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Sand Sieving Machine

D. Khaleel Basha[1], D. Sai Basha[2], Talari Yugandhar[3], V. Venkata Prasad[4], A Mohan[5], Y. Sudheer[6]

[1,2,3,4,5,6]Department of Mechanical Engineering, Tadipatri Engineering College, Tadipatri.

Abstract:
A demonstration of design and fabrication of sand sieving system is done. As sand is used in construction, manufacturing and many industrial purposes, it needs to be filtered and separated from unneeded particles, stones and other large particles before put to use. This system puts forward a fully automated sand filtering and separator that automatically filters the sand poured on it. For this a motorized shaft is mounted horizontally on the mounts. The shaft is connected to a filter frame with a mesh below and enclosed frame on sides which operates the motor when switched on.
Idea to develop of sieve machine is come from the supervisor that gives a task and a title for this project. 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. lastly fabrication process Before develop the sieve machine, it must compare with other product in market. It is because to study the customer need and to create a new design with new feature.

Keywords: Sand Seeving, Mechanical System, Sieve Machine.

I. INTRODUCTION

Sieving machine serves is to remove large grains with a small grain through a sieve. Separation occurs when the sand is placed on top of a filter having holes size. The first sieving is done to get rid of the sand with a larger than standard with holding sand filter and the second sieving is done to get rid of the sand with a size too small means that the sand filter is ignored. 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 or metal. The problem of size of sand in the market available. Need to spend more money if we want the sand in specific size or category it will increase the budget and time to wait the supplier preparing the goods. Now days people always prefer the most suitable way to cut their cost and time. Example in a construction where they have to finish the work before the due date. His might be a problems. Since we have waiting long waiting for the good to arrive. However, sometime in big company there are high tech machine that can do this work sieving any sub stand or mixture. But sometime in construction required a special sieve machine that are comfortable and easy use. There are several objective of this project as follow: To design and fabricate new sieve machine Small and portable sieve machine Sieving into different size and grade Utilizing power and manual as when required. Expose there al work must be done as future engineer To learnt how to arrange the time and budget To apply all knowledge in this fabrication.

The process used in fabrication:

- Welding:inthisprocess,itusestocombinemanypartofmaterialinthesieve machine fabrication
- Drilling: to make a hole on the material
- Cutting : to cut the material

The sand is commonly known as the basic material use in construction side or any other product. Comes with few type and different size comes in mixture. Sieve machine:

- To design sieve machine that can sieves and to different size.
- Problemthatoftenfacedisthatsomeproductrequireddifferentsizeofsandto fulfil the quality level needed.
- Through this design user can save time sieveing sand and cut the cost to order the required size of sand.
- This product may sieve the sand with safety and quick over use conventional way
- This product may sieve various of sizes and and cut time and cost.

II. LITERATURE SURVEY

From years sand has been the most important thing in human community. Most sediments, including sand, are made up of the fragments that result when rock is broken down by wind and rain (weathering). Generally, they start as larger fragments (gravel), which are broken down as rivers carry them down stream; the finer the particle, the further it has traveled. In other words, large bits of gravel are plentiful on the banks close to the head of a river. As you travel down stream, gravel becomes finer into cobble, pebble, granule, and eventually turning into sand, and finally flowing into the ocean, where these sediments deposit. That is why, by carefully analyzing the mineral content and chemical composition of sand on riverbanks, beaches and ocean floors, weare able to determine which formation, indeed what kind of rock, it originated from. Most sediments, including sand, are made up of the fragments that result when rock is broken down by wind and rain (weathering). Generally, they start as larger fragments (gravel), which are broken down as rivers carry them down stream; the finer the particle, the further it has traveled. In other words, large bits of gravel are plentiful on the banks close to the head of a river. As you travel down stream, gravel becomes finer into cobble, pebble, granule, and eventually turning into sand, and finally flowing into the ocean, where these sediments deposit. That is why, by carefully analyzing the mineral content and chemical composition of sand on riverbanks, beaches and ocean floors, we are able to determine which formation, indeed what kind of rock, it originated from. Most sediments, once formed in the ocean, subduct to the Earth's interior (mantle) from trench with a subducting tectonic plate. However, some pieces tear loose from the whole, and accreted to the hanging wall continental plate, once again becoming part a continent. Geological structures formed in this way are called accretionary bodies (prisms). Accretionary bodies are characteristic to the subduction zone like Japan, which make up a large part of the Japanese islands Formations and rocks form and break down, form and break down, again and again. During that process minerals also break down and alter, even transform into other minerals, again and again. However, some stubborn minerals simply ride these cycles out, refusing mechanical breakdown or chemical alteration at all. These minerals bear the marks of the processes of geological history. By carefully analyzing them, geologists are able to infer the geological history of the earth itself. Most sediments, once formed in the ocean, subduct to the

