

ENERGY GENERATION BY USING THE SLIDING PLATE MECHANISM

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ABSTRACT

Man in his lifetime, uses energy in one form or the another form. In fact whatever happens in nature, results, out of the conversion of energy in one form or the another form. The blowing of the wind, the formation of the clouds and the flow of water are a few examples that stand testimony to this fact. The extensive usage of energy has resulted in an energy crisis, and there is a need to develop methods of optimal utilization, which will not only ease the crisis but also preserve the environment.

In this paper the electricity is generated through the sliding plate mechanism. For obtaining the electricity through the sliding plate mechanism a prototype model is developed and studied. This work used a permanent magnet D.C. generator thereby generating electrical energy in D.C. This D.C. Voltage is used to run the 12-volt exhaust fan. Electricity stored in battery is used to activate the light, fan etc. By increasing the capacity of the battery power rating is increased.

1. Introduction

Electricity is one of the most widely used forms of energy. Today also there is great scarcity of electricity. In this study an innovative concept of Generating Electricity from moving vehicles is presented i.e. Road Power Generator by Using sliding Plate Mechanism. Producing electricity from a Road power generator is a new concept that is undergoing research.

The number of vehicles on road is increasing rapidly and if we convert some of the kinetic energy of these vehicle into the rotational motion of generator then we can produce considerable amount of electricity, this is the main concept of this project.

2. Literature Review

The research about energy recovery from vehicle suspensions began more than ten years ago, first as an auxiliary power source for active suspension control, and later also as energy regenerating devices in their own accord. Zhongjie Li et.al [1] has presented innovative design of regenerative shock absorbers, which helps to reduce impact forces and improves energy harvesting efficiency. It consists of unique mechanism called as mechanical motion rectifier. It converts oscillatory vibration into unidirectional rotation of generator. Shaiju M. B [2] described partially use energy stored in the springs for compressed air generation through a single acting positive displacement pump. Zhang Jin Qui et.al [3] reviewed that conventional vehicle suspension dissipates mechanical vibration energy in the form of heat which waste considerable energy. Y. Zhang et.al [4] presented design; modeling and performance study of novel hydraulic pumping regenerative suspension on an energy recovery unit and a hydraulic actuator. It can harvest energy from suspension vibration; in addition variable damping force can be achieved by controlling electrical load of energy recovery unit. Martande S. et.al [5] presented that Shock absorbers are a critical part of a suspension system, connecting the vehicle to its wheels. The need for dampers arises because of the roll and pitches associated with vehicle and from the roughness of roads. Thus focuses on to develop new correlated methodologies that will allow engineers to design components of shock absorbers by using FEM based tools. Bhoite R. et.al [6] describe that regenerative shock absorber is a type of suspension system that converts parasitic intermittent linear motion and vibration into useful energy, such as electricity. This energy was used to charge the battery and this stored energy was used for different vehicle accessories like power window, lights and air conditioner etc. This energy was applicable in most of the military vehicles, race automobile and maximum suspension systems. Sethu P S et.al [7] described regenerative braking systems become increasingly popular, recovering energy that would otherwise be lost through braking. The system was designed in SOLIDWORKS. When used in an electric vehicle or hybrid electric vehicle the electricity generated by the shock absorber can be diverted to its power train to increase battery life. Analysis was performed in CFD and values are determined. Suda Y. et.al [8] studied consumption of fuel has been an important consideration since the beginning of the transportation facility. The system design was done considering the actual measured data on a goods vehicle at various road and traffic conditions in city, highway and off-road for both laden and un-laden applications. Lei Zuo et al[9] presented a comprehensive assessment of the power that was available for harvesting in the vehicle suspension system. The results suggest that road roughness, tire stiffness and vehicle driving speed have great influence to the harvesting power potential, where the suspension stiffness, absorber damping, vehicle masses.

