

Hygrothermal Effects on Durability and Moisture Kinetics of Fiber-Reinforced Polymer Composites

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ABSTRACT

Various processes of degradation, both reversible and irreversible, are induced in composite materials on exposure to moisture. The durability characteristics of unidirectional E-glass-Vinylester composites under the influence of relative humidity and immersion in water at different temperatures are studied. The correlation between tensile and flexural strength data is investigated using statistical models. This research attempts to analyze the behavior of FRP composites exposed to the aforementioned environments and theoretically model their effects on the mechanical properties- Tensile strength, Tensile modulus, Flexural strength and Short beam shear strength- of the FRP composites, for purposes of long-term life prediction. This study attempts to develop an initial correlation between effects due to immersion in deionized water with those due to exposure to humidity in an attempt to further develop techniques for prediction of longer term durability of these materials under field conditions.