POWER GENERATION USING HYDRAULIC MECHANISM AT SPEED BUMPER

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Abstract: The extensive usage of energy has resulted in an energy crisis, and there is a need to develop methods of optimal utilization, which will not only ease the crisis but also preserve the environment. The focus now is shifting more and more towards the conventional energy, which are essentially, non-polluting. In this paper we approach a new mechanism to generate power from speed bumper, because the number of vehicles passing over the speed bumper in roads is increasing day by day. This proposed system is to extract the kinetic energy of vehicle flow in the streets entitled as generating power from speed bumper through hydraulic mechanism. It is more efficient than other existing models, which enable to accommodate conventional, both in terms of balancing electricity supply and demand in energy across the global.

I. INTRODUCTION

Energy crisis has become a great bottleneck in our sophisticated life and the demand for electricity continues to rise in all parts of the world. Population rise and economic growth are the two main reasons for energy insufficiency. The number of people without access of electricity remained unacceptably high at 1.3 billion, around 20% of the world's population. [2] Consequently, the developing countries share of global electricity demand jumps from 27% in 2000 to 43% in 2030. The International Energy Agency says the world will need almost 60% more energy in 2030 than in 2002. The most optimistic estimates have fossil fuel lasting no more than 100 years; however, they may become economically undesirable in much less time. Obviously, our world move towards the renewable resources to sustain with electricity, only if we utilize the resources properly by implementing this kind of new mechanism will leads to heal our world from power shortage. In the current scenario, when every day the newspapers are flooded with news on accidents due to high speed, speed bumpers are becoming more and more crucial. [1] These help to reduce the speed of vehicles, thereby enabling a comparatively smooth drive.

Figure 1: Conventional Speed Breaker

Roads and highways are provided with speed bumper to control the speed of traffic in congested areas. This energy loss on speed bumpers can be utilized for useful purposes. This paper describes the potential of such type of energy available on roads and its utilization for useful work. The mechanism, which is used to generate power from speed bumper, is elaborated.

Working Principle

When the vehicle (load) passes over the speed bumper which is made of cylinder and piston arrangement, then the piston rod is subjected on a compressive force which in turn the oil gets pressurized and comes out through the outlet nozzle which strikes the turbine blades then the potential energy of oil is used to run the turbines to which the electric generator is coupled. Here the mechanical energy available at the speed bumper is converted in to electrical energy through a generator.

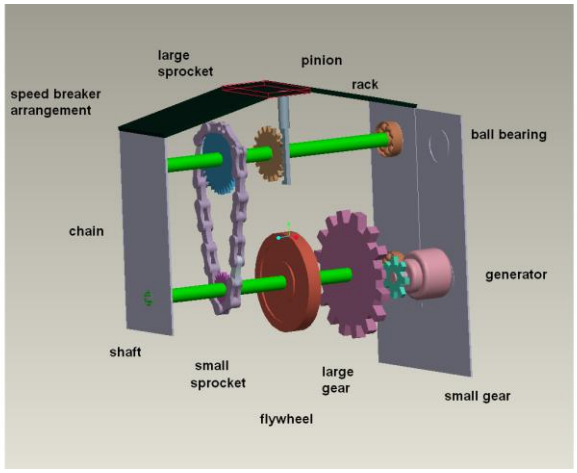

Figure: Working principle

Due to spring tension, the exhausted oil is recycled back to the cylinder with the help of inlet control valve. Hence, the speed breaker gets back to its original position. So, if we implement one such speed breaker on a busy highway, we can able to tap maximum amount of electricity from the waste kinetic energy of a vehicle

II. IMPICATIONS OF USING SPEED BREAKER

The power generated through speed breaker mechanism can be considered renewable source which does not pollute the environment. Below are the advantages and challenges of using speed breaker mechanism for power generation.

Advantages of using speed breaker as power generator

- Require simple construction methods.
- Free from all types of pollutions.
- It is economical and easy to install.

• Maintenance cost is low.
• This concept is quite promising due to its good efficiency as well as energy recovery criteria.
• No fuel transportation problem.
• No consumption of fossil fuel which is nonrenewable.
• No manual work necessary during generation.
• Energy available all year round.
• We can use it at all places according to desired design.

Challenges

- Selecting suitable generator.
- Selection of springs.
- Achieving proper balance of speed and torque.
- Such speed breakers can be designed for heavy vehicles, thus increasing input torque and ultimately output of generator and hence it will not work with light weight vehicle.
- Require more suitable and compact mechanisms to enhance efficiency.
- We have to check mechanism from time to time in short span of period.
- Because of Rain water it may get damage.

III. CONCLUSION

In the coming days, demand for electricity will be very high as it is increasing every day, speed breaker power generator will prove a great boom to the world in theFuture. The Aim of this research is to introduce another innovative method of green power generation in order to contribute toward developing the world by enriching it with utilization of availableresources in more useful manner. Any country, especially Nigeria and other developing nations, can only develop when there is steady and available power supply forits citizens andnot by getting breakdown in middle course of time or unreliable power sources. Now time has come for using these types of Innovative ideas and it should be brought into practice. It is suggested that further developments should be done to minimize above mentioned challenges. This research can also be modified by using camshaft and pulley stem or concepts of fluid mechanics can be used instead of gears, so as to minimize the inherent complexities and difficulties. By using the concept of power generation new ideas should be introduce which would help in reduction of friction and increase the efficiency of the generators.

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REFERENCES

[1] Fairley's- Speed bumps ahead for electric-vehicle charging by, Spectrum,IEEE Publication Year: 2010 , IEEE Journals & Magazines.
[2] Website of International Energy Agency (IEA), world energy outlook.
[3] Aswathaman.VPriyadharshini.M- Every speed breaker is now a source of power 2010 international conference on biology, environment and chemistry, ipcbee vol.1 (2011) © (2011) iacsit press, Singapore.
[4] ShakunSrivastava, Ankitasthana -"produce electricity by the use of speed breakers," Journal of Engineering Research and Studies, Vol.2, No.1 April-Jun 201.

