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Review On Foot Step Or Speed Breaker Electricity Generation

Prof.Tanuja Hulavale¹, Nikalaje Sachin Gorakhnath², Borade Vikas Yadav³, Patil Shubham Suresh⁴, Kamble Raturaj Shashikant⁵

¹Assitant Professor Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

²³⁴⁵Student Mechanical Engineering Vidya Prasarini Sabha's College of Engineering and Technology ,Lonavala

ABSTRACT

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

In the present scenario power becomes major need for human life. Due to day-to-day increase in population and lessen of the conventional sources, it becomes necessary that we must depend on non-conventional sources for power generation. While moving, the vehicles posses some kinetic energy and it is being wasted. This kinetic energy can be utilized to produce power by using a special arrangement called "POWER HUMPS"

The Kinetic energy of moving vehicles can be converted into mechanical energy of the shaft through rack and pinion mechanism. This shaft is connected to the electric dynamo and it produces electrical energy proportional to traffic density. This generated power can be regulated by using Zener diode for

continuous supply. All this mechanism can be housed under the dome like speed breaker, which is called hump.



The generated power can be used for general purpose like streetlights, traffic signals. The electrical output can be improved by arranging these power humps in series this generated power can be amplified and stored by using different electric devices. The maintenance cost of hump is almost nullified. By adopting this arrangement, we can satisfy the future demands to some extent.

1.INTRODUCTION

In this model we show that how we can generate a voltage from the busy traffic. Conversion of the mechanical energy into electrical energy is widely used concept. It's a mechanism to generate power by converting the potential energy generated by a vehicle going up on a speed breaker into rotational energy. We have used that simple concept to the project. We connect one mechanical rod with the dynamo and fit this rod on the surface of the road. When any vehicle moves from this roller then due to friction, vehicle Rotate the rod or roller and roller then move the dynamo. When dynamo move then it generates a voltage and this voltage now connects to the bulbs. In actual practice with the help of this voltage we will charge the battery and then we use this voltage to light the small bulb. If we install this unit to the any small flyover then with the help of this voltage we generate a small voltage, and with the help of this voltage we light the bulb.

The second part of that project is an efficient use of energy by using simple electronics. We always see that road light continuously glow whether vehicle on path or not. We have introduced a concept to avoid a waste of light. We have used two sensors between some distances. When vehicle pass through first sensor it sends the signal to the microcontroller that the vehicle is passing along that particular distance then light will glow for that particular time and when vehicle goes out from the second sensor 2

Then the second sensor sends a signal to a microcontroller that vehicle has been passed through that particular path then light gets off automatically. Different types of basic electronics components has been used to get the desired output like capacitor, resister etc. We have also used a light diode resistance(LDR) when LDR senses a light around it all the road lights gets off and when LDR senses there is a dark around

it then LDR sends a signal to microcontroller then all the road lights gets on. By using a LDR we can avoid a waste of light that glow in a day time. The two sensors are made from the concept of electronics. These sensors are called an infrared sensor which is made from photo diode and light emitting diode each. When any vehicle pass from first sensor then first sensor becomes on, for that time the road lights gets on and when it pass from second sensor the second sensor become on and the first sensor gets off then the road light gets off.

In the present scenario 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.

1.1 BASIC PRINCIPLE

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 utilizes both mechanical technologies and electrical techniques for the power generation and its storage. POWER HUMP is a dome like device likely to be speed breaker. Whenever the vehicle is allowed to pass over the dome it gets pressed downwards then the springs are attached to

