

# Smart T-Box Wind Power Generation

<sup>1</sup>Prof. Piyush Desai, <sup>2</sup>Ritik kumar Saw, <sup>3</sup>Dadapatil Dattaram Avhad

<sup>1</sup>Assistant Professor, <sup>2,3</sup>UG Student

Department of Electrical Engineering

Sandip Institute of Engineering and Management, Nashik

**Abstract-** The aim of this paper is production of electrical power in a smart way that is by using fast running train. The generation of electrical power by using the concept of rotation of wind turbine due to wind which is produced by fast running train. The system which is called as T-Box could be placed in between the railroad (track) or subway and make good use of an otherwise wasted resource. The generated electric power can be utilized in various load means this output electrical power can be used in train cabin and excess electric power will be utilized by storing the power in the batteries. By using this concept, this will help to reduce the usage of non-renewable sources. By using this source, it will also help for reduction of pollution.

**Index Terms-** T-Box, Wind Energy, Wind Turbine, Railway Train, Generation, Electrical Power

## I. INTRODUCTION

The work in this paper refers to the generation of electricity by the rotation of wind turbine and the wind is caused due to the movement of train. For this, inventions like T-BOX are very helpful. As it needs only wind from passing trains to produce the energy. T-Box which is the new generation of wind power generators and has created a quite sensation among techno buffs. The T-Box is a power generated device that wind energy as trains over the railroad tracks. Another form of wind energy created due to the movement of train is very unique and energy generation does not depend on the various climatically. The energy generated from this device is produced as a consequence of human activity T-Box is designed. As we know that, Indian Railway Network is very large and denser and the railway track are in every city and every village of our country so if we installed the T-Box in India then there will be large amount of production of electricity in India.

## II. LITERATURE SURVEY

There are various researcher are research on renewable energy sources, such as wind, photovoltaic generation etc are actively encouraged and we studied all the research paper related to this particular topic. Day by day wind power generation increasing at the rate of 21 percentages annually. In 2009, 238 GW capacity of power are installed in wide range [1].

Fossil fuel usage is increasing day by day as the power demand is rising. Research and development for alternative energy sources is the need of future.

Development in renewable energy sector is good opportunity to survive in the market. Industries are inventing new ways to extract energy from renewable resources. This development is a slow process and the challenges are increasing. The renewable energy is available everyday which is required to be used efficiently to reduce fossil fuel usage. This will overcome the power deficiency and encourage the use of clean energy. [2]

Due to increasing the huge amount of electricity demand it will be very important to utilize the renewable energy sources and it will be very helpful for reducing the fossils fuels. The renewable energy sources may be wind turbines, photovoltaic and other may be distributed generations etc. By using these types of concept, it rises nearly from 5% to 20% of the total energy.

## III. SYSTEM DESCRIPTION

The T-Box is an electrical power generated device that harnesses wind energy s train run over the rail track. The wind energy is produced due to fast running train and it is very unique, as it does not depend on any natural energy sources. The T-Box produced energy without any disturbance of the normal train operation. This device is kept in between the railroad and is partially buried underground. The T-Box consists of electrical as well as mechanical component.

## IV. COMPONENTS OF T-BOX

*1. Turbine--* A turbine is a machine that converts rotational energy produced by a fast running train into usable energy or work. Turbine having shaft with blade attached. The shaft of turbine is connected to the gear box.

Kinetic energy of wind=  $\frac{1}{2}mV^2$ ----- (1)

Where

M= mass

V= wind speed

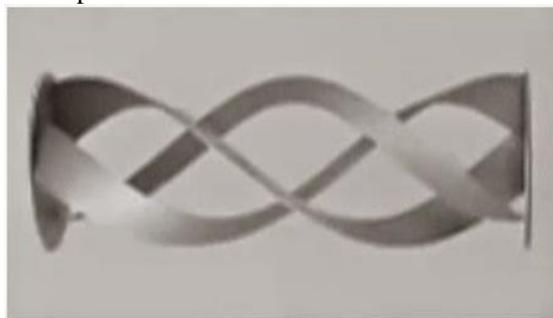


Fig (a):- Turbine

2. *DC Gear Motor*- The DC motor is a rotary electrical machine that converts direct current electrical energy in the form of mechanical energy. Normally all the DC motor having same internal mechanism, either electromechanical or electronic. A speed of DC motor can be controlled over a wide range. The shaft is connected to the DC gear motor.

