

Energy Generation on Modified Highway Roads by using Roller Mechanism

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Abstract – In this paper we have discussed about energy generation on modified highway, in which roads are constructed in such a way that our whole electricity generation system is installed in limited space. Thousands of vehicles pass daily on highways so we can generate specific amount of electricity by this system.

the rollers will rotate with specific RPM as mentioned below. Those rollers are connected to rack and pinion which are mounted on shaft which is connected to dynamo through worm and worm gear. The generated power will be stored to battery setup and this stored energy will be utilized for further use.

Key Words: highway, electricity, roller.

1.INTRODUCTION

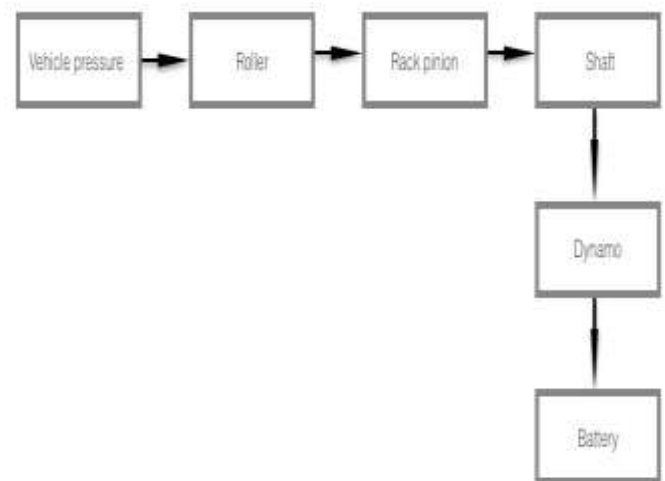
In this paper we have discussed about energy generation on highways by roller mechanism as vehicle passes by on roller installed on roads. So, specified amount of energy can be generated. Some points are discussed below

1.1 Related Highway Engineering

Road transportation energy can be produced, stored, where the ramp is used for tapping energy and generating power.

Table -1: Width of Roadways

WIDTH OF ROADWAY FOR SINGLE-LANE AND TWO-LANE ROADS IN FLAIN AND ROLLING TERRAIN		
S.No	Road Classification	Roadway width (meters)
1	National Highways (Single or two lanes)	12.0
2	State Highways (Single or two lanes)	12.0
3	Major Dist. Roads (Single or two lanes)	9.0
4	Other Dist. Roads – (i) single Lane (ii) two Lanes	7.5 8.5
5	National Highways (Single lane)	7.5



Block-Diagram: working

2.1 Roller Material Specification

Heat capacity=920⁰ C

BHN=400

Fracture Toughness=60-70 MPa

2. Working

We have used malleable cast iron roller, belt and pulley drive, dynamo, rack and pinion, shaft, battery etc. As number of vehicles pass with some velocity on rollers installed on roads,

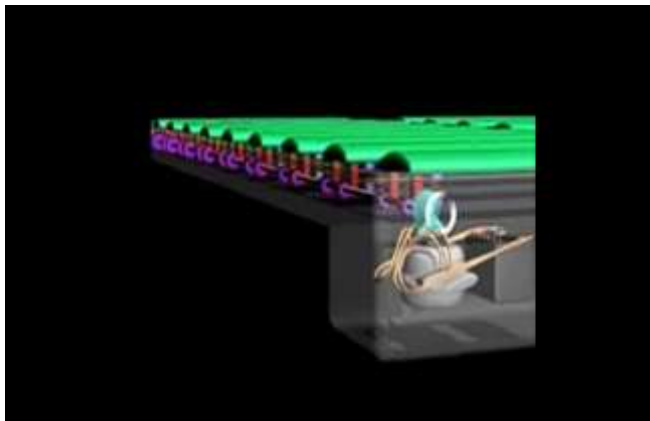


Fig -1: Setup of Rollers and dynamo

$$T_2 = 318.82 \text{ Nm}$$

$$P_2 = T\omega$$

$$= 318.82 \times 36.12$$

$$P_2 = 11.5 \text{ W}$$

$$P_2 = 11.5 \text{ W}$$

Similarly,

$$P_3 = 13 \text{ W}$$

3. CALCULATIONS

Given data:

Diameter of roller = 0.05m

CASE 1:

V = 70 km/hr

N = 18 RPM

M = 550 Kg

15 Vehicles approximately passes by on highways in one minute.

N = 15 × 18

= 270 RPM

$\omega = 28.27 \text{ Rad/sec}$

$T_1 = mgh$

= 550 × 9.81 × 0.05

= 269.77 Nm

$$T_1 = 269.77 \text{ Nm}$$

CASE 2:

V = 80 km/hr

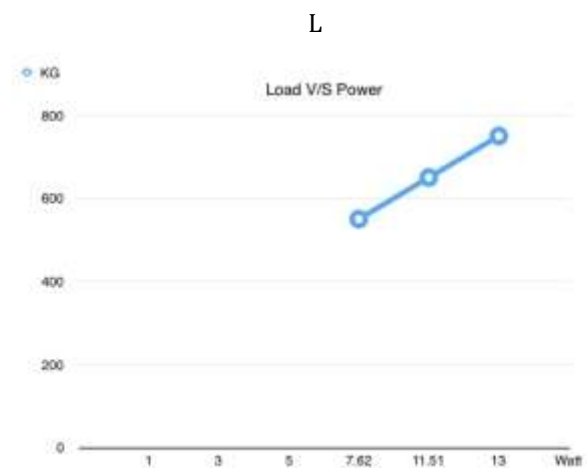
N = 23 RPM

m = 650 Kg

$T_2 = mgh$

= 318.82 Nm

3.1 GRAPH:



Graph 1: load vs power

4. CONCLUSION

In this paper we have concluded that energy can be generated by passing vehicles using rollers on highways and utilizing it in different ways.

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BIOGRAPHIES

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