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Power Generation using Power Breaker

(Smart Speed Breaker)

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***Abstract*—Man has needed and used energy at an increasing rate for the sustenance and well being since time immemorial . Due to this many energy resources have being exhausted and wasted . Proposal for the utilization of waste energy of vehicle motion which can be utilized by the smart speed breakers. Is very much relevant and important for countries like INDIA , where the tolls , car parking , airports etc all roads are over crowded all round the clock.**

This project is all about generating electricity when vehicles move from smart speed breaker .The force act on the speed breaker .Think about the forces that vehicle impart on the smart speed breaker . This idea is to convert weight energy into electrical energy. The power generating smart speed breaker are high intend to translate the kinetic energy to electrical power .Energy crisis is the main issues of the world these days . The motto of this project is to face the crisis somehow. We have successfully designed and manufactured a model smart speed breaker.

1. INTRODUCTION

The smart speed braker it is mainly used to reduction of Co2, renewable energies. The smart speed breaker is used to generate electrical energy by using the movement of vehicle. Producing the electrical energy from coal and some other process harms the environment, and by using this process we can produce the energy without any pollution just with the help of some mechanism and the vehicle running on road. The vehicle running on road is never going to end that's make it never ending process. With less amount of set up and maintenance compare to other methods (Turbines).

The speed breaker used now a days tends to high loss of kinetic energy but the smart speed breaker that we are designed and manufacture the prototype that helps to convert that kinetic energy into electrical energy that we can use in some work.

Prototype of power breaker

1.1 Field of use

Smart speed breaker we can use in many places in any busy or crowded highways where high traffic is there. We can use this in the mall's parking or where the bridge is ended.

1.2 Literature survey

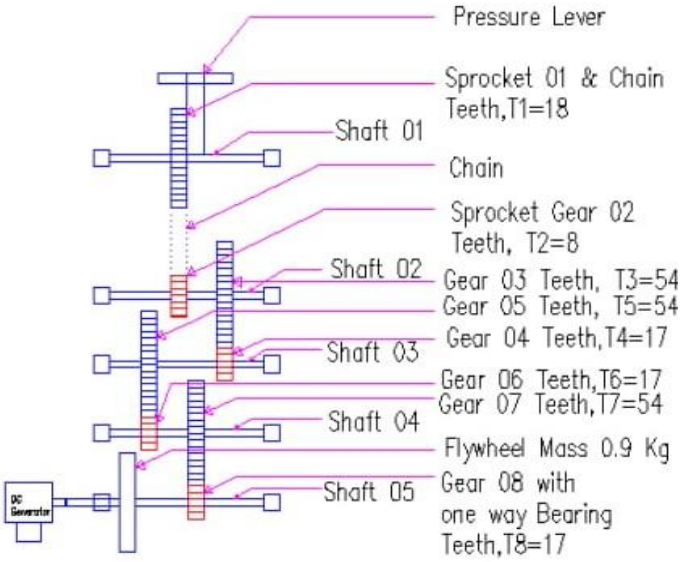
By taking the reference of dadar railway station entry point we have discussed and managed to design and manufacture the prototype of the smart speed breaker that can help us to save and produce the energy.

1.3 REASON FOR USING THIS PROJECT

- PRODUCING A SOURCE OF POWER WITHOUT ILL-TREATING THE ENVIRONMENT.
- SIMPLE CONSTRUCTION, MATURE TECHNOLOGY AND EASY MAINTENANCE.
- TRANSPORTATION OF FUEL WOULDN'T BE A BARRIER.
- IT DOESN'T REUIRED ANY FOSSIL FUELS TO WORK.
- NO OTHER SOURCE IS REQUIRED FOR POWER GENERATION

2. WORKING

When pressure lever is pressed the flywheel will rotate by chine sprocket gear mechanism, it will force to rotate the DC generator because DC generator and flywheel are in same shaft. DC generator will produce electricity by the rotation of armature coil and generated electricity will be stored in a rechargeable battery. This electricity can be used later for lighting bulb during night time on the road



schematic diagram of speed breaker

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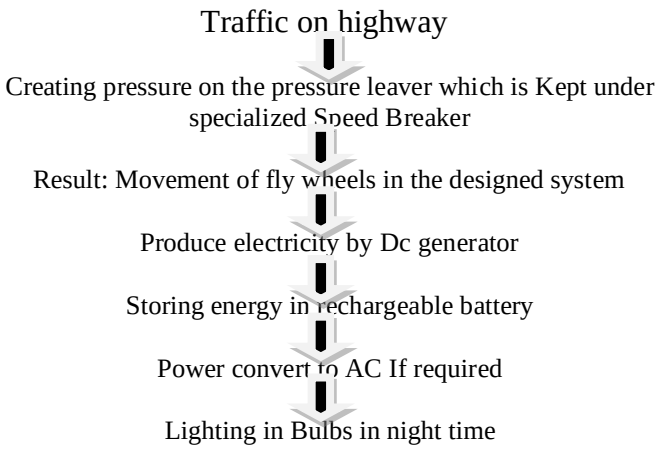
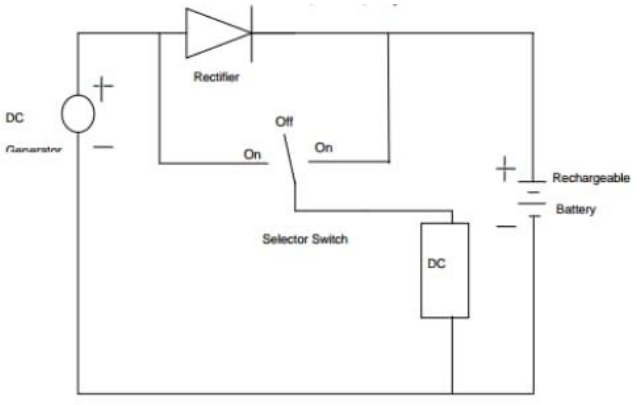
2.1 Working flow chart



