

ELECTRICITY GENERATION BY SPEED BREAKER USING RACK AND PINION MECHANISM

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ABSTRACT

This project is an attempt to utilize such energy source and in which we had studied various mechanism which can installed to convert such wasted energy into useful form. But due to some manufacturing limitations at this level it is prefer to build the prototype of the above mentioned project. The design and all other details of this report are as per to satisfy the requirements of prototype. At the end of this report we have discussed few of the modifications which will improve performance of the system. In future we hope that this system will be one of the reliable sources of energy. We welcome any ideas for the modifications and improvements in this project's. Because of now a day's road traffic is very fast and preferable for any person. And to reduce the speed of the wheels on roads speed breakers are provided. On these bumps abundant amount of energy is available which at present waste and it can be used for useful work with the help of batteries.

Keywords: - *Dynamo; Rack and pinoin ;spring; Flywheel;*

1. INTRODUCTION:-

Energy can neither be created nor be destroyed, But it can be converted from one from to another” This is the law of conservation of energy we regularly read. We obtain the energy from nuclear, hydro, thermal, and number of sources. But there is some area where project is taking such as on the roads. With the development of the automobile sector the traffic density on the road is increasing day by day. Different types of vehicles are introduced on the road and there will be the competition in the world till the world will last. The government is also implementing new infrastructure to build new and faster ways of traffic and to join one city to another. Highly populated cities are specially connected to each other with national and express highway on these roads vehicle can run at maximum speed. Roads are essential means of transportation and so along with the population the number of wheel on the road are increasing. There speed also increasing with the development of the high speed engine. But some areas like market and school where driving at high speed can be dangerous for human life so far safety precaution government road Development Corporation install speed breaker near such areas. The new technologies of constructing roads and modern materials of the road increase the quality of road. The present speed breakers are rigid in construction and the abundant energy losses occur when any vehicles passes over it. This loss may is in the form of kinetic energy. This loss of energy can be converted from the kinetic form to other useful form of energy. So the idea to convert this energy into an electrical form is the evolution of this project.

2.0 LITERATURE REVIEWS:-

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.

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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. An amateur innovator, Kanak Gogoi in Guwahati has developed a similar contraption to generate power, when a vehicle passes over speed-breaker. The idea has caught the eye of IIT-Guwahati, which funded the pilot project related to generate electricity from speed-breakers. They has evaluated the machine and recommended to the Assam government. Their work has provided the need to think on this alternative to generate electricity on the large scale, as it proves to be a boon to the economy of the country

Novel Speed-Breaker for Electrical Energy Generation Suitable for Elimination of Remote Parts of Power Systems where is Near to Roads. Mohsen Partodezfoli1, Abbas Rezaey, Zahra Baniasad, HoriehRezaey Department 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

3.0 CONSTRUCTION AND WORKING PRINCIPLE:-

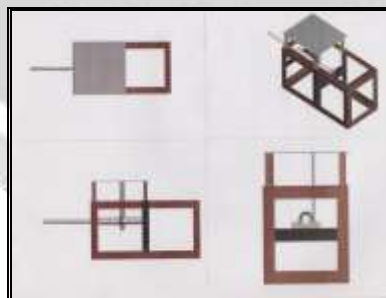
This is a system design to capture waste and kinetic energy from all vehicles. This device converts the kinetic energy of the vehicles into electric energy. This is done by moving plate installed on the road, this plate captured very small movement from the road surfaces and it transferred to rack and 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 shaft and shaft connected with flywheel.

The speed due to the rotary motion achieved at the pinion is less. This speed which is sufficient to rotate dynamo. The dynamo 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.

Experimental setup photos



(a)



(b)



(c)



(d)

(e)

(f)

Fig No: - 01

Fig. (a) (b) shows cad design of project and fig. (c),(d),(e),(f) shows practical setup of project

3.1 Power Calculations

The mass of any vehicle travelling over the speed breaker= 300Kg (Approximately)

Height of speed brake = 15 cm

Work done = weight of the body x distance travelled by the vehicle

Here, Weight of the Body = 300 Kg x 9.81 = 2943 N

Distance travelled by the body = Height of the speed breaker = 15cm

Power = Work done/Second = $(2943 \times 0.15)/60 = 7.3575$ Watts

Output Power developed for 1 vehicle passing over the speed

Breaker arrangement for one minute = 7.3575 watts

Power developed for 60 minutes (1 hr) = 441.45 watts

Power developed for 24 hours = 10.5948 Kw

4.0 CONCLUSIONS

In this project we discover technology to generate electricity from speed breakers in which the system used is reliable and this technique will help conserve our natural resources. In coming days, this will prove a great boon to the world, since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights. In coming days, this will prove a great boon to the world since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights. As the conventional sources are depleting very fast, it's high time to think of alternative resources. We got to save the power gained from the conventional sources for efficient use. So this idea not only provides alternative but also adds to the economy of the country

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