# Basic Study Of Vertical Axis Wind Mill

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## 1. ABSTRACT

*. Vertical axis wind mill (VAWM), which may be as efficient as current horizontal axis systems, might be practical, simpler and significantly cheaper to build maintain than horizontal axis wind mill (HAWM).They also have other inherent advantages, such as they are always facing the wind, which might make them a significant player in our quest for cheaper, cleaner renewable sources of electricity. VAWM might even critical in mitigating grid interconnect stability and reliability issue currently facing electricity producers and suppliers.A wind turbine is a device that converts kinetic energy from the wind, also called wind energy, into mechanical energy in a process known as wind power. Wind energy is one the most widely used renewable energy resources. Small wind turbines need to be affordable, reliable and almost maintenance free for the average person to consider installing one. Small-scale wind turbines produce more costly electricity than large and medium-scale wind turbines, especially in poor wind sites and in autonomous applications that require a high level of reliability.*

## 2. INTRODUCTION

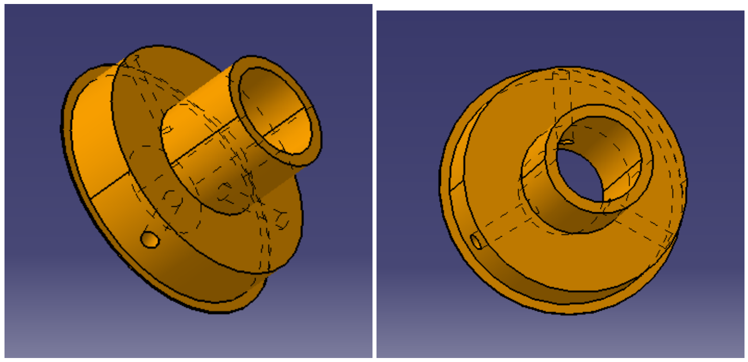
*The project 'Vertical Axis Wind Mill' is generally replaces the current horizontal axis wind mill. Since the horizontal axis wind mill requires the air which penetrates over the blade is perpendicular only, the vertical axis wind mill is best substitute to horizontal one. The vertical axis wind mill uses the air from all direction and helps in rotating turbine. This arrangement allows the mill to be located close to the facilitating service and repair.*

*If the efficiency of a wind mill is increased, then more power can be generated thus decreasing the need for expensive power generators that cause pollution. This would also reduce the cost of power for the common people. The wind is literally there for the taking and doesn't cost any money. Power can be generated and stored by a wind mill with little or no pollution. If the efficiency of the common wind mill is improved and widespread, the common people can cut back on their power costs immensely.*

## 3. COMPONENT

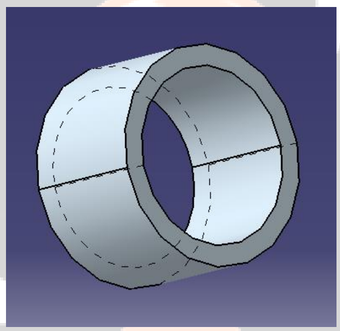
### 3.1 Block

The block is the main part of joining two parts that is shatft-1 and shaft-2(blade shaft) which consist of two bearings at lower and upper side of block for freely rotation of blade shaft and to balance and sustain the blade shaft.



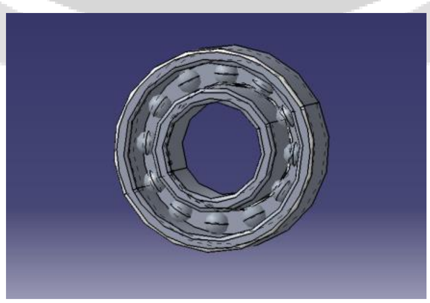
### 3.2 Bush (Packing)

Bush is mechanical component which is fix or removable cylindrical metal lining used to constrain, guide or reduce friction. Bush is mechanical fixing between two possibly moving, parts, strengthened fixing point where one mechanical assembly attached to other. Applying bearing in which the lining is closely fitted into the housing in the form of bush.



### 3.3Bearing

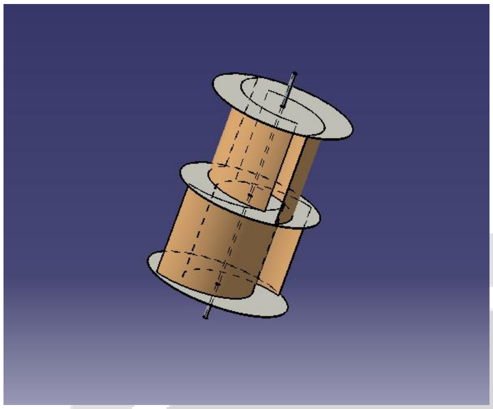
Here we provided three bearings at the bottom and top of the block and one at the top of the blade shaft to provide frictionless spinning of shaft and to support shaft rigidly. The outer diameter of bearing is 21mm where as the inner diameter is 10mm.

