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"SAND FILTER MACHINE"

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ABSTRACT

In recent years, the use of sand filter machine has gradually increased. But, most of them are quite large and difficult to be move. Besides that, the price to own it is quite expensive. With that, there are a large number of construction workers who have to exert their energy to making sand filters by themselves in the traditional way. However, there are some problems that come with using the traditional sand filter. Among these are, the construction workers have to exert their energy to build the sand filter. In addition, refined sand will mix with foreign matter when refined sand falls to the ground. Therefore, we have created a product that can facilitate the construction work of the construction site. Our main goal of creating sand filter machines is to reduce the workload of construction workers when they want to filter or use sand filters. It runs using an electric motor that

will shake the filter. We just need to put the sand on the filter and the sand will be filtered with the shake that is produced. The sand filter machine is equipped with a funnel as a way for fine sand to fall. All we have to do is put the wheelbarrow next to the sand filter and the sand will drop into the wheelbarrow. It is different with the traditional sand filter where the refined sand falls, we have to put it in the wheelbarrow. It will use more of construction workers energy. Most important is that the filter machine is easy to move around in construction as it is equipped with two suitable wheels. It will make it easier for construction workers to filter sand in one place or another place.

CHAPTER 1
INTRODUCTION

1.1 Introduction

The project that we intend to implement for the final year project is a sand filter machine. This idea came about when we saw the difficulties of contract workers who needed to build sand filters on their own using the wood. It has wasted energy consumption as well as time as it is necessary to build the filter before it can be used. Additionally, the sand filters use a lot of energy as users need to take the sand and dump the sand on the filter nets. After that, the filtered sand would have to be taken again using a sand shovel to be placed in a stroller and taken to a site that needs to use the fine sand. With that we think of an innovation to reduce the energy and time of contractor workers by creating a sand filter machine that uses engine power to get the good qualities of sand. By using an existing sand filter, contractor workers do not get the good qualities of sand because the filter has only one layer of filter net. Furthermore, filtered sand with existing sand filters will mix with foreign objects because the sand falls on the ground there is nothing to lining the sand. With the machine we wanted to create this, filtered sand could be inserted into the wheelbarrow. With that, sand will not mix with foreign objects and it can also save energy.

The sand filters we want to create will help contractor worker to facilitate their work. Manpower can be reduced when using this sand filter machine. We put two wheels on this machine so that the machine is easy to move on the construction site. This filter machine we put three different types of filter coating so that it can get good qualities of sands. We use the vibrator engine to vibrate the filter part so that the sand can descend quickly.

1.2 Background of Study

This study is deal with the generating a new idea to produce a sand filter machine with new design. Producing sand filter machine for small building's construction and household because of some problem that occur. Plus to realize our goal in technological advances based on modern principles. Explosive ideas based on statement of problems that have been recorded from studies on quality of fine sand and workload used. Many things and research support us to create this product as our main project. We create and upgrade a product that can filter the quality sand without mixing it with foreign matter and reducing the workload of filtering sand. It would be present 2 functions in 1 concept as well.

1.3 Problem Statement

The reason for the idea of building this sand filter is that we have seen contractor workers use their energies in abundance just to get fine sand. They need to build sand filters that need to be made using the used wood to filter the sand. From there, they waste their energy as well as their own time. Additionally, we realize that filtered sand using the existing sand filter will mix with foreign matter because the filtered sand falls directly onto the ground without any reason. We do not know that there are many foreign objects in construction sites such as nails, iron, stone and so on. The existing sand filters cannot be brought anywhere because there is no wheel. It makes it difficult for workers to bring fine sand to areas requiring fine sand. This is because they need to put the sand in the cart beforehand and then bring the sand to where it should be.

1.4 Objectives

• Get the good quality of sands

Our goal to build the sand filter machine is to get the good quality of sands. This sand filter machine equipped by a funnel that where the fine sand will dropped into the funnel. After that, the fine machine will dropped into the wheelbarrow that has placed besides the sand filter machine. Contrasts with the traditional sand filter where the sand will drop on the ground. So, the sand will mixed with the foreign things. But, using this sand filter machine will avoid the fine sand from be mixed with foreign thing because the fine sand will drop into the wheelbarrow.

• Reduce workload

Using the traditional way, the constructions workers need to build the sand filter first before them able to use that to filter the sand. That will use lot of workload just to build it. So we build this sand filter machine to reduce the constructions worker workload. Besides, this sand filter machine uses the electric motor that will shake the net. Users just need to put the sand on the net of sand filter machine.

• Easy to moving at construction area

This sand filter machine have equipped by two wheels that can make this sand filter machine able to move easily at construction area. At construction site, the fine sand might be required at different area. So the workers just need to bring this sand filter machine at that place.

1.5 Scope

i. Accommodate 20 – 25 kg of sand - Can accommodate sand for 20 to 25 kg at a time.

ii. Site construction – For purpose of this sand filter machine can be move in construction site.

iii. Small building – Suitable to use it for small building like house, hut, mosque and so on.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

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 and MARA Training Institutes (IKM) for training purposes

So to make the process more efficient new technology is needed to help increase the productivity so the human power can be reduce and also can cut the cost of the process.

2.2 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. Most sediment, including sand, is made up of the fragments that result when rock is broken down by wind and rain (weathering).

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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. Most sediments, once formed in the ocean, sub duct to the Earth's interior (mantle) from trench with a sub ducting 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.

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Figure 2.1 Traditional sand filter

The figure 2.1 above show the process has been use by people before us the ancestor way to sieve the sand. And collect the sand they wanted. This process sieve the sand into it size depending on the size of the net been used. This smooth sand or the product usually uses as main material in construction to build building or house. Smooth sand is required to achieve better quality product example in making sand casting or making any product based on sand.

