

# Power Generation Using Railway Track and Energy Saving

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**Abstract:** Man in his lifetime, uses energy in one form or the other. In fact whatever happens in nature, results, out of the conversion of energy in one form or the other? The blowing of the wind, the formation of the clouds and the flow of water are a few examples that stand testimony to this fact. The extensive usage of energy has resulted in an energy crisis, and there is a need to develop methods of optimal utilization, which will not only ease the crisis but also preserve the environment. In this paper the electricity is generated through the sliding mechanism. For obtaining the electricity through the sliding mechanism a prototype model is developed and studied. Findings from this research work are discussed in this project. This research work used a permanent magnet D.C. generator thereby generating 24 Volt D.C. This D.C. voltage is stored to the lead 12volt battery. Electricity stored in battery is used to activate the light, fan etc. By increasing the capacity of the battery power rating is increased.

**Keywords:** Energy, Sliding Mechanism, Electricity Stored, .

## Introduction

Electricity is one of the most widely used forms of energy. Today also there is great scarcity of electricity. In this study an innovative concept of Generating Electricity from moving vehicles is presented i.e. Railway Track Power Generator by Using Flip Plate Mechanism. Producing electricity from a Railway Track power generator is a new concept that is undergoing research. The number of vehicles on Railway Track is increasing rapidly and if we convert some of the kinetic energy of these vehicle into the rotational motion of generator then we can produce considerable amount of electricity, this is the main concept of this project. Today our whole life style is dependent on electricity. With the increasing population the use of electric power is also increasing. But we know that the resources to generate electricity are limited, and this has lead to the energy crisis. During this scenario we need to generate electricity from the things used in day-to-day life. In this project the speed breakers present on Railway Track s are used to generate electricity. As we know that vehicles on Railway Track are increasing day by day which will help us to generate electricity as these vehicles pass through the speed breakers? This electricity generated can be used for different purpose such as lighting of signals and streetlights on Railway Track etc.

The principle of the electric power generation using sliding mechanism is very simple. It is based on the same principle as in the case of electricity generation in case of hydroelectric power plant, thermal electric power plant, nuclear power plant, geothermal energy, wind energy, tidal energy etc. In all of the above power plant mechanical energy is converted into electrical energy. In this setup also mechanical energy is converted into electrical power using a D.C. generator. Here the vertical motion of the top of the sliding plate is converted into the rotational motion, which in turn rotates the generator and generates electricity. Indian Railway is having largest network in Asia, where their services are utilized by almost every human being irrespective of the fact whether they are rich or poor it is also not out of point to mention here that requirement of electricity is much more as compared to its generation by various sources. Hence on date stress to conserve electricity by one and all has become the prime responsibility. Government of India has also realized this fact and accordingly parliament had passed "Energy conservation Act 2001" with as clear direction that Bureau of Energy Audit, Chennai will enforce discipline in this field. In Railways, it is earnest felt to go for the use of energy efficient right fittings equipped with electronic chokes, CFL lights, fans with electronic regulator, extensive use of time switches in the station circulating area and also to design circuits to eliminate dependency on man power in switching on off ' the righting circuits. use of incandescent ramps be banned as it consumes more energy also in Railway marshalling yards old high wattage mercury light fittings be replaced by metal halide fittings as these consumes less power produces equal or more luminous intensity. Various energy efficient measures are being therefore, described in detail for adoption in railways on war footing to conserve electrical energy to a reasonable extent

## PART A – GENERATION

### Working Mechanis



Fig, Working Model of Power Generaton

Railway Track Power Generation (RPG) is a system design to capture waste and kinetic energy from all vehicles. This device converts the kinetic energy of the vehicles into electric energy. This is done by moving flap installed on the Railway Track, this flap captured very small movement from the Railway Track surfaces and it transferred to a key way flywheel system. From hundreds of wheel lies a single flywheel having used to driving machinery. The RPG included the method of driving one flywheel to another, once it reached predetermining velocity. The RPG flywheel system has been developed to achieve large amount of moment of inertia in relatively small space. The captured energy is converted into electricity which is fed into power grid. In this project the two sliding flap are mounted on the Railway Track surface and these flap are followed by the sliding mechanism arrangement. Sliding flap are mounted on the shaft which is attached to the frame via bearing. Spring arrangement is made for flexible sliding motion of sliding flap when vehicles are moving on the Railway Track. Frame is installed under the Railway Track. And the shaft rod is connected to sprocket. This sprocket will convert sliding motion into rotary motion. This sprocket arrangement is connected to the gear arrangement. Gear is mounted on the D.C generator. As wheel of the vehicle reaches upper most position of the plate, flap get slide through guide; simultaneously shaft moves sliding provide torque to sprocket. The sprocket transmitted this torque to shaft. Shaft is supported by two bearings attached on wall of frame. The shaft having gears and flywheel arrangement on shaft through one way bearing. This arrangement functions to enhance rotation of flywheel for small motion of shaft. The bigger gear has coupled with smaller gear mounted on the D.C. generator shaft. The d. c. Generator converts the rotation of smaller gear into electricity.