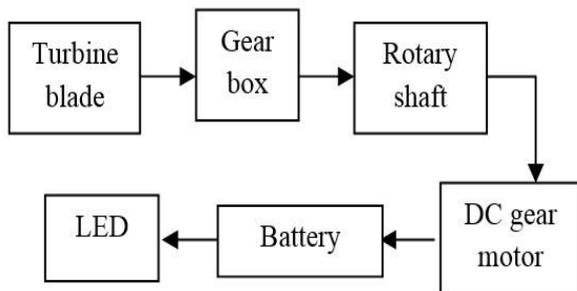
3. *Shaft*— A shaft is rotating machine component, usually circular in cross section. The shaft is used to transfer the power from one part to another part. The members like pulleys and gears re mounted on the shaft.



Fig (b):- Shaft

4. *Outer box*- The outer box of T-Box looks like a rectangular shape. Outer box is normally used for protection purpose. It protects the entire component present in the T-Box system from the atmospheric condition and the rainy season. Outer box are also help in reduce the corrosion problem.

VI. BLOCK DIAGRAM



Fig(c):- Block diagram of wind power generation

VI. WORKING PRINCIPLE

When a fast train moves over tracks produce force fully speed wind, the turbine starts rotating and the generator connected to the turbine will also rotate with gear box which will rotate the generator with a precise RPM to generate the energy.

The kinetic energy converted into mechanical energy and the mechanical energy converted into electrical

energy. The electrical energy is then store in the battery thus, the LED will glow.

VII. CALCULATION

- The distance between two sleepers is 660mm, and the distance of long rail is 1000m.
- We can place 150 T-Box for the distance of 1000m long rail.
- If train speed (average) is 200 km/hr
- 200m long train passes 1000m with the speed of 200km/hr and for this operation it only requires 22.24 seconds.
- If 1T-Box generates 0.01733kwh electric power, so 150 T-Box produced

$$150 * 0.017333 = 2.5995 \text{ kwh} = 260 \text{ kWh}$$

VIII. APPLICATIONS

- A. *It generates electrical energy from waste wind.*
- B. *Renewable energy producing*
- C. *It helps in decreasing pollution if we use it instead of the Fossil Fuel sources.*

IX. REFERENCES

- [1] Bansode Prakash, Ahire Rahul, Deshmukh Abhijit, Dhage Vikrant, Prof. Velapur Sachin.” Review on wind power generation through train”. International Engineering Research Journal (IERJ) Volume 2 Issue 1 Page 242-246, 2016, ISSN 2395-1621.
- [2] Sanket Nandan1, Swapnil Thakare, Kshitij Kulkarni, Hardik Wagh , Gunwant Magre. “T-Box wind power generation”.Vol. No. 09. Issue no. 01 january-june 2017.
- [3] Vikram Bastapure , Pravin sandbhor, Suraj Shaikh, Nilam Ghuge.” Power generation using t-box and fault detection system using PLC”. Volume: 04 Issue: 03 | Mar -2017.
- [4] S.Bharathi1, G.Balaji, and M. Manoj Kumar, “A Method for Generating Electricity by Fast Moving Vehicles.
- [5] Fink D.(2005). Small Wind Turbine Basics, Energy Self Sufficiency Newsletter, July 2005.
- [6] B. Bletterie and H. Brunner, Solar shadows, Power Engineer, vol.20, no.1, pp.27-29, 2006.