RESEARCH ARTICLE OPEN ACCESS

Every Speed Breaker Is A Source Of Power

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ABSTRACT
Electricity in India, is a big problem which is faced by people who reside in the country. Electricity is the form of energy, Electricity is a basic part of nature and it is one of our most widely used forms of energy. We get electricity, which is a secondary energy source, from the conversion of other sources of energy, like coal, natural gas, oil, nuclear power and other natural sources, which are called primary sources. Before electricity generation began slightly over 100 years ago, we use kerosene lamps, and rooms were warmed by wood-burning or coal burning stoves. Direct current (DC) electricity had been used in arc lights for outdoor lighting. In the late-1800s, Nikola Tesla pioneered the generation, transmission, and use of alternating current (AC) electricity, which can be transmitted over much greater distances than direct current. Generating electricity by speed breakers is innovative and useful concept. Researches show that the world has already had its enough Shares of its energy resources. Fossil fuels pollute the environment. Nuclear energy requires careful handling of both raw as well as waste material. The focus now is shifting more and more towards the renewable sources of energy, which are essentially, nonpolluting. Energy conservation is the cheapest new source of energy. 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. This paper is presenting the study of electricity generation through the speed breaker mechanism.
Keywords **-** ac: alternating current, dc: direct current, generation, lead acid battery, speed breaker.

I. INTRODUCTION

Is anyone happy with current situation of electricity in India. So, this is our small step to try to improve this situation by our project. First of all what does electricity mean to us??? Electricity- secondary source of energy i.e. converted from other sources. We need it for every small thing, still notice its importance only during load shedding. Man has needed the use 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 wood. He derived this by eating plants or animals, which he hunted. Subsequently he discovered force 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. For this project the conversion of force energy is converted into electrical energy. 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 this will help us to generate electricity. 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 coupling of motor shaft and speed breaker by using ball bearing. There are also some electrical components such battery, rectifier etc. The power is generated by the motion of wheels over the speed breakers and due to coupling of motor shaft and speed breaker mechanism power is generated and can be supplied to rural areas and many other places. In this model we have been showed that we can generate voltage from busy traffic. Conversion of their mechanical energy into electrical energy used widely concept. It is a mechanism to generate power by converting potential energy generated by a vehicle going on up speed breaker into rotational energy. We used that simple technique to the project. When any vehicle moves it on the roller then due to friction vehicle rotates the roller. Electricity generates by the motor and that generated voltage can connects to the bulb. In actual practice, with the help of voltage we can charge the batteries then we can use that voltage to light the bulbs, etc. The second part of the project is an efficient use of energy by using simple electronics. We always see that road light continuously glow whether vehicle are on path or not. We have introduced this concept to avoid aware of light.

II. PROJECT DETAILS

1. Working principle

The bearing is provided in order to permit the relative motion between the shafts. In this way vertical motion is to be converted into rotational motion. The one end of the shaft will be fixed with the help bearing. The working of this speed breaker arrangement for producing electricity is very simple. The ball bearings are connected in one side of roller in this project. At one side ball bearing is used to make the linear and smooth rotation of roller. At the second side synchronous AC motor has been connected through mechanical coupling. As the roller rotates because of vehicle motor also starts to rotate due to which electricity is being produced. . The speed breaker on a busy road will be lifted to some height from one side and fixed to the road from other side. Then there will be a shock absorber kind of mechanism beneath the speed breaker

There are a large number of automobiles running on the road. These automobiles go over a number of speed breakers present on the road. The vehicle is having a variety of weight like trucks, buses, cars, and two wheelers therefore whenever they are passing over a speed breaker a lot of energy is wasted. So when the vehicle will come on the speed breaker, electricity produced by motor which acts as a generator because it get rotated linearly with the speed breaker due to coupling of speed breaker with motor shaft.