3. Design And Drawing

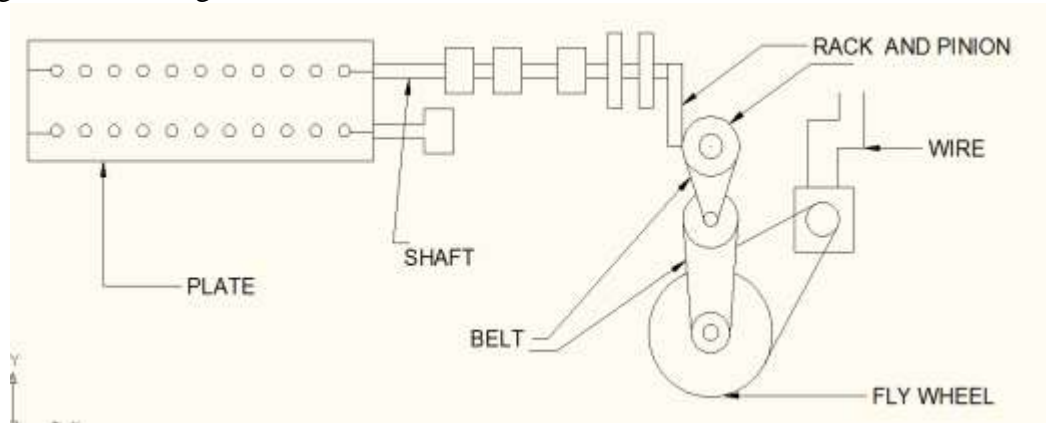


Figure 1 Top view

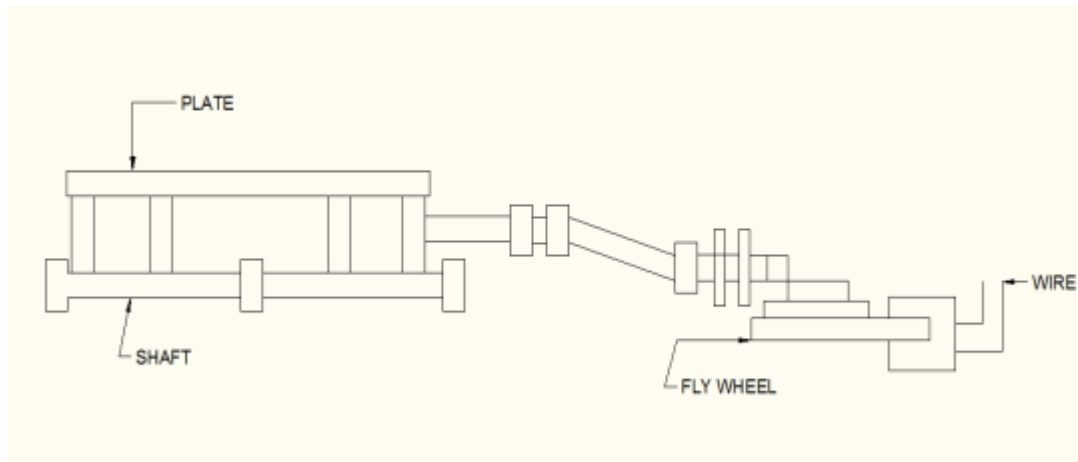


Figure 2 Front view



Figure 3 Fabricted model

4. Output Analysis And Graphs

Table 1. Summary of volt generated and speed of vehicles:

S.no	Speed of vehicles (km/hr)	Voltage generated (volts)
1	10	4.95
2	20	5.65
3	30	6.05
4	40	7.32
5	50	8.93

Table 2 Voltage generated and load of man and vehicle:

