

Power Generation From Speed Breaker

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Defination

- This device converts the Potential energy of the vehicles into electric energy.
- This is done by moving plate installed on the road, this plate take the stroke motion of the vehicles and convert it to the rotary motion by crank mechanism and than dynamo generates the electricity.

Why Should We Select This Project?

- In the present scenario power becomes major need for human life. Due to day-to-day increase in population and lessen of the conventional source, it becomes necessary that we must depend on non-conventional source for power generation.
- The automotive industry in India is one of the largest in the world and one of the fastest growing globally.

- India's passenger car and commercial vehicle manufacturing industry is the seventh largest in the world, with an annual production of more than 3.7 million units in 2010. We every day mesh up with these vehicles give us headache.
- But this mesh up could be answer of new type power generation.
- Speed Breaker Power Generation (SBPG) is one of the most recent power generation concepts.

- This device is engineered as a practical and useful alternative energy technology for generating clean electricity from the millions of vehicles on our roadways .
- Once fully optimized and installed, engineers anticipate that devices may be used to replace conventional electrical supplies for powering roadway signs, street and building lights, storage systems for back-up and emergency power, and other electronics appliances, and even devices used in homes and businesses.

- An amateur innovator in Guwahati has developed a simple contraption that can generate power when a vehicle passes over a speed breaker. The innovation has caught the eye of the Indian Institute of Technology (IIT), Guwahati, which will fund a pilot project to generate electricity from speed-breakers. IIT Guwahati has evaluated the machine and recommended it to the Assam ministry of power for large scale funding.

- A K Das, a professor at IIT's design department says it is a 'very viable proposition' to harness thousands of mega watts of electricity untapped across the country every day.

- A survey has been conducted about electricity consumption from Tamil Nadu electricity board website. It says that: The amount of electricity consumed in one night by all the street lights around Chennai city is equal to consumption of electricity in a remote village for one month and 14 day. This survey inspired us a lot and made us to think about saving this wasted power which made us introduce this new technique.

Project Background

- Our project is based on future demand and future demand is electricity.
- By using some research paper which have been published by expert, we implement the rack and pinion mechanism in our project.
- Rack and pinion mechanism provides more efficiency than other mechanism like roller, crank and shaft etc.

- In this world where there is shortage of electrical power supply, this project will be helpful to solve the power crisis to some extent. This project has some advantages such as; it is economical and easy to install, free from all types of pollutions well as maintenance cost is low .Speed breaker power generator prototypes have been designed, built and experimentally tested. The generator relies on the use of different gear combination to harness power from the speed breaker. This concept is quite promising due to its good efficiency as well as energy recovery criteria.

Voltage generated VS Speed of vehicle

Sr. no.	Speed of vehicle (km/hr)	Voltage generated (volts)
1	10	8.93
2	20	7.32
3	30	6.05
4	40	5.65

Voltage generated & Load of vehicle

Sr. no.	Load(kg) of vehicle	Voltage generated (volts)
1	360	8.33
2	430	9.57
3	470	10.44
4	500	11.34

Objective

- The challenges inspired us a lot and made us to think about for generating mechanism to save the wasted power from automobiles to generate electricity
- To select an alternate source for generation of electricity for lightening the streets
- To design, develop and performance evaluation of the mechanical setup of the project work.
- To generate electricity at low price
- Ecofriendly system
- Using wasted kinetic and potential energy of vehicle at speed breaker

Scope Of Project

- The utilization of energy is an indication of the growth of a nation.
- For example, the per capita energy consumption in USA is 9000 KWh (Kilo Watt hour) per year, whereas the consumption in India is 1200 KWh (Kilo Watt hour). One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy.
- A recent survey on the energy consumption in India had published a pathetic report that 85,000 villages in India do not still have electricity.

- Supply of power in most part of the country is poor. Hence more research and development and commercialization of technologies are needed in this field.
- India, unlike the top developed countries has very poor roads. Talking about a particular road itself includes a number of speed breakers. By just placing a unit like the “Power Generation Unit from Speed Breakers”, so much of energy can be tapped.
- This energy can be used for the lights on the either sides of the roads and thus much power that is consumed by these lights can be utilized to send power to these villages.

