
DESIGN AND FABRICATION OF SAND FILTER MACHINE A REVIEW

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ABSTRACT

A sand sieving machine is a machine tool that assists in the separation of sand and stone from a produced mixture. If sand, stone and other large particle are included in the produced mixture, it is not used for further constructional work. As a result, if a worker was sieving the sand in traditional ways without having a machine, sieving machine will helps that worker who sieve the sand in traditional ways with the help of machine mechanism, which is automated by help of motor power and it will increase the efficiency in the terms of time and energy required to screening sand. The aim of this research is to fabricate the best possible machine in terms of design, operating costs, and efficiency. The literature review, objectives, idea generation, idea creation and analysis, design, and research of numerous concepts, computation, and Gantt chart are the steps of design evaluation.

Keywords- Efficiency, Quality, Analysis, Design evaluation, Traditional

I. INTRODUCTION

Here we demonstrate the design and fabrication system .Sand is used in construction, manufacturing and many industries. Sand needs to be filtered and separated from unneeded particles, stones and other large particles before it is put to use.Sand is the most important component in every construction project. Because it normally comes in a mixture form, before used in constructions it required to be removed from unwanted material like stones and other undesired large particles before used in constructions. Similarly, the size of sand changes depending on the stage of building, for example, fine sand is used for plastering and slightly coarse sand is used for wall and slab construction. That's why, sands need to be appropriately screened as requirements of sand in different stages of construction. [1].

II. LITERATURE REVIEW

S. K. Subramaniam et.al 2022 have developed the machine whose title was "Design and fabrication of automated Sand filter and waste separator machine". The main purpose of this paper to reduce the time and waste material. Author used two horizontal sieve net and operate the machine by the horizontal reciprocating motion with the help of electrical motor. With using rectangular mesh sieving of the sand is carried out where the mesh is inclined at certain angle. Due to this a relative motion between particles and the sieve take place. This will helps to separation of sand, individual particles pass through the sieve mesh or retained on the sieve surface according to their size[1]. Dr. S.M.Mowade¹, Rohit Dhakulkar², Sachin kapgate³, Nitesh Meshram⁴, Rohit Hemane⁵ et.al. Vol. 4, No.4, 2019 Fabrication of Power Operated Sand Filtering Machine When we begin the engine shaft transmit the movement starting with one pulley then onto the next pulley by utilizing belt drive, at that point another pulley is associated with the rectangular edge that perform responding movement. This responding movement helps to channel sand. Pradeep Kumar Krishnan* and Bushra Zaid Humaid Alrisi et.al. 2021 Design and Development of an Electronic Sieving for Sand Separation using Node MCU System Sand sieving is now considered one of the essential needs in the construction industry. Where businesses collaborate to find the best and highest-quality methods for extracting pure sand suitable for construction. These businesses always require high-quality machines to complete the process flawlessly. This is also to prove its market power and guarantee its products.

III. COMPONENTS OF SIEVING MACHINE

- ❖ Motor
- ❖ Pulley
- ❖ Bearing
- ❖ Sieve

Motor: An electric motor is an electric machine in which mechanical energy is obtained from electrical energy. Most electric motors operate by the interaction of the motor's magnetic field with the current in the coil of the wire, producing force in the form of torque applied to the motor shaft. Electric motors can be powered from direct current (DC) sources such as batteries and rectifiers, or alternating current (AC) sources such as power grids, inverters, and generators. 3.2.2



Figure 1: Motor

Pulley: A pulley is a wheel on an axle or shaft designed to assist in changing the movement and direction of a tensioned cable or belt, or transmitting power between a shaft and the cable or belt. For pulleys that do not transmit power to the shaft but are supported by a frame or shell that is used to guide or apply force to the cable, the support shell is called a block and the pulley is called a pulley. The pulley may have one or more grooves around the flange to locate the cable or belt. The driving element of the pulley system is a rope, cable, belt or chain. [2].



Figure 2: Pulley

Bearings: Are mechanical elements that limit relative movement to only what is needed and reduce friction between moving parts. Bearing designs can, for example, provide free linear motion of moving parts or free rotation around a fixed axis. Alternatively, you can prevent movement by controlling the vector of the normal force acting on the moving parts. Most bearings facilitate the desired movement by minimizing friction. [2].



Figure 3: Bearings

Sieve: Net Since ancient times, various methods have been practiced in the sieving process. Almost all methods use a mesh or net with small holes (diameters vary depending on the fineness of sand required). Sieves, mesh sieves are devices for separating elements of interest from unwanted materials or for characterizing the particle size distribution of a sample using a sieve such as Woven mesh or net or perforated sheet material. [2].

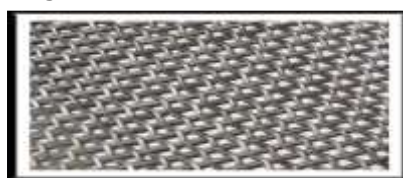


Figure 4: Sand filter net

Mechanical Design- The Figure 5 shows the sand sieving machine and its main parts. Where the machine was designed using Solid Work program [3]. The major purpose of the machine is to sieve the sand and make it free from impurities like grain and stones. The machine consists of a frame, wheels, channel, sieving mesh, connecting rod, belt drive, belt link, and motor. Where the frame used to support the body of the machine. The wheels are used as a support for the sieving mesh to move in the horizontal movement forward and backward [4]. While the channel uses allows the pure sand to flow in a specific place. The sieving mesh uses to filter the sand from impurities [5]. This mesh has different size holes, the use of each size comes as needed for the degree of purity of the sand from the impurities. As well as, the connecting rod used to move the sieving mesh after receiving the motion from the shaft. While the belt drive moved by the belt link after receiving the motion from the motor. Finally, the motor is responsible for the movement of the machine as a whole.



Figure 5: Sand sieving machine parts

IV. FUTURE SCOPE

1. Produce superior quality of sand.
2. Very low water wastage.
3. Robust and unique design
4. Easy maintenance.
5. Low production cost
6. Safe system.
7. High production, less wastage
8. Long service life.
9. Easy to operate and highly efficient.

V. CONCLUSION

In this research study, the mild steel failure problems encountered by loads were successfully. Thus a low cost and simple design motor operated sand filter and is fabricated. This machine reduces the human effort and hence we don't need multiple persons to filter the sand.

VI. REFERENCES

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