

Research Article

Speed Breaker Power Generation and Compress Air

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Abstract

Day by day power consumption increases and electric crisis occur. So the minor needs of electricity such as street lights and traffic signals can be generated from speed breakers. Instead of wasting kinetic energy of vehicles at speed breakers the minor needs can be met by converting kinetic energy to electrical energy.

Keywords: Kinetic energy, Speed breaker, Electro-mechanical unit, Electric dynamo, Non-Conventional Energy

1. Introduction

This project harvests energy from speed breaker. In this project we are generating electrical power as nonconventional method by simply attaching this mechanism to the road hump. Non conventional energy system is very essential at this time to our nation. Non-Conventional energy using speed breaker needs no input power to generate the output of the electrical power. This project using simple drive mechanism such as crank mechanism. And this device can also generate compress air and well as power

For this project the conversion of the force energy is converted into electrical energy. And also generate compress air. Air pump, tank, D.C generator, battery and invertors control. We have discussed the various applications and further extensions also.

Man has needed the used energy at an increasing rate for his sustenance and well-being ever since he came on the earth a few million years ago. Primitive man required energy primarily in the form of food. He derived this by eating plants or animals, which he hunted. Subsequently he discovered fire and his energy needs increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as for a keeping himself warm. With the passage of time, man started to cultivate land for agriculture. He added a new dimension to the use of energy by domesticating and training animals to work for him.

With further demand for energy, man began to use the wind for sailing ships and for driving windmills, and the force of falling water to turn water for sailing ships and for driving windmills, and the force of falling

water to turn water wheels. Till this time, it would not be wrong to say that the sun was supplying all the energy needs of man either directly or indirectly and that man was using only renewable sources of energy. Every thing is running by energy in nature. Either it is living thing or any machine; they required energy for their proper operation. There are two types of energy sources i.e. renewable and non renewable resources.

The non renewable resources are limited in nature. They will be ended from the earth after a certain period of time. Thus it is very necessary to invent the other renewable energy resources. This project works for the utilizing the kinetic energy of a running vehicle. The kinetic energy (i.e. mechanical energy) is converted into electrical energy (i.e. electricity) by using dynamo. This electricity is stored in the battery bank and use for various purposes.

2. Literature Review

Shakun Srivastava (2011) worked on Produce Electricity By The Use Of Speed Breakers In the coming days, as demand of electricity is increasing every moment, it will prove a great boon to the world, since it will save a lot of electricity of power plants which are wasted in illuminating the street light. Future aim of this research is to develop our country by enriching it in utilizing its sources in more useful manner. Any country can only develop when it uses power supply frequently and not by getting breakdown in middle course of time. Now times comes when these types of innovative ideas should be brought into practice. At least, by this idea we should start to think something about to save electricity.

3. Proposed System

While moving, the vehicles possess some kinetic energy and it is being wasted. This kinetic energy can

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be utilized to produce power by using a special arrangement called Power Hump. It is an Electro-Mechanical unit. All this mechanism can be housed under the dome, like speed breaker, which is called Hump. It utilizes both mechanical technologies and electrical techniques for the power generation and its storage.

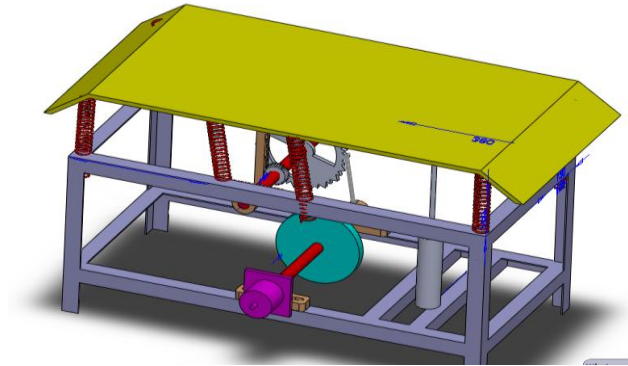


Fig.1 Speed Breaker Power Generation & Compress Air

4. Equipment Required

A. Rack and Pinion Gears: The rack and pinion used to convert between rotary and translator motion. The rack is the flat toothed part, while the pinion is the gear. Rack and pinion can convert rotary to linear or from linear to rotary motion.