2.3 Sand

Sand is a quartz-based material. The sand is practiced sized between 4.75mm and 0.15mm are common sand used to produce concrete and plaster. According to research, sand are available from mines or rivers. The sand mining is sand which was excavated from the mine. This sand is widely used and usually divided into two types, namely fine and rough sand. Fine sand which contains little soil is usually used for mixing along with fine sand from rivers and cement. The mix produces a mixture of plastic and easy to attach although its strength is somewhat less. Coarse sand is suitable for use to combine concrete and make blocks and cement bricks. According to research, river's sand its quality is good and does not contain excessive impurities. Concrete mixing using sand the river is harder to work. Therefore the additives are named facilitators are sometimes used to improve workability. If the mixer is not used, the mix need more cement to get that work pleasures same. Sand obtained from seafront is not suitable for use. The beach sand contains salt that will cause a pelvic event on the building's surface.

Figure 2.2 Sand

CHAPTER 3
Methodology

3.1 Introduction

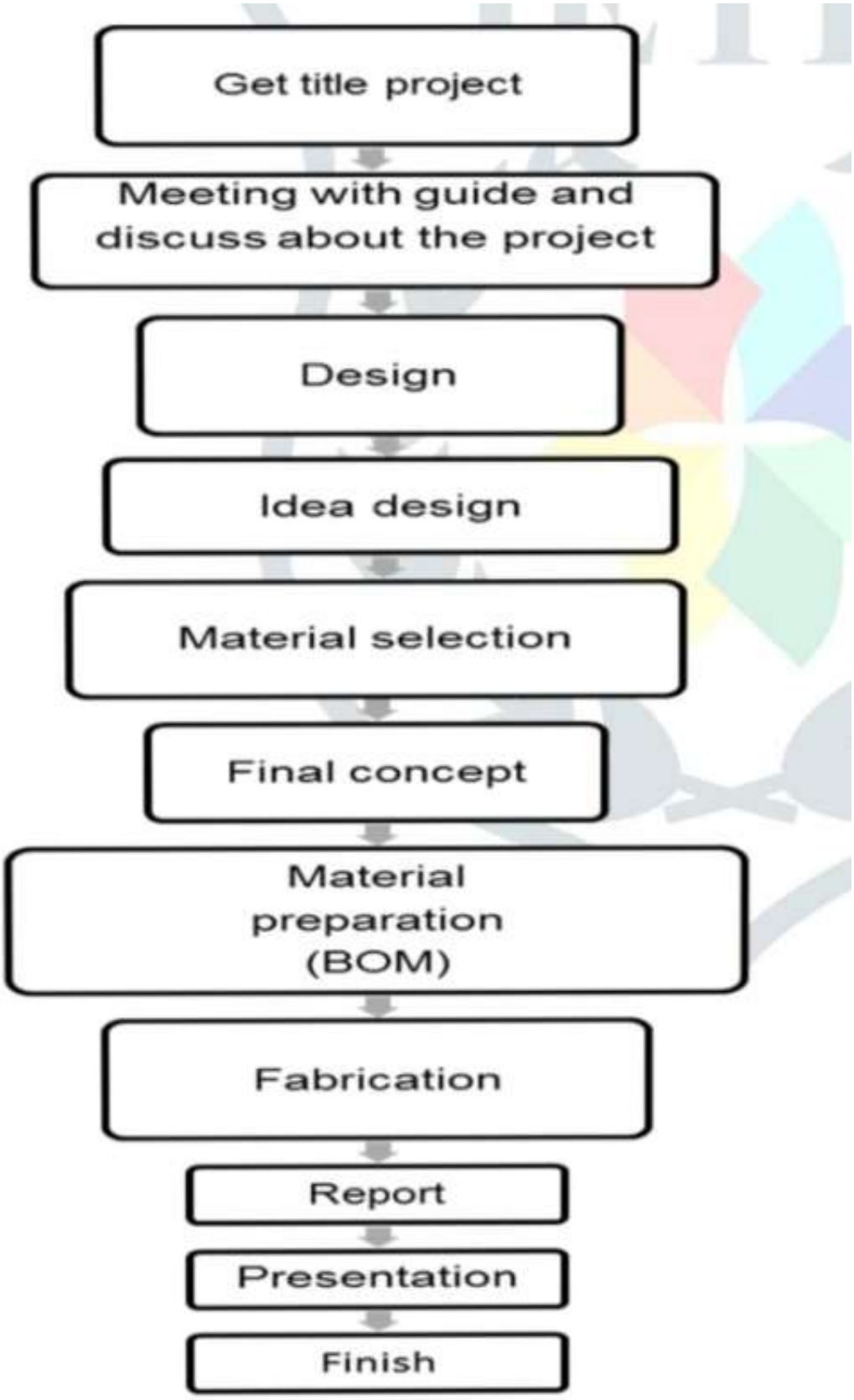
This chapter will cover the detail explanation of methodology that is being used to make this project complete and working well. Many finding from this field mainly generated from research of other to improve this project.

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.

3.2 Flow Chart

The diagram shows the flowchart of the process for the success of this project. In addition, there are also several steps to be taken as well should be followed in implementing this project. The step is as shown in figure. From the charts of this flow, the activity record for the success of this project can be done smoothly and consistently.

Fig1.METHODOLOGY



CHAPTER 4
PROCESS PLANNING

4.1 PROCESS PLANNING

Process planning is an important function, which takes place directly after the design of product. It takes the information received and creates a plan for manufacture. The process planning involves an application of systematic procedures which involves following steps.

A) PRELIMINARY PART PRINT ANALYSIS

1) Size configuration
2) Material
3) Dimensional relationships and identification of various reference surfaces
4) Implicit and explicit remarks regarding from error and finish.

