

Automatic Generation cum Traffic Controller

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ABSTRACT

In this Paper 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. Its 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. Then the second sensor sends a signal to a microcontroller that vehicle has been passed through that particular path then light gets off automatically.

Keywords— Non - Conventional energy source, roller mechanism, speed breaker power, chain sprocket, generator.

ARTICLE INFO

Article History

Received :24th May 2016

Received in revised form :
26th May 2016

Accepted : 28th May 2016

Published online :

2nd June 2016

I. INTRODUCTION

Vehicular traffic at intersecting streets is typically controlled by traffic control lights. The function of traffic lights requires sophisticated control and coordination to ensure that traffic moves as smoothly and safely as possible. Again for safety purpose the way in which signal is being RED to mark the exact blocked through the signal as well as a series of rods with some height in the exchange of speed breaker and when GREEN opening the way to shut down the rods exchanging with speed breaker. Battery is use as a source and charging of battery through the mechanism provided, to make the action depending upon the movement of vehicle

along with the Speed breaker ,where as the movement of up-down to rotate the shaft of alternator , battery get charge and it is available as a source to the system.In recent days electro-mechanical controllers are replaced by electronic circuits. The accuracy & fault tolerant drive towards electronic circuits. Also the provision of emergency calls like zambulance, fire brigade vehicles etc. By using sensor, along the way of emergency calls, traffic get blocked, an availability is depending upon the priority call levels.This project is developed to meet the requirements of solid state traffic light controller by adopting microcontroller as the main controlling element, and led's as the indication of

light. A micro controller is interfaced to LED's provide for centralized control of the traffic signals. Microcontroller is programmed in such a way to adjust their timing and phasing to meet changing traffic conditions. The circuit besides being reliable and compact is also cost effective.

II. SCOPE OF THE PAPER

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. "Every Speed Breaker Is Now A Source of Power". 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. And traffic control.

III.SIMULATION WORK

We are going to construct a working model of Power generating using rack and pinion arrangement. The working principle for this system is as follows

Working Principle

The complete diagram of the power generation using shock absorber is given below. The vehicle running time the shock absorber piston is moving up and down motion. This movement is converted to the electrical energy by using Rack and pinion arrangement. The rack & pinion is fixed at the shock absorber which is mounded bellow the L-angle window. The pinion shaft is connected to the supporter by end bearings as shown in fig. The larger sprocket also coupled with the pinion shaft, so that it is running the same speed of pinion. The larger sprocket is coupled to the small cycle sprocket with the help of chain (cycle). This larger sprocket is used to transfer the rotation force to the smaller sprocket. The smaller sprocket is running same direction for the forward and reverse direction of rotational movement of the larger sprocket. This action locks like a cycle pedaling action. The fly wheel and gear wheel is also coupled to the smaller sprocket shaft. The flywheel is used to increase the rpm of the smaller sprocket shaft. The gear wheel is coupled to the generator shaft with the help of another gear wheel. The generator is used here, is permanent magnet D.C generator. The generated voltage is 12Volt D.C. This D.C voltage is stored to the Lead-acid 12 Volt battery. The battery is connected to the LED lights. 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. In the past decade, regenerative braking systems have become increasingly popular, recovering energy that would otherwise be lost through braking. However, another energy recovery mechanism that is still in the research stages is regenerative suspension systems. This technology has the ability to continuously recover a vehicle's vibration less energy dissipation that occurs due to road irregularities, vehicle acceleration, and braking, and use the energy to reduce fuel consumption. Consumption; however, only 10%–16% fuel energy in the vehicles is utilized for driving to overcome resistance from road friction and air drag. In addition to thermal efficiency and braking energy, one important loss is kinetic energy dissipated by shock absorbers. The function of vehicle suspension system is to support the weight of vehicle body, to isolate the vehicle chassis from road disturbances, and to enable the wheels to hold the road surface. Two chief elements in suspension are spring and damper. Conventionally, damper is designed to dissipate vibration energy into heat to attenuate the vibration which is transmitted from road excitation. However, the dissipated heat is from fuel or electrical power. It is a pity that so much energy is wasted. Green manufacturing, also called environmentally conscious manufacturing, is one of the most popular topics nowadays. The future of green manufacturing technology is foreseeable, especially on vehicle industry. Since the suspension is an important source of energy dissipation, it is feasible to harvest its vibration energy and convert into regenerative energy to improve the vehicle fuel efficiency. Therefore, so called regenerative suspensions arise as the times require. Instead of dissipating the vibration energy into heat wastes, the damper in regenerative suspension will transform the kinetic energy into electricity or other potential energy and store it for late use. The stored energy can be used to tune the damping force of the damper to improve the suspension performance or to power vehicle electronics to increase vehicle fuel efficiency.

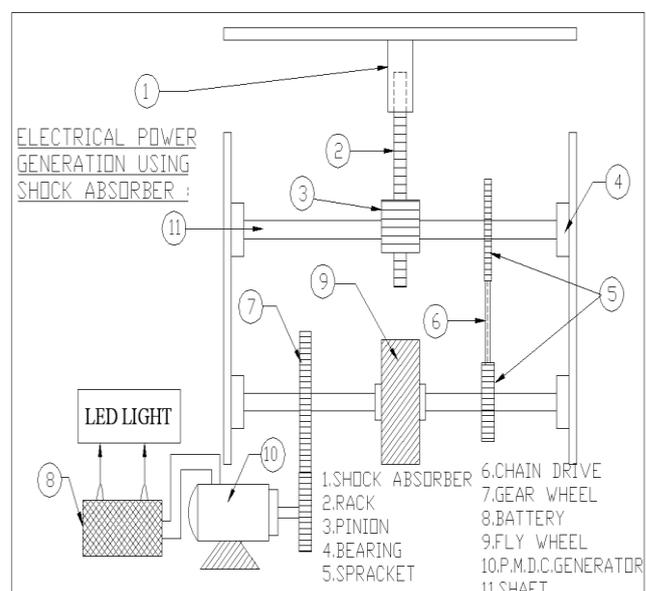


Fig: Diagrammatic representation of the system (PGSA)

