

Title : A Review of Experimentation Numerical Simulation of Low-Velocity Impact Performances and Damages of Fiber-Reinforced Composites

Author Names : Md. Mominur Rahman, Al Emran Ismail, Muhammad Faiz Ramli, Azrin Hani Abdul Rashid

Abstract: Fiber-reinforced composites (FRCs) are extensively utilized in various industries due to their lightweight and high-strength properties, making the understanding of their response to low-velocity impact (LVI) crucial for ensuring structural integrity, performance and invisible internal damages that can compromise performance and safety. This paper critically examines the current state of research on the low-velocity impact behavior of FRCs, focusing on both experimental and numerical simulation approaches. The review comprehensively surveys on characterizing and modeling the response of FRCs to low-velocity impacts leading to damages. The effects of parameters including composites preparation; impact mechanics; testing methods; induced damages including assessment methods; different performance parameters including impact energy, force, load, impact resistance; post-impact damages and their resistance; performance and damage affecting different factors; numerical and simulation modeling are discussed. Current challenges and future prospects regarding the subject matter is highlighted. The comprehensive analysis presented in this review goals to consolidate current knowledge, identify research gaps, and guide future endeavors in enhancing the understanding of low-velocity impact (LVI) behavior in fiber-reinforced composites (FRCs).

Keywords: Fiber-reinforced composite, Low-velocity impact, Performance and damage

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