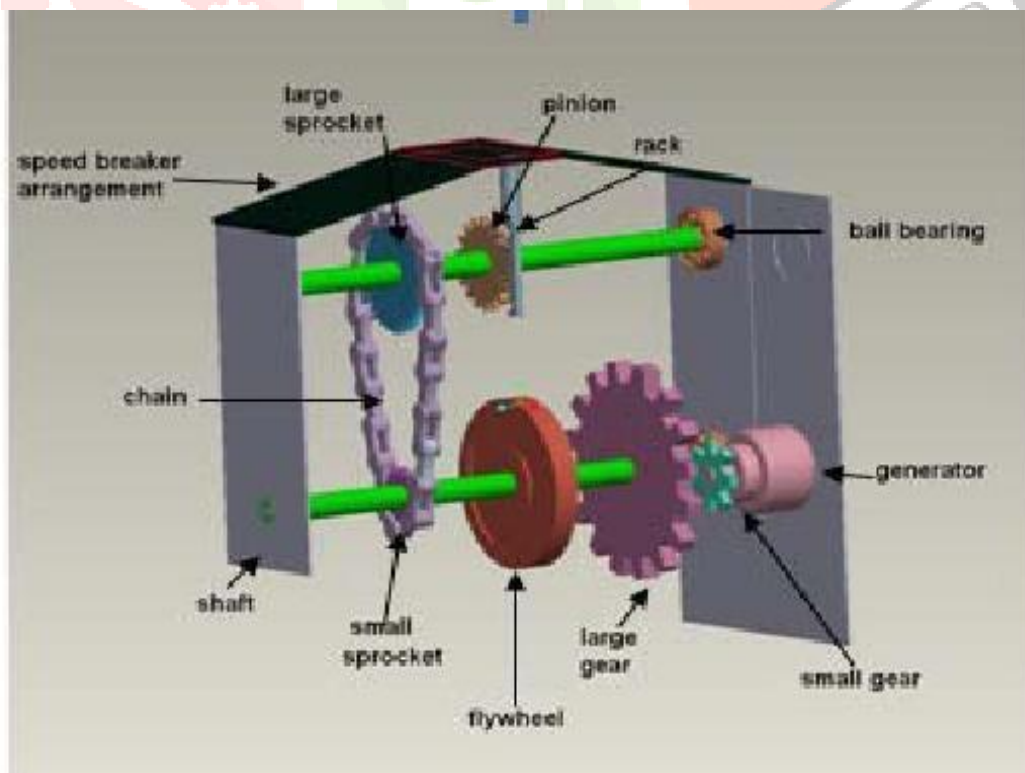
the dome is compressed and the rack which is attached to the bottom of the dome moves downward in reciprocating motion. Since the rack has teeth connected to gears, there exists conversion of reciprocating motion of rack into rotary motion of gears but the two gears rotate in opposite direction. A flywheel is mounted on the shaft whose function is to regulate the fluctuation in the energy and to make the energy uniform. So that the shafts will rotate with certain R.P.M. these shafts are connected through a belt drive to the dynamos, which converts the mechanical energy into electrical energy. The conversion will be proportional to traffic density.

1.2 OBJECTIVES OF PROJECT

- Manufacturing of Speed Breaker Energy Generation Unit.
- Electronic system design .
- Sensor Activation When Darkness Increases.
- Automatic activation of street light when darkness increase to certain limit

POSSIBLE USING DIFFERENT MECHANISMS

- ☐ Spring coil mechanism
- ☐ Rack- Pinion mechanism
- ☐ Crank-shaft mechanism
- ☐ Roller mechanism



2. LITERATURE REVIEW

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.

Totaram Ingle Devanand, Road energy plant by vehicle motion, WO 2011027355 A1

Generation of electricity on roadways: This is a structure to produce electric power by the vehicle flow on the surface of the road. This structures works when the vehicle passes with its own speed on energy plants erected on road. In this construction system there are slide ratchet bars, shafts, balance wheels & springs. That is sure that system will not work till a vehicle passes on road way. Slide bars are attached with free wheel type gears. Slide bars go down from upper to lower position with the speed of the vehicle. As slide bars are attached with free wheel type gears, they transform the axle shaft into cyclical speed. And the axle shaft activates the revolving speed of the generator and the generator in turns works for electric generation.

3. DESCRIPTION

Background of invention :-

Since last many years there is effect of vehicle - power on roads. It has curiosity. By being mechanical profession in India there is problem with electric itself. Due to shortage of electricity the problem itself is known as the mother of invention.

Energy is creative and so it is okay. Energy can be transferred, from one place to another. My research is that creative energy leaves its own waste. For e.g. - living creatures leave its waste which certainly contains energy. As cow takes energy in the form of grass and its waste cow dung contains energy. We use it to burn it in domestic oven.

Dung works for gas formation. When the tree is burning, we get one form of energy and from coals we get another form of energy. Grass and trees are known for creative energy. Dung and coal which we are using should be called as waste energy. It is accepted in invention and we can see by our own eyes that on earth day passes by Sun energy while night passes by waste energy from Sun. If there is no waste

energy from Sun on the earth then the temperature on earth will fall down to such an extent that entire living creature may come to an end on this earth in one night only.

