

# Producing Electricity From Oscillating Device (Pendulum)

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**ABSTRACT:** The more power demand has been occurring now a day in India. The main reason of the power demand is due to the lack of improper energy utilization and conservation. We can implement the pendulum based power generation system in real time application whenever the vibration produced, the pendulum power generator is the machine which converts the motion of the pendulum i.e. mechanical energy into electrical energy. This is most helpful source or machine for power generation in India today. There are a lot of availability of mechanical energy in the environment. This mechanical energy can be converted into other form of energy like electrical energy. Here we developed a pendulum motion based power generator that sustains its motion with low maintenance providing voltage output from oscillating mechanical structure. The oscillating effect of our device is enhanced by using gear mechanism that is composed of shaft with a dynamo.

**Keywords:** *Pendulum bob, Gravity, pendulum frame, generator, charge controller circuit, battery.*

## INTRODUCTION

Energy has been universally recognized as one of the most important basic requirement for economic growth and human development. There is a strong two-way relationship between economic development and energy consumption. Man has always been in pursuit of energy to meet his ever increasing demand. In recent times due to effects of pollution and global warming there is a need for generating power from renewable sources. The reason for generating power using gravity is that it is available all over the Earth, abundant and consistent too and it cannot be efficiently converted into electrical energy. In this paper we designed a methodology wherein gravitational energy is further amplified into Mechanical motion and hence can be successfully transformed into usable electrical energy. The basic concept of a gravity power generating mechanism is simple. When a body moves down from a higher altitude to a lower one its potential energy is converted into kinetic energy. This motion is converted into circular motion and is then converted into electricity using a generator. The more power demand has been occurring now a day in India. The main reason of the power demand is due to the lack of improper energy utilization and conservation. The pendulum setup has been made, that is whenever it has been kicked off the kinetic energy of ball makes the pendulum to oscillate, generates the electrical energy .We can implement the pendulum based power generation system in real time application wherever the vibration produced. We can implement a pendulum based power generation system in such dynamic application we can generate power from it.

## LITERATURE SURVEY

[1].**Mithun Gajbhiye, Mayuri Boke, Akshay Kelwadkar, Prof.Sandeep Mude:** The pendulum generator deals with the power generation from the mechanical energy. We can implement the pendulum based power generation system in real time application whenever the vibration produced. We can implement a pendulum based power generation system in such dynamic application. We can generate power from it. The pendulum power generator is most efficient & ecofriendly power generator. The pendulum power generator is the machine which converts the motion of pendulum i.e. mechanical energy into electrical energy. This is most helpful source or machine for power generation in today

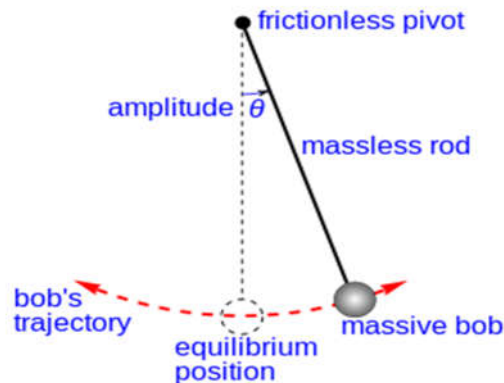
[2].**Rajat Wairagade, Sonu Tagwan, Prof S.K.Mude:** At the end of a research they did a designed a power generator with a pendulum that employs the concepts of reciprocating system. The ambient vibration can be used in an effective way by converting them to electrical energy. It proposes energy conversion system in terms of generating electricity. The technique of implementing the pendulum power generator is to reduce global warming. The compact model not only provides the accurate result but also gave the computational speed-ups of the generation.

[3].**Mohan Gautam, Ankit Tiwari, Kuldeep Singh Arya:** Nowadays, demand of electricity in India is more than supply as source of raw materials like coal etc. are disappearing quickly. To solve this issue an investigation on working model of pendulum has been performed related to generation of electricity. An experiment has been carried out in order to converted oscillatory motion of simple pendulum into rotatory motion which is further transferred into electrical energy. For performing the experiment, a 52.07 cm length vertical pendulum of aluminum attached with a bob of 700gm weight is connected to a threaded screw axle of 6mm outer diameter. The wheel is connected to threaded screw axle with the help of ball bearings of 6mm diameter.

