



# **HARVESTING ELECTRICITY FOR STREET LIGHTS USING ROAD TRANSPORT TYRE PRESSURE**

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## **ABSTRACT**

In the present situation, Electricity becomes a basic requirement of human beings and the ratio of electricity requirement is also increasing day by day. But the conventional energy sources are limited. And also the conventional energy sources are polluting the environment causes global warming. So we should go with nonconventional energy sources, which is also friendly to the environment. In this project, the kinetic energy from the moving vehicles is to be used to convert as electricity.

***Keywords: Speed breaker, Power generation, Renewable energy***

## **I. INTRODUCTION**

Harvesting Electricity using road transport is used to capture the wasted kinetic energy from the millions and millions of vehicles, which are travelling on our roads[1]. The captured Kinetic energy is converted into electrical energy.

When the pressure is created on the pressure lever of the vehicle, the wheels of designated system rotate thoroughly. These rotations of wheel produce electricity in the dc generator. Then the electricity is stored in the rechargeable battery. If required the DC current is converted to AC current and can be used further.

In these days solar power considered as the best alternative source of energy[1]. But the solar energy is weather dependent; the solar energy does not have as good effect as compared with the normal days.

Nuclear energy is also an alternative source of energy. But it causes harm to the organisms and environment, also the cost of nuclear power generation is high.

Harvesting of electricity using a Road transport is one of the new and best method to generate electricity and this will play a major role I the upcoming years. When comparing with the other sources, this is low cost, high efficient and very simple.

## II. WORKING PRINCIPLE

The sequence of units, which is used in this paper are,

- Speed breaker arrangement
- Rack and pinion
- Belt sprocket arrangement
- Gear arrangement
- Fly wheel
- Battery

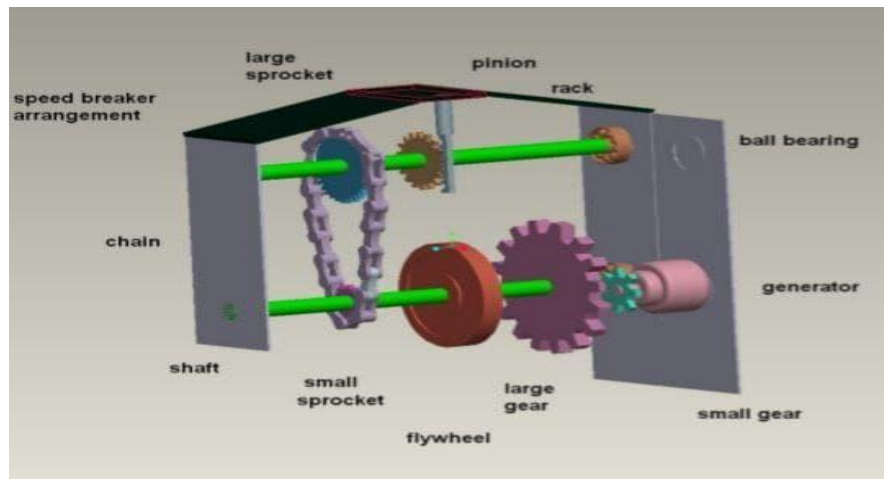


Fig.[1] Fly wheel Setup

Fig[2] shows that, When the vehicle is running on the speed breaker there will be a creation of pressure on the pressure lever<sup>[2]</sup>. Because of the pressure created on the pressure lever, the fly wheel starts rotating and the rotation from the flywheel produces electricity, which is stored in the battery. The Rack and pinion in this system is used to convert the reciprocating motion into rotating motion.

## III. RACK AND PINION:

A rack and pinion is a type of linear actuator that comprises a circular gear (the pinion) engaging a linear gear (the rack), which operate to translate rotational motion into linear motion[3]. Driving the pinion into rotation causes the rack to be driven linearly. Driving the rack linearly will cause the pinion to be driven into a rotation. A rack and pinion drive can use both straight and helical gears.

## IV. FLY WHEEL

A flywheel is a mechanical device which uses the conservation of angular momentum to store rotational energy; a form of kinetic energy proportional to the product of its moment of inertia and the square of its rotational speed[4]. In particular, if we assume the flywheel's moment of inertia to be constant (i.e., a flywheel with fixed

mass and second moment of area revolving about some fixed axis) then the stored (rotational) energy is directly associated with the square of its rotational speed.