2.2 Electrical circuit

Switches that can be turned to dissimilar positions to make a connection with the contacts in that particular position. The type of electrical battery are rechargeable battery, storage battery and accumulator. It consist one or more electrochemical cells, and it is one type of energy accumulator. It is also known as a secondary cell because its electrochemical reactions are electrically reversible. The Rechargeable batteries come in different structure and sizes, it fluctuate from button cells to megawatt systems connected to stabilize an electrical distribution network. There are many different combinations of chemicals are commonly used, including: nickel metal hydride (NiMH), lead–acid, nickel cadmium (NiCad), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer). When electrical energy is produced it is in DC generator, current passes through the rectifier and rechargeable battery is charged. Whenever the power is required during the nigh and dayt time, selector switch is on and rechargeable battery supplies required power.



3. CALCULATIONS

Calculation of input power, output power and efficiency Input power calculation Applying 07 kg weight on the pressure lever, the lever travels a distance of 0.152 meter (m) and the total time taken to travel this distance is 0.717 second(s) and the RPM for one Stroke is 1014. (Measured by RPM meter).

1) By one stroke sprocket gear moves three teeth from its original position. Gear ratio between sprocket gear 01 & sprocket gear 02

$$N_1/N_2 = T_2/T_1$$
$$3/18*N_2=8/18$$

So the calculated becomes

$$N_2=3/8$$

2) As sprocket gear 02 & gear 03 are on the same shaft So revolution of sprocket gear 03,

$$N_1=N_2=3/8$$

Now gear ratio between gear 03 & gear 04

$$N_3/N_4 = T_4/T_3$$
$$3/8*N_4=17/54$$
$$SO, N_4=1.19$$

3) As gear 04 & gear 05 are on the same shaft So revolution of gear 05 becomes Gear ratio between gear 05 & gear 06

$$N_5= N_4=1.19$$

Gear ratio between gear 05 & gear 06

$$N_5/N_6 = T_6/T_5$$
$$1.19/N_6=17/54$$
$$N_6= 3.78$$

As gear 06 & gear 07 are on the same shaft So revolution of gear 07 becomes so the revolution $N_7=N_6=3.78$

Gear ratio between gear 07 & gear 08

$$N_7/N_8= T_8/T_7$$
$$3.78/N_8=17/54$$
$$N_8 =12.01$$

So the gear ratio between gear 01 & gear 08 :

$$N_1:N_8=3/8:12$$

The flywheel, gear 08 & DC generator shaft are connected on the same shaft So RPM of DC generator shaft becomes

RPM=12*60/0.717

RPM= 1004.1

Work done, W = F*S Where, F = force & S = distance travel

W = mg*s

Where, m = mass & g = gravitational acceleration

W= 7* 9.81* 0.152 =10.43 Joule (j)

Input Power,

P = Total work done / total time taken to do the work

So, P= W/t Pi = 10.43/0.717= 14.55 Watt (w)

Output Power Calculation Output power,

P= Voltage*Current Output power

, Po = V*I = 4.0*0.5 =2 Watt (W)

Work done, W = F*S Where, F = force & S = distance travel

W = mg*s Where, m = mass & g = gravitational acceleration

W= 7* 9.81* 0.152 =10.43 Joule (j)

From the results discussed above it is seen that the input power was 14.55W and the founded power at the output is 2W

4. CONCLUSION

In fututre, it will prove a great success or helpfull to the world. The smart speed breaker will deliver a lot of electricity

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of power that we can use in street lights or some other necessary work. As the current sources of energy are finishing very fast, this is the correct time to think for the new sources of power. We will use the save power gained from the conventional sources for efficient use. The idea of power breaker not only produce energy but also boost the economy of county. The high traffic of vehicle in cities is more that cause the problem to human being, but this vehicular traffic can be use in correct ways for power generation by using new techniques called “power hump”. In this process we are not going to use any external source. In future, if the flywheel speed control device and voltage protection devices are added with large generation process, it would be a model all over the world .After some modification of the designed project, the efficiency of the whole system can be increased by increasing the capacity of the generator and applying more weight.

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