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Design of Power Generation Machine by Using Roller Mechanism

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Abstract—
In the present situation power becomes basic need for human life. Energy is responsible for major developments of any country's economy. Conventional energy sources generate most of the energy of today's world. But the population is increasing day by day and the conventional energy sources are diminishing. Moreover, these conventional energy sources are polluting and responsible for global warming. So, non-conventional sources are needed to be developed for power generation which are clean, environment friendly and sustainable. In this research we propose a renewable non-conventional energy source based on rolling mechanism. Our project is to enlighten the rolling gate utilizing the jerking pressure which is wasted during the rotate rolling gate. Power generation through a rolling mechanism harnesses kinetic energy derived from the rolling motion of objects or systems. This concept has diverse applications, Each of these systems converts the kinetic energy generated during rolling into usable electrical or mechanical power, demonstrating its versatility and sustainability. This abstract explores the various implementations of power generation using rolling mechanisms, highlighting their potential contributions to renewable energy and efficient energy utilization in different sectors. Therefore, by using this mechanism we can save lot of energy which can fulfill our future demands.

*Index Terms— **Kinetic energy, Rolling gate, non-conventional energy.***

I. INTRODUCTION

Now a day's power has become the major need for human life. Energy is an important input in all the sectors of any countries economy. The availability of regular conventional fossil fuels will be the main sources for power generation, but there is a fear that they will get exhausted eventually by the next few decades. Therefore, we have to investigate other types of renewable sources. The day-to-day increasing population and decreasing conventional sources for power generation, provides a need to think on non-conventional energy resources. Another major problem, which is becoming the exiting topic for today is the pollution. Power stations and automobiles are the major pollution producing places. So non-conventional power source is needed to reduce this problem. We proposed a non-conventional power generating system based on rolling mechanism which generate electricity without using any commercial fossil fuels, which is not producing any polluting products. In this paper, our aim is to conserve the kinetic energy which convert into electricity that gone wasted, while rotating gate.

II. METHODOLOGY

Power can be produced from conventional and nonconventional energy sources. In this paper we show energy conversion from kinetic energy to rotational energy an rotational energy to electrical energy respectively. This project explains the mechanism of electricity generation from rolling gate. It is a simple but optimum process to

generate energy from rolling gate arrangements. There are a large number of peoples rotates the gate. It is an Electro-Mechanical unit. This system utilizes both mechanical technologies and electrical techniques for the power generation and its storage.

Developing a methodology for power generation using a rolling mechanism involves a structured approach to designing, building, and evaluating a system that harnesses kinetic energy from rolling motion to generate power.

III. ROLLER MECHANISM

In this Mechanism, a roller is fitted in between a speed breaker and some kind of a grip is provided on the speed breaker so that when a vehicle passes over speed breaker it rotates the roller. This movement of roller is used to rotate the shaft of D.C. generator by the help of chain drive which is there to provide different speed ratios. As the shaft of D.C. generator rotates, it produces electricity.This electricity is stored in a battery. Then the output of the battery is used to lighten the street lamps on the road. Now during daytime we don't need electricity for lightening the street lamps so we are using a control switch which is manually operated .The control switch is connected by

wire to the output of the battery. The control switch has ON/OFF mechanism which allows the current to flow when needed.

IV. PRACTICAL MODEL

Figure 1. Practical Model.

V. HARDWARE

Figure 2. Motor LED

Figure 3. Battery Required wires

VI. MODEL DIAGRAM

Figure 4. Model Diagram

VII. CALCULATIONS FOR THE POWER

Let's consider,
The mass of vehicle moving over the speed breaker
= 350Kg (Approximately)
Height of speed breaker = 15 cm
Weight of the Body = 350 Kg * 9.8 = 3430 N
Distance traveled = Height of the speed breaker = 15cm
Work done = weight of the body * distance travelled by the pressure of vehicle
Power = Work done/Second = (3430*0.15)/60 = 8.58 Watts
Output Power developed for 1 vehicle passing over the speed
Power developed for 60 minutes (1 hr.) = 514.5 watts
Power developed for 24 hours = 12.35 Kw*
Our proposed system can provide 250 v and 24 amp.
We are using CFL bulb (100 watt)
In one km 60 bulbs are needed.
Total watt 60*100 = 6000 watt = 6 Kw

This power generated by vehicles is more than sufficient to run four street lights in the night time

Table 1. Result Analysis

Speed(km/h)	Output power(W)	Output volt(V)	Output current(A)
5	0.56	6.00	0.126
15	1.89	6.00	0.369
30	4.09	6.00	0.560

Advantages
Using this technology one can get the following benefits:
- Low maintenance cost
- Low installation cost
- Pollution free power generation.
- No manual work necessary during generation.
- Simple construction, mature technology and easy maintenance.
- Energy available all year round.

• No consumption of any fossil fuel which is non-renewable source of energy

VIII. CONCLUSION

We need electricity for every small thing. More suitable and compact mechanisms to enhance efficiency. Although we get less electrical output, this is a simple idea for generating electricity from kinetic energy of the rolling gate. If this concept is further developed and is produced in high potential, I am confident that enormous amount of power can be developed. Thus increasing input torque and ultimately output of generator by using the multiple transmission system which is more efficient method.

FUTURE SCOPE

The rollers which are used in this project can be designed for power generation, thus increasing input torque and ultimately output of generator can also be increased by using the multiple transmission system which is more efficient method for generating electricity

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The listed system is non-conventional and the way of power generation technique is also echo friendly. It has advantage that it does not utilize any external source. By using this system we will able to reduce power crisis and load shedding. The stored electricity could satisfy the daily requirement for street lighting. No one is happy with current situation of electricity in India