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Design and Fabrication of Project on Power Generation using Rollers on Busy Highway

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ABSTRACT

This paper presents design and fabrication of a project on power generation using rollers on busy highway. The exploratory set up has been manufactured to use vitality lost at speed breaker by vehicle .We have ascertained vitality lost by vehicle at speed 10 km\hr, 12km\hr, 15km\hr and we use the vitality lost, with the productivity of 0.4%, 0.45% ,0.48% separately. It has been presumed that speed is specifically corresponding to Electrical vitality delivered.

Keywords-- Stepper motor, Rollers, LED's, Battery, Wooden Ramp, Velocity of vehicle

I. INTRODUCTION

Energy from busy road is a wonderful project for every science student. This is a very new concept to produce energy from the busy road. Now days every body is searching for a new type of energy. By using this model we show the concept, how we generate energy from the busy road.

Basic principle of this model is conversion of mechanical energy to electrical energy. To fit this model on the road we can install circular type platform on the road, when any car or heavy vehicle cross the road on platform then due to circular motion it rotate the generator/dynamo and this covert mechanical action into electrical action with help of stepper motor. There are used LEDs for light.

This is a new type of electric generation, in future there is a lot improvement is possible in this circuit, this is just an idea to develop a voltage from any busy road. Amelioration of standard of Living and industrialization leap up the pressure on the conventional sources of power. Depletion of conventional sources becomes a problem in present world. And ever rising cost of conventional fuel may be major impediment in economic and social growth of third world nations.

All of us (developing and developed nations) are searching for new and newer sources of energy and its efficient use. Moving towards modernization, luxuries become necessities which lead the people towards the need of personal vehicle thus contributing to the substantially increased traffic density. This increased traffic density can be utilized for generation of Electricity by using an innovative Technique.

II. MAIN PARTS THEIR SPECIFICATIONS

1. Wooden Ramp
2. Fiber Roller.

1. Wooden Ramp

The whole apparatus is mounted on wooden board and the specifications of the wooden Boards are :-

Wooden board	:	910mm * 1250mm
Platform	:	500mm * 600mm
Thickness of board:		20 mm

2. Fiber Roller

Roller is made of fiber in demonstration in real it should be fiber pipe with metal strips welded on it to give better surface contact between vehicle tire and roller.

Specifications

Outside diameter of roller =	165 mm
Inside diameter of metal roller =	155 mm
Length of roller:	520 mm
Diameter of shaft:	34mm
Thickness of metal strip:	6mm
No. of metal strip:	10

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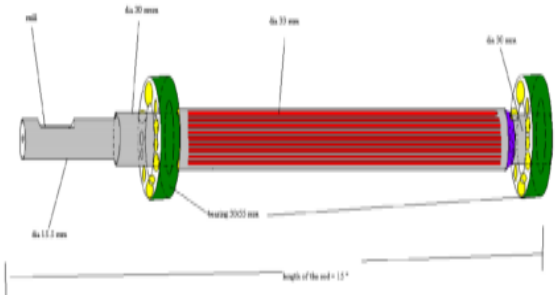
III. WORKING

As the vehicle passes over the ramp, there's is a surface contact between vehicle tires and roller, which will tend to rotate the roller, it is free to rotate as it is supported on bearings which are mounted on T-shape supports which are bolted to wooden base.



User interface for calculating various parameters in the design procedure is prepared using MathCAD software and the user interface is shown in Fig. 2 .Factor of safety is obtained from the given design parameters is 5.07. Hence the design is considered to be safe.

Initially the set up was run by bike and the roller got the rotatory motion. With that rotation, a single DC generator is able to light up a LED setup of 12V. Even if there is an anti-direction rotation by the roller, the negative voltage is converted using bridge circuit. The output voltage and current depends on the vehicle weight and speed as the speed of the vehicle decrease the output voltage and current increases the main advantage of the circuit which has used hear holds the reverse flow and the motors which are connected hear are parallel from which we are getting constant voltage but the current has been adding figure 3 shows the output when vehicle passes over it.

IV. TESTING AND RESULTS

OBSERVATION TABLE

MECHANICAL APPARTUS

Serial No.	Velocity of vehicle (m/sec)	Angular speed of vehicle tire(rad./sec)	Angular speed of roller (rad./sec)	Rotational kinetic energy (Joules)
1	2.78	.00926	.0336	4541
2	3.32	.01108	.0401	6469
3	4.155	.0138	.0503	10057

ELECTRICAL APPARATUS

Serial No.	Rotational kinetic energy of roller(J)	Voltage (volts)	Current (ampere)	Time (seconds)	Electrical energy(J)	Efficiency (percent)
1	4541	5	.8	4	16	.4
2	6469	5.5	1	4	22	.45
3	10057	6.4	1.2	4	31	.48

V. CONCLUSION

We concluded that, electricity is generated by our project. By implementing we observed that on moving a vehicle over the roller speeds varying from 10-15 km/hr, And in this region 5-7 volts is being produced. Speed Vs energy plot shows that energy produced is directly proportional to speed but there will be a limit of Mechanical Instruments.

The efficiency of air set ups is about 0.4 to 0.5%, which seems a very small value but if we see it in terms of numbers of vehicles passed per unit time, there will be huge amount of energy saved.

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