



## Speed Breaker- A Source of Power

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### Abstract

*As olden days the people is saying that their primary requirement is food, shelter and clothes. Now one more important thing come that is energy. Electrical energy more superior than any other form of available energy. The main advantage is that it can be stored in a battery for future use. Our aim here to discuss the waste kinetic energy of any vehicle to transform them in useful electrical energy. Speed breaker power generation it can be used for lighting on rural villages, highway street light etc. Other sources like solar energy, wind energy and wave energy is have some limitation .solar panel is not effective in nighttime, in winter season and during rain. our wind energy plant installed on the away from the populated area it can produce the electrical energy when the sufficient amount of air will abatable .wave energy is has its own limitation its can be produced only in seaside. Speed breaker power generation method produced no pollution, and it is not having any such type of limitation.*

### KEYWORDS:

power generation; lead acid battery; kinetic energy and speed breaker

### I. INTRODUCTION

Our conventional sources of power generation is producing pollution in terms of air pollution, water pollution etc.[1] The major contributor of air pollution is carbon dioxide, carbon monoxide, sulphur dioxide etc. These pollutants affect our environment adversely. Due to pollution and lack of avidity the scientist suggested the renewable energies like wind energy, solar energy, wave energy and biomass. Researchers are working for improvement in our available renewable energy conversion method. Here our aim to transform the energy that wasted in speed breaker in almost all the process and system each one has some type of losses. For example a car passes over the speed breaker its most of the energy is wasted. However, due to safety and security reason of populated areas like near to school, hospital, shopping mall etc. cities and

town there are a more no of breaker ,and so many vehicle passing over the speed breakers are required, it means that we can tapped more energy and produced more electricity so electricity conversion is proportional to traffic density[3] .electricity is clean energy and now days more useful than other form of available energy .Now days battery operated bike, car and aircraft also available .for cooking food, washing clothes, fan, T.V., Fridge, for lighting purpose everywhere we required electricity .without electricity it's very difficult to manage our life style. Due to increments of our population and depends of technology is increases the more amount of electrical energy but resources are limited. Therefore, we need to see towards that energy is waste in the form of heat on the speed breaker.

### History

Due to crises in electrical energy, the people led a new idea for generation of electricity in South Africa. In south Africa electrical energy crises was in a peak there is huge amount of electrical energy is required and this crises made them to implement a new idea, and using this idea use to light up small villages near to highway, street light. The basic physics is behind this method of electricity generation is nothing but just conversion of vehicle kinetic energy in to electrical energy. This idea comes in India first in Assam,

The inventor name is Kanak Gogoi who lives in Guwahti. He develop the similar method to produce the electricity using kinetic energy is wasted over the speed breaker. this idea is caught the eye of IIT Kuwaiti, then IIT funded one pilot project based on similar concept to generate the electricity from speed breaker .the evaluated and analysis the machine in more detailed and recommended to the Assam electricity board on large scale ,and it helps to provide the electrical energy .

## SCOPE OF UTILIZATION IN INDIA

The available and utilization of energy is an indication of the growth of a nation. As compare to developed country developing country, consume less energy. In developed country there is much more facility is there as compare to developing and under developing country. For example, the per captain energy consumption in USA is 9000KWH (Kilo Watt Hour) per year, whereas in India is very less just only 1200KWH (Kilo Watt Hour).from this comparatively data you might conclude that in developed country people consume more energy

A recent survey base on energy consumption in India had published in particular report that 85,000 villages in India do not still have electricity. Supply of electricity in most part of our country is poor. In very few states, having sufficient amount of power .electricity is a major problem in India. Hence, more innovative idea is required in this area to fulfill our power requirement.

In India the condition of road is very poor in villages and also not much better in cities also as compare to the other developed country .there is so many number of speed breaker on the road. Therefore, it is easy to make the power generation unit using speed breaker, and using this power, we can fulfill our requirement.

### Effect of economy

In speed breaker method of generating electricity does not require any consumable matter once its installed it will work for a many years .speed breaker method of generating electricity is required energy is already is going to waste in speed breaker .this method is just utilization of that waste energy. In every year in 9our country s

## III. WORKING PRINCIPLE

Whenever a vehicle is passes over the dome then dome gets displaced in downward direction due to displacement of dome, the spring that's attached with dome gets compressed and rack which I also connected with dome at the bottom it's also displaced in downward direction and the rack teeth is connected to gears, due to meshing of rack and gear reciprocating motion of rack converted in to rotary motion of gears. A flywheel is also mounting on the shaft whose main function is to store the energy and

Supply when required to make the energy uniform and shaft must rotate at certain. These shafts are connecting through a belt drive with dynamos, which function is to

converts the mechanical energy into electrical energy. The rate of conversion will be proportional to the traffic density of the vehicle. [1] Due to rotation of shaft dynamos will also rotates. Inside the dynamos in between two permanents, magnet armature rotates. The rotating armature cuts the magnetic flux generated between the permanent magnet. Due to cutting of magnetic field, an E.M.F (electro motive force) is induced in it. In addition, this electric energy we used for our requirement. For continuous supply of power dynamos has to run continuously. This emf can be stored in lead acid and we can also used in nighttime. For ac application, we prefer to use inverter, which changes this direct current in to alternating current.

