RENEWABLE SOURCE OF ENERGY USING MAGNETIC LEVITATION WIND TURBINE

R.Sharvanan, Rahul Roy, Naveen kumar Janghe, Neeraj kumar

Abstract*: The implementation of various rotary engine sorts for power generation. The vertical axis rotary engine (VAWT) was mentioned mistreatment engineering to confirm the simplest rotary engine performance. With customary VAWT reserves, benefits at low wind speeds, higher power, low noise, etc. the most results of a customary rotary engine is that the energy lost throughout the rotation. Beneath the influence of victimization, a magnet as a perfect replacement for ball bearings means the pivot purpose of a rotating motor causes less energy loss. once magnetic repulsion results from are achieved, the spiral vanes of the rotary engine are mounted on a support for stability throughout the rotation and are suspended from magnets as replacements for ball bearings normally utilized in standard wind turbines. you'll be able to then generate energy with AN axial magnetic flux generator that features the utilization of permanent magnets and a collection of coils. The SEPIC device will then be designed to manage the AC voltage from the rectifier to output a gradual constant voltage. The rotary engine blades are mounted on the bar to confirm stability throughout the flip.

Keywords- VAWT, Magnet, Magnetic Levitation, Wind Turbine, Energy, Wind Power

1. INTRODUCTION

Renewable energies are generally electricity, wind, solar, geothermal, Hydropower and varied varieties of biomass. These sources area unit perpetually updated because of their constant replacement and handiness. The recognition of renewable energy has become vital recently. boost as conventional power generation methods are depleted and the adverse environmental impact is increasing. These new technologies were backed by cutting-edge research and breakthrough technologies, and the current uses of these new resources have been 20% to 50% of the energy consumption of the 21st century. The World Wind Energy Association estimates that by 2010, 160 GW of wind turbines will be installed worldwide, which means the projected net growth of more than 21% per year. Unlike the usual horizontal axis of a wind turbine, this design is lifted by magnetic levitation (magnetic levitation). Vertically on the rotor shaft. This magnetic levitation technology is considered effective. Replacement for ball bearings is used in the newest wind turbine and is usually performed with permanent magnets. This levitation is used between turns.

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Turbine shaft and base of all wind turbine. The design concept also includes the use of spiral blades. Due to the constant effective study of how the sail operates at other wind speeds and other factors, the appropriate shape and size of the turbine bucket suitable for the project are determined.

The setting of this variable output voltage is passed through a DC-DC converter.

2. SYSTEM MODELLING

2.1 Wind Power Generation

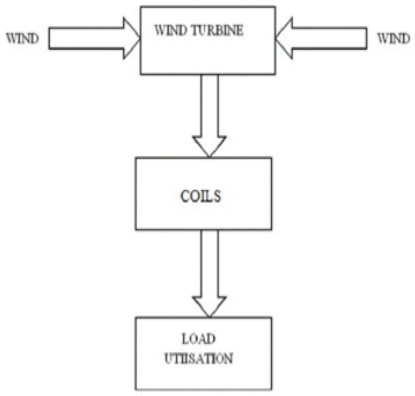

FIG – 1: Block Diagram of Wind Power Generation

When the air strikes the blade of the rotary engine, due to the action of repulsion of the magnet the rotation of the blade increase resulting in rotation of the shaft. so induced emf is generated among the generator. an associated output of a rotary engine is AC power. The bearing arrangement is totally replaced by the metal magnet that provides high repulsion. With the help of this force, a little bit of gas pressure provides a most rotation that lands up in large power generation.

2.2 The power of Wind

As mentioned earlier the effective functioning of a rotary engine is decided by the wind availability in an exceedingly

neighborhood and if the amount of power it's is tight enough to retain the blades in constant rotation.. once the wind is processing the energy accessible is kinetic due to the motion of the wind that the facility of the wind is expounded to the K.E.

Kinetic Energy = 1/2 MV2

The volume V' flowing in unit time through an area A, with wind speed V is denoted by AV and mass M is the product of Volume V' and density ρ so: M = ρAV

Putting the M in equation of kinetic energy we get:

Kinetic Energy = 1/2(ρAV)V2 = 1/2(ρAV3)

But Power is nothing but the kinetic energy generated by the turbine.

Hence, Power = 1/2(ρAV)V2 = 1/2(ρAV3)

Where: Air Density (ρ) = 1.225 kg/m3

Area (A) = Swept Area of turbine blades

Velocity (V) = wind speed in m/s

3. CONSTRUCTION OF THE PROTOTYPE

3.1 Magnet Selection

Some factors should be evaluated when choosing permanent magnets that are best suited for the implementation of the railway section of sight. Understanding the properties of magnetic materials, as well as a completely different range of sizes, shapes, and materials, are crucial. Today, four categories of commercial magnets are used, each of which has its own magnetic properties. Four completely different categories of square gauge: alnico, ceramic, the metal element, metal element, and Nd iron element, as well as the legendary NdFe-B. Nd-Fe-B is the latest addition to the current list of materials and demonstrates the best properties of all magnetic materials at temperature. In the B-H diagram shown in FIG. 2, it can be seen that Nd-Fe-B has an awfully snap-on magnetic characteristic that works with high magnetic flux and can also resist demagnetization. This property is important because the lifting load is significant, and rotation at high speeds can have an excessive downward force on the axle.

