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# DESIGN AND FABRICATION OF ROTARY DRUM SAND SCREENING MACHINE

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## ABSTRACT

For building construction one of the important fundamental materials is sand. But we don't use the sand directly first we have to screen it and later which is used for construction. The sand is a mixture of small grains of rock and granular material which is mainly defined by size. The sand consists of many foreign and suspended matters which need to be removed. We need a definite machine to overcome the problem of sorting/screening/separation of sand in construction field. During earlier time sand was screening by manually it takes a lot of time consumption. So, to make the process more efficient now technology is needed to help increase efficiency so human power can reduce and also cut the cost of the process. Due to this we introduce this ROTARY SAND SCREENING MACHINE. Now the work can take less time compared to the earlier. And the construction work takes rapid progress. A sieve is a device for separating wanted elements from unwanted elements or for characterizing the particle size distribution of a sample, typically using woven screen such as a mesh or net. It is an electrically operating machine and in case of power cut problems it also works on the chain drive mechanism, due to these various applications it has wide future scope.

**Key words:** Sieving machine, Design, Fabrication.

## I. INTRODUCTION

### 1.1 SAND SCREENING

Sand is one of the important industrial thing in the industrial world . now a days the industry need the sand that are already been process known as sand product. As we know the sand mixture with other components such as dirt and metal. Sand is loose particle of hard broken rock. It also a naturally occurring granular material composed of finely divided rock and mineral particles. The composition of sand highly variable, depending on the local rock sources and conditions, but the most of the sand in inland continental settings and non tropical coastal settings is silica (silicon dioxide, or $Sio_2$) usually in the form of quartz. 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 being machines that are used for sand sieving, but we don't demonstrate the design and fabrication of automatically driven sand sieving machine which have low cost and simple in operation.

## II. LITERATURE REVIEW

Huynh et al(1977)reported that threshing and separation were controlled by three phenomena:(1)the detachment of kernels from the heads , (2)the penetration of the loose kernels through the straw mat , and(3)the subsequent separation of the kernels through the concave grate .The action of the conventional tangential flow threshing cylinder-concave mechanism of the current John Deere and Massey-Fergus on combines , and early models of Allis-Chalmers , International Harvester , New Holland and White Equipment combines. Cooper (1966) reported that separating apparatus of the conventional modern combine was developed more than a century ago and used in stationary threshing machine sand grain cleaners. German and Lee (1969),Lee and Min field(1969), Rumble and Lee(1970)and Simpson(1966)concluded that the efficiency of the separation process of an adjustable sieve was affected by a number of factors. 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 Mr. Sai Karthik , Automation is the need of the time considering labour shortage , stringent labour laws , and the most labour intensive industry being the construction and foundry industry where sand seiving is must . Thus wither industry have 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 design were used to achieve fully functional sieve machine body structure.

## III. DESIGN OF ROTARY SAND SCREENING MACHINE

CATIA is a (computer aided three-dimensional interactive application) is a multi-platform computer aided design (CAD)/computer aided manufacturing .

