

Paddy Cleaner Machine

B.U. Tembhurne¹, S.K. Choudhary², P.M. Zode³

¹*P.G. Student, Dept. of Mechanical Engineering, K.D.K. College of Engineering, Nagpur*

²*Professor, Dept. of Mechanical Engineering, K.D.K. College of Engineering, Nagpur*

³*Asst. Professor, Dept. of Mechanical Engineering, K.D.K. College of Engineering, Nagpur*

Abstract - the conventional rice miller is too expensive due to this reason small scale farmers cannot afford it and therefore paddy cleaner is comes into picture for rice husk. It is almost half of price of the rice miller available in the market and it is easy to afford by the low production volume farmers. It produces 95% of the clean paddy or dehusked paddy and only 5% of the unwanted matters including sand particles, paddy straws, small stones, etc. Operation involves feeding the paddy into the hopper, crushed in between two rotating drums powered by electric motor. Finally, the clean paddy gets separated by forced air circulation of blower.

Index Terms - Blower, Rollers, Cleaned paddy, Efficient, Unwanted matter, Hopper.

I.INTRODUCTION

Agriculture is one of the most important pillars of the Indian economy. The future of human is fully depends on the agriculture. Now the major challenge is to accelerate the growth of agriculture. India is the second highest producer of rice after china. The rice consumption is increasing day by day. If country's agricultural sector is good enough to produce more or equal to the demand, then there is no need to import from other countries and selling at higher cost. In contrast to this if we create surplus then exporting option resulting into the picture.

In India West Bengal is the highest producer of rice nearly equal to 15.75 million tons over 5.46-million-hectare cultivable area. Uttar Pradesh, Punjab, Tamil Nadu, Andhra Pradesh, Bihar are also ranked in rice production after West Bengal. There are various types of rice cultivated in India- Ponni rice (Tamilnadu), Sona masoori (Andhra Pradesh), AmbeMohr (Maharashtra), Wada kolam (Gujarat), Gobhind bhog (Bengal), Matta (Kerala).

The Paddy cleaner machine is designed to remove the foreign elements such e.g. sand, dust, small stone etc. This machine provides an alternative to farmers

instead of traditional winnowing technique and rice mill. By the use of Paddy cleaner, farmer can avoid the extra charge of rice mill and minimize the efforts required for winnowing. Portable Paddy Cleaning Machine is designed to remove foreign materials and impurities such as sand particles, stones, paddy straws and foreign seeds from paddy. This machine provides farmers an alternative replacement of current conventional method should the farmers want to extract the paddy seed in small scale amount. Currently, they only use a traditional winnow technique as to obtain the seeds to be used next season or before processing paddies to become rice. The performance of this machine is very efficient where the percentage of clean paddy is observed to be at 95%. It helps farmers improvise their traditional method, reduces purchasing cost of paddy seed and utilizes the cleaning process at low cost and less maintenance.

II.LITERATURE RIVIEW

There are various paddy cleaning machines currently available in market, but these machines are not portable, bulky and of course of higher cost and takes much space. Also, the existing machines are designed for greater capacity and hence are expensive. Moreover, the machine can do the work as equal to twenty workers. After analyzing most of the papers it is noted that the shaft diameter ranges from 20 mm to 30 mm and motor capacity 0.25 HP to 1.5 HP depending upon the capacity and application. The machine can dehusked the paddy up to 2-3 ton/hour, the weight is up to 120 kg. Some researcher employ vibratory sieve mechanism, blower or fan to get clean paddy, some of them used two or three pulley for transmitting motor power to shaft, someone applied rubber or other materials cladding over rotating drums to avoid the extra crushing force on paddy.

