CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

Finn Barry; Kyle Worcester-Moore

Project Number

S0301

Project Title

Focusing Waves: How Stationary Barriers Focus Wave Energy

Abstract

Objectives/Goals

The purpose of this project was to understand how different shaped seawalls (half circles, parabolas, V, and straight walls) would affect the height of oncoming ocean waves. Our goal is to understand how wave energy can be extracted most efficiently by placing shaped walls perpendicular to the oncoming waves. The hypothesis that a parabolic wall shape would generate larger waves to form, from which more energy could be extracted, was supported by the results of the experiment.

Methods/Materials

The effect of these seawall shapes on wave height were observed using a small scale model of each seawall shape in a lap pool. For roughly 25 seconds, an ultrasonic distance sensor above the water surface measured each wave#s height. This process was repeated at several locations around each wave barrier.

Results

A parabolic seawall produced the highest waves at its focal point . The half circle produced the second highest waves and produced high waves at every measured location.

Results from this experiment indicate that the parabola seawall shape produced the most energy from a single location; however, the half circle wall shape may produce the most energy if multiple wave energy extractors are distributed inside the half circle.

Conclusions/Discussion

Further research to measure the extractable wave energy around these seawall shapes, using existing wave power methods should be performed to verify that these findings hold true in real applications.

Summary Statement

This project investigated how different shaped sea walls effect wave height and energy.

Help Received

Parents gave suggestions on construction.