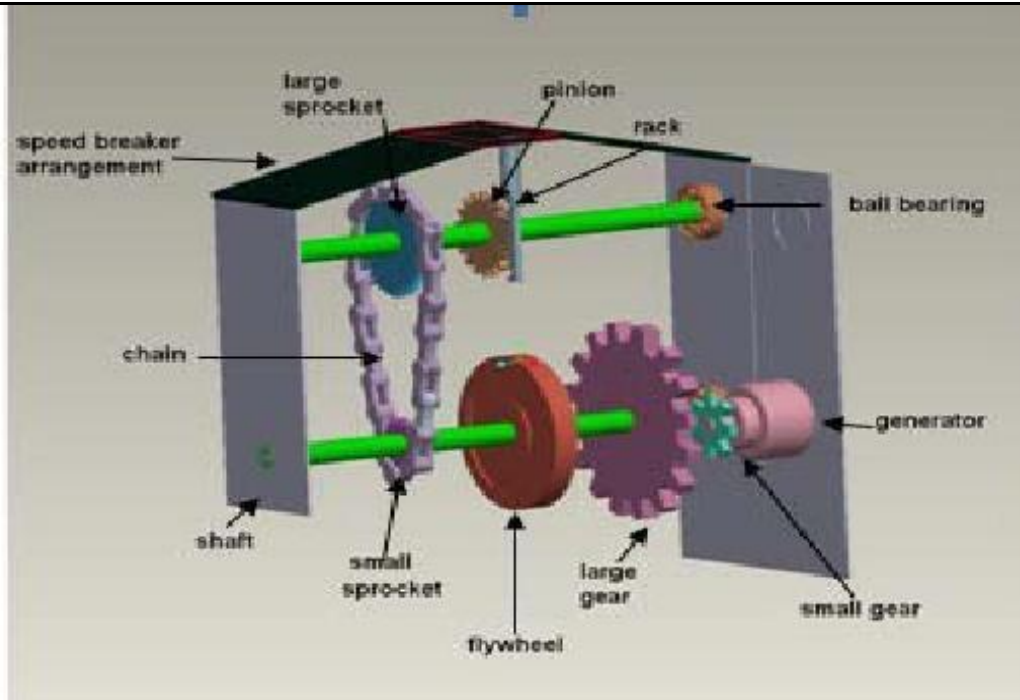
CLAIMS Claim

1. Claim -According to mechanical plan shaft support pole gives strength to system.
2. Claim -According to mechanical plan the bearing which is helpful to rotate shaft so the balance wheel can get speed. Balance wheel is mounted on shaft.
3. Claim _According to mechanical plan in this system, the energy obtained from the slide ratchet bar is converted into the cyclical speed while the axle is helpful in rotating the generator.
4. Claim _According to mechanical plan, free wheel mechanism is used in this system and so the shaft rotates in the programmed direction.
5. Claim -According to mechanical plan, road size slide bars are used in this system across the road (like speed breakers on the road) which gets pressed down at the time when the vehicle passes through and so the shaft gets transformed into cyclical speed from the energy of these passing vehicle.
6. Claim -According to mechanical plan, the joint plate which connects the slide bars with one another in the system so that the vehicles can move easily in their own speed.
7. Claim According to mechanical plan, the platform plate is helpful in pushing down the slide bar easily. The slide bar which is in higher level of the road is attached directly with this platform plate in the front and in the end

4. CONSTRUCTION DETAILS

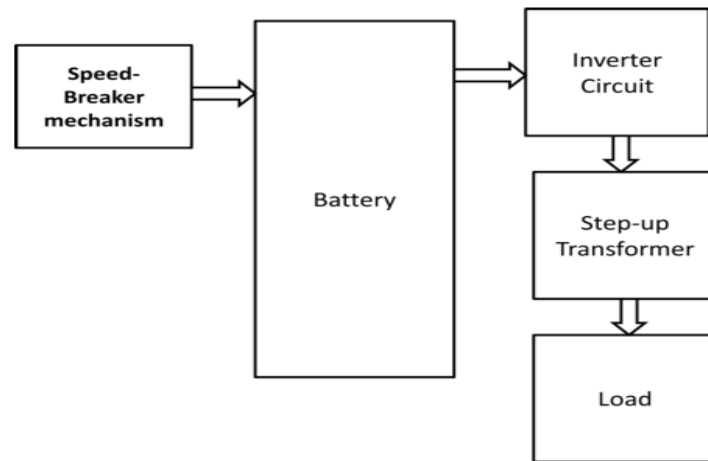
The various machine elements used in the construction of power hump are

