

## Design and Development of Belt Conveyor Operated By Wind Mill

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### ABSTRACT:

As the conventional energy sources are depleting day by day, it is very essential to search for an alternative energy sources. With this an attempt has been made to develop a belt conveyor which is operated by a wind mill. The system is also equipped with electrical motor which works in the absence of wind. Now a day's belt conveyors are playing a key role in material handling applications, they are used to carry materials from one place to another. Based upon the size and nature of material, different conveyors are being used. After Solar Energy Wind Energy is the most prominently using alternative sources of energy, which is also an indirect form of solar energy.

By make use of naturally available wind currents one can generate power or it can be used as a prime mover for a specified application. In this project it is proposed to design a belt conveyor which is used to carry chips packets in a food processing industry. Based upon the distance between source and destination and weight of the product to be shifted, components like conveyor rollers, bearings and length of the belt etc. are to be designed by considering all kinds of necessary assumptions. After estimating the speed of the conveyor, a suitable wind turbine is to be designed to operate the belt conveyor with required speed. Suitable gearing

### KEY WORDS:

Wind Mill, Belt conveyor, Dynamo and Voltmeter.

### I - INTRODUCTION

A wind mill is a type of engine. It uses the wind to make energy .usually a wind mill is a large building .common types of wind mills are post mills, stock mills and tower mills. The energy made by wind mills can be used in many ways .These include grinding grain or spices, pumping water and sawing wood. Modern wind power machines are used to create electricity these are called wind turbines. An organ was powered by a wind wheel was written about in 1<sup>st</sup> century AD by the GREEK ENGINEER HERO. It would have been 1<sup>st</sup> machine in history that used wind power. The vertical axle wind mills where used in eastern Persia by60 AD.

Horizontal axle wind mills where invented in north Western Europe in the 1180s.this the type often used today. The first wind mills had long vertical shafts with rectangle shaped blades. They existed in Persia in 9<sup>th</sup> century .There is a story about a wind mill and second caliph (634/644 AD). It is not known if this is a true story .These wind mill were made of 6 to 12 sails. The sales were covered in reed matting or cloth .they were very different from European versions .A similar type of vertical shaft wind mill with rectangle blades can also be found in 13<sup>th</sup> century china.

They were used for irrigation. These are of two types Horizontal wind mill and vertical wind mill. A belt conveyor is rubber or textile structure with a belt shape closed ring, with a vulcanized or metallic joint, used for material transportation. Belt conveyors are the most used for transport of solid objects and bulk materials at great speed, covering great distances (up to 30 km). A conveyor belt is carrying medium of belt conveyor system (often shortened to belt conveyor). A belt conveyor is one of the many types of the conveyor systems. A belt conveyor consists of two or more pulleys (sometimes referred as to drums) with an endless loop of carrying medium –the conveyor belt- that rotates about them. One or both of the pulleys are powered, moving the belt and the material on the belt forward.

## II - COMPONENTS AND ITS ASSEMBLYING

### 1 WIND MILL



We should use the thin light weight material to construct vanes. And we have cut it according to dimensions. we should place it in a certain area where the wind energy is more available. we fixed vanes to the stand and the base is of wooden and by the help of L angular. The stand is fixed to the wooden base. And vanes are fixed to the dynamo of 1000rpm. And also a voltmeter is fixed to the stand to see how much power is obtaining from wind mill. A wind mill is a type of engine. It uses the wind to make energy. usually a wind mill is a large building. common types of wind

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### 2 BELT CONVEYOR:

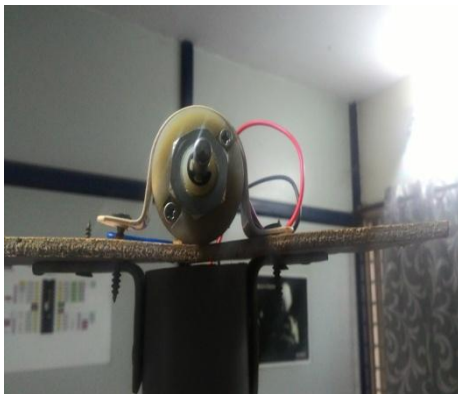


We use track belt to construct belt conveyor (42mm). And we use track wheels to rotate the belt in a loop circuit. And we fix motor of 100rpm to rotate track wheels. The motor is connected to the battery, and there will be switch placing between the motor and battery. The belt conveyor is to transfer the light weight things from one place to another. A belt conveyor is rubber or textile structure with a belt shape closed ring, with a vulcanized or metallic joint, used for material transportation.

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### 3 DYNAMO:

The dynamo is to convert the rotational energy into electrical energy. The dynamo which we used is 1000rpm 2kg torque. It is fixed to the vanes and when vanes get rotate then the dynamo changes the rotational energy into electrical energy and send to battery. A typical electric motor. An electricity generator has exactly the same components but works in the opposite way, turning motion into electrical energy. If you've read our detailed article about electric motors, you'll already know pretty much how generators work generator is just an electric motor working in reverse. If you've not read that article, you might like to take a quick look before reading on— but here's a quick summary either way.