The generate voltage is in A.C. because the motor is A.C synchronous motor and we can use it into D.C by using bridge rectifier. This D.C. voltage is stored to the lead 6-volt battery. The battery is connected to the inverter. The inverter is used to convert 6 volt D.C. to the 230 volt A.C. voltage is used to activate the light fan etc. By increasing the capacity of the battery and the inverter circuit the power rating is increased. This arrangement is fitted in highways; the complete arrangement is kept inside the floor level except the speed brake arrangement. Here we are making speed breaker, when a vehicle crosses the speed breaker the speed breaker will rotate on the basis of weight and the speed of the vehicle. At the output of motor rectifier is connected example bridge rectifier. That output of bridge rectifier is given to the boost converter. Through boost converter we can use the boosted voltage. That output of boosted voltage is given to the application which being implemented such as street light and traffic light. The boosted voltage can also be given to the battery to store the electricity. Through battery we give supply to the port of microcontroller through which traffic light operates. Then the output of the battery is used to lighten the street lamps on the road. Now during daytime we don't need electricity for lightening the street lamps so we are using a control switch which is manually operated .The control switch is connected by wire to the output of the battery. The control switch has ON/OFF mechanism which allows the current to flow when needed.

2. SCOPE OF PROJECT

India has huge source of non conventional energy like huge coastal area, hilly areas and bright sunlight uninterruptable. The effective utilization of is useful in the development of nation non conventional energy sources. 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 (Kilo Watt hour) per year, whereas the consumption in India is 1200 KWh (Kilo Watt hour). One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy. A recent 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. EQUIPMENTS USED

3.1 Roller

Speed breakers are used to slow down the speed of vehicle by offering a resistance on wheels. It is in strips in two to five numbers lying parallel to each other on the road. It can be easily seen on railway crossings. We can use number of the speed breaker either to resist the vehicle or to get the more electricity. Material of vehicle we can use wood, steel, etc

3.2 Dimension of the speed breaker

Without assembly: 18 cm
With assembly: 22.5 cm
Hollow roller: 1.2cm height:0.875m
Height of speed breaker from road: 2 cm
diameter: 35 Cm .
Material of speed breaker: combination of metal like steel and insulator like PVC.

3.3 Microcontroller ATMEL 89S52:

Features of the using microcontrollers are such as it is Compatible with MCS-51Products and it has 8K Bytes of In-System Programmable (ISP)

Flash Memory, the voltage operating range is4.0V to 5.5V and Fully Static Operation is in between 0 Hz to 33 MHz and it has Three-level Program Memory Lock and RAM of 256 x 8-bit. It also has 32 Programmable I/O Lines & Three 16-bit Timer/Counters. This microcontroller has Eight Interrupt Sources and Full Duplex UART Serial Channel. It has some another special features like Watchdog Timer, Dual Data Pointer, Power-off Flag. It works on two modes like Low-power Idle and Power-down Modes and Interrupt Recovery from Power-down Mode. Basically this microcontroller is used to control the time or to give delay programming of traffic signals.

3.4 Traffic signals

Traffic signals are used to control the traffic.Traffic signals are used instead of traffic police. It is used to minimize human efforts and giving for reliable operation. It has three colors like red, green and yellow. Traffic lights were first installed in 1868 in London and are now used all over the world. At those times red and green gas lamps were used for night. The gas was turned with a lever at its base so that the appropriate light faced traffic. Traffic lights alternate the right of way accorded to road users by displaying light of the standard color as mentioned below-s

Red: To indicate stop the vehicles. Red signal prohibit any traffic from proceeding.

Yellow: To indicate the vehicles can go within less time so be in ready position. This light denoting prepared to stop short of the intersection, if it is safe to do so.

Green: To indicate the vehicle can go according to their way. It allows traffic to produce in the direction denoted, if it is safe to do.

3.4 Boost converter

Generated electricity has been converted into D.C. by using rectifier. Boost converter is basically used to boost that converted dc voltage as per requirement. Efficiency, size, and cost are the primary advantages of switching power converters when compared to linear converters. Switching power converter efficiencies can run between 70-80%, whereas linear converters are usually 30% efficient. The DC-DC Switching Boost Converter is designed to provide an efficient method of taking a given DC voltage supply and boosting it to a desired value.

3.5 Motor

The basic principle of the generator is Faraday's law of electromagnetic induction and in this mechanical energy is converted into electrical energy. The turning of a coil in a magnetic field the magnetic flux changes through the coil and therefore generates the voltage. Synchronous motors operate at exactly synchronous speed regardless of load. They can be adjusted to run at unity or leading power factor. They require starting and excitation control equipment that is more complicated than the starting equipment generally used for squirrel cage motors.