### A. BLOCK DIAGRAM:

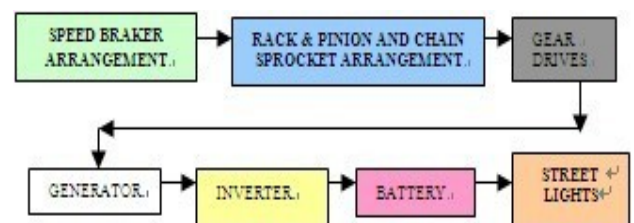


Fig. 1: Block diagram of speed breaker arrangement

As the population is growing vehicle density will automatically increases and these vehicle is passes over the speed breaker arrangement where its weight acts as a load and this load will transfer to the gear drive by using rack pinion and chain sprocket .Generator is connected to gear drive so that its runs as a constant speed and produced electricity next component is invertors which converts the direct currents in to alternating currents .It's used where lower power is required such as street light and small village or colony and can be stored in battery for future use.



Fig. 2: Working Model of speed breaker arrangement

This working model works as a generator but its require muscular power and this power will converted in rotational motion in first half cycle and



next half cycle will completed automatically and these rotational energy is used for rotating the permanent magnet and generating the varying flux field which will passes over the stationary conductor and generates currents. This generated current can be used at the same timing or stored for future work in battery

### C. OUTPUT POWER CALCULATIONS:

Let us consider,

The mass of any vehicle moving over the speed breaker=300Kg (Approximately)

Height of speed breaker =10 cm

Work done=Force x Distance

Here,

Force=Weight of the Body

$$=300 \text{ Kg} \times 9.81$$

$$=2943 \text{ N}$$

Distance traveled by body = Height of the speed breaker

$$=10 \text{ cm}$$

Output power=Work done/Sec

$$= (2943 \times 0.10)/60$$

$$= 4.905 \text{ Watts (For One pushing force)}$$

Power developed for 1 vehicle passing over the speed breaker arrangement for one second=4.905watts

Power developed for 1 minutes =294.3 watts

Power developed for 1 hour=17.658 Kw

Height of displacement =1cm

Work done=Force x Distance

Here,

Force=Weight of the Body

$$=60000 \text{ Kg} \times 9.81=$$

$$=588600 \text{ N}$$

Distance traveled by the body = Height of displacement

$$=1 \text{ cm}$$

Output power=Work done/Sec

$$= (588600 \times 0.010)/60$$

Power developed for passing over the single bogie of passenger train for one second= 98.1watts

Power developed for 1 minutes =5886 watts

Power developed for 1 hour=353.160 Kw

Power developed for 10 hour=3531.60 Kw

*VOLTAGE GENERATED (VS) SPEED OF VEHICLE:*

READING (TABLE 1)

LOAD = 270kg (vehicle weight + man weight)

Table 1: Voltage Generated Vs Speed of Vehicle data

Speed of vehicle	Voltage generated
10	7.93
20	6.28
30	5.03
40	4.66
50	3.03

*B. VOLTAGE GENERATED (VS) LOAD OF MAN*

READING :( TABLE 2)

LOAD = Load of Man 60 to 270

Table 2: Voltage Generated Vs Loads in Kgs

Load (kgs)	Voltage generated (Volts)
60(man load)	8.33
130	9.45
170	10.2
200	11.23
270	11.81

4: Voltage generated Vs speed of vehicle (Graph

Fig. 4: Voltage generated Vs speed of vehicle (Graph)

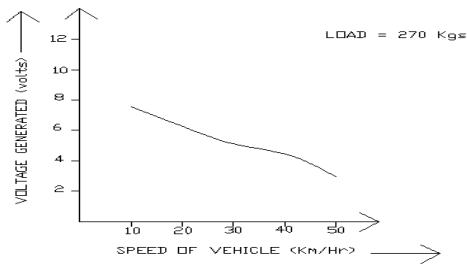
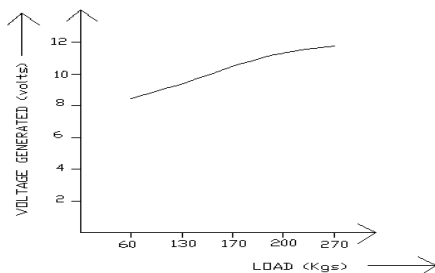


Fig. 4: Voltage generated Vs Loads of man (Graph)



## Conclusion

As our days today, life number of vehicle increases in a considerable amount if in our country on each breaker is works like a power-generating device in this manner it can save a lot of amount of electricity .that electricity can be used for other purpose .as then no of vehicle will increase our speed breaker will be more efficient .and upcoming days this method will be used by some other states .because our this method will be used by some other states .because our most of states faces the problems of power so they can used this as a alternate of power generating sources. The main advantages that it is not required any external sources and as the more number of vehicles will increase its performed better. our speed breaker will be more efficient .and upcoming days this method will be used by some other states .because our this method will be used by some other states .because our most of states faces the problems of power so they can used this as a alternate of power generating sources. The main advantages that it is not required any external sources and as the more number of vehicles will increase its performed better.

## ADVANTAGES

- Pollution free power generation.
- Simple construction, mature technology, and easy maintenance.
- No manual work necessary during generation.
- Energy available at all times
- No need of fuel.
- No consumption of any fossil fuel (non-renewable source of energy).

## DISADVANTAGES

- More maintenance is required
- Initial cost is high
- Overall efficiency is quite low

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