

Design and Fabrication of Automatic Sand Separator

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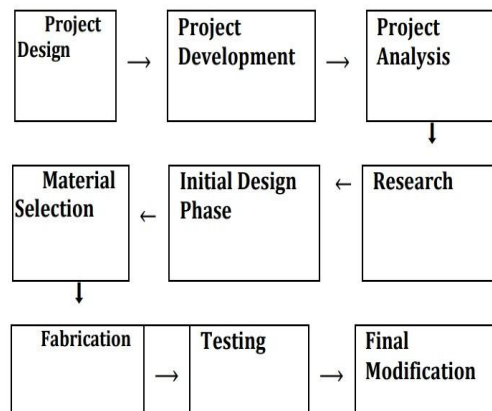
Abstract: Sand is essential for any type of construction. Different types of sand are required for different constructions. For example, column, plaster, stairs. And this process takes a lot of labor and effort, so if you want to build on a large scale, the traditional methods of separating sand are not suitable for us. As per the survey, single filter machine is available in the market. In our experimental setup three different quality of sand filtered in a single process. The strength of this setup is simulated in ANSYS also and by using our experimental setup we reduce labour cost and time. And increase working efficiency or working purpose upto 35%. For this operation we used three types of filter frame and three different compartments. The slider crank mechanism is used in this model.

Keywords: Stress, Reaction force, sand

I. INTRODUCTION

Generally while preparing the concrete for construction purpose, the process of sieving are carried out manually. Sieving of sand is carried out using rectangular mesh which is inclined at certain angle. In the present sand sieving method, the sample is subjected to horizontal movement in accordance with the chosen method. This causes a relative motion between the particles and the sieve. Depending on their size the individual particles either pass through the sieve mesh or retained on the sieve surface. There are different machines that are being used for sand Sieving, but we demonstrate the design & fabrication of automatically driven sand sieving machin which have low cost and simple in operation. 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. This project flow must start from design, analysis, and 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.

II. METHODOLOGY



III. WORKING PRINCIPLE

This machine works on the principle of slider crank mechanism. Slider crank mechanism is a process of converting the rotational motion of a body into a reciprocating motion by means of a rotating driving beam, a connecting rod and a sliding body. The design of the sieve is based on material selection as well as to work safe and more efficient. The material used in each design influence the selection thing because we need an absolutely light material suitable with product size. Almost several numbers of designs were put in order to overcome the drawbacks that exist in the current models. Then the final design is selected and it is given proper dimensions in the Solid works design software. The criteria that are considered in design of sieve machine are: Durability: The machine must be durable when it's rotating and also when it's operating under high load condition. Therefore a suitable material having high strength and toughness is taken. Cost: It depends on the material and manufacturing processes. It should reduce the cost to the minimum. The sieve machine is designed to work in slider crank mechanism. The components which are used to produce

IV. MACHINE DESCRIPTION

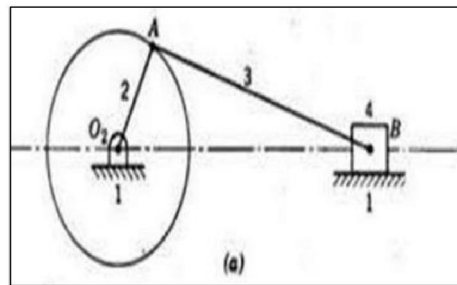


Fig. 1. Single slider crank mechanism

In this mechanism 4 links 1st link is fixed, 2nd link is crank, 3rd link is connecting rod and 4th link is slider. When crank rotate connecting rod will push the slider in forward and backward motion. This mechanism convert rotary motion into reciprocating motion. This principle used for the power and motion transmission, for motor to each separator.

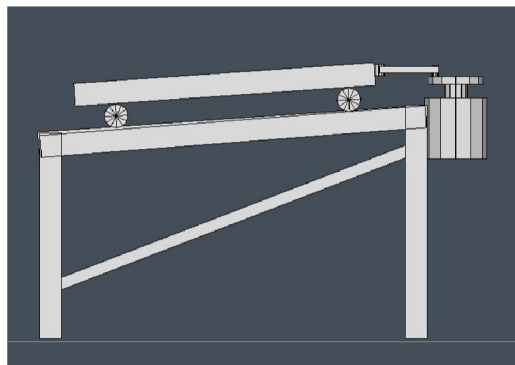


Fig. 2. CAD Modified Drawing

V. CONCLUSION

The automatic sand separator offers significant benefits in various industries, such as increased efficiency, reduced maintenance costs, and improved equipment lifespan. Its ability to efficiently remove sand particles from fluids ensures smoother operations and prevents equipment damage. Overall, implementing an automatic sand separator enhances process reliability and productivity, making it a valuable investment for industrial applications.

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