



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Trenton J. Paddock	Project Number J0720
Project Title Wave Energy: Power of Our Future	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My experiment is about whether wave amplitude and frequency affects the amount of electricity that can be produced by a water wave generator. I want to determine if larger wave amplitudes and higher wave frequencies will produce more electricity. After extensively researching my project, I think that more electricity will be produced at higher wave amplitudes and frequencies.</p> <p>Methods/Materials I designed and constructed a water wave maker to generate waves, a wave float attached to a reciprocating pump to capture the energy of the wave and convert it to hydraulic energy, and an impulse turbine to convert the hydraulic energy to electrical energy. I constructed a large, 15 foot water wave tank for my apparatus. With my wave maker, I was able to accurately control wave amplitude and frequency. My wave float was designed to follow the profile of the wave from crest to trough. This allowed my reciprocating pump to be driven up and down with the wave float, as the wave float encountered the waves. My reciprocating pump pumped water through a nozzle, which was aimed at my impulse turbine. The impulse turbine was connected to the generator through reduction gears. When the water sprayed through the nozzle, the impulse turbine spun, creating electrical power.</p> <p>Results After 135 tests with my water wave generator system, I found that the highest wave amplitude combined with the highest frequency produced the most electricity. On average, the highest wave amplitude of 7.62 cm. and the highest wave frequency of 60 WPM produced the highest electrical output of .112 watts. I was very pleased with the accuracy of the output of the wave maker (wave amplitude and frequency.)</p> <p>Conclusions/Discussion My hypothesis was correct. By conducting my experiment, I confirmed that wave amplitude and frequency does affect the amount of electrical energy that can be produced by a water wave generator. I think that my experiment is important for the future, because the world is running out of oil and we need to start finding new energy sources. Scientists in the United States need to explore wave energy as an alternative energy source. The United States has done little research on this energy source, while other European countries are ahead of us and actually have working wave energy power plants.</p>	
Summary Statement My project is about wave energy, and determining whether wave amplitude and frequency affect the amount of electrical energy that can be produced by a water wave generator.	
Help Received Mom helped me put together my board; Dad supervised my use of power tools; neighbor loaned me his air compressor; Mr. David Langston from WaveGen Corporation provided me important information for my project.	