IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 71-74

Train Mounting T-Box for Wind Power Generation

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Abstract: *Today many industries are rapidly growing to the wind energy generation. Nowadays, the need of energy resources is increasing at a much faster rate. We need to capitalize all the available options to complete all our needs with ease. For this, inventions such as T-BOX are very helpful. As it needs only wind from passing trains to produce the energy. Since fasting is going on for alternative forms of treatment, T-box has created hope. This device introduces a new generation of wind energy generator producing very prominent in techno buffs. That's it however, it is important to remember, that the design is still in a conceptual state, so that in the future, the 'use and maintenance' of this device has not been resolved.*
Our evolution shows that (i) Constructing electricity using the concept of rotation of wind turbine by hawking rail. (ii) Using air-tight coat to reduce large pressure and use it to control wind flow. (iii) The mouth of casing provided with valve to control the wind flow. (iv) To provide full mechanical support to the train.

I. Introduction

Nowadays, the need of energy resources is increasing at a much faster rate. Inventions such as T-Box are very helpful. The Indian Railways Network is very large and denser. The tracks are in every city, village of the country; as it is in every part of the country then if T-Boxes are installed in India then there will be a huge production of electricity because in Indian Railways there are 1000's of trains and they run continuously and it will produce large amount of power. These TBoxes are installed in railway track means when trains are going to these tracks, then energy is produced.

But our paper can use the T-Boxes not in the railway tracks, these T-Boxes are installed in bottom side of train compartment means by using turbine mounted train on bottom side from near the ground. This was comparatively most energy saving and reduced overhead losses.

Wind energy has long been used to generate electricity through wind turbines, and has proved to be one of the most reliable renewable sources of energy in many countries of the world. The same concept is used in this project, but with a different perspective. Nowadays, the need of energy resources is increasing at a much faster rate. Inventions such as T-BOX are very helpful.

Our Goal

By wind and train, the rotation of the wind turbine is higher, due to which electricity is generated and more energy saving system. This system is designed using the concept of T-box.

In our goal of a paper: a**)** It utilizes wind energy (Non-conventional energy resource) for the generation of electricity; b) T-Box (wind turbine) can generate electricity if coupled with dynamo and exposed to fast blowing winds; c) To generate continuous power from wind energy (Day and night); d) Design and build prototype model.

Challenges

Most energy saving and reducing overhead losses.

II. Literature Review

T-BOX Wind Power Generation [1]

Authors

Sanket Nandan, Swapnil Thakare, Kshitij

Description

This paper designed a wind turbine that can be installed between two sleepers on a track as the train passes overhead.

Production of Electricity Using the Wind Turbine Mounted on a Moving Vehicle [2]

Authors

Menaka S, Archana, Adarsh Rao

Description

The main objective of this paper was that 'Generation of electricity by using concept of wind turbine rotation due to ongoing vehicle and wind". Also, this concept will help to reduce the use of large quantities of nonconventional sources. Thus this paper proposes an effective means of harnessing the wind energy[4,5]. When implemented, it will meet up the power requirement of future generation.

Production of Electricity by Using Turbine Mounted on Train [3]

Authors

Neeraj Kumar, Venkatesh Kumar Sharma

Description

This paper proposes an effective means of harnessing the wind energy by moving the train. When implemented, it will meet up the power requirements for future generation. This method is more reliable.

III. Methods And Techniques

Wind movement on the earth surface is influenced by the train, water, reserve etc. Wind or air in motion contains the kinetic energy which is converted into mechanical power by means of wind turbine which is connected to a generator for producing electricity. At present there are many ways to generate electricity but these power generation techniques result in pollution and so power generation using renewable source in essential.

This paper is thus a proper method to provide electricity using wind turbine mounted on bottom side of train. Thus power produced can provide the electricity to the various loads connected inside the train. Wind energy is one of the fastest growing source of electricity and also one of the fastest growing markets in the world today.

There are two different types of turbine: (i) Vertical axis wind turbine (VAWT), (ii) Horizontal axis wind turbine (HAWT)

Vertical Axis Wind Turbine

The main rotor shaft is in vertical axis wind turbine. Its main advantage is that the generator and gearbox can be placed near the bottom or ground. Therefore, turbine does not need to be warned in the wind.