B) DETERMINATION LOGICAL SEQUENCE OF OPERATION

1) Identification of surface to be machined, selection of machine tool.
2) Supporting accessories, pictures, gauges etc.

4.2 COST ESTIMATION

Cost estimation may be defined as the process of casting the expenses that must be incurred to manufacture a product. These expenses take into a consideration all expenditure involved in design and manufacturing with all related services facilities such as pattern making , tool , making as “well as a portion of the general administrative and selling cost.

4.2.A PURPOSE OF COST ESTIMATING

1) To determine the selling price of a product for a quotation or contract So as to ensure a reasonable profit to company.

2) Check the quotation supplied by venders.

3) Determine the most economical process or material to manufacture the Product.

4) to determine standards of production performance that may be used to control the cost.

4.2.B TYPES OF COST ESTIMATION

BASICALLY THE COST ESTIMATION OF TWO TYPES.

1. Material cost.
2. Machining cost.

- MATERIAL COST ESTIMATION :

Material cost estimation gives the total amount required to collect material which the raw has to be processed or fabricated to desired size and functioning of the components.
These materials are divided into two categories.

(i) Material for fabrication :
In this material is obtained in raw condition and is manufactured or processed to finished size for proper functioning of the components .

(ii) Standard purchased parts
This includes the part which was readily available in the market like Allen screws etc. A list in fo chard by the estimation stating the quality , size and standard parts , the weight of raw material and cost per kg for the fabricated parts.

- MACHINING COST ESTIMATION:

This cost estimation is an attempt to forecast the total expenses that may include manufacturing part from material cost. Cost estimation of manufacturing parts can be considered as judgment on and after careful consideration which includes labor, material and factory services required to produce the required parts.

CHAPTER 5
COMPONENTS

5.1 Selection of Materials:

To prepare any machine part, the type of material should be properly
Selected by considering design, safety and following points:

The selection of material for engineering application is given by the following
Factors:-

Suitability of the material for the required components.

Suitability of the material for the desired working conditions.

Availability of materials.

Cost of the materials.

5.1.A In addition to the above mentioned factors the other mechanical & physical prosperities should be considered while selecting material for fabrication :

1) Strength:

It is the ability of a material to resist the externally applied forces without Breaking or yielding.

2) Stiffness

It is the ability of a material to resist deformation under stress. The modulus of elasticity is the erasure of stuffiness.

3) Elasticity:

It is the property of material to regain its original shape after deformation when external forces are removed.

4) Malleability

The ability of a material to be reshaped in all directions without cracking our technology technician demonstrates the 'malleability' of a material by heating a piece of mild steel until it is red hot. He then beats it with a large forging hammer to reshape it. Because of the high temperature it reaches while heating the steel becomes malleable, it can be reshaped permanently.

Ed often heats up steel, because he likes the color and it matches his complexion after he has run up the stairs.

5) Toughness

A characteristic of a material that does not break or shatter when receiving a blow or under a sudden shock. Our technology technician demonstrates the 'toughness' of a material by hitting a piece or material to see if it will break or shatter.
Ed has been known to test authentic Chinese Ming Dynasty pottery with the same technique. This is why he is often arrested in Museums and has been banned from the local Antique dealers.

6) Hardness

The ability of a material to resist scratching, wear and tear and indentation.

Our technology technician, dressed in a kilt, slides along the floor to see if it will scratch. It will be considered to hard wearing if it resists scratching.

7) Fatigue ratio

The dimensionless fatigue ratio f is the ratio of the stress required to cause failure after a specific number of cycles to the yield stress of a material. Fatigue tests are generally run through 10^7 or 10^8 cycles. A high fatigue ratio indicates materials which are more susceptible to crack growth during cyclic loading.

8) Creep

In materials science, creep is the tendency of a solid material to move slowly or deform permanently under the influence of stresses. It occurs as a result of long-term exposure to high levels of stress that are below the yield strength of the material. Creep is more severe in materials that are subjected to heat for long periods, and near their melting point. Creep always increases with temperature.

1)Mild steel :-

Composition	carbon	0.20 % - 0.25 %
	Manganese max	0.8%
	Sulphur, max	0.05%
	Phosphorus, max	0.05%

Silicon, max	0.25 %
Iron	remainder

Tensile strength : 445.4 N/mm ^2

Yield stress : 280 N/mm^2

Hardness : 170 BHN

2) Cast iron :-

Composition	
carbon:	2.0 % - 4.0 %
Manganese max:	0.4% -1.0%
Sulphur, max:	0.05% -0.1%
Phosphorus, max :	0.07%
Silicon, max :	0.1 % - 4%
Iron :	remainder

Tensile strength : 100 to 200 N/mm ^2

Yield stress : 28 kgf/mm^2

Compressive strength: 400 TO 1000 N/MM^2

Shear stress : 120 N/MM^2

5.2 DC motor:

A **DC motor** is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

Specifination:
V= 12V
I= 2.5amp
RPM= 1000rpm
Torque- will be decided according to the selection of blade.