S.no	Load of man and vehicle (kgs)	Voltage generated (volts)
1	360	8.33

2	430	9.57
3	470	10.44
4	500	11.34
5	570	11.81

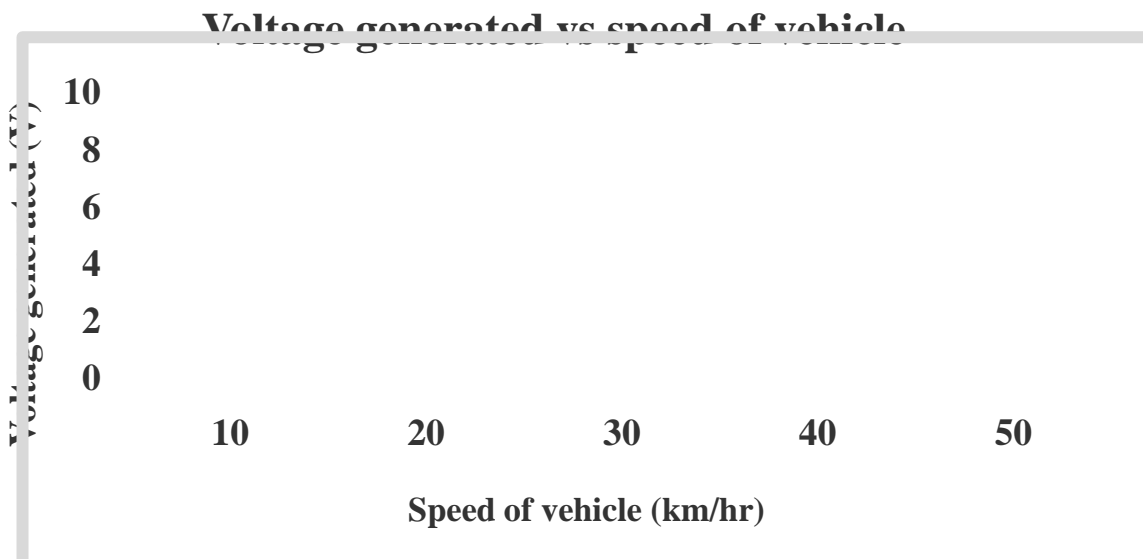


Figure 1 Volt generated vs speed of vehicle

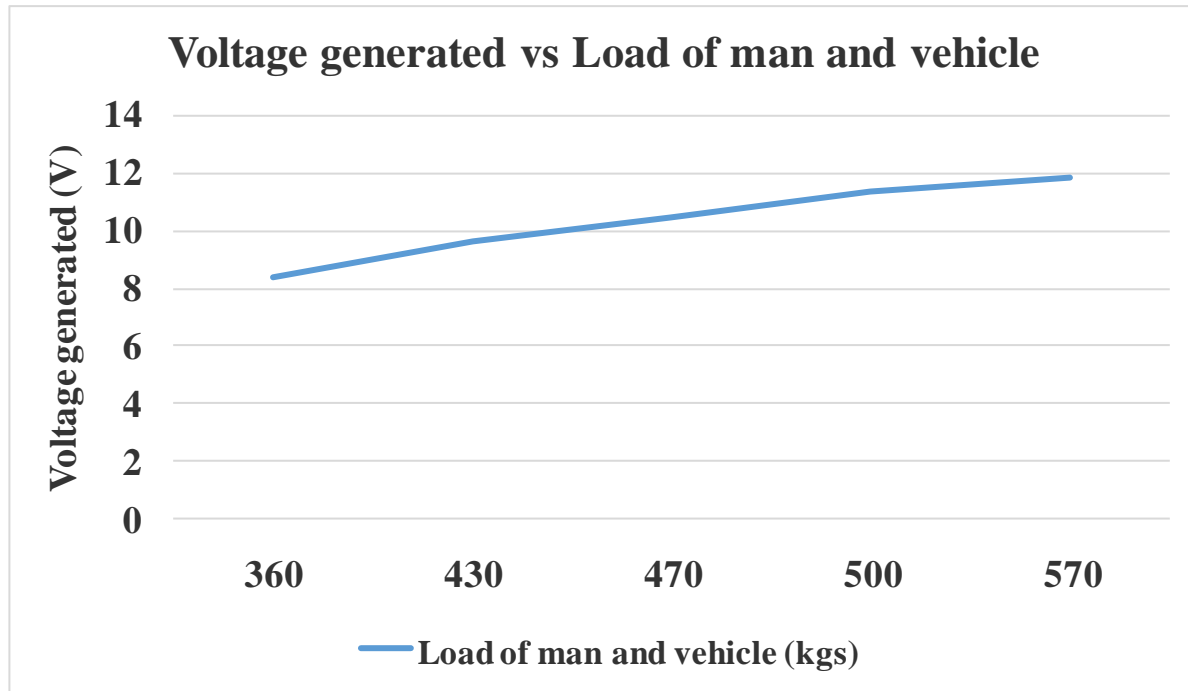


Figure 2 Volt generated vs load of vehicle

From the figure 1 and 2, it was seen that the load of man & vehicles increases then voltage generated for designed system increased.

5. Conclusion

Energy generation is the new type of unconventional source of energy. This device converts the kinetic energy of the vehicles into electric energy. This is done by moving plate installed on the road. This project is designed for energy generation specifically used in toll plaza, entrance and exit of school, colleges, bus stand etc...

In our project, we have analysed the output power generated by the sliding plate and running the 12 volt D.C exhaust fan. In a real time, generated energy can be used for lightning the street lights in the highway roads and also energy can be stored in batteries.

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