**BLOCK DIAGRAM**

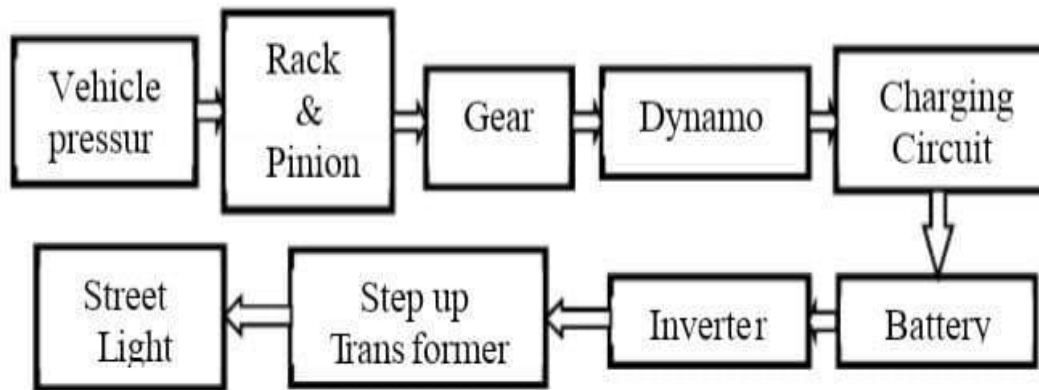


Fig.[2] Block Diagram for Setup

**V. EXPERIMENTAL STUDY AND RESULTS**

Consider if the 100 cars, mass of 400 kg, which passes over a speed breaker in one hour. The rack height is 14cm, the pully diameter is 18mm and having 13 Revolution per minute and shown in fig(3).

The downward motion of speed breaker is due to the weight of the moving vehicle and the upward motion of the speed breakers, take place because of the utilization of energy from the springs.

Consider every car pushers speed breaker 2 times,

$$\text{Force} = mg = 400 \times 9.8 = 3920 \text{ N}$$

$$R = 9\text{mm}$$

$$T = r * F \text{ (Nm)}$$

$$T = 9 \times 10^{-3} \times 3920 = 35.28 \text{ (Nm)}$$

$$P = Tw$$

$$P = 35.28 * (2 * 3.14 * 37) / 60$$

$$= 136.62 \text{ w}$$

Total energy generated in forward and reverse stroke

$$P = 2 * 136.62 \text{ w}$$

$$P = 273.24 \text{ w}$$

Revolution in 1min =  $200/60 = 3.33$  rev/min

Power generated per minute =  $273.24 * 3.33$

=  $909.89$  m(minute)

Power generated in 1 hour =  $909.89 * 60 = 54.59$ kw/hour

The linear relationship between the load and power are,

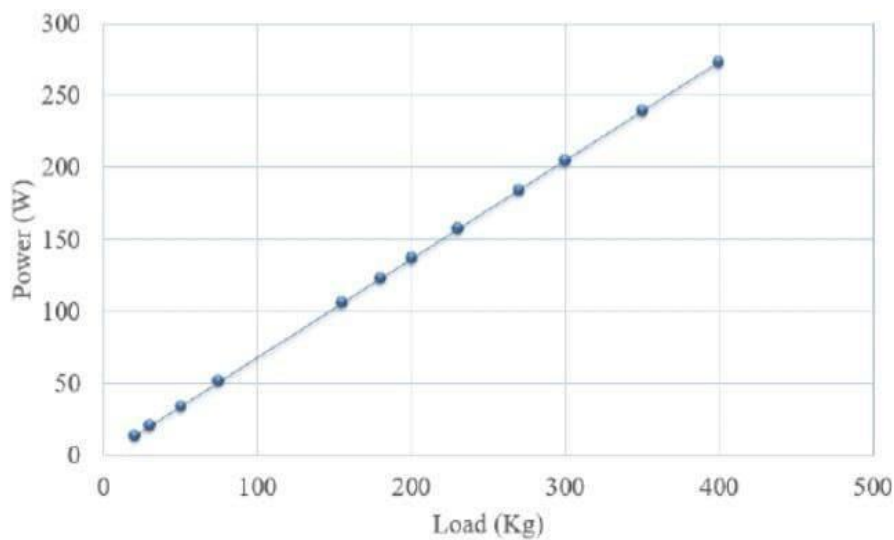


Fig.[3] Load and Power Relationship diagram

## VI. ADVANTAGES

- This is a cheaper mode of energy when comparing to the other renewable sources of energy.
- This is a self generating one.
- It is free from all types of pollution.
- The energy will be available, all year around.

## VII. DISADVANTAGES

- Selection of suitable generator and springs is an challenging one.
- It may get damaged due to rain.
- It will not work with light weight vehicle.



## **VIII. CONCLUSION AND RESULT**

In the upcoming year, the demand of electricity will be increased everyday so, in order to get sort out the demand of electricity. Harvesting electricity using road speed breakers will be an effective method. In future if the fly wheel speed control device and voltage protection devices are added, it would be a model for all over the world. By the result of this system we can able to reduce the power crisis and load shedding. Th electricity whish is stored by this system, could satisfy the daily requirement for street lights and also it can be used for the signal systems on road etc.

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