B. Ball Bearings: A roller-element bearing is a bearing which carries a load by placing round elements between the two pieces. The relative motion of the pieces causes the round elements to roll (tumble) with little sliding. They reduce the friction and transmit the motion effectively.

C. Spur Gear: It is a positive power transmission device with definite velocity ratio. It is preferred for adjusting some linear misalignment. It should have high wear and tear, shock-absorbing capacity.

D. Fly Wheel: The primary function of flywheel is to act as an energy accumulator. It reduces the fluctuations in speed. It absorbs the energy when demand is less and releases the same when it is required.

E. Shafts: It is a rotating element, which is used to transmit power from one place to another place. It supports the rotating elements like gears and flywheels. It must have high torsional rigidity and lateral rigidity.

F. Springs: It is defined as an elastic body whose function is to distort when loaded and to recover its original shape when the load is removed. It cushions, absorbs or controls energy either due to shocks or due to vibrations.

G. Electric Dynamo: It is a device, which converts mechanical energy into electrical energy. The dynamo uses rotating coils of wire and magnetic fields to convert mechanical rotation into a pulsing direct electric current through Faraday's law of electromagnetic induction. A dynamo machine consists of a stationary structure, called stator, which provides a constant magnetic field, and a set of rotating winding called the armature which turns within that field.

5. Advantages

Below is the list of advantages due to the usage of the technique mentioned in this paper.

- Easy in operation.
- Low cost
- Simple construction.
- Adaptable.
- High capacity..
- Manually operated.
- Environmental friendly
- Easy to setup
- Light weight.
- Easy maintenance.

Conclusion

The non-renewable resources like coal, natural oil, natural gas are limited in nature. They are using widely for energy production. The rate of consumption is quite higher. Thus after some time they will remove from the earth. The government works to save these resources. But in the future, the energy is necessary for the various applications. There are many applications and devices which are necessary for the human being in daily life. They consume lot of energy for their working. They are the part of the life. Thus for running of these applications, the energy is required in future. So the option of the non-renewable resources is necessary.

A vehicle weighing 1,000 kg going up a height of 10 cm on such a rumble strip produces approximately 0.98 kilowatt power. So one such speed-breaker on a busy highway, where about 100 vehicles pass every minute, about one kilo watt of electricity can be produced every single minute. The figure will be huge at the end of the day

Now in the daily life, there are lots of vehicles running on the roads. They have kinetic energy. But during the braking all kinetic energy is lost. It means all the generated energy due to such vehicles is going to waste. So we need to have a mechanism that could able to utilize the energy of the vehicles. Their kinetic energy is used to generate the electricity. This energy can be utilized to give the additional rotation to the dynamo. Hence causes to generate electricity. This energy can be stored in battery bank and used for further use.

The major advantages of this project as given below:

- Generation of electricity at low cost.
- Operating cost is less.
- Stored electricity can be used for other purposes.
- Convert the totally waste energy in some useful work.
- For government economic consideration.
- Saving the other energy resources.

On the basis of above discussion and advantages of this project, we can conclude that, it is very necessary for the future use for electricity production at low cost and from totally wastage energy.

We have taken up this project as real challenge, as we were not experience in the hydraulics field. We started our work on this project facing new hurdles initially.

After the completion of the project work we tried its working in our college machine shop and we were pleased to note that it does meet the requirements for what it is meant. It can easily cut the bolts and nuts without applying much force

The maneuverability of the device is quite good and the handling is quite simple. For commercial purpose one can improve the efficiency of the device effectively by increasing the size of the device.

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