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Process in fabrication of sieve machine. This chapter is present about literature review of fabrication process such as welding, drilling, cutting and others. Before fabrication process, the material selection is crucial. The selection of joining is also important to get a product with better strength and durability.

III. PROPOSED SYSTEM

The proposed system presents an automated sand sieving machine designed to improve the efficiency and accuracy of sand separation for construction and industrial applications. The system is developed to overcome the limitations of manual sieving by reducing human effort, saving time, and ensuring uniform particle separation.

The machine consists of a motor-driven horizontal shaft connected to a sieving frame fitted with a suitable mesh. When the system is switched on, the motor rotates the shaft, which in turn generates a controlled vibratory or oscillatory motion in the sieve frame. This motion allows the sand particles to pass through the mesh while retaining larger impurities such as stones and debris on the upper surface.

The structure of the machine is designed with a rigid frame to ensure stability during operation. Proper attention is given to strength and durability so that the system can withstand continuous usage under varying load conditions. Safety features are also considered to protect the operator during operation, while the ergonomic design ensures ease of handling and maintenance.

The proposed model is developed after analyzing existing sieving machines available in the market. This comparison helps in identifying design gaps and user requirements, enabling the incorporation of improved features such as compact size, portability, and enhanced performance. The system is capable of operating with minimal supervision and can be adapted for both small-scale and medium-scale applications.

Overall, the proposed sand sieving system provides an effective, economical, and user-friendly solution for sand filtration, ensuring better quality output and increased productivity in construction-related activities.

SYSTEM ARCHITECTURE

FIG 1. MODEL FOR THE SEEVING MACHINE

IV. RESULTS AND DISCUSSION

The fabricated sand sieving system was tested under different operating conditions to evaluate its performance, efficiency, and reliability. The machine successfully performed the separation of sand from unwanted particles such as stones, dust lumps, and other impurities. The motor-driven mechanism provided consistent vibration to the sieve frame, which ensured continuous and smooth sieving operation.

During testing, it was observed that the system significantly reduced manual effort and time compared to traditional hand sieving methods. The output sand obtained was more uniform in particle size, which is essential for construction applications. The sieving efficiency was found to be high when appropriate mesh size and feed rate were maintained. However, excessive loading of sand on the sieve slightly reduced efficiency due to clogging and reduced vibration effectiveness.

The machine demonstrated stable operation with minimal noise and vibration transmitted to the supporting structure. The rigid frame design contributed to better durability and reduced wear during continuous usage. The portability and compact structure of the system made it easy to handle and suitable for use in small and medium-scale construction sites.

From the analysis, it is evident that the proposed system offers improved productivity and consistent performance. Compared to existing manual methods, it provides faster processing, better separation quality, and reduced labor dependency. However, performance can be further enhanced by optimizing motor speed, improving mesh design, and incorporating adjustable vibration control for different types of sand.

Overall, the developed sand sieving machine meets the intended objectives and proves to be an effective solution for efficient sand filtration in practical applications.

