

## REVIEW ON SOLAR POWER OPERATED SIEVING MACHINE

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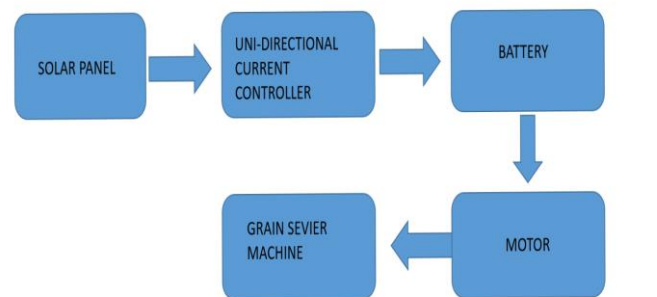
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**Abstract** - Agriculture is the backbone of Indian Economy. Agriculture is basically an energy conversion industry. The different size of grains is separated by using sieving machine. This machine can be used to separate different in grain sizes. A sieve is a device for separating wanted elements from unwanted material or for characterizing the particle size distribution of a sample, typically using a woven screen such as a mesh or net. This project focuses in design, fabrication of the mechanical part of machine and the system of the sieve machine. To achieve this project objective, this sieve machine body structure and mechanical system needs to concern some other criteria such as strength, safety and ergonomic design.

**Key Words:** Solar Panel, Gear Box, Main frame, DC Motor, Battery, Screening Tray

### INTRODUCTION

India has a major agribusiness sector, which have achieved remarkable successes. Unprocessed food is susceptible to spoilage by biochemical processes and infestation the right post harvest practice such as food processing techniques play a significant role in reducing spoilage and extending shelf life. Separation remove unwanted material like straws weed seed soil particle and rubbish from the grain It improve grain stability It also reduces insects, pests and diseases infestation Separating grain from seed also require considerable cleaning to ensure highest quality grains and purity. The screening of grains are depending upon the types of particles to be separated, sieves with different types of holes are used in sieving machine. They are also used to separate stones, small pieces of wood and some more unwanted particles from grains. sieving machine is a machine designed to separate the particle according to their mesh size different levels. in many industries for example the pharmaceutical, it is often desirable to community particulate matter. A metallic plate or sheet, or other similar device, with regularly spaced apertures of uniform sizes, mounted in a suitable frame or holder, for use in separating material according to size. A number used to designate the size of a sieve, usually the approximate number of openings per inch. The normal size of openings usually between cross wires of a testing sieve.



Sieving machine was constructed to shell maize and separate the cob from the grains. Large scale shelling for commercial purposes is not possible due to fatigue. Traditional shelling methods do not support large-scale shelling of maize. There is hand operated maize shellers which are cumbersome to use. Hand shelling takes a lot of time, even with some hand operated simple tools. There are, of course, machines which can shell maize, but these are usually unaffordable for rural farmers. There is a need for a cost effective, eco-friendly solution for shelling maize. The cost of purchasing such shellers is high for the poor rural farmer, and therefore necessitates the design of low-cost system that is affordable and also increases threshing efficiency. Electricity plays a key role in keeping homes and businesses to run smoothly, power transportation that takes people to work, school and other places, and supplies electricity to appliances in all sectors. But due to the steadily increasing demand of

electricity and other energy, some places in the world are experiencing energy crisis. Throughout the world, greater demand for energy in developing nations has been putting pressure on the availability and cost of all-natural resources. These pressures are reflected in electricity cost because of rising prices for fuels used to generate power, as well as transportation cost for delivering fuel. In this case, the use of alternative energy source is needed. Alternative energy encompasses all those things that do not consume fossil fuels. They are widely available and environment friendly. They cause little or almost no pollution. One of the ecofriendly alternative energy resources is using solar energy. It is the energy from the sun that is converted into electrical or mechanical energy. Solar energy is harnessed using a range of technologies such as photovoltaic, solar panels, solar thermal energy, solar architecture and artificial photosynthesis. In order to lessen the problem in energy shortage, the researchers aimed to design and develop a project using solar panel as the source of power in harnessing the solar energy. The project solar powered Sieving machine uses solar panel to harness the energy from the sun. It could be a very useful machine especially to the farmers engaged in small scale industry. The main purpose of this study was to design and develop a solar powered sieving machine for efficient deseeding of grain in small scale production using solar energy.

## LITERATURE REVIEW

[1] As per Mr. Pranit S. Patil, the research work embodied the design and development of a conceptual model of a machine that was capable of performing multiple operations simultaneously, at the same time the machine should excel in productivity but keeping the cost low. The authors used a scotch yoke mechanism with two bevel gear sets for transmission of power at two locations. This machine simultaneously operated two shafts from a single source with the objective to conserve electricity (power supply), reduce cost, increase in productivity, reduce floor space required by the machine.