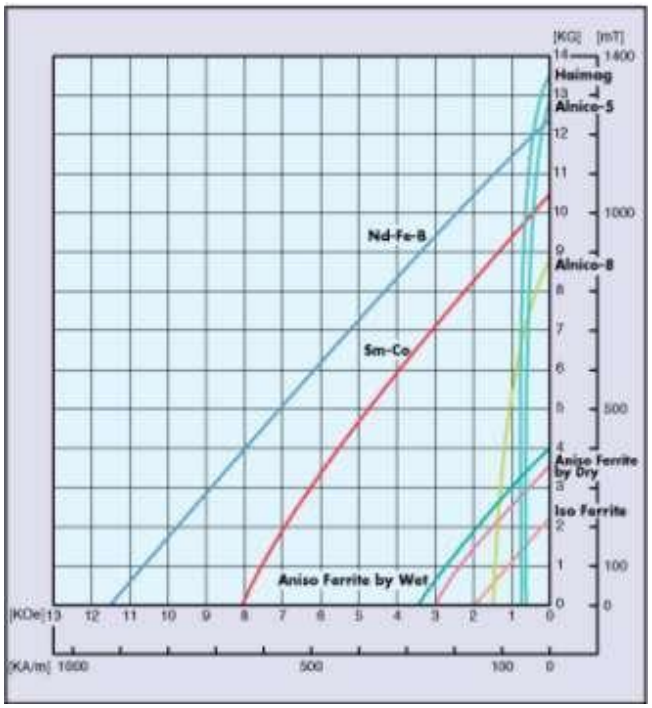

Fig -2 B-H Curve of Different Magnets

3.1.1 Magnet Placement

The next issue that has got to be thought of is that the shape and size of the magnet that's directly related to the position of the magnets. it's that levitation would be handiest directly on the central axis line where, below Associate in Nursing equally distributed load, the rotary engine center of mass goes to be found as a basic rendition of but the maglev goes to be integrated into the design. If the magnets where ring fashioned then they'll merely be fell bicycle down the shaft with the likes of poles facing toward each other. this can be ready to amendment the repelling force required to support the burden and force of the rotary engine and minimize the number of magnets needed to end the thought.

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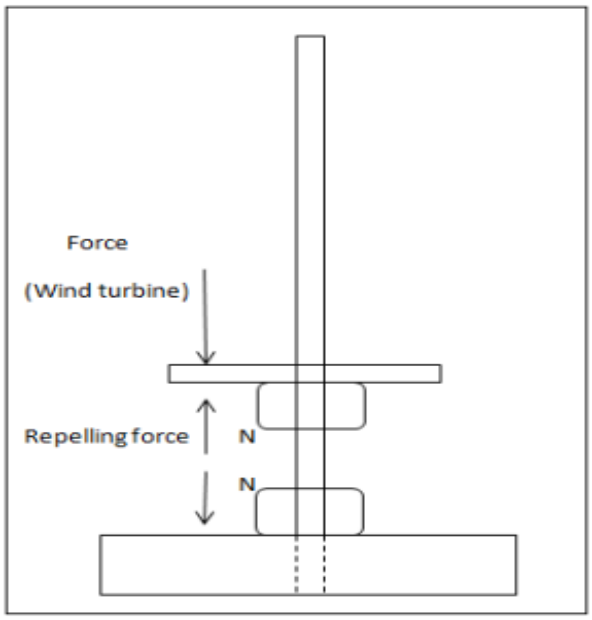

Fig -3 Magnet Placement of Nd-Fe-B

This unit of measurement Nd-Fe-B ring fashioned permanent magnets that unit of measurement nickel plated to strengthen and defend the magnet itself. The scale for the magnets squares measures low-cost with an out of doors diameter of inches, at intervals the diameter of inches and height of inches.

3.1 Coil style

The number of windings per coil produces a mode challenge. The extra windings will increase the voltage created by each coil but in turn, it will collectively increase the size of each coil. Thus on reducing the size of each coil wire with an even bigger size gage square measure usually utilized. Once the add another challenge is presented, the smaller the wire becomes the less current will flow before the wire begins to heat up due to the inflated resistance of the small low wire. A smaller gauge wire would any reduce this resistance. Once designing a generator the applying, that it will be used for, ought to be unbroken in mind. The matter that is created by an even bigger coil is that the sphere density is diminished over the thickness of the coil.

