

“POWER GENERATION USING T-BOX AND FAULT DETECTION SYSTEM USING PLC”

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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 produced will be utilized to run the various loads connected to the train cabin and excess generated power will be utilized by storing the power in the batteries. This proposed work is an attempt to generation of electricity via Renewable Energy Sources and detection of fault within system via PLC controlling. Which will ultimately reduce the human efforts. T-Box which is the new generation of wind power generators and has created a quite sensation among techno buffs. However the design of techno buffs is still at conceptual stage and maintenance and preservation issues are the important issues to implement this device.

Key Words: T-Box, Power generation, Wind turbine, PLC controlling.

1. INTRODUCTION

Due to the rapid depletion of fossil fuels and rising the huge demand of electricity it is very necessary to use the Renewable Energy Sources for utilization of Electrical Energy using renewable energy sources to satisfy rising demand of electricity. The interconnection of renewable energy sources including wind turbines, photovoltaic (PV) and other distributed generation etc. has raised concern in the last few years. Hence it becomes a General trend to increase the electricity production using renewable energy systems. According to the survey, in the last few years there is great increase in the use of wind energy and other renewable energy systems. This increase is nearly from 5% to 20% of the total energy used. Also in the year 2014-15 there is drastic increase in the use of wind energy as compare to last decade.

In order to utilize these renewable energy sources more effectively and fulfill power quality requirement T-Box concept is proposed more recently. 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 depends on the various climatically

condition. The T-Box is the combination of the various mechanical components which are required for harnessing, storing and supplying converted power.

Hence, the power generated from this device can be supplied to the public facilities along the railways and also the remote areas where electricity is not reached. Along with that implementation of T-Box is very eco-friendly as it does not produce any side effects on the environment. And detect the fault using programmable logic controller (PLC)

2. SYSTEM DESCRIPTION

This system is particularly based on the generation of electricity via wind energy. The device T-Box is implement or place between two slippers the center of rail tracks.as soon as the train passes over the track, due to the pressure of the wind which is capes of turbine used due to movement of the train rotates the T-Box turbine plate and generates the electricity. The electricity generated due to the T-Box is utilized for the operation of remote areas and in rural areas where electricity is not provided

3. T-BOX WIND POWER GENERATOR

The T-box is a power generated device that wind energy as trains run over railroad tracks. This alternative form of wind energy produced by trains is very unique. The energy generated from this device is produced as a consequence of human activity T-Box is designed

Designed to rotate about a central axis within the cylinder housing. The wind turbine system consists of a 1 meter rotor system and a generator which is 25 cm in diameter. Stand-alone remote electrical power supply system

4. INSTALLATION OF T-BOX



Pic 1: Turbine of 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 tracks.

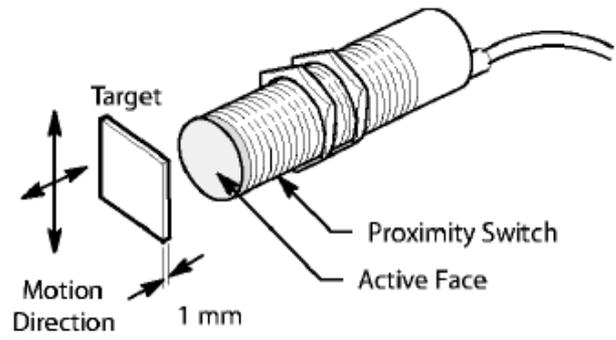


Fig 2.- Proximity Sensor

The active face of an inductive proximity switch is the surface where a high- frequency electro- magnetic field emerges. Principles of Operation for Inductive Proximity Sensors Inductive proximity sensors are designed to operate by generating an electromagnetic field and detecting the eddy current losses generated when ferrous and nonferrous Metal target objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger- signal level detector and an output circuit. As a metal object

Advances into the field, eddy currents are induced in the target. The result is a loss of energy and a smaller amplitude of oscillation. The detector circuit then recognizes a specific change in amplitude and generates a signal which will turn the solid- state output .ON" or .OFF."

A metal target approaching an inductive proximity sensor (above) absorbs energy generated by the oscillator. When the target is in close range, the energy drain stops the

Oscillator and changes the output state. A metal target approaching an inductive proximity sensor (above) absorbs energy generated by the oscillator. When the target is in close range, the energy drain stops the Oscillator and changes the output state.

SR.NO.	AIR PRESSURE (bar)	VOLTAGE (volt)
01	0.6	22.4
02	1.2	40.60
03	3	54.20
04	5	65.3

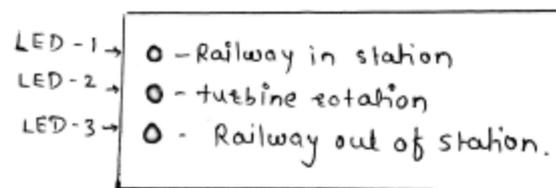
Table- Output of T-Box

1000 meter stretch of railroad can be retrofitted with about 150 T-boxes. Considering that a train barrelling down at a speed of 80-90 kilometres per hour creates winds of roughly 15 miles a second, the T-boxes could generate 2.6 Kwh of electricity.

5. PLC CONTROLLING AND PROGRAMING

The main purpose of PLC is for controlling and indication of whole system so in this project we are use ALLEN BRADLY PLC for controlling. In project we using ladder diagram for indication of proximity sensor on control panel

In this we use Inductive Proximity Sensors Standard Target for Inductive Proximity Sensors



LED-1 Indicate Train coming in to station
 LED-2 Indicate Turbine rotation
 LED-3 Indicate Railway Out of station

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