

DESIGN AND IMPLEMENTATION OF VERTICAL AXIS WIND TURBINE FROM MAGNETIC LEVITATION

Akshay K. Selokar¹, Shubham R.Talegaonkar², Prachi P. kumbhalkar³,
Prof. Rajesh Zombade⁴

1(Department of Electrical Engineering, S.R.P.C.E., Nagpur.

2Department of Electrical Engineering, S.R.P.C.E, Nagpur.

3Department of Electrical Engineering, S.R.P.C.E, Nagpur.

4Department of Electrical Engineering, S.R.P.C.E, Nagpur.

Abstract:

This project is the implementation of conventional wind power plant. There are two types of wind power plant. Horizontal wind power plant and Vertical wind power plant. In normal wind power plant kinetic energy of wind is converted into mechanical energy by its wings. It generated maximum 20RPM rotation per minute average in a day. It converted into 100 RPM by gear system, Gear box is the reason to reduce the power generation by friction losses. So we implemented a vertical wind turbine we used magnetic levitation concept, we used neodymium magnet (special case magnet) which has high magnetic strength and has high life as compared to normal magnet with its same polarity, so both pieces of magnet will repel each other and it helps the mechanical structure of wings to rotated more number of rotation so we will get more power. Gear system we eliminated completely which eliminated total losses.

Keywords- Neodymium magnet, Mag-lev, vertical axis wind turbine, wind energy to electrical energy frictionless.

I. INTRODUCTION

In choosing the vertical axis wind control plant idea for the wind turbine that is actualized as the power age bit of this venture, a specific uniqueness compared to it that don't identified with the other wind turbine outline. The trademark that set this wind generator apart from the others is that it is completely bolstered and turns about a vertical axis with the assistance of shaft. This hub is vertically arranged through the focal point of the wind wings .which takes into account an alternate kind of rotational help as opposed to the ordinary metal ball framework found in even wind turbines. This help is called maglev which depends on attractive levitation. Maglev offers a near frictionless substitute for ball bearings with little

no support. This task in view of the usage of a substitute setup of a wind turbine for control age purposes. A vertical hub wind turbine (VAWT) is acquainted by attractive levitation innovation with advance the execution. The framework use nature of lasting magnet as a swap for metal balls to suspend the turbine part and in this way limit vitality misfortunes while turning, which is the real issue that looked by customary wind turbine. The Maglev Wind Turbine is required to convey wind control innovation to the following level. Besides, the framework can be suited being used for country and urban territories of low wind speed areas. The outcomes acquired will be contrasted and the model of regular wind turbine. For comparison we are use conventional wind turbine in our project.

II Implementation of conventional wind power plant

1. Magnetic Levitation

Attractive levitation, maglev, or attractive suspension is a strategy by which a protest is suspended with no help other than attractive fields. Attractive power is utilized to balance the impacts of the gravitational speeding up and some other increasing velocities .The two essential issues associated with attractive levitation are lifting powers: giving an upward power adequate to check gravity, and steadiness: guaranteeing that the framework does not immediately slide or flip into a setup where the lift is killed Magnetic levitation is utilized for maglev trains, contactless liquefying ,attractive heading and for item show purposes.

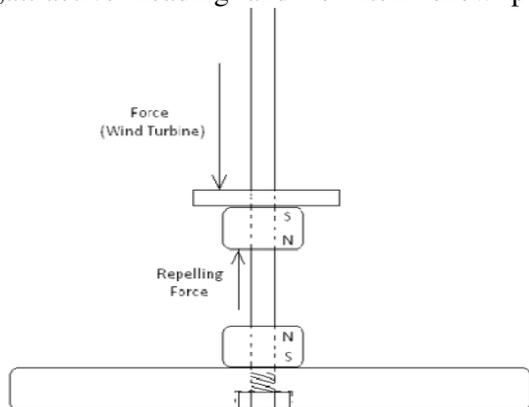


Fig.1(a) Structural diagram



Fig.1(b)Same pole Neodymium magnet

2. Magnet selection

A couple of components ought to be reviewed in picking the enduring magnet decision that would be best to execute the maglev bit of the arrangement. Understanding the characteristics of magnet materials and the various assortment of sizes, shapes and materials is essential. So we get a magnet which has all property that we required (i.e. neodymium magnet). Neodymium magnets are a person from the Rare Earth magnet family and are the most proficient never-ending magnets on the planet. They are in like manner suggested as NdFeB magnets, or NIB, since they are made generally out of Neodymium (Nd), Iron (Fe) and Boron (B).