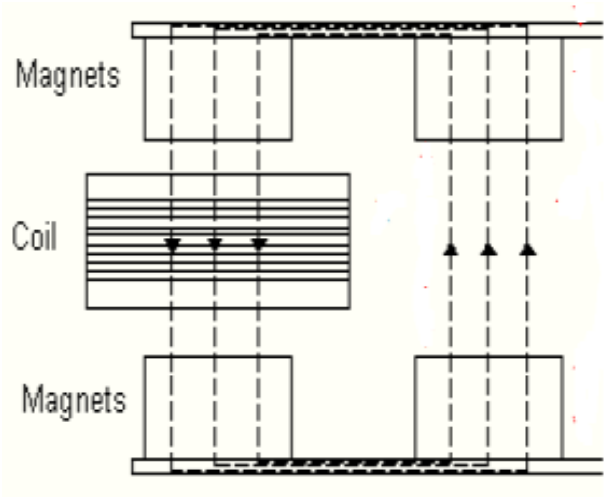

Fig -4 Coils and Magnets

This design increases the density of the field and significantly improves the output voltage. Therefore, the increased thickness of the coil increases the distance between the two magnets, thereby reducing the magnetic flux. It is necessary to find a balance between the magnitude of the required voltage and the magnitude of the required current. To increase the voltage supplied by the generator, we chose a very thick wire. If the generator needs to generate more energy, the coils can be replaced by smaller wire coils. The permanent magnets we choose to provide a very strong magnetic field.

3.2 Choosing a wind sail design

Compared to the standard Savonius design model, we slightly changed our design and turned it into a curve from the top of the sail to the bottom. This design was achieved using six triangular shapes cut from sheet aluminum. Thanks to the flexibility of the bow, we were able to turn the sail down from the top of the mine.

Fig -5 Design of the Sail

The main consider the look is that the affiliation of our generator to the mechanical device and part to the railroading train. It ought to be noted that our efficient style eliminates the blade within the higher 1/2 the Savonius model and descends from the highest of the shaft to the perimeter of the circular base, providing a downward flow characteristic. It concentrates mass torsion on the side of the sails and provides a quieter torsion throughout the rotation. The quality Savonius model for this style can produce larger instability around the shaft and bearing, that ultimately can cause an outsized load and tilt of the rotary engine.

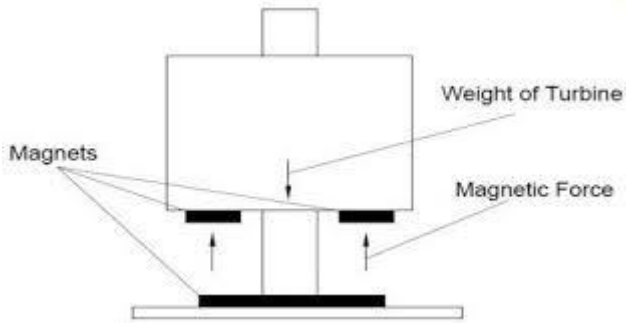

Fig-6 Scooping In Levitated Area

The presence of eight permanent magnets on the stator adds weight to the base of the sail, so little resistance is expected when the turbine starts up during operation. In our design, we expect quieter torque during rotation, as wind energy shoots at the base of the sails, and the rotors can easily and freely rotate around the shaft. It also means minimum or zero load on the levitation of the rotors and the generator using magnets, which increases the efficiency and durability of the suspension.

3.1 Methods of the induction voltage

There are three ways to cause tension.

- The path is the first path - to change the river. The axial flow generator to which we are inclined uses the dynamic flow created by the magnets to create tension. Rotating magnets jump over different coils, each of which generates its own voltage.

- Fashion The second option is to change the range of the personal coil during flow.

- The third and last method is to change the angle between the coil and the flow. Currently, several generators use this voltage control method. Some of these generators rotate coils during the field, etc., by rotating the ball around the fixed coil.

CONCLUSION

Sustainable power generation is the key to seeing the globe freelance of fossil fuels. As shortly as we tend to learn many world systems, we tend to tend to induce it right, however there area unit a number of things that may be improved. The generator itself had some rhetorical flaws, which, in our opinion, limit the ability it will turn out. With relevance to large-scale power generation, vertical axis wind turbines haven't proved their connection for these applications. Because of the structure and quality of the rotary engine with a vertical axis, the most setting for any size isn't suggested. the scale of the rotors ought to be one on the opposite and is simply too costly. Additionally, to the value, this customer doesn't wish to use the realm he will consume, and so the aesthetics of the merchandise. Horizontal axis wind turbines area unit was helpful for these applications as a result of they are doing not occupy the maximum amount of the selected space as potential. They're set high whenever they reach higher wind speeds for optimum performance. a house owner would be ready to receive clean energy at no cost, which might enjoy a discount within the value of his public services.

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