

# POWER GENERATION USING SPEED BREAKERS

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**Abstract:** The economy runs on energy and quest for development means that more energy is needed. Statistics show that the majority of energy comes from burning fossil fuels, and they pollute our environment. This work is aimed at producing a mechanical speed breaker electricity generator. It converts the linear motion of the rack gear that is depressed by the vehicular movement to rotary motion of the pinion gear keyed on the shaft and alternator. The machine gets actuated by compression and release of the springs, thus increasing the output of the machine. It consists of a stable frame, dome-shaped top, rack and pinion mechanism, chain and sprocket mechanism, springs, shafts, an alternator and a deep cycle battery. The design was carried out using engineering principles with due consideration to cost, serviceability, and ease of operation, durability and performance.

Keywords: Electricity, Speed Breakers, Automation

## I. INTRODUCTION

During last few decades, electrical energy is the basic requirement of human beings. The ratio of electricity requirement is increasing day by day. But we know that the resources for power generation are limited, and this has caused the energy crisis. The increasing power demand results reduce in conventional resources for power generation and increase the pollutants emissions. It is a need of time to think about non-conventional energy resources or renewable energy resources which are eco-friendly to the environment. In order to minimize the emission of greenhouse gases, renewable energy technologies are widely used for electricity generation. Solar and wind technologies are frequently used for electricity generation.

## II.LITERATURE SURVEY

The literature review suggests that the energy crisis is a 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. First to make use were South African people, their electrical crisis has made them to implement this method to light up small villages of the highway. The idea of basic physics to convert the kinetic energy into electrical energy that goes waste when the vehicle runs over the speed-break was used. Since then a lot has been done in this field. The idea caught our working team and we have decided to develop such a project that will produce more power and store it for use at night time as it proves to be a boon to the economy of the country.

2.1. Akash Bhoria(2018): In this paper the team has done an excellent job by using rack and pinion combination with a generator setup with a DC to AC converter

With a battery to store the energy and a electrical module that can be connected through WiFi by which output can be monitored

2.2. Sanjida Parvin(2016): In this paper the team aims to generate the electricity using the speed breaker setup . Here they have used a Rack & pinion setup and a hydraulic press for smoother moments and additional force which was connected to battery where the electricity was stored

2.3. A. Padma Rao (2014): In this paper vehicle pressure on the speed breaker which is converted into rotary energy through rack and pinion using hydraulic press. Consequently, this rotary energy rotates generator that generates electrical power which is being stored through battery using charging circuit.

2.4. Deepak Malgar (2013): By this simple mechanism of speed breaker we can produce electricity by converting the up and down motion of speed breaker into circular motion this electric power which is generated by the prototype model of speed breaker is used for different purpose like lightning of street light on road or for providing the electric supply for traffic signal system.

2.5. Huddy S.R. (2013): In this paper utilization of energy of the vehicles i.e their kinetic energy is used to generate the electricity by the additional rotation to the dynamo. Hence causes to generate electricity. This energy can be stored in battery bank and used for further use.

## III.PROBLEM DEFINITION

Electricity is generated by replacing the usual speed breakers with some simple mechanism. As vehicles pass over the speed breakers, rack and pinion mechanism works and with the help of high tension springs in turn generate electricity. This method is an effective way to produce electricity as the number of vehicles is ever increasing. It can be effectively placed near toll plazas, parking lots and other locations where density of vehicles is very high. A rack and pinion, spring assembly mechanism is provided which transfer the motion to a DC motor/generator for electricity generation. This method provides a cost effective way to generate electricity from the mechanical energy of dynamic vehicles on roads.

To overcome these problems, use of non-conventional energy sources one of the best methods. Non-conventional energy is considered the energy of the future. Considering the benefits of non-conventional energy generation, many countries have started producing this energy in large scale. There is continuous research for development of technology in this field to reduce the cost of production and to make it more cost-effective. Thus, in order to find closest solution to these drawbacks of existing systems, this equipment is designed.

#### IV.OBJECTIVES

1. To use a non-conventional energy source to generate electricity.
2. To provide an environment friendly power source.
3. To make cheap and easy maintainable power source.

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 piezoelectric crystal which will convert the mechanical pressure in electric output will enhance the system output.

#### V.METHODOLOGY

When a car reaches on speed breaker, rack moves downward to generate linear motion. Two pinions are attached to a rack which converts the linear motion of rack into rotary motion. Both pinions have unidirectional motion, like as bicycle sprocket. Two gears are mounted on pinion shaft's to transfer mechanical power to the common shaft having one gear. At final shaft, a flywheel is used to provide uniform motion. A belt is used to transfer mechanical motion of the common shaft to DC generator. The complete gear box is dipped in lubrication oil sump to minimize frictional losses. There are no chances of slipping between rack and pinions due to guide slots. DC generator generates DC power which is stored in batteries same as in solar technology. The generated power can be used for the domestic purpose or commercially, which are present near the speed breaker.

- a) Rack & pinion setup
- b) Chain sprocket
- c) Shafts & pedestal bearing
- d) Inverter circuit
- e) Battery setup
- f) Dynamo
- g) Led Alternating current bulb



Fig.1.a



Fig.1.b

#### VISPECIFICATON

##### Lead Acid Battery

Capacity: 13.5 V

Current: 7.5 ah

**Rack & pinion**

Gear Minimum Module: 0.3 mm.

Maximum Module: 25 mm.

Minimum D.P. ( Diametrical Pitch ) : 50. ...

Maximum Length of **Rack** to be cut: 25 mm.

**Invertor components:**

Diode

Transistor

Bridge wave rectifier

Capacitor

**Dynamo:**

Output: 6V, 3W

**VII.RESULTS AND DISCUSSION**

The proposed design is successfully fabricated. Thus, the obtained conclusion of the equipment that we have designed, is as follows:

1. "Solar Operating Devices" are more efficient alternatives for "Fuel Operating Devices".
2. It is more economical and suitable for farmers.
3. It is portable and easy to operate.
4. No use of electricity or fuel.
5. The consequence is that we may face energy crisis in future if we are not careful today.
6. It is cheaper than other available method.

**REFERENCES**

- [1] P. E. Yearbook, "Hydrocarbon Development Institute of Pakistan," *Ministry of Petroleum and Natural Resources, Government of Pakistan*, p. 39, 2001.
- [2] D. Zaidel, A. Hakkert, and A. Pistiner, "The use of road humps for moderating speeds on urban streets," *Accident Analysis & Prevention*, vol. 24, pp. 45-56, 1992.
- [3] F. K. Afukaar and J. Damsere-Derry, "Evaluation of speed humps on pedestrian injuries in Ghana," *Injury Prevention*, vol. 16, pp. A205-A206, 2010.
- [4] I. Sayer, C. Baguley, and A. Downing, "Low-cost engineering measures in Egypt, Ghana and Pakistan," *PLANNING AND TRANSPORT RESEARCH AND COMPUTATION*, vol. 352, 1991.