

# Power Generation from Speed Breakers Mechanism

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**Abstract**— In the present day scenario, power is a major need for human life. There is a need to develop non- conventional sources for power generation due to the reason that our conventional sources of power are getting scarcer by the day. This paper emphasises on the idea that the kinetic energy getting wasted while vehicles move can be utilized to generate power by using a special arrangement called “power hump”. This generated power can be used for general purpose applications like streetlights, traffic signals. In addition, we could also have solar panels, which would satisfy our power needs, when there is no vehicular movement.

**Key words:** Power Generation, Rack and Pinion, Energy Conservation, Rotation, 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.

## II. LITERATURE REVIEW

- 1) Aswathaman.v & priyadharshini.M This paper attempts to show how energy can be tapped and used at a commonly used system- the road speed breakers. The number of vehicles passing over the speed breaker in roads is increasing day by day. A large amount of energy is wasted at the speed breakers through the dissipation of heat and also through friction, every time a vehicle passes over it. There is great possibility of tapping this energy and generating power by making the speed-breaker as a power generation unit. The generated power can be used for the lamps, near the speed breakers 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 paper is best source of energy that we get in day to day life.
- 2) G.Ramakrishna Prabu & G.Ethiraj:- 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. 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 existing 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”.
- 3) Prashant Singh, Saurabh Shriwas, Kalpit P. Kaurse:- Our conventional sources of power generation is producing pollution in terms of air pollution, water pollution etc. The major contributor of air pollution is carbon dioxide, carbon monoxide, sulphur dioxide etc. These pollutants affect our environment adversely. Due to pollution and lack of avidity the scientist suggested the renewable energies like wind energy, solar energy, wave energy and biomass. Researchers are working for improvement in our available renewable energy conversion method. Here our aim to transform the energy that wasted in speed breaker in almost all the process and system each one has some type of losses. For example a car passes over the speed breaker its most of the energy is wasted. However, due to safety and security reason of populated areas like near to school, hospital, shopping mall etc. cities and town there are a more no of breaker and so many vehicle passing over the speed breakers are required, it means that we can tapped more energy and produced more electricity so electricity conversion is proportional to traffic density. electricity is clean energy and now days more useful than other form of available energy. Now days battery operated bike, car and aircraft also available for cooking food, washing clothes, fan, T.V., Fridge, for lighting purpose everywhere we required electricity. without electricity it's very difficult to manage our life style. Due to increments of our population and depends of technology is increases the more amount of electrical energy but resources are limited.

