



# “Literature Survey on Electricity Generation By Speed Breaker”

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**Abstract:** Energy is the primary need for survival of all organisms in the universe. Everything what happens in the surrounding is the expression of flow of energy in one of the forms. But in this fast moving world, population is increasing day by day and the conventional energy sources are lessening. The extensive usage of energy has resulted in an energy crisis over the few years. Therefore to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy which is wasted when the vehicles passes over a speed breaker. Lots of energy is generated when vehicle passes over it. We can tap the energy generated and produce power by using the speed breaker as power generating unit. The kinetic energy of the moving vehicles can be converted into mechanical energy of the shaft through rack and pinion mechanism. Then, this mechanical energy will be converted to electrical energy using generator which will be saved with the use of a battery. The energy we save during the day light can be used in the night time for lighting street lights. Therefore, by using this arrangement we can save lot of energy which can be used for the fulfillment of future demands. This project harvests energy from speed breaker by making gear arrangement and using electronic 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 principle involved is potential energy to electrical energy conversion. There is a system to generate power by converting the potential energy generated by a vehicle going up on a speed breaker into kinetic energy. When the vehicle moves over the inclined plates, it gains height resulting in increase in potential energy, which is wasted in a conventional rumble strip. When the breaker comes down, they crank a lever fitted to a ratchet-wheel type mechanism (a angular motion converter) which in turn rotates a geared shaft loaded with recoil springs. The output of this shaft is coupled to a dynamo to convert kinetic energy into electricity

**Keywords:** Electricity, Generation, Speed, Breaker.

## I. INTRODUCTION

Increasing demand of energy adds to the need of identifying non-conventional resources of energy. In my paper, I will discuss about power generation from speed breaker and the possible mechanism required for it. An energy crisis is any great bottleneck (or price rise) in the supply of energy resources to an economy. It usually refers to the shortage of oil and additionally to electricity or other natural resources. An energy crisis may be referred to as an oil crisis, crisis, energy shortage, electricity shortage electricity crisis. While not entering a full crisis, political riots that occurred during the 2007 Burmese antigovernment protests were initially sparked by rising energy prices. Likewise the Russia-Ukraine gas dispute and the Russia-Belarus energy dispute have been mostly resolved before entering a prolonged crisis stage. Market failure is possible when monopoly manipulation of markets occurs. A crisis can develop due to industrial actions like union organized strikes and government embargoes. The cause may be ageing over consumption, infrastructure and sometimes bottlenecks at oil refineries and port facilities restrict fuel supply. An emergency may emerge during unusually cold winters. EMERGING SHORTAGES Crisis that currently exist include.

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.



## II. LITERATURE REVIEW

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## III. METHODOLOGY

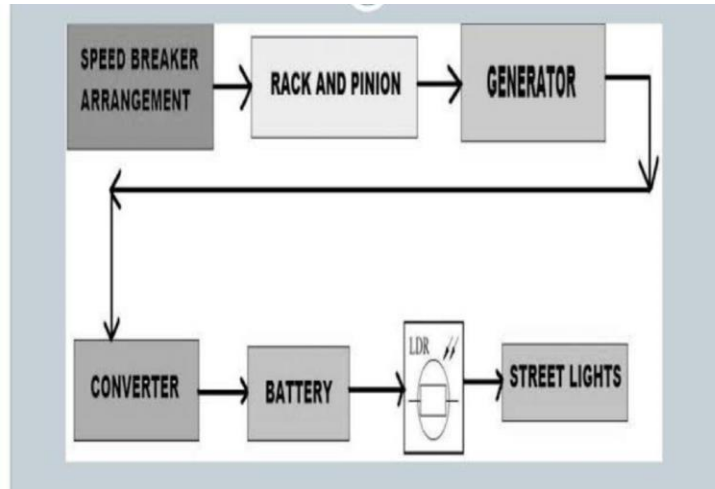
The working principle of this power generation program is to convert the kinetic energy to electric energy via mechanical energy. This can be done when the brakes are applied upon the vehicle kinetic energy is produced. After this the kinetic energy is converted to mechanical energy using a rack and pinion gear and the by connecting the pinion gear to a generator shaft the energy is converted into electrical energy.

1. Speed Breaker:- This is a normally used thing in everyday life. This element can be made from the composite of carbon fibre and rubber so that the speed breaker can sustain the heavy load of vehicles such as a container filled with some material in it. The speed breakers can be made such that the starting and ending slopes would be made up of concrete and cement mixture and the central part would be made up of the composite mentioned before.