Methodology

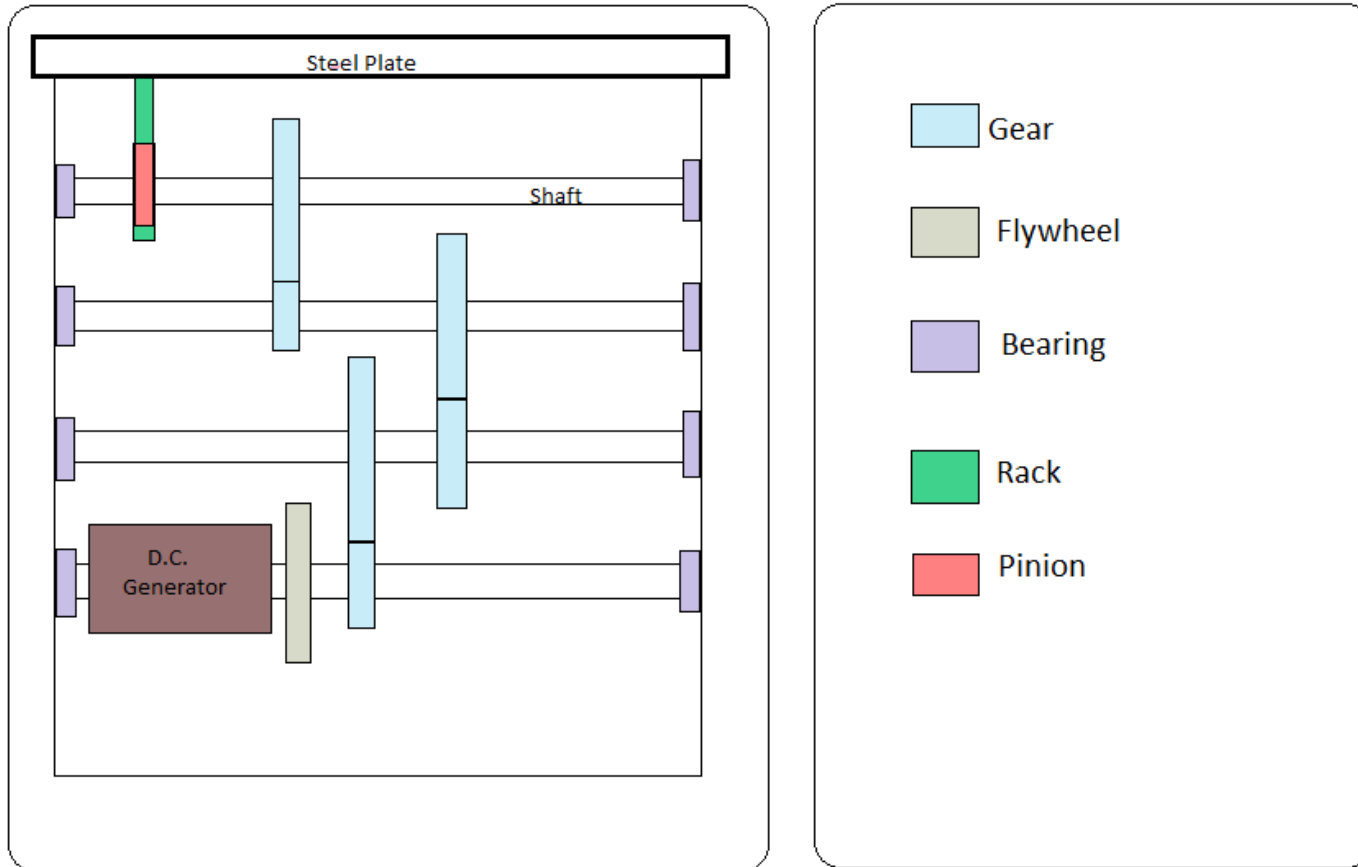


Working Principle

- Power generation from speed breaker (PGFSB) 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 plate installed on the road, this plate captured very small movement from the road surfaces and it transferred to rack and pinion arrangements.
- Here the reciprocating motion of the speed-breaker is converted into rotary motion using the rack and pinion arrangement. The axis of the pinion is coupled to a gear arrangement. Here we have two gears with different diameters. The gear wheel with the larger dimension is coupled to the axis of the pinion. Hence the speed that has been multiplied at the smaller sprocket wheel is passed on to this gear wheel of larger dimension.

- The smaller gear is coupled to the larger gear. So as the larger gear rotates at the multiplied speed of the pinion, the smaller gear following the larger gear still multiplies the speed to more intensity. Hence, although the speed due to the rotary motion achieved at the pinion is less, as the power is transmitted to gears, finally the speed is multiplied to a higher speed. This speed which is sufficient to rotate the rotor of a generator is fed into to the rotor of a generator. The rotor which rotates within a static magnetic stator cuts the magnetic flux surrounding it, thus producing the electric motive force (emf). This generated emf is then sent to an inverter, where the generated emf is regulated. This regulated emf is now sent to the storage battery where it is stored during the day time. This current is then utilized in the night time for lighting purposes on the either sides of the road to a considerable distance.

Fig: Schematic Dia. Of Mechanism



Literature Review

- **A Novel Speed-Breaker for Electrical Energy Generation Suitable for Elimination of Remote Parts of Power Systems where is Near to Roads**
- Mohsen Partodezfoli¹, Abbas Rezaey¹, Zahra Baniasad¹, Horieh Rezaey¹¹Department of Electrical and Computer Engineering, Islamic Azad University, South Tehran Branch, Tehran, Iran
- This device converts the kinetic energy of the vehicles into electric energy. This is done by moving plate installed on the road, this plate take the stroke motion of the vehicles and convert it to the rotary motion by crank mechanism and it generates the electricity

- **Development of speed breaker device for generation of compressed air on highways in remote areas**
- Ashok Kumar Sharma¹, Omkar Trivedi², Umesh Amberiya², Vikas Sharma² Associate Professor, Department of Mechanical Engineering, YIT, Jaipur, India
Student, Department of Mechanical Engineering, YIT, Jaipur, India
- Roads and highways in India are provided with speed breaker to control the speed of traffic in congested areas. This energy loss on speed breakers can be utilized for useful purposes. This paper describes the potential of such type of energy available on roads and its utilization for useful work. The stages of development of a speed breaker device are described and the mechanism to generate and store compressed air that can be further used for desired purpose is elaborated.

- **Power Generation Using Speed Breaker with Auto Street Light**
- Amanpreet Kaur¹, Shivansh Kumar Singh², Rajneesh³, Parwez⁴, Shashank⁵ AP, EIE Dept, Galgotias College of Engineering and Technology, Gr. Noida, U.P
1 Student, EIE Dept, Galgotias College of Engineering and Technology, Gr. Noida, U.P
- The energy crisis is any great bottleneck in the supply of energy resources to an economy. The studies to sort out the energy crisis led to the idea of generating power using speed breaker. Firstly, South African electrical crisis has made them implemented this method to light up small villages of the highway. The idea is basic physics, to convert the kinetic energy into electrical energy that gone wasted when the vehicle runs over speed-breaker. Since then, a lot has been done in this field

Thank

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