CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

J1118

Project Title

Paint Permeability Analysis: What Paint Best Protects against Moisture in Actual Application?

Abstract

Objectives/Goals

The objective of our project is to determine which paint combination will best protect against moisture in actual application. Through our research we have found that it is impossible to completely seal out water from a wall, because the very nature of wood causes it to expand and contract allowing both diffusion and possible leakage. Knowing this persuades us to believe that a paint, which breathes, preventing the condensation of water vapor, will best resist water damage.

Methods/Materials

We constructed twenty-four, four inch square individual wall cavities. Eight combinations of paint were tested three times each in order to gather more accurate results. The paint combinations consisted of -- an interior coating of Elastomeric and an exterior coating Elastomeric, an interior coating of Latex and an exterior coating of Elastomeric, an interior coating of Elastomeric and an exterior coating of 100% Acrylic Latex, an interior coating of Latex and an exterior coating of 100% Acrylic Latex # the previous combination were also tested with identical cracks. Throughout the experiment temperature and humidity readings were taken to determine the direction in which the water vapor traveled.

Results

We found that the paint combination that best protected against moisture consisted of Elastomeric on the interior surface and 100% Acrylic Latex on the exterior surface. Interestingly this combination was one of the samples which included a crack. However, due to the appearance, most consumers would prefer a sealed combination of Elastomeric on the interior surface and 100% Acrylic Latex on the exterior.

Conclusions/Discussion

In conclusion we have found that it is better to leave a surface unpainted then to paint it with the incorrect paint. In affect consumers that have painted their homes with the inappropriate paint have faced serious moisture problems that in some cases have resulted in severe illness or even death. This demonstrates how important selecting the correct paint type is for each job.

Summary Statement

Our project, "Paint Permeability Analysis", was used to test various paint combinations in actual application to dtermine which paint combination would best protect against moisture.

Help Received

Father helped to cut wood and plexiglass, Mother drove us to purchase paper, Expert advise from Structural Engineer