

# T BOX WIND POWER GENERATION

Vrushali thok<sup>1</sup>, minal kaggate<sup>2</sup>, prajkta gawali<sup>3</sup>, shraddha kolhe, Ankita Singh<sup>4</sup>

*1,2,3Student, Department of Electrical Engineering, SVIT, Nashik, Maharashtra, India.*

*<sup>4</sup>Assistant Professor, Department of Electrical Engineering, SVIT, Nashik, Maharashtra, India.*

## ABSTRACT

*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. The electricity will be produced or generated through the wind energy as train runs over the railroad tracks. Alternative form of wind energy produced by train concept is very unique and it will be utilized to run the various loads connected to the train cabin and access generated power will be utilized by storing the power in the batteries. This propose work is an attempt to generation of electricity via renewable energy sources.*

**Keywords:** T box, wind power, batteries

## INTRODUCT

### 1.1 General

This T box is implemented or place between the two slippers (rails) at the centre of railway track. As soon as the train passes over the track, due to the pressure of the wind which is exerted on the capes of turbines. Thus, the moment of the train rotates the T box turbine blade and generates the electricity. The electricity generated due to the T box is utilized for the operation of the remote countryside areas and in rural areas where electricity is not provided.

### 1.2 Objective

Utilize the up thrust created by train around it to move the alternator turbines.

Provide a solution for power generation which won't require the extra costly land and disturbance to existing structure.

Provide this generated power to the nearby villages. So no need of transmission lines hence no transmission losses will be incurred.

The system should be ecofriendly and provide no disturbance to the external world.

## 2.PROJECT METHODOLOGY

### 2.1 WHAT IS T-BOX WIND POWER GENERATOR?



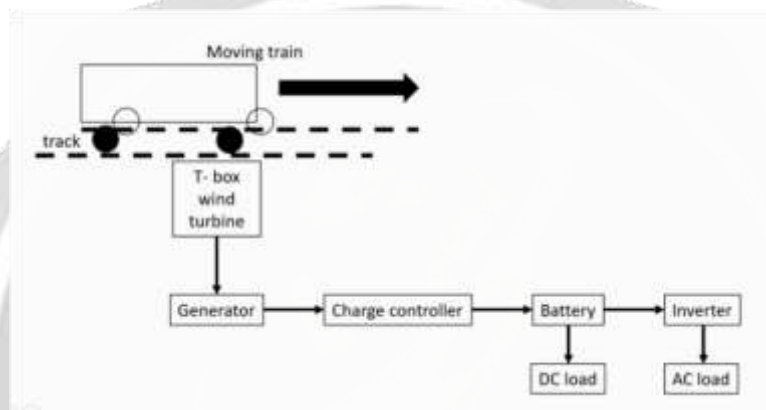
The T- box is a power generated device that harnesses wind energy as trains run over railroad tracks. This alternative form of wind energy produced by trains is very unique, as it does not depend on any natural energy sources. Instead, the energy generated from this device is produced as a consequence of human activity. The T- box device generates energy without any interference of the normal train operation – the device is installed between railroad ties, and is partially buried underground. As the train passes over the device, the wind

generated from the train spins the turbine inside the T- box to generate electricity. The T- box contains all the mechanical components required for harnessing, storing and supplying converted power. Hence, the power generated from this device can be supplied to public facilities along the railway and also to remote areas where electricity has not yet reached.

The device, called a T-Box, differs in that it is designed to be installed within the actual railing track itself. It consists of a durable metallic cylinder with vents, which allow air to flow through and rotate turbine blades housed inside. Yanko claims that a 1000 meter stretch of railroad can be retrofitted with about 150 T-boxes. Considering that a train barreling down at a speed of 200 kilometres per hour creates winds of roughly 15 miles a second, the T-boxes could generate 2.6 Kwh of electricity.

But like many similar ideas, the T-Box currently exists in the pristine world of concepts where issues like debris, dirt and maintenance issues are absent, which isn't the case in the real world. So there's a strong likelihood that train passengers will never see one in operation

### Block diagram



### Hardware required

- Bracket x2
- Main Cover
- Inside Cover
- Turbine (Blades) Internal
- 2 Vents on Inside Cover
- Side Cap x2
- Axis x2
- Flume x2
- Generator x2
- Power Generation Device
- Balance Device
- Hook

### 3. INVENTION OF T-BOX

A speeding train, for instance, produces tremendous gusts that can just as easily be converted into electricity. A couple years ago, an Indian inventor named Santosh

Pradhan proposed a modification to current trains that, according to his calculations, would have harvested as much as 10,000 megawatts of electricity each day from trains operating in Mumbai, a city in India.

