Effect of the extreme conditions on the tensile impact strength of GFRP composites

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Abstract

During operational conditions, extreme environments combined with unexpected high loading rates can induce severe damages or, inclusively, premature fails. Therefore, this paper intends to study the effect of different hostile solutions on the longitudinal impact strength in order to establish design criterions. For this purpose, samples of GFRP composites were immersed into alkaline and acid solutions as well as distilled water. Variables like exposure time, temperature and concentration of the solution were analysed in detail. The effect of pre-damages was also studied for different pre-loads, where the severity of the damages introduced was quantified by acoustic emission. It was possible to conclude that, independently of the solution, the exposure time and temperature were determinant to decrease the tensile impact strength. Finally, the magnitude of the initial damage has a significant influence on the impact resistance.

Keywords: Polymer-matrix composites (PMCs); Glass fibres; Environmental Degradation; Mechanical properties.

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