- 4) Noor Fatima, Jiyaul Mustafa:- The automotive industry in India is one of the largest in the world and one of the fastest growing globally. India passenger car and commercial vehicle manufacturing industry is the seventh largest in the world, with an annual production of more than 3.7 million units in 2010. We every day mesh up with these vehicles give us headache. But this mesh up could be answer of new type power generation. Road Power Generation (RGP) is one of the most recent power generation concepts. This device is engineered as a practical and useful alternative energy technology for generating clean electricity from the millions of vehicles on our roadways. Once fully optimized and installed, engineers anticipate that devices may be used to augment or replace conventional electrical supplies for powering roadway signs, street and building lights, storage systems for back-up and emergency power, and other electronics appliances, and even devices used in homes and businesses. 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
  - 5) Priyanshi Vishnoi & Pradip Agrawal:- We know that the kinetic energy can be converted to electrical energy. We are presenting in this paper that kinetic energy produced by movement of vehicles on speed breaker of road, convert in electrical energy i.e., can produce power. Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicles passing over speed breaker on road is increasing day by day. Beneath speed breaker, setting up an electro-mechanical unit known to be power hump, could help us conserving this energy and use it for power generation. The electrical output can be improved be arranging these power humps in series. This generated power can be stored, by using different electrical devices. We can supply this energy to street light, traffic signal, and nearby area, and thus help to country economy. We could make it more efficient, by also having solar panels that can provide power when needed while the vehicles were not moving.
  - 6) Namesh kumar:- This paper attempts to show how energy can be tapped and used at a commonly used system the road, speed breaker. The number of vehicles passing over the speed breaker is increasing day by day. If we use this speed breaker concept in the bridge speed breaker. With the help of speed breaker or power hump (kinetic energy can be utilized to produce power by using a special arrangement called POWER HUMP) A large amount of energy is wasted at the speed breaker through the dissipation of heat and also through friction, every time a vehicle passes over it. There is great possibility tapping this energy and generation unit with the help of pumps and run the small hydro plant easily because India has of rivers and its bridge.
  - 7) Prof. Surendra Agrawal:- Energy is the primary and most universal measure of all kinds of works by human beings and nature. Every thing what happens in the world is the expression of flow of energy in one of its forms. Most people use the word energy for input to their bodies or to the machines and thus think about crude fuels and electric power.
- Energy in the form of electricity plays a very important role in the life of a normal man. Electricity is one of the greatest wonders of science. Next to man, it is the most important and revolutionary creation in this world of ours. It has practically revolutionized the world. The gradual but excessive use of electricity has come to bring about astupendous changes in industry. With it our modern gigantic tools are worked. Computers as also calculators sum up totals and make other calculations with the utmost accuracy. Newspapers and books are printed in millions overnight. There is not a single phase of human life that is not indebted to electricity for its progress. The modern age has, therefore, been truly called the "age of electricity."
- We do many things with electricity nowadays. We warm our homes, we drive the machines in factories, we run our trains and buses. Electricity has completely revolutionized the methods of travel and transport. It has enabled us to travel in aeroplanes and fly into cold atmosphere of the sky. We also have electric trains in our country. So today our whole life style is dependent on electricity with the increasing population the use of electric power is also increasing. But we know that the resources to generate electricity are limited, and this has lead to the energy crisis. During this scenario we need to generate electricity from things used in day-to-day life. In this project we have tried to generate electricity through speed breakers present on roads. As we know that vehicles on road are increasing day by day which will help us to generate electricity as these vehicles pass through the speed breakers. This electricity generated can be used for different purpose such as lighting of signals and streetlights on road etc. This set up requires very basic mechanical components such as gear shaft bearing. There are also some electrical components such battery, inverter etc
- 8) Fayeq Najuib, Nikita Gupta, Pradyumna Rawat, Priyank Agarwal, Prashant Mani:- In the present day scenario power has become the major need for human life. Energy is an important input in all the sectors of any countries economy. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources. Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicle is passing over speed breaker on road is increasing day by day. Beneath speed breaker, setting up an electro-mechanical unit known to be power hump, could help us conserving this energy and use it for power generation. The electrical output can be improved by arranging these power humps in series. This generated power can be stored, by using different electrical devices. We can supply this energy to street lights, traffic lights, and nearby areas, and thus helps in country's economy. We could make it more efficient, by also having a solar panels that provides for power needs while the vehicles were not moving
  - 9) B. Aravind Reddy, T.Venkata Sahaj, Y Arun Kumar, D.Ramana Reddy:- Many studies were made on this technique especially in the recent times where the natural resources are terminating. There is plenty of matter in the internet which deals with the design and propagation of

speed breaker. But the main problem is to trap maximum energy out of it. So, the research has been started to make the effective usage of the available energy. My paper is going to bolster the research which has the plenty of scope. It is said that the wonderful innovations comes from the place where the problem is severe. One such example is taken from worst power hit country. The First one 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