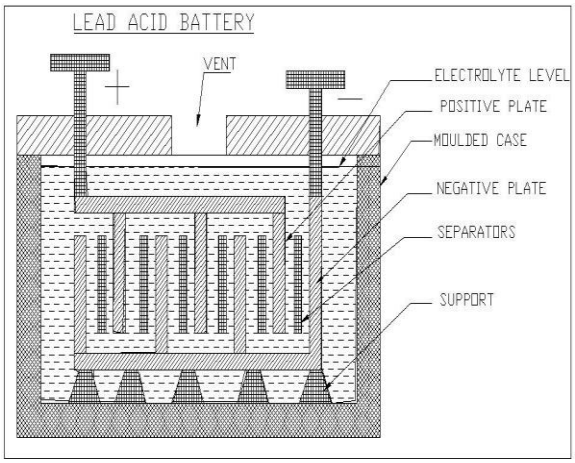

FIG 2. LEAD ACID BATTERY

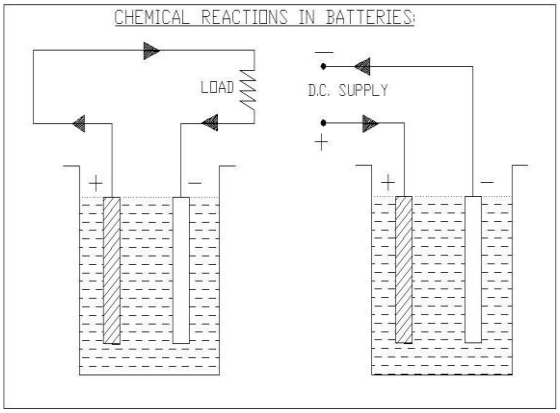

FIG 3. CHEMICAL REACTION BATTERIES

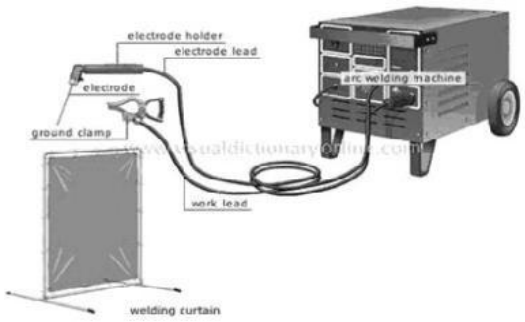

FIG 4.WELDING

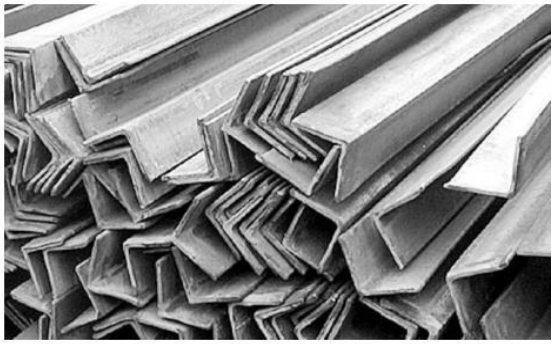

FIG 5. STEEL

V. CONCLUSION

The design and fabrication of the automated sand sieving system have been successfully completed and evaluated. The developed system effectively separates sand from unwanted materials such as stones and larger particles, ensuring better quality output for construction and industrial applications. The use of a motorized mechanism enables continuous operation, significantly reducing manual effort and processing time compared to conventional methods.

The machine demonstrates reliable performance with simple construction, low maintenance requirements, and ease of operation. Its compact and portable design makes it suitable for small and medium-scale usage. The study confirms that proper selection of mesh size and controlled feeding of material are important factors influencing the efficiency of the system.

Overall, the proposed sand sieving machine provides an economical and practical solution for sand filtration. It improves productivity, enhances work efficiency, and minimizes labor dependency. The system can be further improved by incorporating adjustable speed control, advanced vibration mechanisms, and enhanced material handling features to increase its performance and adaptability in future applications.

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