Motor Driver and Road blocking Mechanism:

For driving the d.c. motor, current through any port pins is not sufficient to drive it . So, we need an external driver to provide a sufficient current,(2) ULN2003 is used to drive the one d.c. motor . A series of rods with equal height is attached on the other flat side of segmented type speed breaker with equal distance, other end of rods are just above the tooth of d.c. motor shaft. Segmented type rigid speed breaker gets rebalanced through the spring action, which is attached below each segment. One d.c. motor is used to change the orientation of roads with series of rods when road gets blocked and open when segmented type speed breaker is present. Other d.c. motor is used, Segmented type speed .

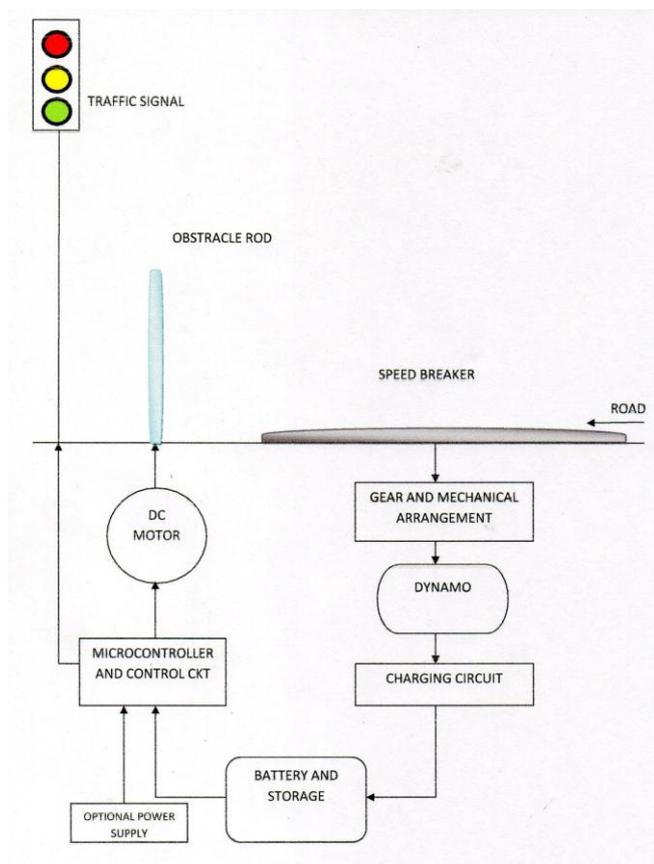


Fig:Block Diagram Of Automatic Generation Cum Traffic Control

breaker base is aligned on the two rigid strips through a spring. Before changing the orientation of the road way, we should move the two strips horizontally aside by some distance to allow the movement of the speed breaker into a series of rods or segmented type speed breaker on roadways.

Safely co-ordination between the signal and vehicle can be made possible by simply inserting a series of rods on the roadway to get blocked for some specified time i.e. signal RED and get open to change the orientation of the series of rods into a segmented type speed breaker i.e. signal GREEN, this mechanism is controlled through a stepper motor. When traffic is allowed to pass on them, vehicles pass through the segments of the speed breaker.

simultaneously it moves up-down to put vertical torque applied on the tooth of the alternator shaft, it gives corresponding revolution, hence voltage is generated. And when blocked, one stepper motor where the base of the segment is moved aside and at the same time another stepper motor changes the orientation of roadways.



Fig: Rod Arrangement

IV. RESULT AND DISCUSSION

For testing the above setup, a two-wheeler was run over the model at different speeds to get the reading of current and voltage generated under different conditions. For various speeds various outputs were obtained, this assembly gives an output of approximately 1.5-3 volt generation.

Also the rod assembly works according to the input from the control circuit (microcontroller) and RF module, and controls the traffic.

V. CONCLUSION

For different types of vehicle flow various results were obtained, thus making it a good energy producing setup as energy of vehicles on impact with the speed breakers is otherwise lost. This is lost to heat and sound. This energy can be tapped, stored and used as a backup or for small applications. Improvements have to be made in the setup to increase the efficiency which is discussed in the following section. In this study a new technique has been proposed to generate electricity from speed breakers. This technique will help to conserve our natural resources.

Control the traffic in a proper way, management of traffic congestion. Provide the renewable electrical energy to the traffic signal.

VI.FUTURE SCOPE

To provide electricity in villages near to highway, to feed power directly to smart grid. It can be placed in commercial building i.e. theatre, shopping mole, public/private parking etc. where use for. The bearings can be replaced with more durable plumber bearings reducing the chance of failure. The material of the rollers can be made lighter so as to increase the efficiency. The mild steel used in this model can be replaced by aluminium alloy 6063 or 6061.

ADVANTAGES

- Power generation is simply running the vehicle.
- Simple in construction.
- No need fuel input.
- This is a Non-conventional system.
- Battery is used to store the generated power.

ACKNOWLEDGEMENT

We are very thankful to all the faculty members for guiding and motivating us to work on this project. Their support and guidance while doing the project was invaluable.. We are also thankful to Savitribai Phule Pune University for giving us adequate resources to work on the project. Finally, we thank our friends and parents who helped us whenever we faced difficulties.

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