International Journal of Scientific & Engineering Research, Volume 8, Issue 1, January-2017
2004
ISSN 2229-5518

Evolving Technology Trends for Grid Modernization
Section : Energy Storage Technologies. Generation of PowerUsing Speed Breakers and Efficient Application

Neha Kshirsagar[1]
nehakshirsagar42@gmail.com
IIRS, ISRO, Dehradun, India.

Abstract: Utilization of existing systems for power generation is increasing on day-to-day. Due to rapid urbanization and industrialization, it becomes necessary for generating large amount of power. Energy consumed from sources that are conventional in nature is not sufficient to meet a certain level demand and will get exhausted due to variation in Socio-Economic factors.Therefore utilization of renewable energy system is advisable.Bytaking this problem into consideration, this project deals with non-conventional source of energy and law of thermodynamics. The aim of this project is to develop a renewable energy source with the speed breaker system using engineering modeling. The traffic on roads is increasing at abrupt rate at day and night.The first task of project is power generation from rotation of speed breaker(i.e. roller connected to dynamo) having high rotation speed and sensors system. The second task is to store generated power which can be recycled as next medium of efficient use of estimating energythat would charge batteries.Calculating the expected outcomes and results, the generated power gives result that may be usedfor maximum 24 hours for a city or 2 days street light at night time at one and half hour continuous rotation of speed breaker. This maximum utilization of wasted energy form increasing vehicle pressure can be efficient source in future generation.

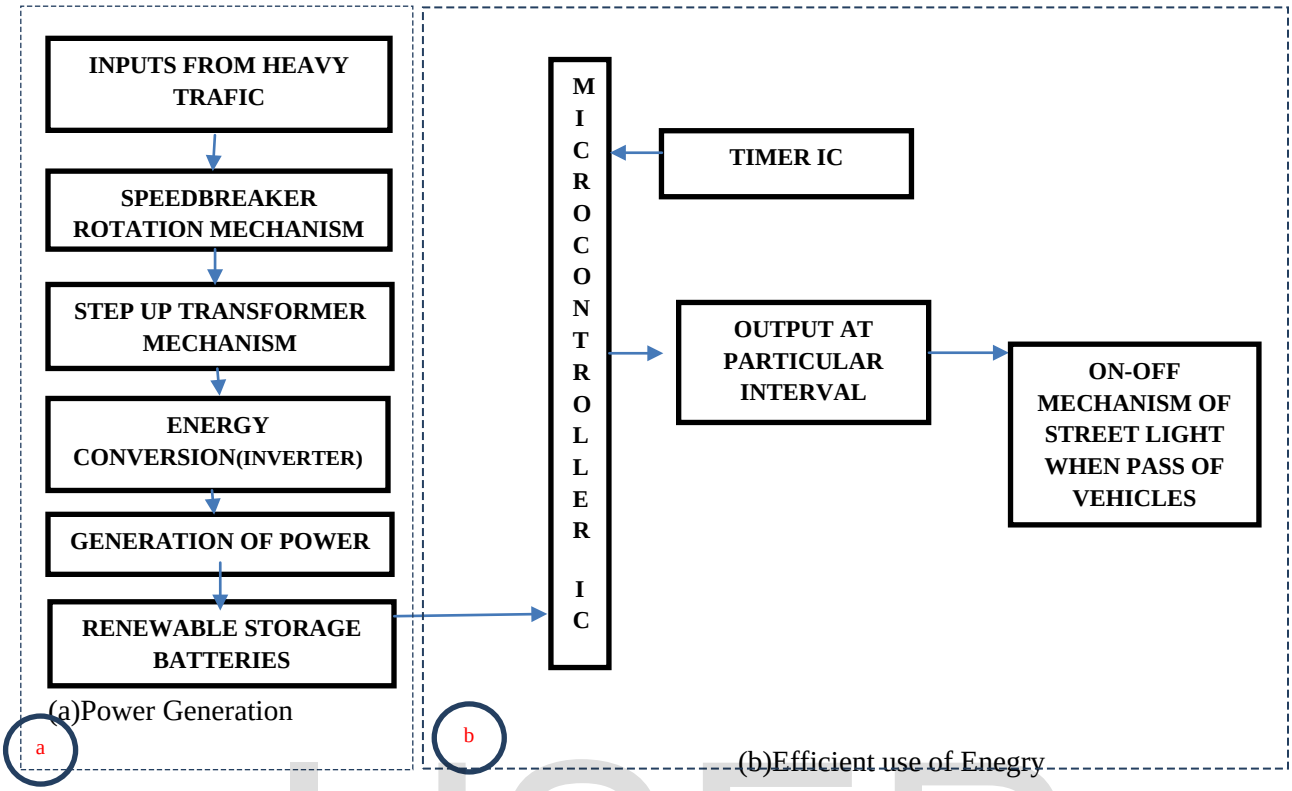
Keywords: Dynamo,Speed breaker, Renewable Energy source,etc.

Introduction

Electricity and Power is one of the current demands in today's environment. The growth in the population from millions to billions makes the use of electricity as one of the prominent issue. Due to upsurge requirement of power in various fields like industrial, domestic, recreation, transport, etc., there becomes necessity to store and utilize the energyat stipulated time.

Increasing demand of power may not be satisfied by using coal,natural gas, disel,petrol,etc. These conventional resources will be exhausted upto the next century.POSS [Power Saving System] along with the necessary circuitries are being developed in accordance to get the data.

