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Electricity Generation from Speed Breakers

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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. My paper 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

KEYWORDS: - Electromotive force, Generator, Non-conventional energy, Speed breaker.

I. INTRODUCTION

In the present day 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. Therefore, we have to investigate other types of renewable sources, which produce electricity without using any commercial fossil fuels, which is not producing any harmful products. There are already is exist such systems using renewable energy such as solar wind, OTEC (ocean thermal energy conversions) etc...for power generation. The latest technology which is used to generate the power by such renewable energy” POWER HUMP”.

II. PROBLEM STATEMENT

The demand of electricity is increasing rapidly day by day but the production rate is not according to meet the need. Establishing new power plants to produce more electrical energy is not a solution to this problem as per economical point of view. The government and the electricity generating companies is suffering huge losses in electrical power production due to inefficient methodology and various other constraints especially in thermal power plants. The existing huge gap between demand and production can be filled by producing electricity at individual level in order to meet various household needs. To generate electricity to satisfy daily or basic needs various sources can be used that are normally overlooked in daily life, one of these sources include mechanical pressure of vehicles on speed breaker.

III. MOTIVATION

An energy crisis is any significant bottleneck in the supply of energy resources to an economy. Industrial development and population growth have led to a surge in the global demand for energy in recent years. There is a current global need for clean and renewable energy sources. Fossil fuels are non-renewable and require finite resources, which are dwindling because of high cost and environmentally damaging retrieval techniques. So, the need for cheap and obtainable resources is greatly needed.

IV. 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 piezoelectric crystal which will convert the mechanical pressure in electric output will enhance the system output. A classification model derives a conclusion from the values that have been seen. One or more inputs are utilised in a classification model to predict the value of one or more outcomes.

V. LITERATURE REVIEW

Laukik Kharche¹, Kalpesh Jadhav², Pranay Gawas³, Chaitali Gharat⁴, “ speed breaker power generation” [1] The project is about the design and manufacturing of speed breaker power generator. In this project we are trying to utilize one such source. Electricity is generated by replacing the traditional speed breakers with some simple mechanism. As vehicles pass over the speed breakers, the speed breaker itself goes down due to weight of the vehicle which results in displacement of a rack gear which rotates the pinion connected to shaft of the generator which in turn produces electricity. This method is an effective way to produce electricity as the numbers of vehicles on the road are ever increasing. Also, the cost of fabrication of the model is low. It can be effectively placed near traffic lights, at the entrance of parking lots and any other place where the traffic density is high. As vehicle passes over it, it starts moving. This method provides an efficient way to generate electricity from the kinetic energy of moving vehicles in roads, highways, parking lots etc.

Mrs. S.S Pitre ¹, Mr. Rahul Raj ², Mr. Sachin Raina ³, Mr. Akash Bhoria ⁴, Mr. Alok Kumar ⁵ “Electricity Generation Using Speed Breaker” [2], - Energy is the primary need for survival especially for mankind. Everything that 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 which is an electromechanical principle. 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 sufficient energy can be generated to meet various daily need. This work focuses to generate energy from speed breaker by making gear arrangement. To make the system more efficient a pressure transducer i.e. piezoelectric crystal can be used that will convert vehicle pressure into electrical output. The output of system can also be monitored on real time basis using Wi-Fi based module. This will lessen the dependency on energy produced by conventional process to some extent.

Ashwin Chandwani¹*Amit N. Patel¹#Abhay Kothari², “Design of Road Power Generator (RPG):an Alternate Energy Source for Sustainability”,[3] the overall concept of Road Power Generator (RPG) that deals with the mechanism to generate electricity from the wasted kinetic energy of vehicles. It contains a flip-plate, gear mechanism, flywheel, and finally a generator is coupled at the end so that the rotational motion of the flywheel is used to rotate the shaft of the generator, thus producing electricity. RPG does not require any piezoelectric material. It is novel concept based on flip-plate mechanism. The project can be installed at highways where a huge number of vehicles pass daily, thus resulting in more amount of electricity generated. This generated electricity can be utilized for different types of applications and mainly for street lighting, on road battery charging units and many domestic applications like air conditioning, lighting, heating, etc .

Dave Jaymin J. “Power Generation from Speed Breakers by Air Compression Method”,[4] - Electricity is the most necessary form of the energy. We cannot even imagine our life without electricity. Consumption of the electricity is increase day by day. Nowadays most of the electricity is generated by conventional fossil fuels, eventually the conventional power sources will get depleted by the next few decades. This paper is about to use nonconventional energy source for power generation. Here we generate energy by air compression. All the setup is place under speed breaker when vehicle passing from speed breaker it generates electricity. Main benefit of this method is here we use wasted energy for power generation.



Er.Vijay Kumar Yadav¹, Durgesh², Sonu Prajapati³, Akash porwal⁴, “Electric Power Generation through Speed Breakers”[5] : Power is everything in this recent world, from the beginning of the science still people try to discover the source, modify and develop many concepts and method for better future. The efficiency of power generation is the key to making a country economically enriched. This project includes how to utilize the energy which is wasted from the vehicle which is passes every minute over a speed breaker. There are four mechanisms to generate electricity through the speed breaker like, Rack and pinion mechanisms, gear and flywheel mechanisms and spring coil mechanisms. 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 through the rack and pinion mechanisms or some other mechanisms. Then, this mechanical energy will be converted into electrical energy using generator which will be saved with the use of a battery.

1Aniket Mishra, 2 Pratik Kale, 3Atul Kamble, “Electricity Generation from Speed Breakers”[6] 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. My paper 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

VI. BLOCK DIAGRAM

Energy Estimation: When the vehicle moves over the speed breaker, speed breaker reduces its speed. As these breakers have a little height it gains an increase in its potential energy. A vehicle weighing 1,000kg passes over the system it pushes the damper to a depth of 10 cm it can produce approximately 0.98 kilowatt power (ideally). So from one such speed breaker on a busy highway, where about 100 vehicles pass every minute, about one kilowatt of electricity can be produced every single minute. This type of energy is a non-conventional resource or renewable energy. 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 POWER HUMP. It is an Electro-Mechanical unit. It is a mechanical type of arrangement. The amount of electricity consumed in one night by all the street lights around Chennai city (India) is equal to consumption of electricity in a remote village for one month and 14 days. The design of speed breakers was developed long ago but only utilized by few nations, as there were limitations of speed breaker power generators.

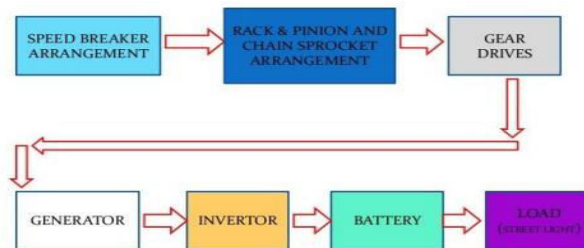


Fig.:-Block Diagram



VII. CONCLUSION

The demand for sustainable energy is increasing day by day. So, RPG proves to be a viable mechanism that can tap the wasted kinetic energy of the vehicle and in turn it can produce electrical energy. This generated energy can be used to light the street lights and also can be used to charge batteries for cars. The design of the same was carried out and the results proved that a compact RPG system can be used so as to get reasonably good amount of energy. Similarly, different constituent parts were designed and different results on the basis of design were obtained.

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