III.DESIGN MODEL

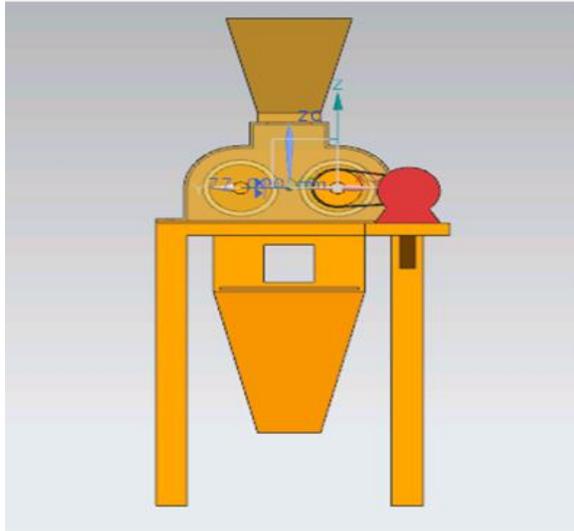


Fig. 1- Front View

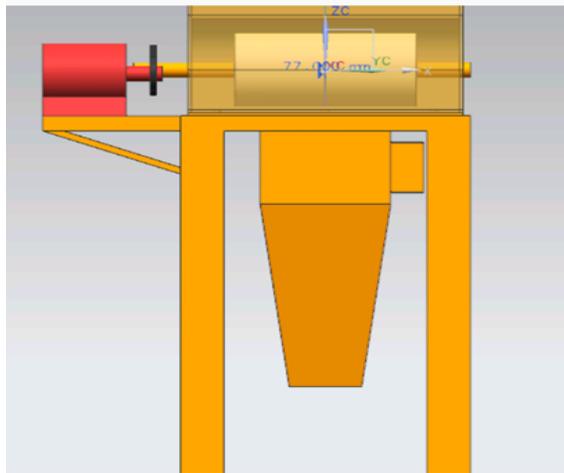


Fig. 2 – Side View

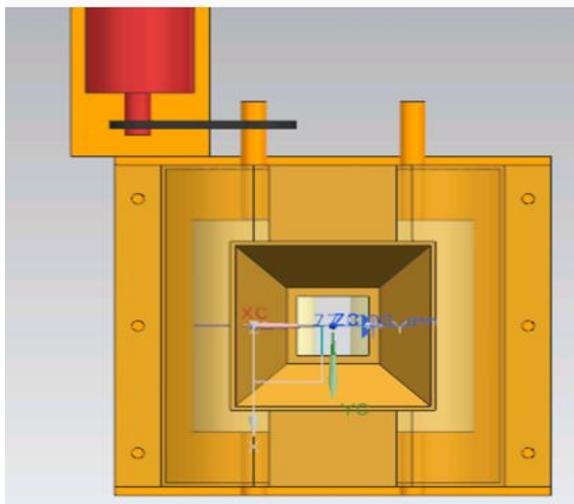


Fig. 3 - Top View

IV.WORKING OPERATION

The conceptual design of paddy cleaner machine is depicted into the picture. Following are the main components of paddy cleaner machine.

1. Frame
2. Electric motor
3. Drum
4. V-belt
5. Pulley
6. Hopper
7. Fan/blower

At the very first feeding the paddy into the hopper which is similar to floor mill hopper. Output from hopper comes in between two rollers by gravity and gets crushed. These two drums are adjustable. The crushing force is function of gap between rollers and is adjusted by the screw mechanism as there are various types of paddy available. One of drum gets power from electric motor. Finally, the paddy get separated from unwanted matter by the forced air circulation from blower.

V.FUTURE SCOPE

The paddy cleaner machine can be used to dehusk other grains by adjusting suitable distance between the rotating drum as per the grain size.

By upgrading the motor capacity and roller size we can employ it for higher capacity.

Moreover, paddy cleaner can be operated on solar power.

VI.CONCLUSION

By taking problems into consideration of the existing paddy cleaner, we need to design a paddy cleaner that should not take lot of space i.e. compact, portable and versatile, inexpensive so that small scale farmer can afford it and capable of dehusking 95% clean paddy.

IX.ACKNOWLEDGMENT

With profound feeling of immense gratitude and affection, I would like to thank my guide Dr. S. K. Choudhary and co- guide Mrs. P. M. Zode, for their continuous support, motivation, enthusiasm, and guidance.

REFERENCES

JOURNAL PAPERS

- [1] International Journal of Science and Qualitative Analysis 2017; 3(4): 37-41
<http://www.sciencepublishinggroup.com/ijjsqa>
doi: 10.11648/j.ijjsqa.20170304.11 ISSN: 2469-8156 (Print); ISSN: 2469-8164
- [2] International Journal of Engineering Technology Science and Research IJETSr www.ijetsr.com ISSN 2394 – 3386 Volume 4, Issue 8 August 2017.
- [3] International Journal of Engineering Technology Science and Research IJETSr www.ijetsr.com ISSN 2394 – 3386 Volume 4, Issue 8 August 2017
- [4] Lim Yee Kai limyeekai Politeknik Kuching Sarawak
- [5] Food Science and Technology 2(1): 1-5, 2014
<http://www.hrpub.org>
DOI:10.13189/fst.2014.020101 Mechanical Engineering Department, Federal University of Technology, Minna Niger State. Nigeria
- [6] International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887 Volume 6 Issue III, March 2018
- [7] International Journal of Application or Innovation in Engineering & Management (IJAIEM) Web Site: www.ijaiem.org Email: editor@ijaiem.org Volume 3, Issue 10, October 2014
- [8] Journal of Mechanical Engineering and Automation p-ISSN: 2163-2405 e-ISSN: 2163-2413 2017; 7(5): 145-149
- [9] International Research Journal of Engineering and Technology (IRJET) TRJET Volumes 06 Issue: 03 Mar 2019 www.irjet.net e-ISSN: 23950056 p-ISSN: 23950072
- [10] Shayfullzamree, Rahim, Mohd Fathullah, Ghazli, Mohd Azman and Mdderos, 2010. Design of a portable paddy cleaning machine, Proceedings of the international conference on design and concurrent engineering.
- [3] Rice Milling - Poonam Dhankhar M. Tech (Food tech), G.J.U.S & T, and Hissar.
- [4] Jesse E. Harmond, N. Robert Brandenburg, and Leonard M. Klein, 1968, Agriculture handbook no. 179, seed cleaning and handling
- [5] Agriculture handbook no. 354, agricultural research service u.s department of agriculture in cooperation with oregon agricultural experiment station.
- [6] James e and Wimberly 1983. Technical handbook for the paddy rice postharvest Industry in developing countries.

HANDBOOKS

- [1] Design data handbook by K. Mahadevan and K. Balaveera Reddy, 3rd edition, CBS publishers and distributors, New Delhi.
- [2] Standard Handbook on Machine Design by Joseph Shigley and Charles Mischke, 3rd edition, Tata McGraw-Hill publications