

ELECTRO KINETIC ROAD RAMP

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ABSTRACT

For development of country/world and for meeting up the day to day demand of energy electricity is common source of energy. For getting non pollution and economical source of energy the focus now is shifting more towards renewable source of energy which is essential now a day .So using road transportation energy can be produced, stored, where the ramp is used for tapping the energy and generating power as a power generating unit. In which we can get 24x7 supply of electricity without harming and polluting the environment. The pressure plate is main mechanism used for generating the electricity.

Keywords: - Pressure plate, Electrical Energy, Ramp.

I.INTRODUCTION

Amongst the all form of energy the electricity is most widely used form of energy. There is great lack of electricity in today's world, which we have to overcome. As we know the vehicles on road are increasing very fastly in the world. As these vehicle are moving on the road they possess some kinetic energy, which can be used for generating rotational motion of generator and then we can produce considerable amount of electricity. As we know that the resources to generate the electricity are lasting very rapidly and there is great increase in population which uses the electricity for their day to day requirements. These has generated the problem of energy crisis in the world. So we need to bring such ideas which can generate the electricity from the things which we can uses in day to day life. So from the vehicles we can generate the electricity by using their kinetic energy as these vehicles passes over the ramp. These generated energy can be utilised for many purpose like street lights, lighting of signals, toll plazas villages where the lack of electricity is more.

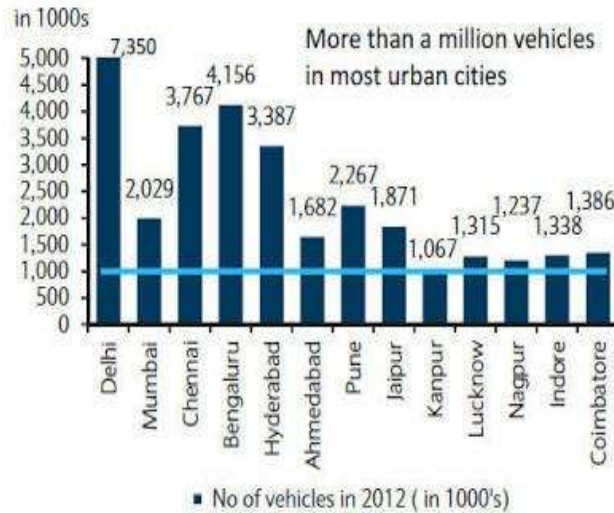
II.ROADS IN INDIA

The India has second largest road network in the world, which contributes of over 5472144 km as on 31st march 2015. Amongst which 1455 km of expressway are operational now a day in India.

An additional 18637 km of expressway is aim to be constructed by government of India by the year 2022. National Highway Authority of India(NHAI) which is responsible for development and management of the network of over 50000 km of a national highway out of 115000 km in India.

The 148000 km of a state highway are operational in India and the Maharashtra state has 33705 km of state highway which is largest of state highway as compare to other states. So using these road network and vehicles we can generate electricity using "Electro-Kinetic Road Ramp" installed on road.

More than a million vehicles in most of the leading developed cities in India



Source: MORTH, Barclays Research

III.OBJECTIVE

- To create electrical energy for running our appliances which are used in day to day activities.
- To utilize freely available renewable resources for generating energy rather than using exhaustible non-renewable resources.
- Such ramps can be designed at every highway as an alternative source of energy to meet the increasing demand of energy.
- This energy can be used for the lights on the either sides of the roads and thus much power that is consumed by these lights can be utilized to send power to these villages.

IV.METHODOLOGY

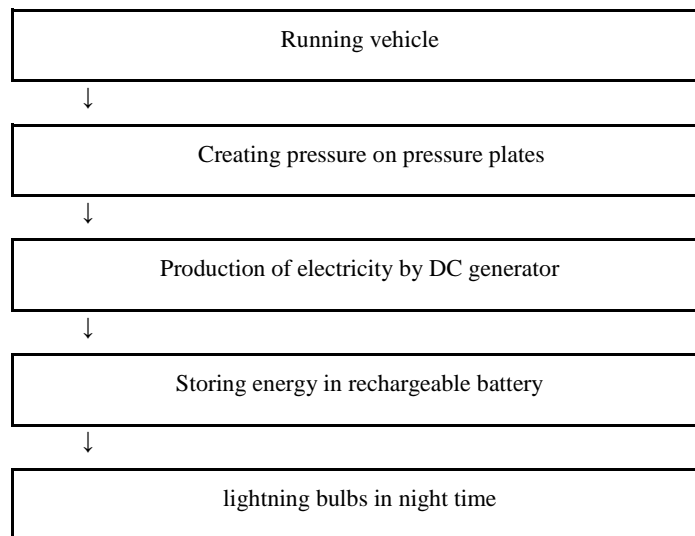
WORKING MODEL

Road Power Generation (RPG) is a system design to capture waste and kinetic energy from all vehicles. This device converts the kinetic energy of the vehicles into electric energy. This is done by pressure plates installed on the ramp.

- First moving car pass over the ramp. Due to vehicle load pressure plates present on the ramp will be pressed down.
- All pressure plates are connected to shaft using Rack and Pinion mechanism.
- Rack and Pinion mechanism convert the linear motion of pressure plate into angular motion and rotates shaft.
- Shaft is connected to Gearbox. This Gear Box is connected to flywheel and DC alternator.
- Alternator converts the rotational energy to electrical energy.

- As a result, it produces electricity. And it stored in batteries.
- Whenever needed DC energy is converted into AC energy with the help of inverter and passed on.

V.FLOW CHART



VI.DRAINAGE SPECIFICATION

HIGHWAY DRAINAGE ACCORDING TO IRC

HEIGHT: 1-1.2 Below the sub-grade

SLOPE: 2H-1V

RAMP DRAINAGE

HEIGHT: 1m

SLOPE: According to ground level

METHOD 1: By using electric motor

METHOD 2: By using pipe

VII.WORKING PRINCIPLE

Thus, system design for RPG to capture the kinetic energy from every vehicle in this process kinetic converts into electrical energy. These is done by installing the pressure plate on the road ramp.

VIII.THEORETICAL EQUATION

Mass of Vehicle =500kg (approximately)

Height of pressure plate =0.1m

Force =Weight of the body

$$=500 \times 9.81$$

$$=4905 \text{ N}$$

Work done = Force x Distance

$$=4905 \text{ N} \times 0.1 \text{ m}$$

$$= 490.5 \text{ N-m}$$

Output power = work done / second

$$=490.5/60$$

$$=8.175 \text{ Watt}$$

Power developed for 60 sec (1 min)

$$=8.175 \times 60$$

$$=490.05 \text{ Watt}$$

IX.CONCLUDING REMARKS

- 1)Electricity generated from one vehicle around 8.175Watt which can be used for various purpose.
- 2)Energy scarcity is the main problem in our country,so this may solve the problem to some extent.
- 3)Energy produced from this ramp is pollution free and maintenance of ramp is more,so it can be used in Toll plaza,street lights etc.

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