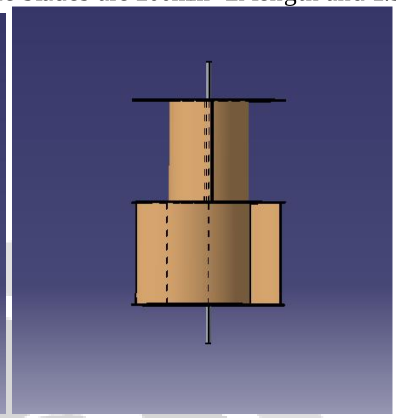


### 3.4 **Blade**

The savonius blade is an extremely simple vertical- axis device that entirely because of the thrust force of the wind. The basic equipment is a drum cut into two halves vertically. The two parts are attached to the two opposite sides of a vertical shaft. The wind blowing into the assembly meets two different surfaces- convex and concave- and different forces are exerted on them, giving torque to the blade.

Here we have provided 4 blades in two stage, two blades in upper stage and two in lower stage. The upper stage blade is placed exactly at 90º to the lower stage blade. The blades are 200mm in length and 1.5mm thick.





### 3.5 Motor

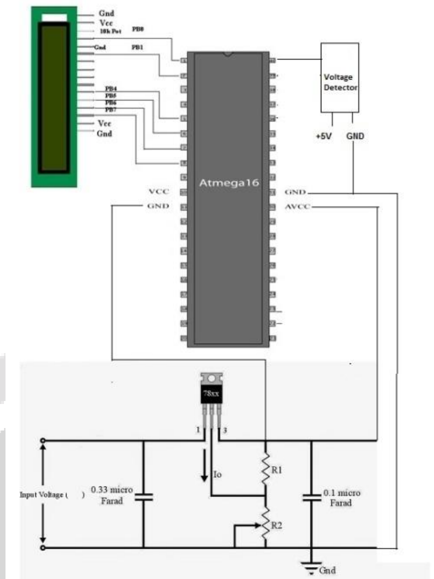
A planetary gear motor is used for generation of current which stores the current in battery. We have used 12v 10rpm brushed DC gear motor. All Internal gears are of metal. We have used this motor since it gives high volt for very small rotation or RPM.

### 3.6 Battery

The output of planetary motor is given to the battery for electric energy storage purpose. The capacity of battery is up to 12 volt. Generally this battery is lead acid type battery and also restorable. The supply of planetary motor is given to the battery through a switching circuit.


### 3.7 Switching Circuit

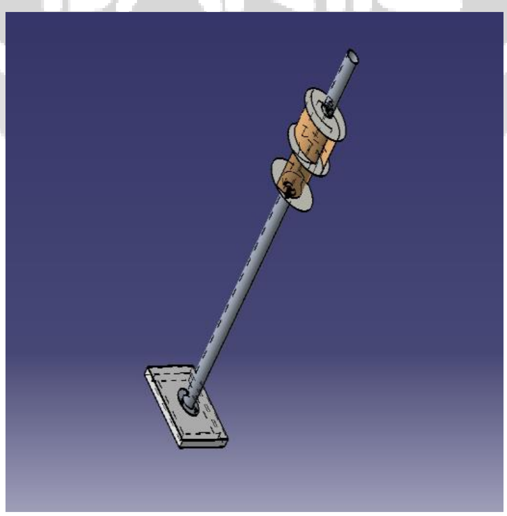
The switching circuit is used for switching the power input from blades or solar panel. The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.




### 3.8 Solar Panel

The solar panel is used for the alternate production of electricity with the help of switching circuit. The panel of 400 by 250 mm size is used to produce near about 12volt.

### 3.9 CAD MODEL(Vertical Axis Wind Mill)



## 4. PROCESS INOVLVED IN FABRICATION

1. Gas Cutting

2. Arc Welding

3. Grinding

### 4.1 GAS CUTTING

A cutting torch is used to heat metal to kindling temperature. A stream of oxygen is then trained on the metal , and metal burns in that oxygen and then flows out of the cut.

**The gases used in this process are**

1. LPG

2. Helium

**Advantages of the Gas Cutting.**

- Environment friendly (reducing the emission of CO2)
- High quality of cut surface
- Reduction of man-hours for finishing after cutting
- High productivity by high-speed cutting

### 4.2 ARC WELDING

Arc welding uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point. They can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is sometimes protected by some type of inert or semi-inert gas, known as a shielding gas, and/or an evaporating filler material. The process of arc welding is widely used because of its low capital and running costs

The following gauge lengths of electrodes are used in this process 8, 10&12mm. The number of electrodes used in this fabrication is around 40-45 electrodes.

### 4.3 GRINDING PROCESS FOR FINISHING

Grinding is an abrasive machining process that uses a grinding wheel as the cutting tool and also for finishing process.Grinding practice is a large and diverse area of manufacturing and tool making. 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.

## 5 CONCLUSION

Our work and the results obtained so far are very encouraging and reinforces the conviction that vertical axis wind energy conversion systems are practical and potentially very contributive to the production of clean renewable electricity from the wind even under less than ideal sitting conditions. It is hoped that they may be constructed used high-strength, low- weight materials for deployment in more developed nations and settings or with very low tech local materials and local skills in less developed countries.

## 6 REFERENCE

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