

Gravity- A Non-Conventional Energy Source for Electricity Generation

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Abstract

There is a need to find an alternative source of electricity generation other than the conventional sources. To fulfill this need, non-conventional energy source is a best solution. This is an attempt to use of gravitational force which acts on every object as a free source to generate electricity to provide an environment friendly source of electricity generation technique. A gravity machine works on a compound chain drive arrangement which allows increasing the speed of the rotation of alternator which convert potential energy of a mass element into electrical energy. The converted energy can be stored in a DC powered battery which can be further used for various electrical applications.

Keywords: Non-conventional source, gravitational force, potential energy

1. Introduction

Now a day due to the effects of pollution and global warming there is a need for generating power from renewable sources. Energy demand is increasing day by day with rapid growth in industrialization as well as modernization. But the energy resources are gradually decreasing at high extent. Within a few years the energy resources will be finished. Coal is getting depleted and will last for only another 200 years. The hydroelectric power plant energy generation is depends on water availability which cannot be setup in draught areas because of scarcity of water. Solar energy is a renewable type of source of electricity, but the installation cost is very high. There is a need to find such alternative energy generation source which will be non conventional eco-friendly.

Due to the availability of gravity all over the earth, it is very helpful to generate power. Use of gravitational energy as the input source is a best solution. As per the theory of

energy conservation, it is proved that, energy can neither be created nor be destroyed, it can only be converted from one form to another and total amount of energy in the universe remains constant. This is an attempt to convert kinetic energy to potential energy and potential energy into electricity.

The gravitational power electric generation can replace all existing nuclear and fossil fuel plants and it would essentially solve the problem of global warming to the extent it is caused by fossil fuel used [1,2].

The paper studied the principle of gravity power generation mechanism, to give better efficiency to the system and improve the working of power generation [3,4].

Gravity is one source which can fulfill requirement of energy loss. Gravitational force is force that attracts any object with mass. The primary objective is to provide a gravity power generation mechanism which can continuously convert gravity potential energy into kinetic energy. This motion is converted into circular motion and is then converted into electricity using a generator. This paper

concerned with the study of power generation using a technique which produces power from gravity force [5].

2. Design of System

2.1. Mechanical Design

Reduction ratio of sprockets = No. of teeth on bigger sprocket

No of teeth on smaller sprocket = 43/18 = 2.388

2. 1st pulley rotating at 1 r.p.m. the r.p.m. of the output sprocket is calculated as speed of rotation of previous pair x 2.388 = 1 x 2.38 = 2.388 r.p.m.

for further pairs:-

= 2.388 x 2.388 = 5.702 r.p.m. (3rd pair)

= 5.702 x 2.388 = 13.617 r.p.m. (4th pair)

= 13.617 x 2.388 = 32.519 r.p.m. (5th pair)

= 32.519 x 2.388 = 77.655 r.p.m. (6th pair)

= 77.655 x 2.388 = 185.440 r.p.m. (7th pair)

= 185.44 x 2.388 = 442.833 r.p.m. (8th pair)

= 442.833 x 2.388 = 1057.485 r.p.m. (To alternator)

Time required for the weight to touch the ground is calculated as circumference of the pulley on which weight is mounted x speed of rotation of that pulley in r.p.m.

$$= \pi \times \text{diameter of pulley} \times 1 \text{ r.p.m.}$$

$$= 3.142 \times 43 \times 1$$

$$= 135.02 \text{ cm}$$

The total height of the system is 135 cm. Therefore, the weight will touch the ground after approx. 1 mins. The time calculation is dependent on the total height of the system. So this time can be increased by increasing the total height of the system.

The parameters like height, weight, no. of pairs and time are interdependent on each other.

i. e. if no. of pairs is increased then weight required will also increase then height needed is more...so when we increase the height ultimately the time required for the weight to reach the ground will be increased.

3. Working Methodology

Weight of 20 kg is attached to a pulley which is at 54 inches above the ground level. Due to gravitational force the weight proceeds toward the ground. Pulley starts rotating anticlockwise direction and it is connected to another pulley on which a bigger sprocket is mounted. Bigger sprocket is attached to the smaller sprocket which is the driving sprocket of the whole system which can be disengaged from the system for reversing purpose. Use of compound chain arrangement, the speed gets multiplied at a 2.4. reduction ratio. 8 pairs of sprocket are arranged to increase the rpm. from 1 to 1057. At the last pair, an alternator is connected which produces an A.C. of 9.7 V. The weight takes about 15 min. to reach the ground level. Once the weight reaches the ground level the whole system stops. (Fig.1)



Fig. 1. Experimental Setup for electricity generation

Further the alternator output is connected to the terminals of a battery. As the result, the battery starts charging. This charged battery is connected to an inverter with the help of charging circuit and can be further used for various applications. The time required for charging a standard battery is 18 hours.

4. Results and discussion

The test Volt = 9.7, Current = 0.7

$$R = V / I = 9.7 / 0.7 = 13.85 \Omega$$

$$\begin{aligned} \text{Electrical Power (Watt)} &= V \times I = 9.7 \times 0.7 = 6.79 \text{ W} \\ &= 0.00679 \text{ kW} \end{aligned}$$

$$\text{Apparent Power} = I \times V / 1000 = 0.7 \times 9.7 / 1000 = 0.007 \text{ kVA}$$

Power Factor (P.F.) = True power / Apparent power

$$= 0.00679 / 0.007 = 0.97$$

Energy Calculation = Power x Hours

$$= 0.00679 \times 0.02276 = 0.000154 \text{ kWh}$$

5. Conclusion

The gravity generator has the advantages of positive transmission system, eco-friendly. This system can be utilized for personal use in public place like railway stations.

References

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