III. INDENTATIONS AND EQUATIONS

The calculation is based on the mass and speed of the vehicle. In our paper we are calculation the voltage generation by considering mass of vehicle. Below calculation shows the calculation considering the prototype model. The calculations are below:

Let us consider,

Assuming the mass of a vehicle moving over the speed breaker = 1 Kg

Assuming the mass of the roller which are being used = 2.5 Kg

The mass of a vehicle moving over the speed breaker+ mass of the roller which are being used =1 Kg+2.50 Kg (Approximately) = 3.5 Kg

Height of speed brake = 2 cm

Work done=Force x Distance

Here, Force=Weight of the Body = 3.5 Kg x 9.81 = 34.33 N

Distance traveled by the body = Height of the speed brake = 2 cm

Output power=Work done/Sec = (34.33 x 0.02)/60 = 0.011 volts (For One pushing force)

Power developed for 1 vehicle passing the speed breaker arrangement for 1 minute = 0.011 volts

Power developed for 60 minutes (1 hr) =0.66 V

Power developed for 24 hours= 15.84 V

This power is sufficient to burn four street lights in the roads in the night time.

IV. FIGURES AND TABLES

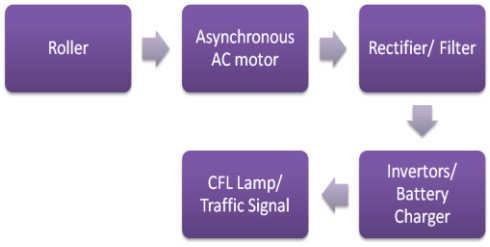

Fig-1. block diagram of working of model

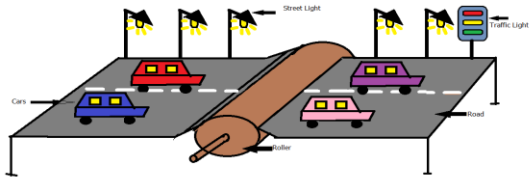

Fig-2. 3D view of model with equipments

Load of the vehicle (Kgs)	Voltage generated (V)
1	0.011
2	0.014
4	0.021
10	0.040

Table-1. Voltage Generated Vs Weight Of Vehicle Of Prototype Model

Load of the vehicle (Kgs)	Voltage generated (V)
100	**1.6**
250	**4.2**
400	**6.5**
750	**11.44**
1050	**17.16**

Table-2. Voltage Generated Vs Weight Of Vehicle Of Practical Model

V. CONCLUSION

The energy is an important input to sustain industrial growth and standard of living of a country can be directly related to energy consumption. The conventional energy sources energy like coal, oil, uranium etc are depleting very fast and by the turn of the century man will have to depend upon non-conventional sources of energy for power generation. In this world where is shortage of electric power supply, the project will be helpful to solve some of the problems. Advantages of the electricity generation by using speed breaker such as it is Pollution free power generation; Simple construction, mature technology, and easy maintenance; No manual work necessary during generation; Energy available all year round; No fuel transportation problem; No consumption of any fossil fuel which is nonrenewable source of energy; No external source is needed for power generation; Less floor area; Easy to install; No obstruction to traffic. Low budget electricity production and Low initial cost & capital cost therefore project is economical. Power generation is simple and we can use Battery to store generated power. No need fuel as an input. There are some disadvantages of this modern technique such as in this Selecting suitable generator is difficult. Achieving proper balance of speed and torque is difficult. We have to check mechanism from time to time therefore High maintenance cost. It May not work with light weight vehicle efficiently. It can rust in rainy season. There are so many applications of this technology. Power generation using speed breaker system can be used in most of the places such as in all highways, in all roadways Speed brake, to charge the Batteries and using them to light up the street, Traffic signals, Road Signals, Sign boards on the roads. Generated electricity can be used for Parking of multiplex, mall, toll booth, bus stops/ bus stand for school and colleges airports for cinema theaters, shopping complex.

This project can also be modified by using camshaft and pulley, gears instead of coupling which we have used in our paper which will reduce the complexities and difficulties faced during the project. Now, vehicular traffic in big cities is more, causing a problem to human being. It has advantage that it does not utilize any external source. Now the time has come to put forte these types of innovative ideas, and researches should be done to upgrade their implication. 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. Since the arrangement is easier but power transmission is not as costly as its setup. Hence power can easily be transmitted. This project is the one step to path of exploring the possibilities of energy from several non conventional energy sources.

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