| Name(s) | Project Number |
|---|---|
| **Bryce W. Fender** | **J0710** |

**Project Title**

## Ocean Wave Energy Converted to Electricity

**Abstract**

**Objectives/Goals**

The capitalization of wave motion through the use of a pendulum, a ratchet device, a gearbox, and a motor/ generator can produce electricity. Continuous on going renewable force 24 hours a day, 7 days a week, 52 weeks a year, and on and on. Waves come from the moon tides, wind, and reefs. A flotation device will have securely anchored braces/ gussets attached with freely moving ball bearings to a horizontal drive shaft with a series of multi toothed gears. Through the gearbox the rotational movement of the drive shaft will be accelerated to rotate an electrical motor/ generator. The electrical motor/ generator in turn will convert the rolling wave motion into electricity.

**Methods/Materials**

The parts of a wave are, Wave crest, Wave trough, Wave height, Wave Amplitude, Wavelength, and Wave period. Water molecules move in an orbital motion as the wave passes. There are three types of waves defined by water depth: Deep-water wave, Intermediate-water wave, and Shallow-water wave. The celerity is the velocity of the waveform, not the water.

A machine that converts mechanical energy into electrical energy is called a generator, alternator, or dynamo. A simple motor has six parts: Armature or rotor, Commutator, Brushes, Axle, Field magnet, DC power supply of some sort.

Gears are generally used for one of four different reasons: To reverse the direction of rotation, To increase or decrease the speed of rotation, To move rotational motion to a different axis, to keep the rotation of two axes synchronized. The gear ratio is controlled by the number of teeth the gear has even if the diameters are a bit off.

**Results**

KINETIC ENERGY OF RELATION

E=WK N#ft.LBS./5878=.0017943ft.LBS.

INTERTIA=I=WK=(3)(.15625)=.07324 LBS.-ft

TORQUE=T=(3(.15625)(12)/(308)(1)=.002854 ft.LBS.

WORK AND POWER

HP=P2rN=(T)(N)=(.002854)(12)=.00000652ft.LBS.33,000 5252 min.

1HP= 745.7 WATTS,.00000652x745.7=.00486 WATTS

GEARS

Pitch line velocity=V=mTpnp/60=(3.14159265)(.5)(25.4)(30)(12)/30=2.54 mm/s 60

Tooth bending stress=st=P/(vKvfmY)=.00000486=3.9638x10=12.261

**Summary Statement**

Converts the up and down and sideways motion of oceanwaves into electricity through gears, pendilum, and a generator.

**Help Received**

My Mom and Dad helped with the boards. My Dad helped me with the construction of my project. My Grandfather helped me with my Generator / measuring device (volt meter).