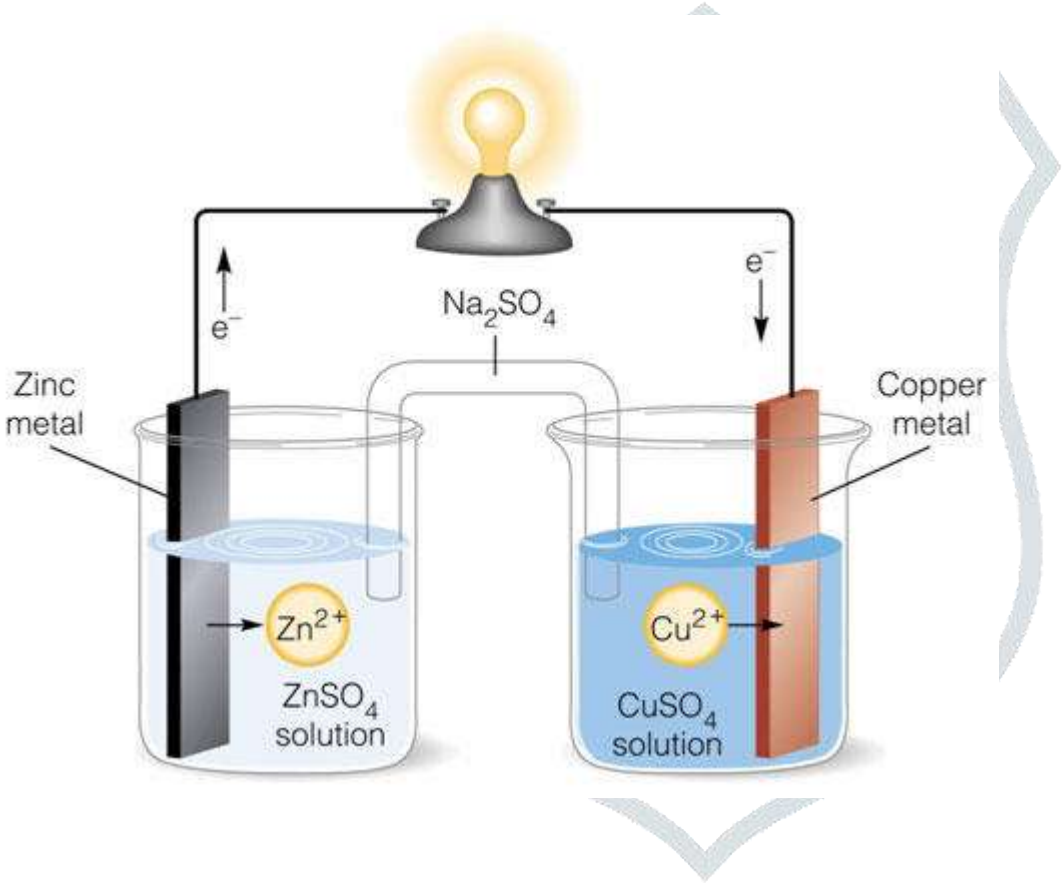
5.2.A Motor Faults.

Unable to operate and low operating speed are two normal faults that can take place in the motor. In both the cases it is necessary to check the motor by using a voltmeter to ensure that the motor is receiving the full battery voltage. To test the motor is situ, a pair of test leads is used to connect the motor directly to the battery. However a spare wiper motor plug simplifies this job. This test indicates the possible faults in the switch and wiring. After a reasonably long time of operation the brushes wear down and the commutator becomes dirty. On many models it is recommended to replace the brush when the main brushes are worn to a length of less than 5 mm, or the stepped portion of the third brush has worn away. The complete new brush sets including springs and plastic mounting plate is normally reinstalled. The commentator should be cleaned using a petrol-moistened rag or a strip of glass-paper when the surface is extremely blackened. Some motors use a screw for adjustment of the armature end-float, a typical setting of which is 0.2 mm.

5.3 Battery

5.3.A What is a Battery

So what actually is a Battery? It is a collection of one or more electrochemical cells in which stored chemical energy is converted into electrical energy. The principles of operation haven't changed much since the time of Volta. Each cell consists of two half cells connected in series through an electrolytic solution. One half cell houses the Anode to which the positive ions migrate from the Electrolyte and the other houses the Cathode to which the negative ones drift. The two cells are may be connected via a semi permeable membranous structure allowing ions to flow but not the mixing of electrolytes as in the case of most primary cells or in the same solution as in secondary cells.



Different amounts of voltages are built up according to the separation between the ions in the electrochemical series which results in the flow of ions in the solution and electrons in the external circuitry in the form of current. The performance of the cell continues to dip gradually as the concentration of ions in the solutions decrease, marked by an increase in internal resistance eventually leading to the exhaustion of the battery. The reversibility of this condition classifies the battery into two major categories, Primary and Secondary.

5.3.B History

Electricity has been by far, one of the most important and novel discoveries to mankind. With population getting increasingly mobile, they have gravitated more towards portable solutions of electricity, which manifests itself in the form of Batteries. Electricity has been around us since the beginning of time, but its practical use has been at our disposal since a few hundred years only.

While history stands witness to many artifacts such as the Parthian Battery unearthed in Baghdad, which tell us that the concept had been existent even in early civilizations like Egyptian and Babylonian, their use had been limited to electroplating. In 1660, Otto von Guericke succeeded in generating static charge in the form of sparks on rubbing and turning a sulfur globe. In 1791, Luigi Galvani discovered animal electricity while experimenting on a frog with metallic prongs. Prompted by the findings of this experiment, Alessandro Volta, the inventor of the Electric Battery, initiated a series of experiments using different metals and found out that certain fluids could generate a continuous flow of electricity when used as a conducting medium. This led to the invention of the first voltaic cell commonly known as The Battery in 1800.

Sir Humphry Davy discovered the phenomenon of chemical decomposition (Electrolysis) on passing electricity through substances. In 1802, William Cruickshank designed the first electrical battery for mass production which resembled the flooded battery we still use. In 1859, Gaston Plante invented the first rechargeable battery based on lead acid system which is still very popular and hence came the first secondary cell. In 1899, Waldmar Jungner invented the Nickel-Cadmium battery using Nickel for cathode and Cadmium for anode. It was further improved by many people like Thomas Edison, Shlecht, Ackermann and Georg Nuemann. It remained popular for many years to come until environmentalists became concerned about contamination, if NiCd were disposed off carelessly. This led to the development of Nickel Metal Hydrides and later the popular Lithium Ion batteries. Numerous local, national and international players are involved in this business providing portable battery solutions, a few of the key players being Duracell International Inc., Electric Fuel Battery Corp., Energizer Holdings Inc., GP Batteries International Ltd., Philips, Renata SA, Toshiba Battery Co. Ltd., VARTA Consumer Batteries GmbH & Co. KGaA, Sony Electronics Asia Pacific Pte. Ltd., ZeniPower Battery Co. Ltd., Sanyo Electric Co., LG Chem. Ltd Exide industries Ltd. etc.