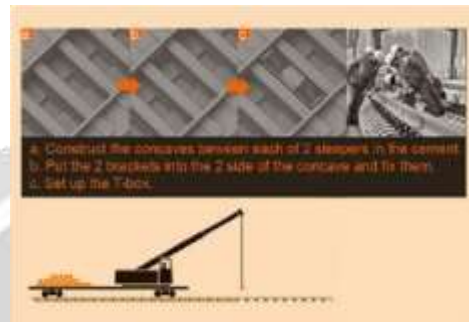
Now designers from the firm Yanko Design have seized upon the same principle and developed a device that can collect wind energy from passing trains. The technology works similarly to a wind tunnel concept put forth last year by a team of Korean designers in which miniature turbine-based generators would be strategically placed at various spots along the walls of a subway train tunnel. The idea of a train being able to utilize its very

infrastructure to generate electricity is very fascinating. Generating power by harnessing the wind energy created by fast moving trains is not an idea that may occur to the average researcher. However, two industrial designers

**China's Qian Jiang and Italy's Alessandro Leonetti Luparini have managed to develop a device that produces power by utilizing this unique form of wind energy.**

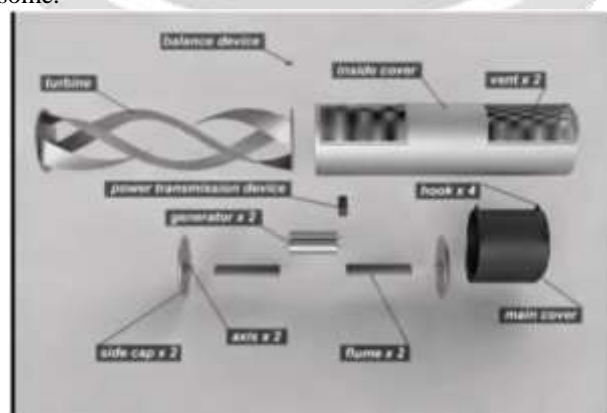
### INSTALLATION OF THE T- BOX

To fit the T- BOX on the tracks, some work has to be done on them: Firstly, Concaves have to be constructed in cement between each of two sleepers Two brackets then have to be placed on two sides of the concaves The brackets have to be examined to ensure that they are well fixed The T-box is then set upon the maneuvered tracks



### DESIGN OF T-BOX

As anyone living near railway tracks will tell you, speeding trains generate quite a bit of wind as they whoosh past. Industrial designers Qian Jiang and Alessandro Leonetti Luparini have come up with a device that's installed between the sleepers on a track, and as the train passes overhead, the wind drives a turbine to generate electricity. The T-box devices could be placed along railway or subway lines, and make good use of an otherwise wasted resource. Unlike innovations such as the Solar Roadways project and Solar Wind concept, the T-box device wouldn't have to depend on a natural energy source, but instead one that is produced as a consequence of human activity. China's Jiang and Italy's Luparini reckon that about 150 of these devices could be installed along a kilometre (0.62 miles) of track and as a train speeds along, the turbines inside the device would generate electricity. The designers say that the turbine is based on models produced by HETRONIX, although the blades are obviously designed to rotate about a central axis within the cylinder housing. Much of the T-box would be below ground level with only the vent showing, and even though the wind produced by passing trains may only come in short bursts, installing them along a busy route should result in a decent amount of energy being produced. Of course, keeping these clean and safe could be a problem. In addition to the dust and debris kicked up as the train speeds along or grime and grease deposits escaping from underneath, protecting such shiny boxes from the destructive hands of vandals could prove somewhat tiresome.



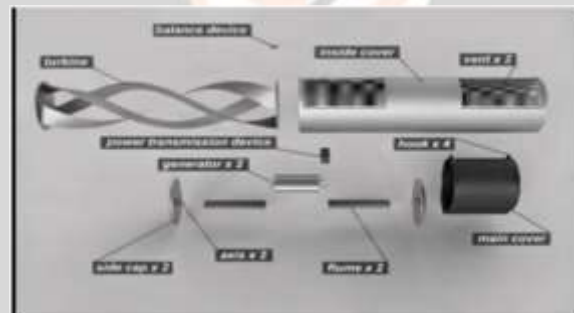
## TURBINE OF T-BOX



The designers say that the turbine is based on models produced by HETRONIX, although the blades are obviously designed to rotate about a central axis within the cylinder housing. Much of the T-box would be below ground level with only the vent showing, and even though the wind produced by passing trains may only come in short bursts, installing them along a busy route should result in a decent amount of energy being produced. Hetronix wind turbine system is the latest small wind turbine generator system designed to provide electricity which can be used on several different type applications, such as batteries charging, or standalone remote electrical power supply system. Furthermore, with the additional Power Grid Inverter, the Hetronix wind turbine system can also be connected to the power grid.

