

Electricity Generation by E-Bump

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Abstract- This project is designed to use the jerking movement produced by the vehicle while passing the speed breaker and then turns this energy to electricity which then can be used for other purposes. Consequently, a kinetic energy is produced and transferred into electrical power. And the biggest advantage of this type of speed breaker over other speed breakers that produces electricity is that, it is not necessary to dig down the road to install or do the maintenance of the speed breaker. Designing energy recovery systems that are pollution free has become a significant goal.

Keywords- Speed Breaker, Free Energy, Recovery.

I. INTRODUCTION

An innovative and useful concept of Generating Electricity from an e-bump is our step to improve the situation of electricity. What is electricity for to us? Electricity is the form of energy. It is the flow of electrical Power.

Electricity 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. Many towns were built alongside waterfalls that turned water energy to electrical energy.

Before electricity generation began over 100 years ago, houses were light with kerosene lamps, food was cooled in iceboxes, and rooms were warmed by wood-burning or coal-burning stoves. Tesla's inventions used for electricity to coming indoor lighting to our houses and to industrial machines.



Fig 1. Places with Speedbreaker.(Toll plaza & Parking area)

The number of vehicles on road is increasing speedy and if we convert some of the Potential energy of these vehicle into the rotational motion of generator then we can produce some amount of electricity, this is the main principle of this project. At now we are cladding shortage of electricity. Electricity can be generated using speed breakers, strange. The advantage from this innovation will be to generate electricity for the streetlights, hoardings and then for other use.

Generally when vehicle is in movement it produce various forms of energy like, because of friction between vehicle's wheel and road i.e. rough surface HEAT energy produced, also when vehicle motion at high speed the wind then also heat energy is produced which is always lost in environment and of which we can't make use of...OR we can say that all this energy that we cannot make use of is just the WASTAGE OF ENERGY that is enough available around us.

In this project we are just trying to make use of such energy in to generate an ELECTRICAL ENERGY. This project will work on the principle of "POTENTIAL ENERGY TO ELECTRICAL ENERGY CONVERSION" Potential energy can be thought of as energy stored within a physical system.

II. PARTS & MATERIALS

- **Frame-** Box sectioned Cast Iron (C.I.) bars or Mild Steel (M.S.)
- **Fourbar mechanism link-** Stripped Cast Iron (C.I.) or Mild Steel (M.S.)
- **Linkage-** Stripped Cast Iron(C.I.) or Mild Steel(M.S.)
- **Belt-** Rubber
- **Sleeved Gear for Belt-** Cast Iron (C.I.)
- **One way Gear Mechanism Bearing-** Bearing Steel or Steel
- **Foot Grills (2 Pcs)-** Ladder designed Cast Iron (C.I.) or Mild Steel (M.S.)

- **Wheel** - Mild Steel or Steel
- **DC Dynamo**
- **Electric Connection** - Copper Wiring

III. MODELING AND WORKING

When the vehicle passes from the bump, it presses the foot grill downward. The four bar mechanism is welded on the smaller foot grill and with the smaller foot grill the four bar also comes downward. The linkage arm is connected at the other end of the four bar and the linkage is connected with a triangular shaped linkage its other end.

The triangular link is pivoted at one point and is connected with elastic or a belt at the other section. So, when four bar goes downward, it pulls one end of the triangular link and turn it above its pivot point and pulls the other end of the triangle too, which in turns pulls the belt. When belt moves, it provides rotation to the wheel. Wheel moves freely on its bearing. The wheel on its other end transfers the rotational movement to an electromagnetic generator or a dynamo.

At the rotations of wheel the electromagnetic motor rotates the motor armature and due to flux generating in motor the electricity generates at the connections on the motor and this electricity can use for charging batteries or lighting etc. purpose.

The time taken in the operation of bump going down and coming up again would be very less, about 1.5 to 2.5 seconds only.

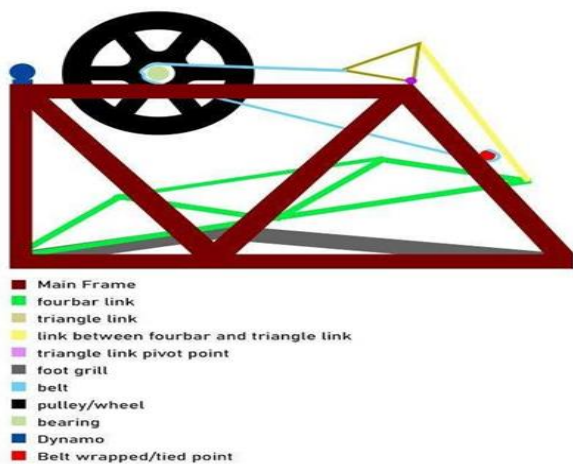


Fig 2. Line Diagram of Model.

IV. RESULTS AND DISCUSSION

The time taken in the operation of bump going down and coming up again would be very less, about 1.5 to 2.5 seconds only

Let us consider,

- The mass of any vehicle travelling over the speed breaker= 500Kg (Approximately)
- Height of speed breaker = 15 cm

Work done = weight of the body x distance travelled by the vehicle

- Here, Weight of the Body = 500 Kg x 9.81 = 4905 N

Distance traveled by the body = Height of the speed breaker = 15cm

- Power = Work done/Second = (4905 x 0.15)/60 = 12.2625 Watts

Output Power developed for 1 vehicle passing over the speed

- Breaker arrangement from one vehicle = 12.2625 watts
- Power developed for 60 minutes (1 hr) = 735.75 watts
- Power developed for 24 hours = 17658 watts = 17.658 Kw

Table 1. Power Production Calculation.

| Weight of Vehicle (Kg) | Work done/Load (N) | Height (m) | Power Developed | | | |
|------------------------|--------------------|------------|----------------------------|-----------------|----------------|-----------------|
| | | | One Vehicle per minute (w) | In one hour (w) | In 24 hour (w) | In 24 hour (Kw) |
| 100 | 981 | 0.15 | 2.4525 | 147.15 | 3531.6 | 3.531 |
| 500 | 4905 | 0.15 | 12.2625 | 735.75 | 17658 | 17.658 |
| 1000 | 9810 | 0.15 | 24.525 | 1471.5 | 35316 | 35.316 |
| 000 | 19620 | 0.15 | 49.05 | 2943 | 70632 | 70.632 |

This power generated by vehicles is more than sufficient to run four to six street lights in the night time.

V. CONCLUSION

In this project we discover technology to generate electricity from speed breakers in which the system used is reliable, simple and this technique will help conserve our natural resources. In coming days, this could be proven a great to the world (where the population is increasing on a big scale), since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights.

As the conventional sources are depleting very fast, it's high time to think of alternative resources. We got to save the power gained from the conventional sources for efficient use. So this idea not only provides alternative but also adds to the economy of the country.

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