5.3.C What are the different types of batteries?

Different types of batteries use different types of chemicals and chemical reactions. Some of the more common types of batteries are:

Alkaline battery

Used in Duracell and Energizer and other alkaline batteries. The electrodes are zinc and manganese-oxide. The electrolyte is an alkaline paste.

Lead-acid battery

These are used in automobiles. The electrodes are made of lead and lead-oxide with a strong acid as the electrolyte.

Lithium battery

These batteries are used in cameras for the flash bulb. They are made with lithium, lithium-iodide and lead-iodide. They can supply surges of electricity for the flash.

Lithium-ion battery

These batteries are found in laptop computers, cell phones and other high-use portable equipment.

Nickel-cadmium or NiCad battery

The electrodes are nickel-hydroxide and cadmium. The electrolyte is potassium-hydroxide.

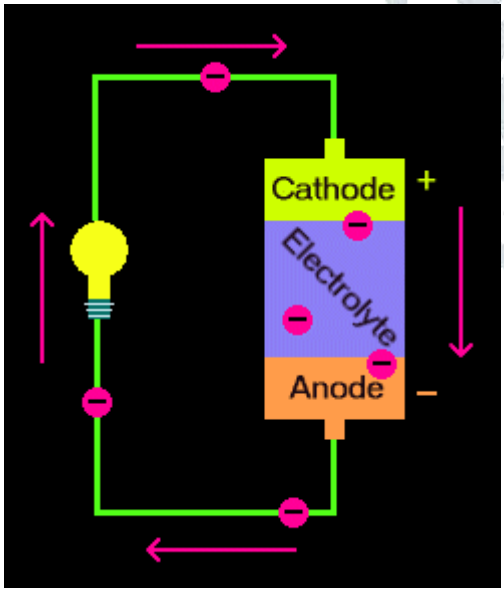
Zinc-carbon battery or standard carbon battery –

Zinc and carbon are used in all regular or standard AA, C and D dry-cell batteries. The electrodes are made of zinc and carbon, with a paste of acidic materials between them serving as the electrolyte.

5.3.D How do batteries work?

Electricity, as you probably already know, is the flow of electrons through a conductive path like a wire. This path is called a circuit.

Batteries have three parts, an anode (-), a cathode (+), and the electrolyte. The cathode and anode (the positive and negative sides at either end of a traditional battery) are hooked up to an electrical circuit.



The chemical reactions in the battery causes a buildup of electrons at the anode. This results in an electrical difference between the anode and the cathode. You can think of this difference as an unstable build-up of the electrons. The electrons want to rearrange themselves to get rid of this difference. But they do this in a certain way. Electrons repel each other and try to go to a place with fewer electrons.

In a battery, the only place to go is to the cathode. But, the electrolyte keeps the electrons from going straight from the anode to the cathode within the battery. When the circuit is closed (a wire connects the cathode and the anode) the electrons will be able to get to the cathode. In the picture above, the electrons go through the wire, lighting the light bulb along the way. This is one way of describing how electrical

potential causes electrons to flow through the circuit.

However, these electrochemical processes change the chemicals in anode and cathode to make them stop supplying electrons. So there is a limited amount of power available in a battery.

When you recharge a battery, you change the direction of the flow of electrons using another power source, such as solar panels. The electrochemical processes happen in reverse, and the anode and cathode are restored to their original state and can again provide full power.

