CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Clint L. Hatayama

Project Number
J1810

Project Title
The Effects of Environmental Factors on the Strength of Wood

Abstract

Objectives/Goals
My project was to determine if various enviromental factors has an effect on the strength of wood when exposed to them.

Methods/Materials
One hundred pieces of identical 12 inch lengths of redwood were cut with an electric saw. Twenty were soaked in salt water (3% saline to simulate ocean water). Twenty were soaked in a vinegar/water solution with a pH of 4.0 to simulate acid rain. Twenty were soaked in plain water and twenty were covered in moist soil. All the wood was soaked or covered for 24 hours then removed and allowed to dry for 48 hours. Twenty pieces were left untouched to serve as control. After drying, weights were attached to each piece of wood in increasing increments until the wood broke. The weight required to break each piece of wood was recorded.

Results
Ocean water had the greatest effect on the strength of the wood with an average of 491.85 ounces required to break the wood compared to the control which required an average of 512.85 ounces. It weakened the wood more than moist soil with an average of 502 ounces, plain water with an average of 512.35 ounces, and acid rain. Acid rain was the least corrosive to the wood with an average of 587.85 ounces required to break the wood.

Conclusions/Discussion
My conclusion is that environmental factors do have an effect on wood and that ocean water and moist soil are the most damaging. The data suggests that any wooden structures like a house, bench, picnic table, or walkway built near a beach exposed to ocean water should be prepared with a preservative to help prevent damage. When building a fence moist soil is probably going to corrode wood exposed to it. You should coat the wood with a preservative or make sure that the wood doesn't come in contact with the moist soil. In my experiment, acid rain almost acted as a preservative, but if I let the wood stay in contact longer it might corrode it. That is something I need to investigate further.

Summary Statement
My project tested to see if wood exposed to acid rain, salt water, moist soil, and plain water was weakened when compared to unexposed wood.

Help Received
Mr. Carl Gong helped clarify my project idea. My parents helped with equipment that I needed and helped with cutting letters and gluing on display board.