- RACK
- SPUR GEAR
- BEARINGS
- SHAFT
- SPRINGS
- ELECTRIC DYNAMO

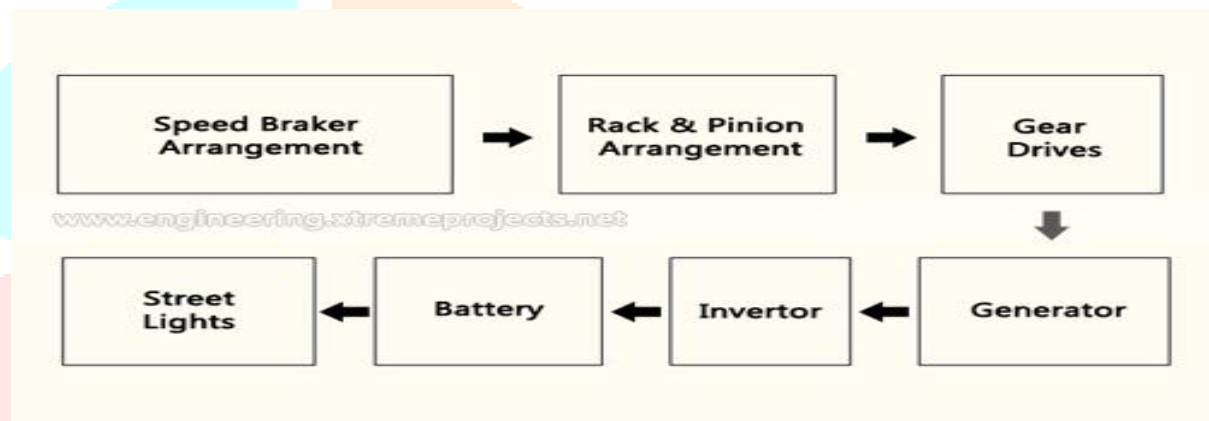


5. WORKING PRINCIPLE

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 utilizes both mechanical technologies and electrical techniques for the power generation and its storage. POWERHUMP is a dome like device likely to be speed breaker. Whenever the vehicle is allowed to pass over the dome it gets pressed downwards then the springs are attached to the dome are compressed and the rack which is attached to the bottom of the dome moves downward in reciprocating motion. Since the rack has teeth connected to gears, there exists conversion of reciprocating motion of rack into rotary motion of gears but the two gears rotate in opposite direction. A flywheel is mounted on the shaft whose function is to regulate the fluctuation in the energy and to make the energy uniform. So that the shafts will rotate with certain R.P.M. these shafts are connected through a belt drive to the dynamos, which convert the mechanical energy into electrical energy. The conversion will be proportional to traffic density.



The electrical output can be improved by arranging these POWER HUMPS in series. This generated power can be amplified and stored by using different electrical devices



SCOPE AND USES

- Low Budget electricity production
- Less floor area
- No obstruction to traffic
- Easy maintenance
- Suitable at parking of multiplexes, malls, toll booths, signals, etc.
- Uses: Charging batteries and using them to light up the streets, etc.

DISADVANTAGES

- Selecting suitable generator.
- Selection of springs.
- Achieving proper balance of speed and torque.
- It gives low electric output

6. 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.
- More suitable and compact mechanisms to enhance efficiency.

7. CONCLUSION

It is a non-conventional type of producing the energy. The existing source of energy such as coal, oil etc. may not be adequate to meet the ever increasing energy demands.

These conventional sources of energy are also depleting and may be exhausted at the end of the century or beginning of the next century. Consequently sincere and untiring efforts shall have to be made by engineers in exploring the possibilities of harnessing energy from several non-conventional energy sources. This project is a one step to path of that way. The overall goal was to design the speed breaker System while keeping the engineering, producer and customer models in check. The reason why this feature was used more than all of the other features are because the other features would not have as much effect on the complete system. By changing the size and desirable price, weight and capacity can be realized.

Future work would consist of a redesign of this model to see exactly how much data we may be missing with the assumption that we made with low price, weight and capacity. Despite all the assumptions, we still have realized that this product can be very marketable and that the demand is extremely large which means this is a viable design that will yield a high return on an investment.

- ☐ It can be implemented at metropolitan cities.
- ☐ So that more electric power is produced.
- ☐ Arrangement of whole setup is easier.
- ☐ The stored electricity could satisfy the daily requirement of electric power

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