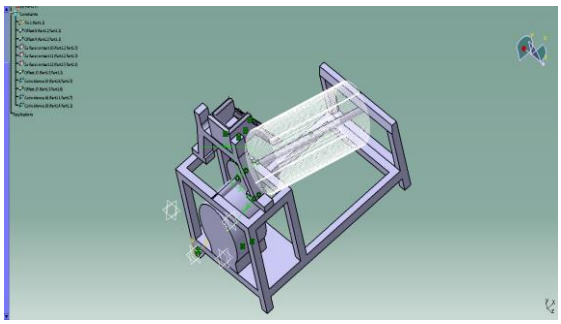

Fig 1: Design of Rotary Sand Screening Machine in CATIA 1

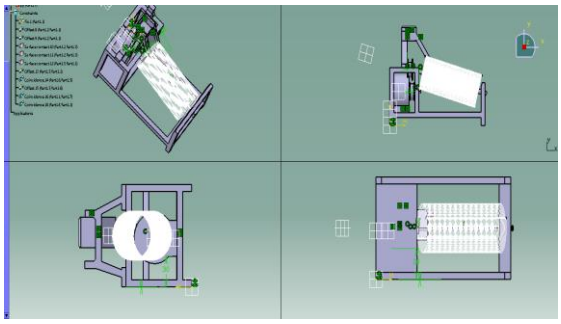

Fig 2: Design of Rotary Sand Screening Machine in CATIA 2

## IV. FABRICATION OF ROTARY SAND SCREENING MACHINE

The fabrication of Rotary Sand Screening Machine is fabricated by using different fabrication techniques i.e, cutting process, welding, turning, boring, grinding and drilling etc. This sieving machine consists of several parts are as follows.

1. Electric Motor
2. Bearings
3. Sprocket

4. Plumber block
5. Pulley and belt drive
6. Mesh
7. Chain drive
8. Shaft

### 4.1 ELECTRIC MOTOR

An electric motor is an electrical machine that converts electrical energy in to mechanical energy.

**Specifications:**

- ✓ Type: AC, 0.75 HP, 930 RPM
- ✓ Material: Mild Steel
- ✓ Voltage: 220 V
- ✓ Power Source: Electric
- ✓ Phase: Three Phase
- ✓ Frequency: 50/60Hz
- ✓ Capacity: 0.559 KW,3.2 amp, CYS-50

**Fig 3: Electric Motor**

### 4.2 BEARING

A bearing may be a machine element that constrains relative motion to only the specified motion, and reduces friction between moving parts. In this project we used a Roller and Ball bearing.

Fig 4: Bearing

### 4.3 SPROCKET

A sprocket or sprocket wheel is a profiled wheel with teeth, cogs or even sprocket that mesh with a chine, track or other perforated or indented material. The name sprocket applies generally to any wheel upon which radial projection engage a chain passing over it.

**Specifications:**

- ✓ Material: Cast iron
- ✓ Outer Diameter: 85mm
- ✓ Inner Diameter: 25 mm

Fig 5: Sprocket

### 4.4 Plumber Block

A plumber block usually refers to a housing with an included anti friction bearing. A plumber block refers to any mounted bearing where in the mounted shaft is in a parallel plane to the mounting surface.

Fig 6: Plumber block

### 4.5 PULLEY AND BELT DRIVE

The Belt drive consists of two or more pulleys connected with belt in tension. An

open belt drive is employed to rotate the driven pulley within the same direction of driving pulley within the motion of belt drive, power transmission results make one side of pulley more tightened compared to the opposite side.

**Specifications:**

Type of belt: V-belt
Material of the belt:
Size: 52-B grade
Type of pulley: V grooved
Quantity: 4 No's

Fig 7: Pulley and Belt Drive

### 4.6 MESH

A mesh is a barrier made of connected stands of metal, fibre, or other flexible/ductile materials. A mesh is similar to a web or a net in that it has many attached or woven stands.

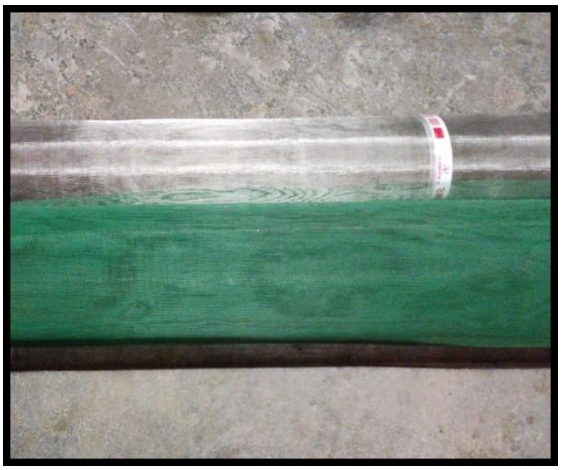

Fig 8: Mesh

### 4.7 CHAIN DRIVE

Chain drive is a way of transmitting the mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle particularly bicycle and motor cycles. It is also used in a wide variety of machines besides vehicles.