[2] As per Mr. Sai Karthik, Automation is the need of the time considering labor shortage, stringent labor laws, and the most labor-intensive industry being the construction and foundry industry where sand sieving is must. Thus, wither industry has opted for fully automatic sieving machines. But the small-scale foundries and low-level contractors are cannot afford this high-end technology and hence require low cost methods and machine. Authors describe the sieving process using a rectangular mesh with slight inclination as laborious. Authors not that there are different machines that are being used for sand sieving and cement mixing processes and in their concept both the process will took place

simultaneously thereby eliminating the time consumed during the whole process of preparing the concrete is reduced.

[3] As per Mr. OLADEJI AKANNI OGUNWOLE, Quality of the casting, depends upon the size distribution so a sieve analysis needed to be performed on any type of non – organic or organic granular materials including sands, crushed rock, clays, soil, granite, feldspar and coal, a wide range of manufactured powders, grains and seeds, down to a minimum size depending on the exact method. Author identified the article sizing as the most important parameter and so with the view to expedite the process and increase the production rate of cast products instead of the use of the manual traditional way of sand throwing method through a mesh tray more over up to six different sand sizes can be sample at a time depending on the arrangement of the trays. The author observed that this design could take four different sizes of sand grains, meaning four different sizes of mesh arranged in layers of preference, from coarse on top to the finest at the bottom.

[4] As per Mr. Nachimuthu A.K, for characterizing the particle size distribution of a sample a sieve is a device for separating wanted elements from unwanted material that uses a woven screen such as a mesh or net. Authors have focused in their design on, fabrication of the mechanical part of machine and the system of the sieve machine. Criteria such as strength, safety and mechanical system needs to concern some other ergonomic design were used to achieve fully functional sieve machine body structure

[5] V.P. Duriraj 2]. Manikandan 1,2Asst Professor, Department of Mechanical Engineering, Bharath University, BIHER, Chennai. Design and fabrication of sand sieving machine. The aim is to separate screws, nuts & bolts and Dust depend upon their size to change different size of mesh". According to the current situation, society of labor, salary, and for automatic operation elimination of labor work is necessary for the future days. In current situation the water treatment plant uses these types of separator to separate the faces and unwanted material from the water. The vibrating table is fixed with the crank which moves the tray to vibrate it and act as a separator with the help of DC motor. Thus, try the Design and fabricating of Sieving Machine to help the industrial people and farmers on the global market.

[6] As per Mr. Sai Karthik, Automation is the need of the time considering labor shortage, stringent labor laws, and the most labor-intensive industry being the CONSTRUCTION and foundry industry where sand sieving is must. Thus, wither industry has opted for fully automatic sieving machines. But the small-scale foundries and low-level contractors are cannot afford this high-end technology and hence require low cost methods and machine.

[7] Vol-4 Issue-3 2018 IJARIIE-ISSN (O)-2395-4396 ,8358 www.ijariie.com 4 Describe the sieving process using a rectangular mesh with slight inclination as laborious. Authors not that there are different machines that are being used for sand sieving and cement mixing processes and in their concept both the process will took place simultaneously there by eliminating the time consumed during the whole process of preparing the concrete is reduced.

[8] Heinrich Arnold1 November 2001: Rather long reinvestment cycles of about 15 years have created the notion that innovation in the machine tool industry happens incrementally. But looking at its recent history, the integration of digital controls technology and computers into machine tools have hit the industry in three waves of technology shocks. Most companies underestimated the impact of this new technology. This article gives an overview of the history of the machine tool industry since numerical controls were invented and introduced and analyzes the disruptive character of this new technology on the market. About 100 interviews were conducted with decision-makers and industry experts who witnessed the development of the industry over the last forty years. The study establishes a connection between radical technological change, industry structure, and competitive environment. It reveals a number of important occurrences and interrelations that have so far gone unnoticed.

[9] Qing Huang, Hui Zhang, Jesse Zhu It deals with the three types of nanoparticles and their combinations were blended into a fine powder, which has been used in the powder coating industry. To study their effects on flow properties, the modified powder samples were characterized using a variety of techniques that tested the powder under different powder states ranging from dynamic to static. It was found that all three nanoparticles improved the flow properties of the powder to some degree, though the amounts of the nanoparticles needed were different depending on their physical properties. Secondly, inconsistency among these powder characterization techniques was also found. This is attributed to the different states of the powder samples during a measurement including dynamic, dynamic-static and static states. It was confirmed that characterization techniques test the flow properties of a powder under all three states are needed to fully describe the flow properties of the powder. Finally, the effects of combinations of nanoparticles were explored, and it was found that combinations of nanoparticles can intensify, weaken or combine the effects of their component nanoparticles. The effects of nanoparticle combinations are not a simple summation of the effects of their component nanoparticles.

