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Sand Filter Machine

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Abstract:

The Sand Filter Machine is a mechanical system designed to remove impurities, debris, and suspended particles from sand, making it suitable for construction, water filtration, or other industrial uses. The machine operates on the principle of mechanical separation, where sand passes through a series of sieves, vibrating screens, or filter beds that allow fine particles to pass while retaining larger contaminants. It may be powered manually, electrically, or through automated systems depending on the design requirements. This filtration process enhances the quality and consistency of the sand, improving its utility and reducing environmental pollution caused by unfiltered sand use. The machine is especially beneficial in regions where natural sand contains high levels of clay, silt, or organic materials. Through efficient design, the sand filter machine promotes resource sustainability, operational efficiency, and reduced labor costs in sand processing.

Methodology

Methodology is the process of preparing a project that you want to create. Design method or methodology is one of the methods used in developing or designing a project. The methodology used is to help create a creative and innovative project to achieve production objectives in the final project. The design of this machine takes into account all aspects and must also meet the needs of the user to make sand separation in a construction. The design you have created is not that complicated. In addition, the design of the "Modern Sand Filter" project tool is also easy to understand because it has its own basic parts. The size and balance of this project have also been taken into account to facilitate the learning session.

Literature Review

Sand substance is one of the most important things in industrial world. Nowadays the industry need the sand sub stand that are already been process known as sand product. As we know the sand sub stand are mixtures with variety other component such as dirt and metal. Usually, people use their hands to sieve sand and absolutely it will take much time to do it. But now, we get some ideas to modify this sieve sand machine by using the power of vibration motor system. With the invention of this sieve sand machine, it can be overcome and makes the construction contractor's work more convenient. It can also be used in the manufacturing of mould industries especially for the sand casting process. By using this sieve sand machine, we can save more time, energy and cost. Indirectly, it will improve the manufacturing qualities. This machine is fixed with wheels, so it is easy to move and to keep. Besides, it is easy to use even by the unskilled workers. Furthermore, it is easy to operate and the spare parts can be obtained easily on the local market Therefore, this machine is suitable to use in the "Industri Kecil dan Sederhana (IKS)" and training institutes such as Polytechnic.

History of Sand Filter Machine

From years sand has been the most important thing in human community. Most sediment, 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 travelled. In other words, large bits of gravel are plentiful on the banks close to the head of a river. As you travel downstream, 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 analysing 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.

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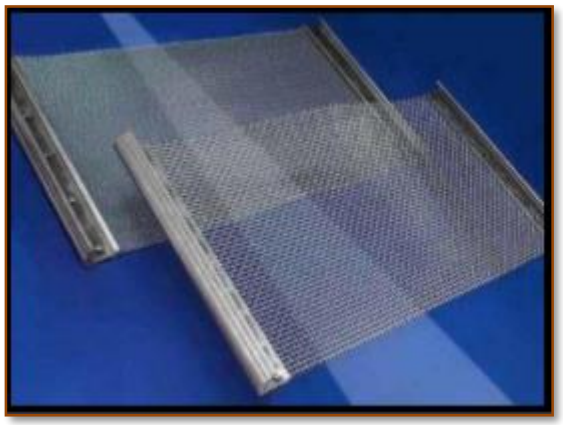
Working Principle

The Horizontal sieving machine is very easy to construct and can be operated easily. It is very economic among this kind of machines. This project is fabricated with the help of parts like a motor, crank and slider link mechanism, bearing, caster wheels, sieving box. The horizontal sieving machine is worked on the basis of crank and slider mechanism. Here crank is attached to the sieve box the power is given by motor through pulley belt arrangement. The rail track is attached at the base in which the sieving box moves in it. The sieving box fixed with the crank shaft in order to move when the crank shaft is reciprocated. The sieving box is placed inside the rail track and the machine is started. When the sieving box moves in the reciprocating motion the sieving process is performed.

Working of the Sand Filtration Machine



The figure shows the sand filter and separator. In this the whole work is based on the mechanism of crank and slider mechanism. The rotation of the crank transfers the motion to the movement of rectangular shape filter. It consists of the pulley and belt arrangement which rotates the crank and through it slider consists of oscillating mechanism. The power is transmitted to the crank and slider mechanism. This mechanism is

used to rotate the crank, the pulley which is having an extended rod is connected to the sliding portion of the rectangular plate directly by means of a linkage. The rectangular plate is passed through the guide ways by means of maintaining the cutting axis. The rectangular sieve moves linearly on guided path. The crank is connected to the flywheel which is transfer the motion from one to another. The flywheel is connected to another wheel which is connected to the rectangular filter plate through belt. The rotating motion of the electrical motor converts to the sliding motion using two flywheels and belt. The sliding crank mechanism is used in this project. The flywheel which is placed at the top is used as crank and connecting rod in between the rectangular plate and flywheel. The Rotary motion of the motor is converted into Reciprocating Motion of the sand filter. Hence this causes the filter to move back and forth and this filters the sand for other impurities.

Conclusion

This chapter explains about the project that has successfully completed in about 6 month equivalent to one semester. Besides that, there were some problems that we have to face along our process to installation and testing for our product. Therefore, there have some suggestions to improve our project in the future that will give benefits to the users. In this chapter, the decision has been made based on the overall decision that we got from the research and discussion in the previous chapter before this. Besides that, in this chapter also, the related matters that are relate to the objective and also the suggestion from the research that we have made. With that, the conclusion has been made to our research. For our project, Sand Filter Machine, this product was tested by constructions worker. When our product was tested, our product can produce a good result as well. Our products are successfully to achieve the objectives that we have been set. Among them is, our product can get the good quality of sand when we use it to filter the sand. The fine sand that we got from using the traditional sand filter can mix with the foreign things because the fine sand the have been filtered will drop on the ground. As we know those maybes there were many foreign things on the ground like nails, stone, and others. Our sand filter machine has a funnel that as the way for fine sand to drop into the wheelbarrow. Besides that, our product also can reduce the workload of constructions worker. This is because, the constructions worker don’t need to waste their energy just to build a traditional sand filter. They can just keep their energy for any works that more important.

Future Scope

After us running this project, we found that our project can give benefits to the users because this product can reduce the workload of constructions workers compared to traditional sand filter. Besides that, finishing that we do to our product is more neat and productive compared to traditional sand filter that just use the used wood to build the sand filter.

Every project that is done have their own benefits and objectives. Same like our project ‘Sand Filter Machine’. There were no troubles when we do this project and the objective for this project finally can we achieve.

This project can filter the sands with the good quality of sand for the result with using the electric motor helps with 4-5 UF and the speed in about 1300 rpm that is suitable for this project. This project achieves the objective that is to get the good quality of sand without mix with foreign things compared with using the traditional sand filter. Besides that, this project is more attractive and the size is suitable for construction surrounding.

Project Model