Horizontal Axis Wind Turbine Horizontal axis wind turbine either has six blades. The six blades wind turbines are operated with blades facing into the wind. The other common wind turbine type is three bladed—down wind turbine. In HWAT the wind turns two or three aerodynamic blades mounted around a rotor shaft producing mechanical power. This power rotates the blades, and the shaft is connected to a generator normally a gear box which produces electricity.

IV. Proposed System

T-box wind power generator includes two wind turbines. Turbines are kept in two side of dynamo. Dynamo converts mechanical energy into electrical power. Power generated by dynamo is DC in nature. In this we use two side shaft dynamo for power generation. Dynamo is placed between two turbines and coupled to turbine with the help of rigid shaft coupling.

The whole assembly is installed on train at the bottom side of train. When train starts moving, air pressure is developed which rotates turbine and ultimately turbine rotates dynamo as they are coupled and electrical power is developed at terminals of dynamo (Figure 1).

Turbine Specifications

TurbineHorizontal axisRated power output 1.5 kw Dynamo Brushless PMG

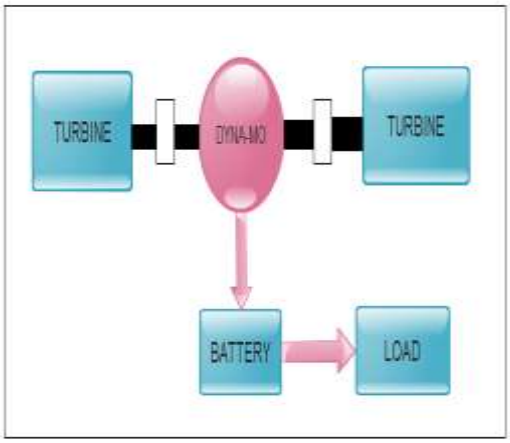

Fig. 1: Block Diagram of T-Box Wind Power Generator.

Working

When the train moves with an average speed, the wind turbine attached to it also rotates. The turbine should be placed in such a way that the wind strikes the blades. It gives the turbine a rotational movement. The turbine is placed along the path of the wind flow path that is mounted on the bottom side of train, then the blade rotates and energy is generated and this rotational energy can be converted into electrical energy which can be stored in a battery. This provides power to the various loads such as fans and lights etc.

Storage of Electrical Energy

The rotational movement of the rotor blade is converted into electrical energy by the

generator.t magnet generator is used. Permanent magnet generators use the high-field strength generated by magnets mounted on rotor. The electric energy then can be used in for other domestic uses.

Calculations

Calculating the energy available in the wind energy: ***Kinetic Energy***

The kinetic energy (KE) is the total mass M and velocity V given by the expression:

$$KE = ½ * M * v^2 \quad (1)$$

Volume

Air pollution is a pollen in a gas parcel, considering that the plane of an air turbine blades (which is a typical cross-suspension area), is going on for a specific period. y the following expression:

Density

Let ρ represent the density of the air in this parcel. The density is mass per volume and is expressed as:

$$\rho = \frac{M}{Volume} \quad (3)$$

$$M = \rho * Volume \quad (4)$$ ***Velocity***

If a time T is required for this parcel (of thickness D) to move through the plane of

wind turbine blades, then the parcel's velocity can be expressed as:

$$V = D / T \quad (5)$$

$$D = V * T \quad (6)$$

If expression of KE is:

$$KE = ½ * M * v^2$$

Substitute for M = ρ * Vol in Eq. (1)

Then$KE = ½ * (\rho * Vol) * v^2$ (7)

And substitute by $Vol = A * D$in Eq. (7)

Then $KE = ½ * (\rho * A * D) * v^2$ (8)

Substitute for $D = V * T$in Eq. (8)

$$KE = ½ * (\rho * A * V * T) * v^2 \quad (9)$$

Leaving us with: $KE = ½ * \rho * V^3 * A * T$ (10) ***Power***
If power can be calculated in kinetic energy in per unit timmr$Power = KE / T$

V. Conclusion And Future Work

Conclusion

This paper proposes an approach which is more effective and assembly of T-box is installed at the bottom side of the train. It involves the conversion of mechanical energy to electrical energy. When implemented it will meet up the power requirement for future generation; this method is more reliable.

Future Work

We are planning to give more features such as Solar Pv-wind Hybrid Power Generation System and Piezoelectric Wind Hybrid Power System.

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