3. Vertical axis wind turbines

Vertical-axis wind turbines (VAWTs) are a sort of wind turbine where the fundamental rotor shaft is set transverse to the wind (however not really vertically) while the primary parts are situated at the base of the turbine. This course of action enables the generator to be found near the ground, encouraging administration and repair. VAWTs did not should be pointed into the wind, which expels the requirement for wind-detecting and introduction instruments. Real downsides for the early outlines incorporated the huge torque variety or "swell" amid every insurgency, and the huge bowing minutes on the cutting edges.Later designs addressed the torque ripple issue by sweeping the blades helically

4. Practical model -

We utilized both the model ordinary wind control plant and maglev vertical axis wind control plant and looked at each other, so we get more number of turn with maglev idea then we changed over wind vitality into electrical vitality. This electrical vitality is given to 6 volts battery then it goes to transformer through an inverter circuit and we got 220 volts essentially which is our need.

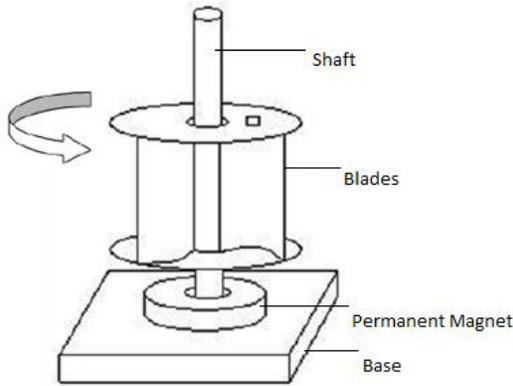


fig.4(a) Vertical axis wind power plant with maglev



fig.4(b) working model of mag-lev plant

5. Working

A Maglev wind turbine or Maglev windmill would utilize appealing levitation to supplant consistent or common bearing in layout of wind turbine. A late plan was made in china by Guangzhou Energy Research Institute under china's Academy of sciences and by Guangzhou Zhongke Hengyuan. The arrangement cases to use turns with beginning rate as low as 2 meters for reliably, and cut in speed of 3 m/s. This could fuse 1,000 hours of movement reliably to wind control plants in areas with a normal wind speed of 3 m/s. However since the essentialness open in bend changes as the third

energy of wind speed, the power made at such speeds would be lower than ordinary wind turbine under higher speed winds. The rotating turbine shaft is bolstered by alluring levitation rather than metal rollers. Appealing bearing have been utilized for littler turbines and pumps, in any case they everything considered can't oversee affect disturbing the shaft, and all around requires effectively controlled electromagnets. Making alluring heading enough solid to manage pile of wind turbine would utilize restrictive measure of energy basically keeping the electromagnet running. The chines scientist said to utilize interminable magnets to enable the rotor to shaft.

6. Mathematical calculation –

The effective functioning of a wind turbine is dictated by the wind availability in an area and if the amount of power it has is sufficient enough to keep the blades in constant rotation.

The wind power increases as a function of the cube of the velocity of the wind and this power is calculable with respect to the area in which the wind is present as well as the wind velocity.

$$\text{Kinetic energy (K.E)} = 1/2mv^2$$

Amount of Air passing is given by

$$m = \rho AV \quad \dots\dots\dots (1)$$

Substituting this value of the mass in expression of K.E.

$$\text{K.E} = 1/2\rho Av^3 \text{ watts} \quad \dots\dots\dots (2)$$

To convert power to kilo watt a non-dimensional proportionality constant k is introduced where, k = 2.14 X 10⁻³

Therefore

$$\text{Power in KW (P)} = 2.14\rho Av^3 \text{ mili} \dots\dots (3)$$

Where

m = mass of air traversing

Air Density (ρ) = 1.2 kg/m³

Area (A) = area swept by the blades of the turbine

Velocity (V) = wind speed

Summary

This paper include the diagram portion some portion of an appealingly suspended vertical rotate wind turbine. Using the effects of alluring repulsiveness, winding shaped breeze turbine sharp edges will be fitted on a post with a shaft for quality in the midst of rotate and suspended on magnets as an exchange for metal rollers which are commonly used on conventional breeze turbines. Maglev wind turbines have more inclinations over run of the mill wind turbines. For instance, they're prepared to use turns with starting paces as low as 2 meters for each second. Furthermore, they could work in winds outperforming 40 m/s. This sort of wind setup does not require any gigantic land for foundation we can present in any best of the building.

Conclusion

Mag - Lev has different applications in various fields of new and present day building layouts and advancements of new world. The point of convergence of this paper is primarily to display alluring levitation wonder in a to a great degree essential and basic way to deal with enable science and building instructional technique to likely recognize appealing levitation and its potential applications. The paper in like manner assist the showing technique with comprehending diverse benchmarks and thoughts of fascination probably ,despite the affirmation of guidelines

behind potential maglev applications, for example, maglev trains, flying cars, maglev wind turbines and alluring heading, thusly, this may in a perfect world incite them to look for after research on maglev headways to meet the appealing solicitations of the overall population at show and besides later on too.

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