CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J0321

Project Title
Tsunami Slicer: Which Structure Will Best Reduce a Simulated Tsunami?

Abstract

Objectives/Goals
The objective is to determine which structure will efficiently decrease the height and speed (increase of time) of a simulated tsunami wave.

Methods/Materials
A 40 gallon fish tank measuring 36#x15#x17# was used. Small river style gravel was used to build sloping land into the water. Measurements were marked along the front of the tank to measure wave height and land height. A metal yard stick was taped to the front length of the tank to measure a consistent length of the land gravel and grape Kool-Aid was used to dye the water for visibility. A plastic lid approximately 12#x14# with 2 holes was submerged in the water and pulled by nylon string attached to the holes to displace the water and create a fast moving wall of water that simulated a tsunami wave. The structures are: a sea wall made from peg board, break waters made from 1#x1# dowels cut to 3#,4#,5# pieces, and under water half pipes made from PVC pipe with a diameter of 1 ½ #. Each structure was place in the tank and tested 10 times while recorded with a video camera and timed with a stop watch function on a cell phone. Later the video was reviewed in slow motion to determine the wave height.

Results
The control average height was 5.55# with an average time of 1.61 seconds. The sea wall had the best results with an average height of 4.95# and average time of 1.91 seconds. The half pipes were a close second with average height of 5.08# and average time identical to the sea wall at 1.91 seconds. The break waters were in last at an average height of 5.28# and average time of 1.77 seconds.

Conclusions/Discussion
My hypothesis was correct that the sea wall would do the best in decreasing the height the most but the wave time tied with the half pipes.
My results lead me to believe that although the sea wall did the best for height by a small margin the half pipes may be a better choice given the details of the 2011 Japanese tsunami where the walls failed due to a drop in the lands sea level. The half pipes would also be a better choice for areas that don#t want an obstructed view from a sea wall.

Summary Statement
I want to know which structures, between a sea wall, underwater half pipes or break waters, will lessen the effects of a tsunami by decreasing its height and slowing its speed.

Help Received
Mother was my assistant and edited video, father cut my materials for me using power tools