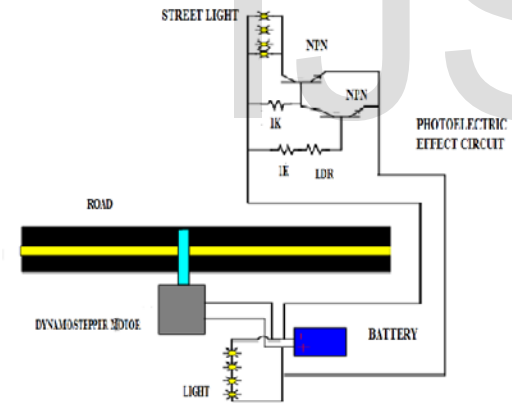
The use of energy is increasing as the human requirements are increasingrapidly.Therefore, Renewable energy source is one of the most important way of consuming power in effective manner.Some researchershave implemented the model based on the concept of utilization of heavy traffic (Singh,et. al., 2013;Mishra, Kale, & Kamble, 2013;Kaur,et. al., 2013) and given a scope of experiment in the field of power generation and renewable energy source.



(a)Power Generation

(b)Efficient use of Enegry

Construction & Operation



Methodology

The utilization of various circuitories for the generation of power is required in current need.The effective generation of power is done by using dynamo/step up transformer & inverter and effective supply of power is done by using combination of microcontroller along with two circuits for streetlight.

The concept of power engineering consist of three subsystem as: the generation subsystem, the transmission subsystem, and the distribution subsystem. In the generation subsystem, the power plant produces the electricity. The transmission subsystem transmits the electricity to the load centers. The distribution subsystem continues to transmit the power to the customers.

A) Power Generation

In first part, generation of a voltage from the busy traffic is implemented. Conversion of the mechanical energy into electrical energy is widely used concept.The principle used is that the potential energy of the vehicle moving on a speed breaker is transformed into rotational

energy. A mechanical rod connected to a dynamo is fitted at the surface of the road.The mechanism of this circuit is to generate power by converting the potential energy generated by a vehicle going up on a speed breaker into rotational energy.When any vehicle moves from this roller then due to friction, vehicle Rotate the rod or roller and roller then move the dynamo and produces an electromotive force(emf). This emf is then utilized as input for storage of the batteries.

Here, the storage batteries is the renewable batteries which get charged when the input voltage is applied to it.This power or applied enery is then utilized in any time.

B) Effective Utilization of Generated Power

The second part of the project is an efficient use of energy by using simple electronics.Generally, Street light at the path is continuously in on condition whether vehicle is on the path or not.Therefore objective of this project is to introduce a concept to avoid a waste of light. Two sensors are placed 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.The battere

C) Effective Utilization of Generated Power in day-night time.

The third part of the projectusinglight detecting resistance(LDR) and photovoltaic cell is also introduced in this paper.When LDR senses a light around it, all the road lights gets off and when LDR senses a dark around it then LDR sends a signal to microcontroller then all the road lights gets switch on.Thus, by using a LDR circuitory, we can avoid a wastage of light in a day time.

Results& Disscussion

The power generated from the moving vehicles according to weightages applied is given below-

Load(Kg)	Voltage Generation (V)
100-130	~120V[10(count)*12V(batteries)]
130-150	~135V
150-200	~ 150V
>200	~>200V

The calculated voltage (P=V*I) generated by moving roller at the pick time,i.e. during 10:30-11:30 AM and 5:30-6:30 PM will be capable to keep 24 hr light for a city or 2 days street light at night time when efficient use of energy is taken into consideration.

Conclusion

The effective utilization of energy produced by moving speed breaker or roller is one of the main renewable energy source as the conversion of enery from one form to other form is utilize in generation of power.As the population is growing abruptly,utilization of vehicles increseses in parallel ways. The released wasted energy from the heavy traffic is one of the prominent energy source in today's situation and may be excellently utilized in the effective manner for the generation, transformation and distribution of energy.This model can be

implemented in any terrain area like flat,undulating, unplanned, planned area,etc. as the basic principle and the materials used for implantation is simple and easily available.Themore models implemented for each speed breaker,the more power will be generated and utilized in many purpose.

Reference

- Kaur, A., Singh, S. K., Rajneesh, Parwez, & Shashank. (2013). Power Generation using Speed Breaker with Auto Street Light. *International Journal of Engineering Science and Innovative Technology*, *2*(2), 488–491.
- Mishra, A., Kale, P., & Kamble, A. (2013). Electricity Generation from Speed Breakers. *International Journal of Engineering and Science*, *2*, 25–27.
- Singh, A. K., Singh, D., Kumar, M., Pandit, V., & Agarawal, S. (2013). *International Journal of Innovations in Engineering and Technology*, *2*.

Neha Kshirsagar is Diploma in Electronics & Telecommunication from Government Polytechnic, Amravati, Maharashtra. B.Tech in Electronics & Communication from Government Engineering , Amravati ,Maharashtra and Currently pursuing M.Tech in Remote Sensing and GIS with research area in Urban Extraction of High resolution Satellite Images.

Contact Information

Name	Neha Sudhakar Kshirsagar
Designation	Student
Institute	IIRS,ISRO, Dehradun
Phone No.	9673162058
E-Mail Address	nehakshirsagar42@gmail.com

Subject	**Towards 100% Renewables**
Paper Title	**Generation of Power Using Speed Breaker and Efficient Application**