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Salt-fog spray aging of Jute-basalt reinforced hybrid structures: flexural and low velocity impact response

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Abstract

In this work, a study on the aging resistance of jute and jute-basalt interply hybrid laminates exposed to salt-fog is presented with the aim to investigate the possibility to enhance the durability of natural fiber reinforced composites for marine application by a ply-substitution approach. In particular, jute and basalt/jute reinforced composite plates were manufactured by vacuum assisted resin infusion in two different staking sequences (i.e., intercalated and sandwich-like basalt-jute) and aged under salt fog conditions. The effects of the accelerated aging at increasing times on the mechanical response of laminates were assessed in both quasi static (three point bending) and dynamic (low velocity impact) conditions. Overall, it was found that the substitution of external jute layers with basalt layers (i.e. sandwich like configuration) represents the best solution to enhance the durability of structures exposed to salt fog aging conditions. This is highlighted by lower decrements, after 90 days of aging, of the quasi-static flexural modulus and the impact peak load (16% and 3.5%, respectively) compared to those showed by jute laminate (40% and 10.5%, respectively).

Keywords: A. Hybrid composites, A. Ceramic fibers, B. Mechanical Properties, E. Thermosetting resin, Natural fibers

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