

MEE 696 Mechanical Engineering Graduate Seminar

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Variability in Flexural Response of E-Glass/Vinyl Ester Composites Fabricated using the VARTM Process

Presented by

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Abstract

Despite advances in the Vacuum-Assisted Resin Transfer Molding (VARTM) manufacturing process, questions remain regarding the consistency of material properties in large, fiber-reinforced polymer composite parts. In this paper, a parametric study designed to examine the variability in flexural response of marine grade composites, fabricated via a VARTM process, is presented and a method of data analysis is discussed. The objectives of the study were: 1) to determine the specimen geometry and test configuration for 25.4 mm (1.0 in.) thick woven fabric reinforced composite flexural members, which results in a repeatable test method; and 2) to characterize the variability in flexural strength and modulus. A three-dimensional digital image correlation (DIC) system was used to record full-field strain measurements during the tests. The DIC system allowed for through-the-thickness strain measurements to be recorded during testing. The effects of load-head size, and shear deformations, on the stress distribution, flexural strength, flexural modulus, and failure type were investigated.