5.3.E Battery Charging Current and Battery Charging Time formula

Charging Time of battery = Battery Ah / Charging Current

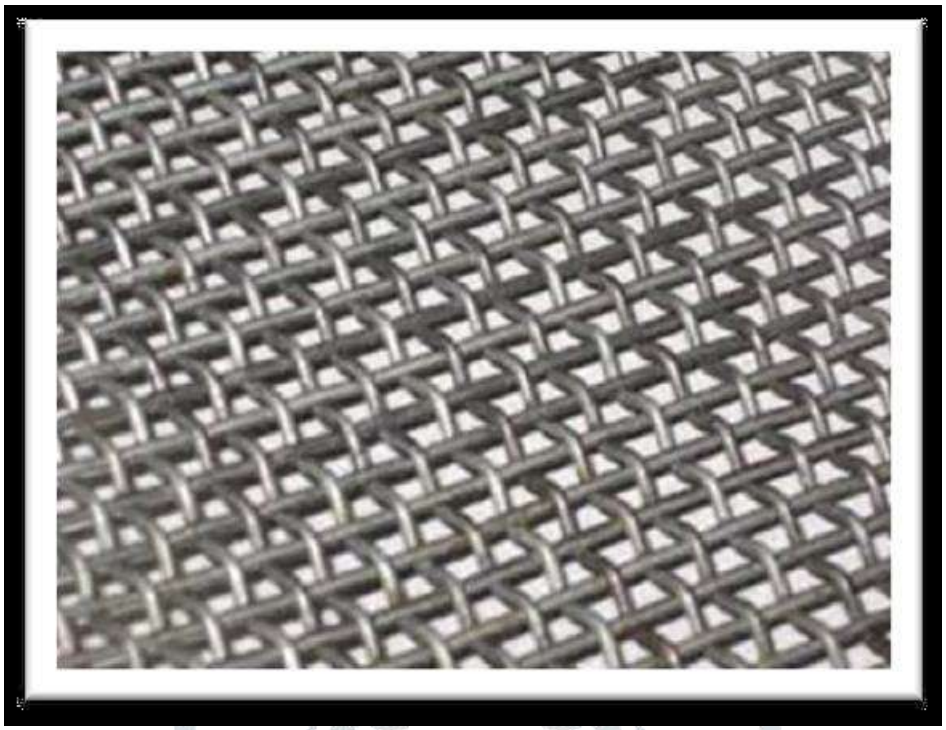
T = Ah / A

Example,
Suppose for 120 Ah battery,
First of all, we will calculate charging current for 120 Ah battery. As we know that charging current should be 10% of the Ah rating of battery.
so charging current for120Ah Battery = 120 x (10/100) = 12 Amperes.
but due to losses, we can take 12-14Amperes for charging purpose.
suppose we took 13 Amp for charging purpose,
then charging time for 120Ah battery = 120 / 13 = 9.23 Hrs.
but this was an ideal case…
practically, this is noted that 40% of losses (in case of battery charging)
then 120 x (40 / 100) = 48 …..(120Ah x 40% of losses)
therefore, 120 + 48 = 168 Ah (120 Ah + Losses)
Now Charging Time of battery = Ah/Charging Current
168 / 13 = 12.92 or 13 Hrs (in real case)

Therefore, an **120Ah** battery would take **13 Hrs** for completely charging (with 13A charging current).

Battery Chemistry	Lead Acid (VRLA)
Battery Cell Size	12V
Voltage - Rated	12V
Capacity	7Ah
Size / Dimension	5’’* 3’’* 5’’ H
Termination Style	Spade, .187" (4.7mm)
Discharge Rate	2Hr
Standard Charge Current	1.0 Ah
Standard Charge Time	4.5H
Weight	4.2 kg

5.4 Sand filter net



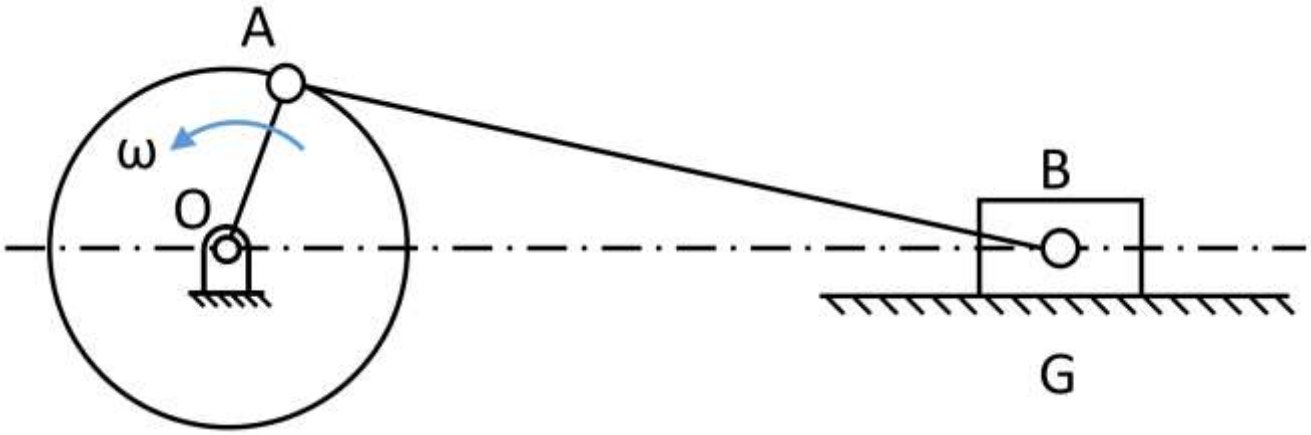
This sand filter machine uses the sand filter net with suitable size. The size of the sand filter net's particle hole not too big and not too small. So the sand might able to go through over the net.

5.5 Crank:

"Crank" is a pejorative term used for a person who holds an unshakable belief that most of his or her contemporaries consider to be false. A crank belief is so wildly at variance with those commonly held as to be ludicrous. Cranks characteristically dismiss all evidence or arguments which contradict their own unconventional beliefs, making rational debate a futile task, and rendering them impervious to facts, evidence, and rational inference.

Common synonyms for "crank" include crackpot and kook. A crank differs from a fanatic in that the subject of the fanatic's obsession is either not necessarily widely regarded as wrong or not necessarily a "fringe" belief. Similarly, the word quack is reserved for someone who promotes a medical remedy or practice that is widely considered to be ineffective; this term however does not imply any deep belief in the idea or product they are attempting to sell. Crank may also refer to an ill-tempered individual or one who is in a bad mood, but that usage is not the subject of this article.

Although a crank's beliefs seem ridiculous to experts in the field, cranks are sometimes very successful in convincing non-experts of their views. A famous example is the Indiana Pi Bill where a state legislature nearly wrote into law a crank result in geometry.