### VOLTMETER



It is to calculate the which is obtained from wind mill. It is placed into the stand and connected to dynamo when the vanes starts rotating the voltmeter shows the energy obtained per revolution.

### MOTOR

The motor converts the electrical energy into mechanical energy. The motor we used here is 100rpm. That means if vanes rotates 1000 times here the motor will rotate 100 times. A DC motor is a motor that uses direct electrical current (DC) as the source of its energy. An AC motor is a motor that uses alternating electrical current (AC) as the source of its energy. AC current is the type of electricity provided by household wall outlets. DC current is the type of electricity provided by batteries.

### III - ASSEMBLY

First we should construct the design of the vanes here we use thin metal sheet as a vanes and later a stand for the support to the vanes. Where we should fix the vanes to the dynamo of 1000 rpm and the dynamo is to be fixed to the stand by wooden frame. And latter we should fix voltmeter to the stand and connected to the dynamo from back side. Here we use multi meter to calculate the volts coming from the dynamo. It shows the output of the power. And the stand is fixed to the wooden board with L angular.



And later take a wooden board and fix battery to it. The battery is 6volts and 4.5 amph. And later fix a switch on the base of the belt conveyor, here we use a SPDT switch. And take 100rpm motor and fix it to wooden frame and the motor to fixed to track wheel and other one is fixed to wooden board. And place a track belt between the rollers and then give the connection and connect motor to battery and switch. And the switch we used here is DPDT switch. The dynamo is directly connected to the battery. When there is a wind we can store the power in battery.



And once we on the switch the BELT CONVEYOR starts working. In this we can store the energy when there is no work. By implementing this we can use this in Industries etc..

#### **IV. ADVANTAGES:**

- 1) Wind energy doesn't pollute the air like power plants that rely on combustion of fossil fuels.
- 2) Wind turbines doesn't produce atmospheric emissions that causes acid rain or green house gases.
- 3) The wind is free with modern technology it can be captured efficiently.
- 4) Economic benefits, it is one of the lowest priced renewable energy technologies available today.
- 5) This greatly benefits the economy in Industrial areas.
- 6) Eco friendly
- 7) Easy handling.
- 8) More efficient.
- 9) Less effort more power
- 10) Save of power.
- 11) Very cheap
- 12) It is a limit less resource
- 13) Energy generated without polluting environment
- 14) The power generated produced can be harnessed to send power across the gird.

#### **V. APPLICATIONS:**

- 1) Over time different ways were developed to regulate the turning speed with varying wind elocities
- 2) Initial requirement stopping the blades and manual adjustment in time automated techniques were developed.
- 3) The Greek island wind mills were fixed in orientation due to more stable prevailing wind directions.
- 4) A perpendicularly : oriented small sail was eloped to maintain head on orientation to wind of the main driving sails
- 5) A common applications has been in pumping water wells to pump water from wells to pump water from reclaimed island.

6) In areas where electricity reticulation is difficult or absent wind mills still have a place in providing mechanized power.

7) The biggest application is these days though is in turning turbines to supply power . Around the world and increasing.

8) Wind mills do not have quite the same length of history as their water based ,but they have been around for centuries .

9) High friction for inclining /declining

10) Low friction for accumulation

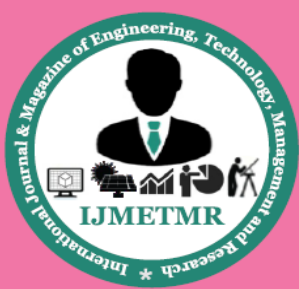
11) Oil resistant

12) Electrically conductive

#### **VI – CONCLUSION:**

We can conclude that time and human effort can be reduced by implementing such project in industries like chemical food, chip, manufacturing soon. Though this project has some limitations regarding the strength and built of the structures it can be considered to the small step forward, as far gravity conveyor are concerned. During the test run of this project, it was realized that it would not be a bad idea to conceded this design for carrying light weight loads up the flexible conveyor .Wind turbine technology has demonstrated the potential for contributing the energy needs of the united states. If the sites with the acceptable wind characteristics were fully utilized, they couldn't contribute up to about 10 percent of nations electrical energy needs.

That wind energy is far more superior than solar energy for numerous reasons. Wind turbines emit a significantly lower amount of carbon dioxide for each kilowatt hour produced than solar panels.Solar energy has energy balance of 6.6 months .wind energy also has higher energy return on investment. For the above reason we that wind energy far more efficient than solar energy .Necessary to look at the energy return on investment because it had the capacity to produce more electricity more effectively than a single solar panel.



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