- 10) Kuldeep Chauhan, Ayushi Tomar, Dheeraj kumar, Gaurav kumar:- In the present day scenario power has become the major need for human life. Energy is an important input in all the sectors of any countries economy. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources. Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicles passing over speed breaker on road is increasing day by day. Beneath speed breaker, setting up an electro-mechanical unit known to be power hump, could help us conserving this energy and use it for power generation. The electrical output can be improved by arranging these power humps in series. This generated power can be stored, by using different electrical devices. We can supply this energy to street lights, traffic lights, and nearby areas, and thus helps in country economy. We could more efficient, by having solar panels that provides for power needs while the vehicles were not moving.
- 11) Amanpreet Kaur, Shivansh Singh:- In the present day scenario power has become the major need for human life. Energy is an important input in all the sectors of any countries economy. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicles passing over speed breaker on road is increasing day by day. Beneath speed breaker, setting up an electro-mechanical unit known to be power hump, could help us conserving this energy and use it for power generation. The electrical output can be improved by arranging these power humps in series. This generated power can be stored, by using different electrical devices. We can supply this energy to street lights, traffic lights, and nearby areas, and thus helps in country economy. We could make it more efficient, by also having a solar panels that provides for power needs while the vehicles were not moving.
- 12) Prof. Chandni V. Shah:- In the present day scenario power has become the major need for human life. Energy is an important input in all the sectors of any countries

economy. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources. Here in this paper we are looking forward to conserve the kinetic energy that gone wasted, while vehicles move. The number of vehicles passing over speed breaker on road is increasing day by day Beneath speed breaker, setting up an electro-mechanical unit known piston/water tank assembly could help us conserving this energy and use it for power generation. This generated power can be stored, by using different electrical devices. We can supply this energy to street lights, traffic lights, and nearby areas, and thus helps in country's economy. This is a design of such a type that there will not be any problem to drive the vehicle over it. From cycle and motorcycle to L.C.V. or M.C.V. or all types of heavy vehicles can pass through this system.

### III. WORKING PRINCIPLE

The project is concerned with generation of electricity from speed breakers-like set up. The load acted upon the speed breaker - setup is there by transmitted 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 with the sprocket arrangement. The sprocket arrangement is made of two sprockets. One of larger size and the other of smaller size. Both the sprockets are connected by means of a chain which serves in transmitting power from the larger sprocket to the smaller sprocket. As the power is transmitted from the larger sprocket to the smaller sprocket, the speed that is available at the larger sprocket is relatively multiplied at the rotation of the smaller sprocket.

The axis of the smaller sprocket is coupled to a gear arrangement. Here we have two gears with different diameters. The gear wheel with the larger dimension is coupled to the axis of the smaller sprocket. Hence the speed that has been multiplied at the smaller sprocket wheel is passed on to this gear wheel of larger dimension. The smaller gear is coupled to the larger gear. So as the larger gear rotates at the multiplied speed of the smaller sprocket, the smaller gear following the larger gear still multiplies the speed to more intensity.

Hence, although the speed due to the rotary motion achieved at the larger sprocket wheel is less, as the power is transmitted to gears, finally the speed is multiplied to a higher speed. This speed which is sufficient to rotate the rotor of a generator is fed into to the rotor of a generator.

The rotor 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.

A. Block Diagram:

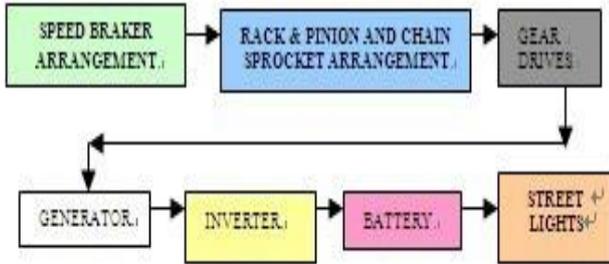


Fig. 1:

B. Construction Diagram:

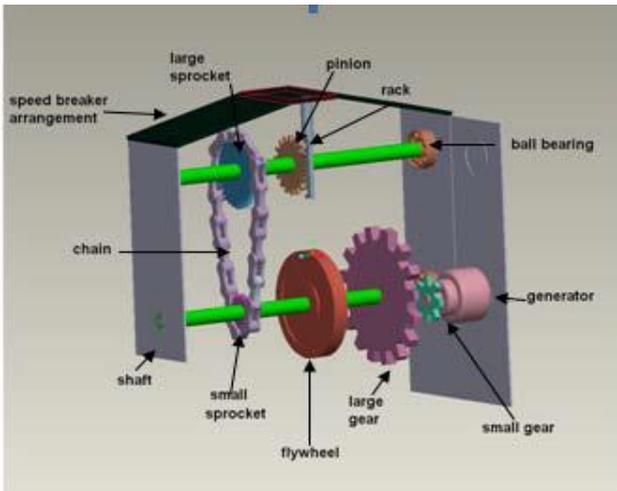


Fig. 2:

IV. OUTPUT POWER CALCULATION

Let us consider,  
 The mass of a vehicle moving over the speed breaker  
 =250Kg (Approximately)  
 Height of speed brake =10 cm  
 Work done=Force x Distance  
 Here,  
 Force=Weight of the Body  
 =250 Kg x 9.81  
 =2452.5 N  
 Distance traveled by the body = Height of the speed brake  
 =10 m  
 Output power=Work done/Sec  
 = (2452.5 x 0.10)/60  
 =4.0875 Watts (For One pushing force)  
 Power developed for 1 vehicle passing over the speed breaker  
 arrangement for one minute= 4.0875 watts  
 Power developed for 60 minutes (1 hr) =245.25 watts  
 Power developed for 24 hours=5.866 Kw  
 This power is sufficient to burn four street lights in the roads  
 in the night time.

V. FUTURE SCOPE

- Suitable at parking of multiplexes, malls, toll booths, signals, etc.
- Uses: Charging batteries and using them to light up the streets, etc.
- Such speed breakers can be designed for heavy vehicles, thus increasing input torque and ultimately output of generator.

- The shortage of light can be reduced at some extent.
- Wastage of energy of vehicles passing on roads can be minimized.
- Such speed breakers can be designed for heavy vehicles, thus increasing input weight and ultimately increasing output of generator.
- More suitable and compact mechanisms to enhance efficiency.

VI. CONCLUSION

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 paper is best source of energy that we get in day to day life.

REFERENCES

- [1] "Aswthaman.v & priyadarshini.m (2010 International Conference on Biology, Environment and Chemistry) IPCBEE vol.1 (2011) © (2011) IACSIT Press, Singapore"
- [2] "Chandani Shah (International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineerin) (An ISO 3297: 2007 Certified Organization)Vol. 4, Issue 5, May 2015"
- [3] "Kalpit P.Kourse (speed breaker is power sorce) Journal for Studies in Management and Planning
- [4] "Noor Fatima, Jiyaul Mustafa (International Journal of Advances in Electrical and Electronics Engineering) Available online at www.ijaeec.com & www.sestindia.org/volume-ijaeec/ 9 ISSN: 2319-1112 "
- [5] "Priyanshi Vishndi & Pradip Agrawal (MIT International Journal of Electrical and Instrumentation Engineering) Vol. 4, No. 2, August 2014, pp. 90-93ISSN 2230-7656 ©MIT Publications"
- [6] "Nameesh kumar ISSN: 2319-5967 ISO 9001:2008 Certified International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 5, September 20"
- [7] "Surendra Agrawal (international journal of innovations in engineering and technology)"
- [8] "International journal of Engineering Research ISSN:2348-4039 & Volume-1,Issue-1 Management Technology January 2014"
- [9] "IJRET: International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308"
- [10] www.altair.com"National Conference on Synergetic Trends in engineering and Technology (STET-2014) International Journal of Engineering and Technical Research ISSN: 2321-0869, Special Issue www."
- [11]"Amanpreet Kaur, Shivansh Singh (ISSN: 2319-5967 ISO 9001:2008 Certified International Journal of Engineering Science and Innovative Technology) (IJESIT) Volume 2, Issue 2, March 2013"
- [12]"Prof. Chandni V. Shah ( © 2014 IJEDR | Volume 2, Issue 1 | ISSN: 2321-9939)"