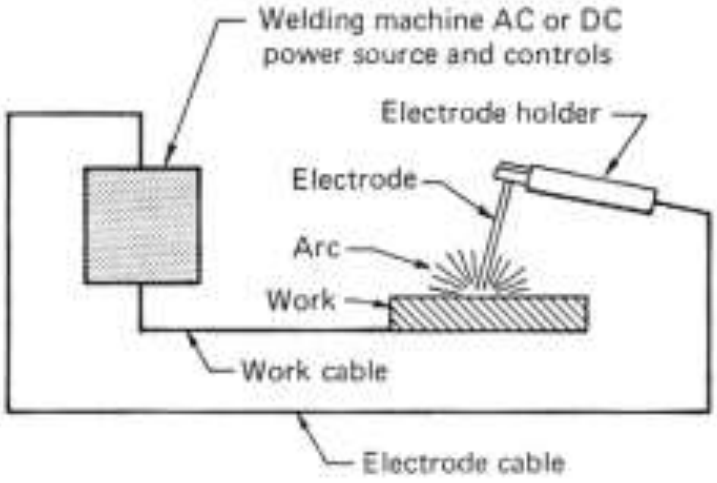
CHAPTER 6
OTHER MACHINES

6.1 Machine required for completion of above project

ARC Welding Machine, Drilling Machine, Grinder

6.1.A Welding

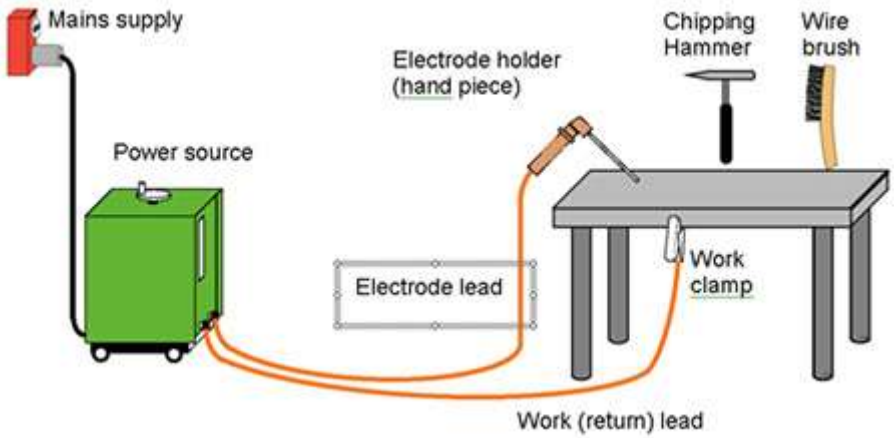
Arc welding is one of several fusion processes for joining metals. By applying intense heat, metal at the joint between two parts is melted and caused to intermix - directly, or more commonly, with an intermediate molten filler metal. Upon cooling and solidification, a metallurgical bond is created. Since the joining is an intermixture of metals, the final element potentially has the same strength properties as the metal of the parts. This is in sharp contrast to non-fusion processes of joining (i.e. soldering, brazing etc.) in which the mechanical and physical properties of the base materials cannot be duplicated at the joint.



In arc welding, the intense heat needed to melt metal is produced by an electric arc. The arc is formed between the actual work and an electrode (stick or wire) that is manually or mechanically guided along the joint. The electrode can either be a rod with the purpose of simply carrying the current between the tip and the work. Or, it may be a specially prepared rod or wire that not only conducts the current but also melts and supplies filler metal to the joint. Most welding in the manufacture of steel products uses the second type of electrode.

Equipment

The equipment for the shielded metal arc welding process consists of a power source, welding leads, electrode holder, and work clamp or attachment. A diagram of the equipment is shown below.



6.1.B DRILLING. MACHINE

Drilling is a cutting process that uses a Drill bit to cut a hole of circular cross-section in solid materials. The drill bit is usually a rotary cutting tool, often multi-point. The bit is pressed against the work-piece and rotated at rates from hundreds to thousands of revolutions per minute.

This forces the cutting edge against the work-piece, cutting off chips (swarf) from the hole as it is drilled.

In rock Drilling, the hole is usually not made through a circular cutting motion, though the bit is usually rotated. Instead, the hole is usually made by hammering a drill bit into the hole with quickly repeated short movements. The hammering action can be performed from outside the hole (top-hammer drill) or within the hole (down-the-hole drill, DTH). Drills used for horizontal drilling are called drifter drills.

In rare cases, specially-shaped bits are used to cut holes of non-circular cross-section; a square cross-section is possible.

6.1.C GRINDING MACHINE

A grinding machine, often shortened to grinder, is one of power tools or machine tools used for grinding. It is a type of machining using an abrasive wheel as the cutting tool. Each grain of abrasive on the wheel's surface cuts a small chip from the workpiece via shear deformation.

Grinding practice is a large and diverse area of manufacturing and toolmaking. It can produce very fine finishes and very accurate dimensions; yet in mass production contexts it can also rough out large volumes of metal quite rapidly.

It is usually better suited to the machining of very hard materials than is "regular" machining (that is, cutting larger chips with cutting tools such as tool bits or milling cutters), and until recent decades it was the only practical way to machine such materials as hardened steels. Compared to "regular" machining, it is usually better suited to taking very shallow cuts, such as reducing a shaft's diameter by half a thousandth of an inch or 12.7 μm.

Grinding is a subset of cutting, as grinding is a true metal-cutting process. Each grain of abrasive functions as a microscopic single-point cutting edge (although of high negative rake angle), and shears a tiny chip that is analogous to what would conventionally be called a "cut" chip (turning, milling, drilling, tapping, etc.)

However, among people who work in the machining fields, the term cutting is often understood to refer to the macroscopic cutting operations, and grinding is often mentally categorized as a "separate" process. This is why the terms are usually used separately in shop-floor practice.

6. 1. D Spray painting:

Spray painting is a painting technique where a device sprays a coating (paint, ink, varnish, etc.) through the air onto a surface. The most common types employ compressed gas—usually air—to atomize and direct the paint particles. Spray guns evolved from airbrushes, and the two are usually distinguished by their size and the size of the spray pattern they produce.

Airbrushes are hand-held and used instead of a brush for detailed work such as photo retouching, painting nails or fine art. Air gun spraying uses equipment that is generally larger. It is typically used for covering large surfaces with an even coating of liquid. Spray guns can be either automated or hand-held and have interchangeable heads to allow for different spray patterns. Single color aerosol paint cans are portable and easy to store.