### Methodology

#### DESIGN OF MACHINE:-

In our attempt to design a special purpose machine we have adopted a very a very careful approach, the total design work has been divided into two parts mainly;

- System design
- Mechanical design

System design mainly concerns with the various physical constraints and ergonomics, space requirements, arrangement of various components on the main frame of machine no of controls position of these controls ease of maintenance scope of further improvement; height of m/c from ground etc.

In Mechanical design the components are categories in two parts.

- Design parts
- Parts to be purchased.

For design parts detail design is done and dimensions thus obtained are compared to next highest dimension which are readily available in market this simplifies the assembly as well as post production servicing work. The various tolerances on work pieces are specified in the manufacturing drawings. The process charts are prepared & passed on to the manufacturing stage. The parts are to be purchased directly are specified & selected from standard catalogues.

## PART B – ELECTRICITY SAVING

The 80 Percent of the power generation in India is by thermal power plant which has 35 Percent efficiency T D roses are 20-25 Percent in some cases over 50 Percent. The T D losses reduction measures being adopt by supply companies at their own level. However, at consumers level electrical energy saving measures should adopt at own by energy auditing, demand management control, automated load shedding energy balancing, economic power purchase planning, power factor management for best utilization is required. Exhaustive study needs for righting at industries/ workshops, street rights specially during midnight to

morning alternate fittings may be switched off by making suitable arrangements, as the railways is doing good job at station platforms, colonies, Indian Railways have been doing rigorous efforts on energy savings in General services Traction supply system for a long period pay to the nation in terms of precious energy output with the phrase „Energy Saved Energy generated ” .In due course the major steps are being taken in to replacement of conventional chokes by electronic choke Resistance type of Fan regulators by electronic fan regulators, Human sensors for AC units righting circuits, halls, committee rooms chambers etc., high efficiency righting fixtures at platforms, yard lighting, offices, streetlights. several type of timers, dimmers electronic gadgets for energy savings. As well as in its workshops, production units, high efficiency compressors, exhausters being used with soft starters, cranes elevators with VVVF motor.

### Advantages

Generation of power without polluting the environment.

- Simple construction, mature technology and easy maintenance
- No fuel transportation required.
- No consumption of any fossil fuel which is nonrenewable source of energy.
- No external source is needed for power generation.

### Disadvantage

- Complex circuit is required
- It is insu cient on station where frequency of train is more Is has electronic component hence less reliable

### Application

Power generation using speed breaker system can be used in most of the places such as:

- This technique can be used in all highways.
- This technique can be used in all Railway Track ways Speed brake.
- This mechanism of generating of electricity can be placed on the actual speed breaker of the Railway Track s.
- The power is Generated when the vehicles pass through it. Which in can be stored in the battery.
- Thispower can be used in many Places after using the inverter, which enhances in the voltage from 12 volts to 230 volts.
- This power can be used in the following:
- Street Lights.
- Railway Track Signals.
- Sign boards on the Railway Track s.
- Lighting Of the bus stops.
- Lighting of the check post on the highways etc

### Conclusion

Railway Track Power Generation is a new type of unconventional source of energy.

This uses wasted energy of moving vehicles. It converts kinetic energy developed from moving vehicles to electric energy. RPG is possible answer for battery charging station and also for the lightning of the street light. The higher frequency of passing vehicles provides higher capacity.

As a fact only 11% of renewable energy contributes to our primary energy. If this project is deployed then not only we can overcome the energy crises problem but this also contributes to create a healthy global environmental change.

### Future scope

This project is designed for Railway Track power generation is specifically used on highways, entrance and exit of school, college and companies.

Entrance and exit of malls. It can be installed at toll booths, bus stands, airports and railways parking zone electricity generated by Railway Track power generation.

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