

## Speed Breaker Power Generation System

**Rajat Bametha**

UG Student,  
Dept. of Mechanical  
Engineering,  
Dr. D.Y.Patil Institute of  
Technology,  
Pimpri, Pune.

**Anoop Jadwani**

UG Student,  
Dept. of Mechanical  
Engineering,  
Dr. D.Y.Patil Institute of  
Technology,  
Pimpri, Pune.

**Manvendra Pratap Singh**

UG Student,  
Dept. of Mechanical  
Engineering,  
Dr. D.Y.Patil Institute of  
Technology,  
Pimpri, Pune.

**Prof. Abhishek Dabb**

Professor,  
Dept. of Mechanical  
Engineering,  
Dr. D.Y.Patil Institute of  
Technology,  
Pimpri, Pune.

### **Abstract:**

*This project harvests energy from speed breaker by making gear arrangement and using gadgets. Large amounts amount of electricity can be generated saving lot of money. And if implemented will be very beneficial for Government. When vehicle is in motion it produces various forms of energy like, due to friction between vehicle's wheel and road i.e. rough surface HEAT Energy is produced, also when vehicle traveling at high speed strikes the wind. The output of this shaft is coupled to a dynamo to convert kinetic energy into electricity. Practical testing of the system has been done with different loads at different speeds. The utilization of energy is an indication of the growth of a nation. One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy. And this project is best source of energy that we get in day to day life.*

**Keywords:** Road power generation, rack and pinion, DC motor etc.

### **INTRODUCTION:**

In the present scenario power becomes the major need for human life. The availability and its per capita consumptions are regarded as the index of national standard of living in the present day civilization. Energy is an important input in all the sectors of any countries economy. Energy crisis is due to two reasons, firstly the population of the world has been increased rapidly and secondly standard of living of human beings has increased. India is the country, which majorly suffers With lack of sufficient power generation. The availability

of regular conventional fossil fuels will be the main sources for power generation, but there is a fear that they will get exhausted eventually by the next few decades. Therefore, we have to investigate some approximate, alternative, new sources for the power generation, which is not depleted by the very few years. Another major problem, which is becoming the exiting topic for today is the pollution. It suffers all the living organisms of all kinds as on the land, in aqua and in air. Power stations and automobiles are the major pollution producing places.

### **BASIC PRINCIPLES:**

- Simple energy conversion from mechanical to electrical.
- To generate electricity using the vehicle kinetic energy as input.
- We can develop electricity from speed breakers.
- They are using Rack- Pinion mechanism.

While moving, the vehicles possess some kinetic energy and it is being wasted. This kinetic energy can be utilized to produce power by using a special arrangement called SPEED BREAKER. It is an Electro-Mechanical unit. It utilizes both mechanical technologies and electrical techniques for the power generation and its storage. SPEED BREAKER is a domelike device. Whenever the vehicle is allowed to pass over the dome it gets pressed downwards then the springs are attached to the dome are compressed and the rack which is attached to the bottom of the dome moves downward in reciprocating motion. Since the rack has teeth connected to gears, there exists conversion of reciprocating motion of rack into rotary motion of gears but the two gears rotate in opposite

direction. A flywheel is mounted on the shaft whose function is to regulate the fluctuation in the energy and to make the energy uniform. So that the shafts will rotate with certain R.P.M. these shafts are connected through a gear drive to the motor, which converts the mechanical energy into electrical energy.

The conversion will be proportional to traffic density. Whenever an armature rotates between the magnetic fields of south and north poles, an E.M.F (electro motive force) is induced in it. So, for inducing the E.M.F armature coil has to rotate, for rotating this armature it is connected to a long shaft. By rotating same e.m.f, is induced, for this rotation kinetic energy of moving vehicles is utilized.

**LITERATUREREVIEW:**

Produce electricity by the use of speed breakers shakunsrivastava [1]

The rotor (rotating shaft) is directly connected to the prime mover and rotates as the prime mover turns. The rotor contains a magnet that, when turned, produces a moving or rotating magnetic field. The rotor is surrounded by a stationary casing called the stator, which contains the wound copper coils or windings. When the moving magnetic field passes by these windings, electricity is produced in them.

Design of rack and pinion mechanism for power generation at speed breakers [2]

M.Sailaja, M. Raja Roy, S. Phani Kumar

The conventional sources of energy are generally non-renewable sources of energy, which are being used since a long time. To improve the power generation technologies and to make them more sustainable, non – conventional technologies have been discovered. Energy generated by using wind, tides, solar, geothermal heat, and biomass including farm and animal waste is known as nonconventional energy.

A review: comparison of different mechanisms for electricity generation using speed breaker [3]

Pankaj D. Jagtap, Sanket D. Pardeshi, Angad G. Khade,

VarunSathe

Electricity is a basic part of nature and it is one of the most widely used forms of energy across the globe. Researches show that the world has already had its enough shares of its energy resources. Fossil fuels pollute the environment.

Energy is the basic need for the development of the modern world. For meeting up the regular demand of energy we need to design a system that will produce electricity without destroying the nature. This paper attempts to show how man has been utilizing and optimizing kinetic energy. Researches show that the world has already had its enough shares of its energy resources. Fossil fuels pollute the environment. Nuclear energy requires careful handling of both raw as well as waste material.