Air gun spraying:

This process occurs when paint is applied to an object through the use of a yogi and pop t air compressor spray gun. The air gun has a nozzle, paint basin, and air compressor. When the trigger is pressed the paint mixes with the compressed air stream and is released in a fine spray.

Due to a wide range of nozzle shapes and sizes, the consistency of the paint can be varied. The shape of the workpiece and the desired paint consistency and pattern are important factors when choosing a nozzle. The three most common nozzles are the full cone, hollow cone, and flat stream. There are two types of air-gun spraying processes. In a manual operation method the air-gun sprayer is held by a skilled operator, about 6 to 10 inches (15–25 cm) from the object, and moved back and forth over the surface, each stroke overlapping the previous to ensure a continuous coat. In an automatic process the gun head is attached to a mounting block and delivers the stream of paint from that position. The object being painted is usually placed on rollers or a turntable to ensure overall equal coverage of all sides.

While giving red oxide with the help of air spray gun using compressor (red oxide is the anti-corrosive type of paint which is be given before giving the paint by adding the turpentine

CHAPTER 7
WORKING PRINCIPLE

7. WORKING PRINCIPLE

Working principle single slider mechanism

A single slider crank chain is a modification of the basic four bar chain. It consist of one sliding pair and three turning pairs. It is, usually, found in reciprocating steam engine mechanism. This type of mechanism converts rotary motion into reciprocating motion and vice versa.

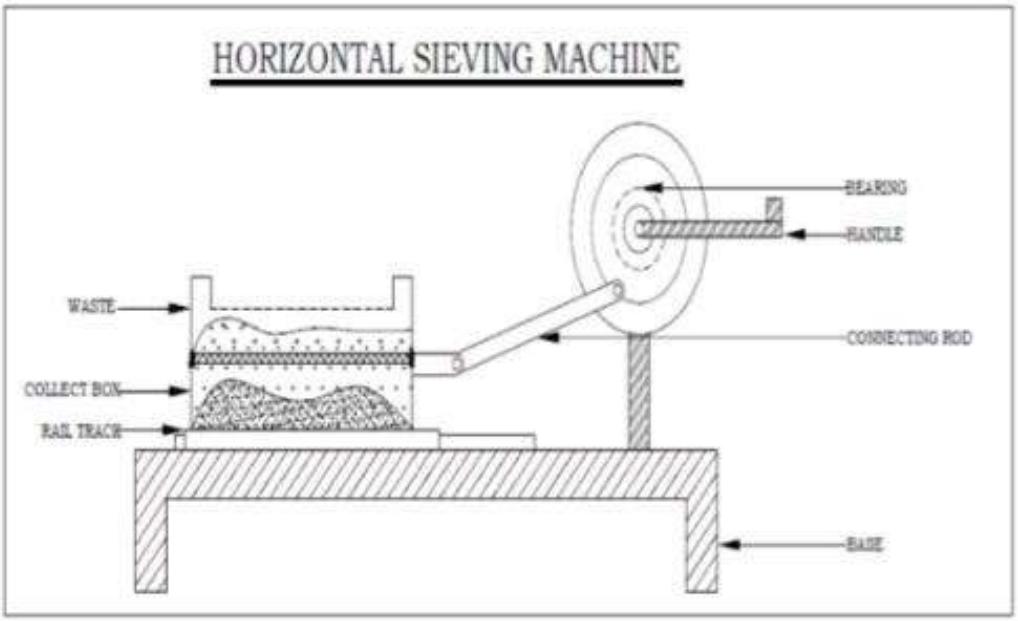
7.1 WORKING PROCESS OF MACHINE

As the machine starts we pored a sand in mesh tray, due to motion of tray the sand is get shaked in tray.

Due to the size of mesh the small particles of sand gets fall down into the collecting frame and large size particles of sand remains in mesh tray.

After that the remains large particles are moves in forward direction and falls into large particles collecting tray because of one side of mesh in tray is slightly upward.

So the sand is filtrated into tow grades which depends upon the size of mesh used in mesh tr



CAD MODEL OF GRAINS SIFTING MACHINE

CHAPTER 8

MODEL

FABRICATED MODEL OF GRAINS SIFTING MACHINE

CHAPTER 9
PURPOSE OF MACHINE

10. PURPOSE OF MACHINE

Dependence of SIFTING efficiency on the amplitude and frequency of vibration.The purpose of the vibrating screen is that particles are introduced to the gaps in the screens repeatedly. The frequency of the screen must be high enough so that it prevents the particles from blocking the apertures and the maximum height of the particle trajectory should occur when the screen surface is at its lowest point. Based on the principle, there is an optimum frequency and amplitude of vibration .

Transmission refers to the fraction of desired particle that passes through the apertures in the screen. At low frequency, SIFTING efficiency is high but blinding is severe. Blinding will decrease as frequency increases but the particles will have difficulty going through the apertures. When designing a high frequency vibrating screen, an optimum point of frequency and amplitude must be chosen,depending on the specific applications.

SEPARATION EFFICIENCY

The separation efficiency is simply a measure of the amount of material removed by the screen compared to the theoretical amount that should have been removed. Screen efficiency can be obtained using different equation, which depends on whether the desired product is the oversize or undersize fraction from the screen.

CHAPTER 10
CONCLUSION AND FUTURE SCOPE

FUTURE SCOPE :

- Produce superior quality of sand.
- Very low water wastage.
- Robust and unique design
- Easy maintenance.
- Low production cost
- Safe system.
- High production, less wastag
- Long service life.
- Easy to operate and highly efficient.

CONCLUSION :

The proper guidance of project head and the sincere efforts of our group have lead to the successfully accomplishment of our concerned projects.

"SAND FILTER MACHINE " was interesting to work on and was also gained in this project work..

CHAPTER 11

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11.REFERENCE

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