2. Rack and Pinion Gear :- This is one of the simplest types of gears and can be manufactured according to one's own need. As the name suggests this type of gear has two components namely Rack which is a straight gear with tooth in only one direction, the second component is the Pinion which is a round shaped gear and will roll upon the rack to perform its task. The alignment of this gear will be in vertical direction.

3. Generator:- A generator is a device which converts mechanical energy into electrical energy. In this case the work of the generator remains the same and for that the shaft of the generator will have a pinion gear on its edge. The pinion gear will be meshed with the pinion gear of Rack and Pinion arrangement. As the first pinion gear will rotate the second gear will also rotate with the shaft of the generator. This will induce EMF (Electro Motive Force) in the generator and electricity will be produced.

4. Electricity Storage:- It is very difficult to store electricity for a long time into any kind of storage. To deal with this issue a battery pack will be introduced which will help us store the electric energy in to the battery pack. Also battery packs can be useful to transfer electric energy from one place to another.



**OBJECTIVES**

The generation of electricity using speed breaker is one of the easiest way as now-a -days everyone is having vehicle. It can be widely accepted at individual level because of its low production cost also it doesn't need any extra effort. Also the piezo electric crystal which will convert the mechanical pressure in electric output will enhance the system output.

**COMPONENTS**

**RACK:**

Gear racks are utilized to convert rotating movement into linear motion .A gear rack hasst raight teeth cut into one surface of a square or round section of rod and operates with a pinion, which is a small cylindrical gear meshing with the gear rack.



Fig.1. Rack

**SPURGEAR :**

Spur gears or straight-cut gears are the simplest type of gear . They consist of a cylinder or disk with teeth projecting radially. Viewing the gear at 90 degrees from the shaft length (side on) the tooth faces are straight and aligned parallel to the axis of rotation. Looking down the length of the shaft, a tooth's cross section is usually not triangular. Instead of being straight (as in a triangle) the sides of the cross section have a curved form)to achieve a constant drive ratio. Spur gears mesh together correctly only if fitted to parallel shafts. No axial thrust is created by the tooth loads .Spur gears are excellent at moder ate speeds butt end to be noisy a thigh speeds

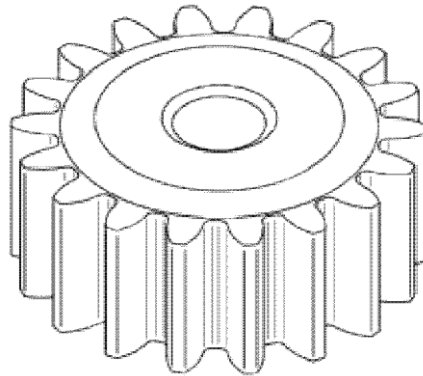


Fig.2. Spurgear

### FLYWHEEL:

A flywheel is a mechanical device which uses the conservation of angular momentum to store rotational energy a form of kinetic energy proportional to the product of its moment of inertia and the square of its rotational speed. In particular, assuming the flywheel's moment of inertia is constant (i.e., a flywheel with fixed mass and second moment of area revolving about some fixed axis) then the stored energy is directly associated with the square of its rotational speed.



Fig.3. Flywheel

### SHAFTWHEEL:

These are the wheels and shaft sets we use with our wheel edall-terrain robotkits. The wheels with shaft sets are specifically designed for our robot kits, but can be used in your applications as well. We also sell the wheels and shaft individually here. We also carry Treads and Tracks, for those that want to roll with it.



Fig.4. Shaftwheel

**GENERATOR MOTOR:**

A motor-generator is a device for converting electrical power to another form. Motor-generator sets are used to convert frequency, voltage, or phase of power. They may also be used to isolate electrical loads from the electrical power supply line. Large motor-generators were widely used to convert industrial amounts of power while smaller motor-generators (such as the one shown in the picture) were used to convert battery power to higher DC voltages.



Fig.5. Generator Motor

**BATTERY:**

When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy. Historically the term "battery" specifically referred to a device composed of multiple cells; however, the usage has evolved to include devices composed of a single cell.



Fig.6. Battery

**CONCLUSION**

This is generating many kilowatts power by using downward as well as the upward motion of rack. With the help of speed breaker mechanism, linear motion of rack is converted into rotary motion of pinion and thus is used to rotate the shaft of DC generator. It generates 273.24 watts with 400kg of load and 14cm of the height of the rack. DC voltages charge the batteries during the passage of moving vehicles. Using inverter (DC to AC conversion), we will be able to use batteries power for other useful applications. It can be implemented on the toll plazas, highways. Guide slots and lubricating oil sump is required to minimize friction losses. The initial cost of this arrangement is high but after the first cost, it will be free energy system.

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