The Hetronix wind turbine system consists of a 2.5 meter rotor system and a generator which is 35cm in diameter. The 58 kilogram wind turbine is rated at 2000 watts @ 12.5 m/s wind. The Hetronix wind turbine system features superior low windspeed blade design which provides great performance, very high system efficiency, and low noise. The Hetronix wind turbine system also provides the optional monotower kit and guyed tubular tilt tower kit.

### Construction



The construction of the T-Box power generator is as shown in the figure above.

The elliptical strips are wound around the central axis of the structure.

This axis is coupled with the shaft of the generator. So, both rotates at the same time.

This structure is enclosed in a steel capsule. A net is provided near the blades structure, so as to facilitate the air pressure to be exerted on the blades.

This type of structure helps is protect from external stones or dust to enter into the blades to harm it.

The generator output is then taken outside to the control room box, where the charge controller is fitted.

The output from the charge controller is then fed to the battery, which is to be charged for DC illumination purpose.

Furthermore an inverter is provided to step up the voltage to AC and pass onto the grid of 50 Hz. Frequency.

In this way, a robust and protective T-box structure is described of the project for installation.

### Working

When the train moves on the railway track, it creates a high pressure force around it. This force is exerted on the T-box wind turbine blades.

This blades are in the form of vertical axis wind turbine.

So the movement of blades in turn rotates the shaft of the generator coupled with it.

Due to the Faradays law of electromagnetic induction, electromotive force is induced in the conductor. Thus electricity is generated and passes through the conductor.

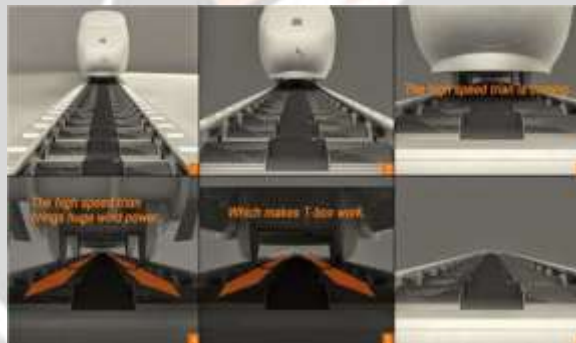
This electricity is then passes through the buck boost converter module, which limits the voltage output to the required 12v of the battery. Thus the charger voltage is controlled for permissible voltage.

Thus the battery is charged with the help of moving train.

Further this stored charged can be used to illuminate the premises directly.

Further this electricity is inverted to power the AC sources through the Mosfet powered AC inverter of 230 Volts AC.

### HOW IT WORKS?



### Advantages and Disadvantages

#### Advantages

- Will help contribute to national electric demand.
- Rather than national level, it can surely help fulfill electricity demands of nearby villages.
- No extra space will be required, since it will be placed underneath the existing track.
- Less installation cost.
- It is Ecofriendly. As, it does not emit any Carbon contents it does not harm environment and also it helps in decreasing pollution if we use it instead of the Fossil Fuel sources.



- It is Cheaper. Construction of TBox is very easy and also it does not cost so much.
- Easy to install. It is very easy to install.
- Needs less maintenance & has less chances of Failure.

### Disadvantages

- Since it is a moving part, regular maintenance will be required.
- Theft protection will be needed to protect it.

## CONCLUSION AND FUTURE SCOPE

### Conclusion

T-BOX WIND POWER GENERATOR is a device which can help in parallel with the Wind Mills across the World. As we already know that in the Setup of those large Wind Mills we need to invest so much of money. Also, they need a large area for it because in Wind Farms they should be in large in numbers, then only they will produce electricity. Also, one drawback is that they are variable and totally depends upon winds and that is why they can't produce continuous electricity. The T-BOX is to be setup between the rail sleepers by making only a concave space and by using two brackets it can be easily install. It is very small in size as compared to Wind

Mills and also don't need extra space. These can be really useful in those places where electricity is not available. These T-

BOX need less capital investment compared to the solar panel installation of same capacity. Also, they produces more energy in terms of space taken by them. As

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 runs continuously and it will produce large amount of power.

### Future Scope

This project is consists of two part that is hardware and software. The hardware will be the bicycle and the software is the program of the controller to control the operation bicycle. To be more specific about this project, there will be using several things that are:

### REFERENCES.

[https://www.youtube.com/watch?v=jIOE0\\_o59ftg](https://www.youtube.com/watch?v=jIOE0_o59ftg) <http://gisr07.hubpages.com/hub/The-T-Box-A-New-Generation-WindPowerDevice> <http://www.indianrailways.gov.in>  
<http://www.gizmag.com/tbox-conceptwould-capture-wind-energy-fromspeeding-trains/18272/>  
<http://www.coroflot.com/jq/t-box/> [www.yankodesign.com/2011/03/22/power-to-the-fast-tracks/](http://www.yankodesign.com/2011/03/22/power-to-the-fast-tracks/) <https://images.google.com/> <http://www.wikipedia.org/>