

유리섬유 강화 복합재료의 계면 접착력이 충격 강도 및  
에너지 흡수 능력에 미치는 영향

Effect of Interfacial Adhesion Strength on the  
Impact Strength and Energy Absorption Capability of  
Glass Fiber Reinforced Composites

Beom Joon Kim, Min Ji Choo, Jae Kon Lee, Tae Jin Kang

Dept. of Textile Engineering

Seoul National University

Abstract

Surface treatments determine the strength of the interfacial bond between the resin and reinforcement. The effect of interfacial adhesion strength on the impact toughness and energy absorption capability of S2-glass fiber woven fabric reinforced polyester laminates has been studied.

The interfacial strength between fiber and matrix was altered by the surface treatment of the reinforced fibers with heat cleaning, starch treatment, starch-oil treatment and silane coupling agent at several levels. Interlaminar shear strength and flexural strength were measured to evaluate the mechanical properties of the laminates. An instrumented drop-weight impact test was performed on the specimens at the various energy levels and the internal damages of the specimen were examined using a ultrasonic C-Scan.

The laminates treated with silane coupling agent showed the best mechanical properties but showing the poorest impact properties. Starch and starch-oil treatments, which are incompatible with the matrix, afforded the best impact toughness while mechanical properties were inferior to the silane treatment. The specimens treated with starch, starch-oil and semi-compatible agent showed only internal damages at the initially applied impact energy of 94 Joule while the silane coupling agent treated specimens were penetrated at the energy level of 24.30J Joule.