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Laboratory Experiment in Fiber Reinforced Polymer Composites

Abstract:

One subject area that is common to many undergraduate introductory materials courses is polymer materials in general. An extension to this subject where many recent developments and applications have emerged is in the combining of polymers with other materials to produce composites. The work done in this experiment exposes groups of students to the underlying principles of fiber reinforced polymer composites. Appreciation for the manufacturing perspective of composites, as well as the variability in properties is readily observed by the students after the structures have been assembled, and tensile tested to failure. Test results show that some reinforced structures can support stress values that are 3 to 4 times higher than the original epoxy material. Other structures that only test at $\frac{3}{4}$ the strength of the epoxy clearly show that manufacturing and materials must work together to achieve optimum properties.

Proposed Presentation:

- Outline of laboratory experiment that has been conducted at Wentworth Institute of Technology for the past three years.
- Materials and Equipment required for experiment.
- Pictures of apparatus, structures, etc.
- Tensile test results and pictures of composite structures.
- Student learning (conclusions) drawn from the experiment.
- Alternative methods that could be adapted for other equipment .