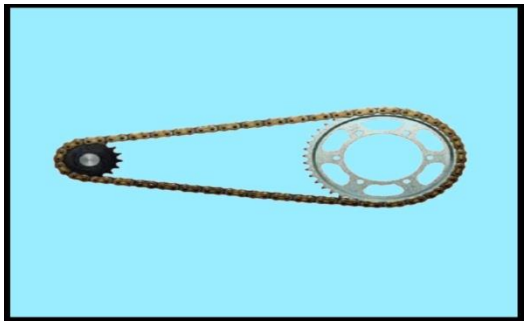

Fig 9: Chain drive

### 4.7 SHAFT

A shaft is a rotating machine element used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power. The material used for ordinary shafts is mild steel. The various members such as pulleys and gears and mounted on it .They are mainly classified in to two types.

1) Transmission shafts
2) Machine shafts

Fig 9: Shaft

## V. WORKING OF ROTARY SAND SCREENING MACHINE

- The sand sieving machine is very easy to construct and can be operated easily. It is very economic among this kind of machines. The project is fabricated with the help of parts like a V-Belt, pulley, cam plate, sand sieve. Machine works on the principle of rotary motion is responsible for sand leading to separation of stone particles from the required fine and clean particles.
- The rotary sand sieving is a sand ore machinery that uses coarse and fine

materials to separate sieving equipment.

- The sand sieving imitates the working principle of manually sieving sand with a bevel screen to ensure that the material flow can be continuously sifted for more than five turns between the spiral blades in multiple turns in the sieve cylinder.

**Fig 10:** Rotatory Sand Screening Machine

**PRO'S**

- ✓ Current consumption is very low.
- ✓ Simple in construction
- ✓ Assemble and dismantle easily
- ✓ It can be utilized for separation of sand in different sizes.
- ✓ Low cost and suitable for small scale industry
- ✓ It can be used for mass production.

**CON'S**

- ➢ This machine can be used for residential and commercial projects.
- ➢ Only minimum carrying load is applicable.

## VI. 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 machine fabricated. This machine reduces the human effort and we do not need multiple persons to filter the sand. to improve the quality of sand and also increase the efficiency of worker. And it can be better useful for small industry.

## VII. FUTURE SCOPE

- ✓ The project can be made for higher capacities by increasing the dimension and improving the design aspects.
- ✓ Based on the required sand particle size, the mesh can be changed. The machine can be operated by using DC motor, handle, pedal also which is economically useful.

## VIII. REFERENCES


) Vaibhav V. Patil, Department of mechanical engineering, KDK college of Engineering Nagpur, Sandeep Raut, M.tech symbiosis institute of technology, Pune'Sand Screening And Washing Machine, International journal of innovative research and development, sept- 2013,page no.208,Vol 2,issue 9

2) Tomasz SZYMANSKI, Piopr WODZINSKI, 'Characteristics of screening in screens with vibrating sieves' International journal of innovative research and development, Physiochemical problems of mineral processing ,39(2005),177-188,Received march 15, 2005; reviewed ;accepted may 15,2005.

3) M. Ramarao Associate professor B. Mahesh UG student , Department of mechanical engineering, Holy mary institute of technology and science, 'Design and fabrication of development of sand filter and separator pedal powered, International journal of emerging technologies in engineering research (IJETER) Vol 6,issue 3, March(2018).

4) V.P Duriraj, J. Manikandan, Assistant Professor, Department of Mechanical Engineering, Bharath University, BIHER, Chennai 'Design and Fabrication of sieving Machine, International journal of Punee and applied Mathematics, Vol 116, No.19 2017,474-451.

5) A.K Nachimuthu, S Raghunath, Assistant Professor, Department of Mechanical Engineering SVS of Engineering

Coimbatore 'Design And Fabrication Of Horizantal Sieving Machine, International Research Journal of Multidisciplinary science and technology, Vol 1, issue 3 july-2016.
6) Joshi Anilkumar, V. S. Lakshmi Ravuri, Research Scholar School of Mechanical Engineering, VIT University, Vellore, 'Fabrication of Solar Based Sand Sieving Machine' Technical Research Organization India(TROI) Vol. 4, issue 5 Jan 2017.