

CONVERSION OF TIDAL ENERGY TO POWER GENERATOR

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Keywords:

Energy Conversion, Renewable Energy, Buoyance Force.

Introduction:

Nowadays, the world is moving toward the use of sustainable energies to reduce its dependency on non-renewable energies. The use of these sustainable fuels will be used to gauge society's growth and well-being. Wave energy, one of the renewable energy can be used to generate power. We intend to build a wave energy convertor which can be used to convert the wave motion to linear motion which then can be converted to rotatory motion. This rotational motion can be used to rotate a motor thereby producing power. This wave energy convertor consists of buoy which is a navigational aid that float on the top surface of the ocean, buoys are designed in such a way that they float, and the material used in the buoys are polyfoam or other floatable material. The motion of the buoy depends upon the shape and dimension of the buoy.

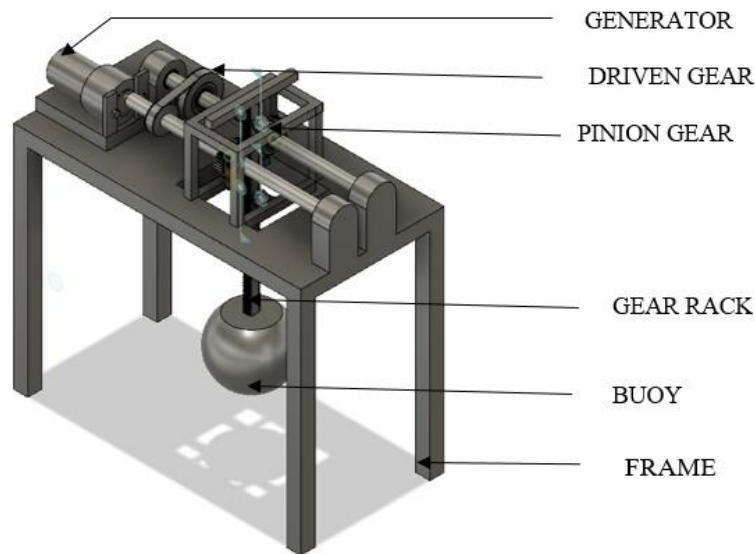
Objectives:

1. To design a wave energy converter to produce electricity
2. To convert wave energy to power using rack, sprocket and shaft arrangement
3. To fabricate a lab-size prototype of a wave energy converter
4. To design lightweight and anti-rust structure for long-term usage

Methodology:

To build a wave energy convertor, various journal paper written on tides and renewable energies along with different types of the wave energy convertor was studied. Using the Fusion 360 software a CAD model of the prototype is created. The wave energy convertor mainly consists of floating device, linear to rotational motion convertor and output recorder. Floating device is made up of poly foam material which is free to move up and down and sideways motion is restricted. This buoy is connected to the square rod welded with chain which acts as a rack. The motion of the rack is also restricted only to the linear manner. This rack is meshed with two sprockets so as to convert the linear motion into rotational motion.

These sprockets are connected to two shaft which is placed on the support frame with the help of pillow bearing. These shaft are interconnected with two sprockets and chain. The one of the shaft is coupled with motor which acts as output device.



CAD Model of Conceptual Design with Labelled Parts

Conclusion:

This project has been aimed to produce power using wave energy. Due to the depletion of fossil fuels and other non-renewable energy the usage of renewable energy is much needed. Wave energy convertor uses energy produced from the tides and converts it and generates power with the help of the rack, sprocket and chain arrangement. This can be a used as an alternative for the power production. An efficient mechanism is created to convert the wave energy into useful power generation. Lab size prototype is portable and rust free. An efficient way to use one of the renewable energy source to generate the power has been developed. Even though the initial cost of the prototype is high, the maintenance of the prototype is considerably low. An environmentally friendly prototype has been created.

Scope for future work:

1. The sprocket size can be varied to increase the rotation of the shaft to increase the power generation
2. Multiple buoys can be used to increase the efficiency
3. Stable foundation can increase the efficiency by providing good support for overall structure