[10] G.S. Patience, M.G. Rigamonti, and H. Li It deals with the particles and powders are a fixture of our daily lives and a cornerstone of chemical engineering and industry-pharmaceuticals, agriculture, chemicals, construction,

cosmetics, and food technology, to name a few. The granulometry of flour changes the texture of bread and pastry and is distinct from sugar, salt, pepper, spices, and Cheerios'. The activity of pharmaceuticals ingredients depends on their shape and size: Farmers spread less herbicides in their fields with Nano-sized particles. The particle size of cement, concrete, and asphalt vary from micron-size to centimeters.

[11] Atsuko Shimosaka, Shigenori Higashihara and Jusuke Hidaka It deals with the computer simulation of sieving behavior of powders was performed to estimate the sieving rate by the particle element method. The simulated time residue curve of sieving agreed well with the experimental curve. Furthermore, the simulation can well represent the sieving behavior of cohesive powders. Based on the simulation results, the equation to estimate the sieving rate was proposed. The equation involves three engineering parameters newly defined in this study. The relationship between the engineering and operating parameters in the sieving, such as the vibration amplitude and frequency of the sieving surface, is obtained by the simulation. The applicability of the proposed equation is confirmed by experimental sieving of silica sand.

[12] B. H. Kaye and N. J. Robb, it deals with the effect of non-ideal aperture distribution of sieving surface on the sieve residue has been the object of many experimental studies. Unfortunately, the sieving kinetics of many sieving technique do not result in a simple probability relationship between the size distribution function of the powder and sieve aperture distribution function. If one specific a certain type of sieving kinetics, then one can apply probability theory to the rate of movement of powder through the sieve and the size apertures distribution function of the sieve. Under such specified sieving condition, it can be shown that it is possible to deduce a size characteristics parameter of the powder being sieved which in this publication is described as a kinetic residue of the sieve. Ana algorithm for automatic computation of the kinetic residue from the rate of powder sieving is described. The possible implementation of this algorithm to automate sieve analysis is explored.

## OBJECTIVE

The main aim of this project is to develop eco-friendly, cost effective and non-polluting environmentally friendly machine. The sieving machine can operate outdoors under normal working conditions. This machine can remove all the unwanted particles from grains. Which is suitable for small farmers as well as machine did not require much electricity.

## CONCLUSIONS

No electricity is spent so this product save energy and save the environment form getting polluted. And mainly very needful for small and medium class farmer.

As this machine used in rural area and the use of solar operated grain separator machine has reduce the hazardous health implications and make it safe for human and solar product appeals better and affordable by common people. The solar traveler is easily accessible, safe and practical with limited maintenance requirements because of few mechanical parts. It is ideal not only for the experienced cyclists but also for those non athletes, the elderly and individuals with health problems. This is the best source to replace the fuel which is exhausting day by day and becoming more costly.

## OUTCOMES

- 1] As per industry s well as farmers requirement our project is suitable for all-weather conditions.
- 2] Reduction in working stage and working area so that it can work on compact places and suitable for both small- and large-scale industries and Farmers.
- 4] It take less time to give more productivity.
- 6] The cost of this machine is less as compared to the other sieving machine.
- 7] The floor space required for this machine is less.
- 8] The screening operation is done with the help of Crank mechanisms.

## REFERENCES

- 1) C. Alexandru, C. Pozna, "Different tracking strategies for optimizing the energetic efficiency of a photovoltaic system", IEEE International Conference on Automation, Quality and Testing, Robotics, May 2008.
- 2) J. Rizk, and Y. Chaiko "Solar Tracking System: More Efficient Use of Solar Panels", "Proceedings of World Academy of Science, Engineering and Technology", pp. 2070-3740; Vol. 31 July 2008.
- 3) S. C. Saxena, "Energy, Environment and Electricity", "RITES Journal", Journal, 2011.
- 4) John D. Garrison, "A Program for calculation of Solar Energy Collection by Fixed and Tracking Collectors", "Solar Energy", Vol. 72, No. 4, pp. 241-255, 2002.
- 5) Garbin, Ricmart V., Caisip, Eloisa A., Lorzano, Jennifer Joy N. Batangas State University, Electrical and Computer Engineering Department Alangilan, Batangas City Philippines.

- 6) <http://www.miniliftmanufacturers.co.in/grain-siever-machine>.
- 7) <http://greenrevolution.org.in/mining/grain-sevier-machine-sales-in-chennai.html>.
- 8) Philippine Electrical Code Part 1 Volume 1 (2009)
- 9) Gao, Shan, "Study on Developments of Processes for Powder Coatings" (2016). Electronic Thesis and Dissertation Repository.
- 10) Mr. Mosam M. Dange, Dr. S.R. Ikhar, Er. V.D. Dhopte studied on "REVIEW ON DESIGN AND FABRICATION OF COATING POWDER FILTRATION MACHINE" kdk college of engineering, Nagpur. Irjet.net journal 2019.
- 11) V.P. Duriraj 2]. Manikandan 1,2Asst Professor, Department of Mechanical Engineering, Bharath University, BIHER, Chennai. Design and fabrication of sand sieving machine.