Generation of electricity using road transport pressure [4] Md. Saiful Islam, Syed Khalid Rahman, Jakeya Sultana Jyoti,

Energy is the basic need for the development of the modern world. For meeting up the regular demand of energy we need to design a system that will produce electricity without destroying the nature. This paper attempts to show how man has been utilizing and optimizing kinetic energy. Researches show that the world has already had its enough shares of its energy resources. This paper attempts to show how energy can be produced, stored and used using the road transport pressure or any kind of pressure. The number of vehicles passing over the speed breaker in roads is increasing day by day.

**SYSTEM ARCHITECTURE:**

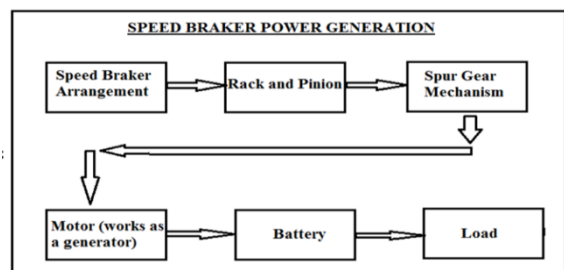


Fig. 1 Block diagram of the system

When the vehicle moves over the speed breaker, the upper plate is pressed down. This is connected to the vertical rack & pinion arrangement. As the rack moves down the pinion rotates which is connected to the gear mechanism. A DC motor is mounted on the shaft for continuous rotation of the shaft. The arrangement is connected to the motor shaft, which acts like a generator. The motion of the pinion is transmitted to the motor shaft using the gear mechanism. The generated electricity is stored to the battery which can be further utilized to glow the LEDs.

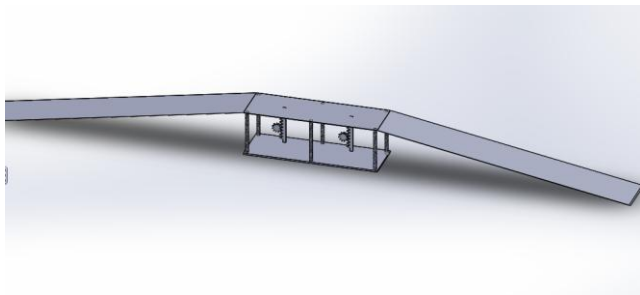


Fig. 2 Proposed model using solidworks

## COMPONENTS AND SYSTEM DESIGN: 8051 MICROCONTROLLER

The Intel MCS-51 (commonly termed 8051) is a Harvard architecture, complex instruction set computing (CISC) instruction set, single chip microcontroller ( $\mu\text{C}$ ) series developed by Intel in 1980 for use in embedded systems.[1] Intel's original versions were popular in the 1980s and early 1990s and enhanced binary compatible derivatives remain popular today.



Fig. 3 Intel P8051 microcontroller.

## 2. LCD (LIQUID CRYSTAL DISPLAY)

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:



Fig.4 16\*2 LCD module

1. The declining prices of LCDs.
  2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
  3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
  4. Ease of programming for characters and graphics.
- These components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.



Fig.5 12 volt battery

## ADVANTAGES AND APPLICATIONS:

### ADVANTAGES:

- Low budget electricity production
- No obstruction to traffic
- Easy maintenance
- Suitable at parking of multiplexes, malls, toll booths, signals, etc.
- Pollution free power generation.
- Less floor area required and no obstruction to traffic.
- No need of manpower during power generation.

**APPLICATIONS:**

Our project has wide range of applications like:

- Charging batteries
- Using them to light up the streets, etc.

**CONCLUSION AND FUTURE SCOPE:**

Such speed breakers can be designed for heavy vehicles, thus increasing input torque and ultimately output of generator. More suitable and compact mechanisms to enhance efficiency. A 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 of the country is poor. Hence more research and development of technologies are needed in this field. This energy can be used for the lights on the either sides of the roads and thus power that is consumed by these lights can be utilized to send power to these villages. It may also be used for light vehicle also.

**REFERENCES:**

[1] Shakun Srivastava , Ankit Astana Produce electricity by the use of speed breakers Journal of engineering research and studies, Vol 2 No. 1, April-Jun 2011

[2] Sailaja, M., M. Raja Roy, and S. Phani Kumar. "Design of Rack and Pinion Mechanism for Power Generation at Speed Breakers." International Journal of Engineering Trends and Technology (IJETT) – Volume 22 Number 8-April 2015

[3] Khade, Angad G., and VarunSathe. "A Review: Comparison of different Mechanisms for Electricity Generation using Speed Breaker."Multidisciplinary Journal of Research in Engineering and Technology Volume 1, Issue 2, Pg.202- 206.

[4] Md. Saiful Islam, Syed Khalid Rahman, Jakeya Sultana Jyoti Generation of electricity using road transport pressure, IJESIT, Vol2 ,Issue 3, May 2013

[5] A. K. Hossain and O. Badr, Prospect of renewable energy utilization for electricity generation in Bangladesh, Renewable and Sustainable Energy, Review

11,1617-1649,2007

[6] M. U. H. Joardder, Md. MamunKabir, Ranjoy and B, Md. EmdadulHoque, Loss to assets: production of power from speed breaker, ICMERE, 2011