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Power Evulsion through Speed Breakers using Pitman's Rod Mechanism

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Abstract: Energy is the need of today's fast-developing world and there is a need to increase methods of renewable energy sources. With the slight change in the design of speed breakers mechanism, electricity is generated. Whenever, a vehicle passes over the speed breakers, spring mechanism along with pitman rod work together to produce a rotating motion in the shaft connected to it. On the shaft, there is a sprocket on which flywheel is mounted. Sprocket helps the flywheel to rotate even when shaft stops rotating by speed breakers in case on no vehicles passing over. This method turns out to be very efficient when considered number of vehicles passed through it during the entire day. Kinetic energy of moving vehicles is converted into electrical energy.

Keywords: Speed breaker, Flywheel, Pitman rod, DC generator, Kinetic energy

1. INTRODUCTION

Energy is a need of today's developing world. There is a huge need of electricity and currently there is a very large gap in the demand-supply ratio. So, it is necessary to setup some conventional sources to meet the demand. As compared to other conventional energy sources, it is necessary to make advancements in the design of speed breakers which could use the kinetic energy of vehicles passing over them. Various models are designed in the past by several researchers. But there is a need of simplicity, flexibility, convenience, low maintenance, hassle-free mechanisms which can overcome the disadvantages of the previous models and these reasons are the need for developing a better and stable system.

Methods of conventional energy sources are increasing day by day but many times there are difficulties in implementing due to high costs and stabilities in normal working. So, keeping it mind a convenient system has been made.

The speed breaker allows vertical reciprocating motion with the help of spring attached beneath it. Now, with the help of pitman rod that motion is converted into rotatory motion. A fly wheel is connected on the shaft which is attached to the pitman's rod. Fly wheel helps to store the energy which acts as inertia and keep it rotating even if there are no vehicles passing over the breakers. A sprocket assembly is also made which is attached to the inner diameter of flywheel which works in either of the directions. The rotatory motion of the fly wheel is then transferred to the DC generator. Generator then charges the battery and the stored energy can be used to power up light loads [1].

The utilization of energy is an indication of the growth of a nation. For example, the per capita energy consumption in USA is 9000 KWh per year, whereas the consumption in India is 1200 KWh. One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy [2]. A survey on the energy consumption in India had published a pathetic report that 85,000 villages in India do not still have electricity. Supply of power in most part of the country is poor. Hence more research and development and commercialization of technologies are needed in this field. India, unlike the top developed countries has very poor roads. Talking about a particular road itself includes a number of speed breakers. By just placing a unit like the "Power Generation Unit from Speed Breakers", so much of energy can be tapped. This energy can be used for the lights on the either sides of the roads and thus much power that is consumed by these lights can be utilized to send power to these villages [3-4]. 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 [5].

2. PROPOSED IDEA

After studying the existing model of speed breaker mechanisms and we have listed many disadvantages that we are overcoming with our proposed idea. The block diagram of proposed system consists of a speed breaker, spring mechanism, pitman rod, a flywheel, sprocket and chain

drive. The proposed system integrates all the mechanisms and performs the function simply and effectively. The speed breaker will be pushed down whenever a vehicle comes over it and moves back to initial position when the vehicle has crossed. It will be helpful in bringing down the demand supply gap of electricity. It will also be equipped with batteries which stores the electricity, which can be used as backup or powering up light loads.

3. METHODOLOGY

The initial motive of our project is to develop electricity through speed breakers which can be used as conventional source of energy. Thus, this is eco-friendly way to generate electricity.
The following methods are followed for designing the speed breaker:

- The frame is made up of iron angles. It provides stability, strength against vibration caused by moving vehicles. Iron is used because it is cheap and easily available.
- Stepper motor is used for the purpose of dynamo/dc generator, by rotating the shaft of the dynamo we get electricity as output. The output voltage of stepper motor is 12V DC.
- Springs are used for to and fro motion of the speed breaker. It acts as the base and provides support the breakers.
- Pitman rod is used to convert linear motion to rotatory motion. One side of the pitman's rod is connected to ball bearing providing free movement. The other side provides with rotatory motion.
- Fly wheel stores energy and increases the momentum of the sytem.it also provides stability to the system.
- Chain and sprocket assembly are used in which driver sprocket is attached to the fly wheel and driven sprocket is attached to the dynamo. The size of the driver sprocket is bigger the driven sprocket. This is done to increase the revolutions per minute of the dynamo.

4. BLOCK DIAGRAM

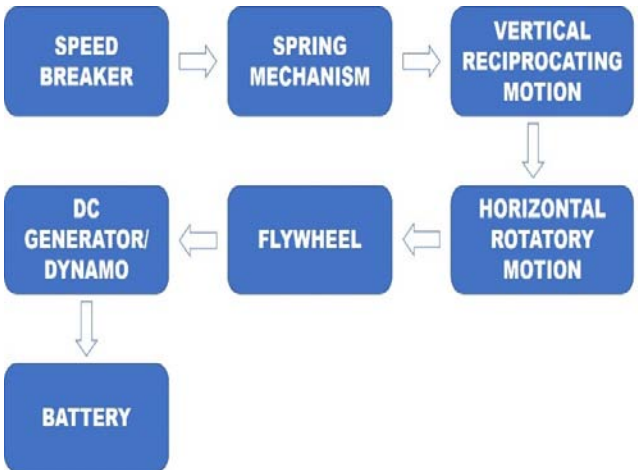

Fig. 1 Block diagram of electricity generation using speed breaker

5. DESIGN

(a)

(b)

Fig. 2 Experimental Setup (a) Front view (b) Side View

6. CONCLUSION

The speed breaker is divided into sections which has its own advantage like additional power output can be obtained. This mechanism overcomes the limitation of vibrations produced by vehicles passing over the breaker. Thus, a better stability is achieved. The upward and downward movement of speed breakers adds up together by the use of pitman rod which further helps to rotate the flywheel. The flywheel is mounted on outer periphery of the sprocket which help to store the momentum and to rotate it smoothly due to ball bearings inside it. A better power output is produced with increased stability.

7. REFERENCES

[1] Singh, Alok Kumar, et al. "Generation of Electricity through Speed Breaker Mechanism." International Journal of Innovations in Engineering and Technology (IJIET, 2 (2) (2013): 20-24.

[2] Nota, Renez, Robert Barelds, and Dirk van Maercke. "Harmonoise WP 3 Engineering method for road traffic and

railway noise after validation and fine-tuning." Deliverable of WP3 of the HARMONOISE project. Document ID HAR32TR-040922-DGMR20 (2005).

[3] Hamet, Jean-Françcois, et al. "New vehicle noise emission for French traffic noise prediction." Applied acoustics 71.9 (2010): 861-869.

[4] Gagen, M. J. "Novel acoustic sources from squeezed cavities in car tires." The Journal of the Acoustical Society of America 106.2 (1999): 794-801.

[5] Mishra, Aniket, Pratik Kale, and Atul Kamble. "Electricity Generation from SpeedBreakers." The International Journal Of Engineering And Science (IJES) 2.11 (2013): 25-27.