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# Design and Fabrication of Highway Maglev Smart Wind Mill

Asgar Ali[1], Anas Khan[2], Devdeep Tripathi[3], Vivek Kumar[4]
[1,2,3,4]*Student, Department of Mechanical Engineering, Pranveer Singh Institute of Technology, Kanpur, India*

***Abstract*: The proposed is to consume the wind potential from fast moving vehicles in highways. Magnetically levitated vertical axis wind turbine is placed in center of the roads that would be driven by the air flow (from 1.5m/s to 40m/s) generated by the passing traffic, additionally to get the real time data such as turbine speed and wind energy generation using IOT. Novelty of this project is the utilization of air flow in highways, which is otherwise wasted and other new thing is the use of magnetic levitation in windmill.**

***Keywords*: Vertical axis wind turbine, Renewable Energy source, Maglev Windmill, Highway Windmill, Smart windmill.**

## 1. Introduction

In a day-to-day life, the demand for the electricity is much higher than the production of electric energy. One of the major problems ever since the natural resources are going to mechanical power can be used for specific tasks to rotate a generator, which convert this mechanical power into electricity.

The use of maglev technique in the vertical axis wind turbine is to reduce the friction loss and increase the rotating speed of the wind turbine in low wind speed. Maglev vertical axis wind turbine is perfectly suitable for installing in center of the roads that would drive by the moving air generated by the passing traffic. Therefore, we can achieve continuous rotation of turbine, which coupled with generator to produce electricity.

The wind energy is the fastest growing source of renewable energy. The need of wind energy is expected to increase dramatically over the next few years according to data from the global wind energy council. The terms wind energy or wind power describes the process by which the wind is used to generate electricity. Wind turbines convert the kinetic energy in the wind into mechanical power.

## 2. Literature Review

Wind is a natural power source that can be used to generate electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. This mechanical power can be used for specific task or a generator can convert this by using mechanical power into electricity. Its main benefits are that it is frictionless due to magnetic levitation design and it does not need vast spaces required by more conventional wind turbines. In addition, it requires very little maintenance. [1]

India is one of the top 5 largest wind energy producer globally after China, US, Germany, and Spain. Wind has made a significant contribution to the installed capacity of power generation and has emerged as a competitive option to fossil fuel based power generation. This is due to the multidimensional initiatives taken by the Ministry of New and Renewable Energy (MNRE) through the Wind Power Program, which aims at large scale commercialization of cost effective generation of grid quality wind power. [2]

We believe in “GO GREEN" theory. So we are trying to implement a new vertical axis wind turbine by using magnetic levitation. This paper represents maglev windmill concept. The main concept is magnetic levitation. These concepts introduced in windmill for maximization of the energy production & reduced friction. [3]

Magnetic levitation is a method by which an object is suspended with no support other than magnetic fields. The principal advantage of a maglev windmill from a conventional one is, as the rotor is floating in the air due to levitation, mechanical friction is totally eliminated. That makes the rotation possible in very low wind speeds, which is the new direction to improve the performance of wind turbines. [4]

### *A. Conclusion Drawn from Literature Review*

The Papers we have studied during our literature survey; we have find that there are different types of wind turbines available for generation of electricity. When we observe on behalf of efficient turbine, we have used vertical axis wind turbine by using magnetic lavitaion to overcome with the problem of frictional resistance.

### *B. Gap Observed*

The current project in which we are working that is efficient, but the treatment of small particle in magnet causing a problem.

## 3. Proposed Methodology

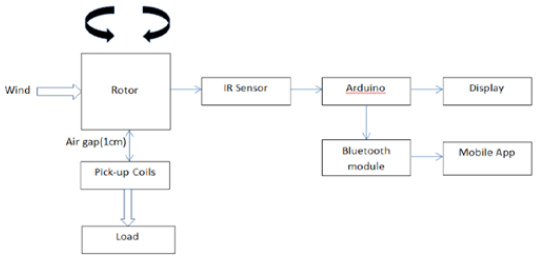


Fig. 1. Block diagram of Vertical axis smart wind mill

## 4. Devices used in Prototype and Specification

### A. *Battery*

12 V Battery is used to store the energy which is generated from vertical axis wind turbine.

### B. *Neodymium Magnet*

A Neodymium magnet the most widely used type of rare-earth magnet, is a permanent magnet made from an alloy of neodymium, iron and boron to form the $Nd_2Fe_{14}B$ tetragonal crystalline structure. They have replaced other types of magnets in many applications in modern products that require strong permanent magnets, such as motors in cordless tools, hard disk drives and magnetic fasteners. We have used 17 Neodymium magnet used in prototype model.

### C. *Maglev Vertical axis wind mill*

Maglev vertical axis wind mill the rotational axis of the turbine stands vertical or perpendicular to the ground. As mentioned above, vertical axis turbines are primarily used in small wind projects and residential applications. Vertical-Axis-Wind-mill this comes from the OEM's claims of a vertical axis turbines ability to produce well in tumultuous wind conditions. Specification of vertical wind turbine-

- Diameter: 294mm
- Length: 800mm

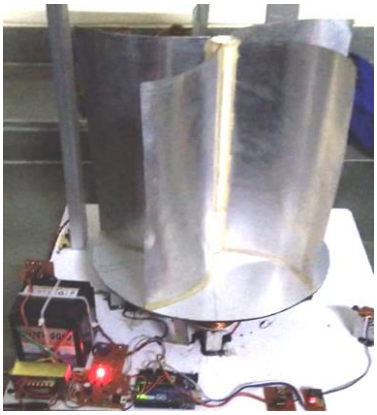

Fig. 2. Maglev vertical axis wind mill

## 5. Conclusion

On the whole the project is mainly focused on the generation of electricity by using the waste wind energy and making it smart by using IOT and Solar energy as well. This system is environment friendly. The turbine efficiency is improved by utilization of magnets helping to spin with fast speed with negligible friction. This work 24/7 with different operating condition due to the incorporation of two energy sources wind and solar.

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