## TERMINOLOGY

**Newton 1<sup>st</sup> law:** This law is really only a definition of force. It state that an object at rest will stay at rest and object in motion will stay in motion with the same speed and direction unless acted upon by unbalanced force.

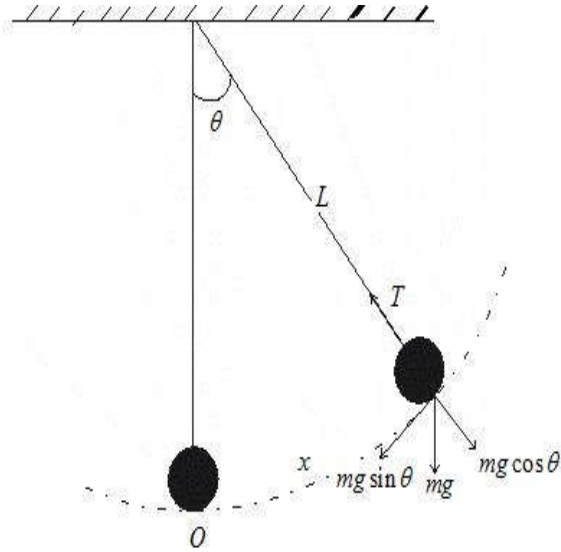
**Pendulum:** A body suspended from a fixed support so that it swing freely back and forth under the influence of gravity. When the a pendulum is displaced sideways from its resting equilibrium position, it is subject to a restoring force due to the gravity that will accelerate it back towards the equilibrium position. When released the restoring force combined with the pendulum mass causes it to oscillate about the equilibrium position, swing back and forth.



**Pendulum time period:** The period of a gravity pendulum depends on its length, and also to a slight degree on the amplitude, width of the pendulum swing. The simple pendulum, the time taken for a complete cycle is

$$T = 2\pi\sqrt{L/g}$$

**Force generated by pendulum:** when pendulum is displaced from its equilibrium position, there will be a restoring force that moves the pendulum back towards its equilibrium position. As the motion of the pendulum carries it past the equilibrium position, the restoring force changes its direction so that it is still directed towards the equilibrium position.



➤ **Force produce by pendulum**

$$F = Mg \sin \theta = 48.55 \text{ N}$$

➤ **Torque produce by pendulum**

$$T_q = F * D = 19.42 \text{ N-m}$$

➤ **Time period of pendulum**

$$T = 2\pi \sqrt{L/g} = 2.476 \text{ sec}$$

➤ **Electrical power produce by pendulum**

$$P = T_q * (2\pi N / 60)$$

In terms of volts = 12V

M = Mass of the pendulum bob

L = Length of pendulum

D = Distance of pendulum oscillation

$\theta$  = Angle between center position to oscillation

### COMPONENTS USED

- 1 Supporting frame
- 2 Bearing
- 3 Pendulum bob
- 4 Chain
- 5 Generator
- 6 Pulley
- 7 Cycle wheel
- 8 Circuit

## WORKING PRINCIPLE

The pendulum generator is the machine which converts the motion of the pendulum i.e. mechanical into electrical energy. The pendulum model be generating power from the real time dynamic movement. Once when the pendulum is disturbed from its equilibrium position its swings to and fro. In this pendulum is attached on a horizontal rod connected at the point at which it moves freely. When pendulum starts moving wooden frame also starts to oscillate. The wooden frame is connected to the flywheel with the help of chain. In this way the mechanical energy of pendulum is transferred to flywheel. Flywheel is connected to the generator. The mechanical energy of flywheel is converted into electrical energy with the help of generator. The electrical energy is stored in the battery or we can use it with help of charger controller circuit





## CONCLUSION

It is simple in construction and required small area for installation. Nowadays, demand of electricity in India is more than the supply as source of raw materials like coal etc. which are disappearing quickly. To solve this issue an investigation on working model of pendulum has been performed related to generation of electricity. There are various applications like it can be used in rural areas of India where electricity is not available in suitable amount so we can implement this model into rural it will help to the rural people

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