

Structural Safety of Biocomposites under Cracking: A Fracture Analytical Approach using the G_F-Concept

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Abstract : Biocomposites have established themselves as a sustainable material class in the industry. Their advantages include lower density, lower price, and easier recycling compared to conventional materials. Now there are a variety of ways to measure their technical performance. One possibility is mechanical tests, which are widely used and standardized. However, these provide only very limited insights into damage capacity, which is particularly problematic under cracking conditions. To overcome such shortcomings, experimental tests were performed applying the fracture energetically G_F-concept to study the structural safety of the interface under crack opening (mode-I loading). Two different types of biocomposites based on extruded henequen-fibers (NFRP) and wood-particles (WPC) in an HDPE matrix were evaluated. The results show that the fracture energy values obtained are higher than those given in the literature. This suggests that alternatives to previous linear elastic testing methods are needed to perform authentic safety evaluations of green plastics.

Keywords : biocomposites, structural safety, G_F-concept, fracture analysis

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