Belt:

Material : Fabric
 Length : 84 cm
 Width : 57 cm



BLOCK DIAGRAM 1.



BLOCK DIAGRAM 2.

Advantages:

Low initial cost
 Using of conveyor belt create automation in threshing.
 This machine is fast working process compare to traditional method and simple rice threshing machine.
 This machine required less man power and labor due to its automation.
 It is not required skilled worker as an operator.
 It is easy to operate.
 More efficient compare to traditional method.
 It reduce labor cost and save time.
 Individual operator can operate this machine

Scope of future work:

We are working on our machine which can also work on solar energy.

We are also trying to make our machine in such a way that it should go to a proper destination and threshing automatically.

Conclusion:

We have been able to design and develop a automatic rice threshing machine which is operated by conveyor belt .conveyor belt is main parameter of this system which is give automation in rice threshing and it is operated on gear motor for required speed. This system reduce human effort, labor cost and time.it produced large amount of output compare to human labor.

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