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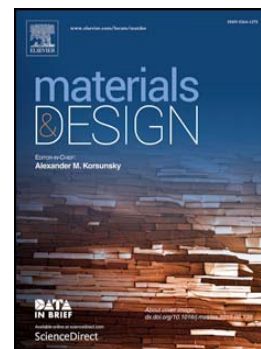
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Burst strength and impact behaviour of hydrothermally aged glass fibre/epoxy composite pipes

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Abstract

This study investigated the effects of water ageing and low-velocity impact loadings on E-glass fibre/epoxy composite pipes subjected to monotonic internal pressure. The pipes, which consisted of six antisymmetric layers with $(\pm 55^\circ)_3$ winding angles, were manufactured by the filament winding process. The specimens were cut from the pipes to the required test length. The specimens were then subjected to the ageing process by being immersed in 80°C tap water for time intervals of 500, 1000, and 1500 h. Impact loadings of three different energy levels (5 J, 7.5 J, and 10 J) were applied, which were followed by monotonic burst tests. Scanning electron microscopy images were captured and the correlation between the ageing time and the level of impact energy on the pipes' burst strength was identified. The results indicated that the peak force and displacement increased as the impact energy increased. The monotonic burst test results revealed that the specimens that had been aged and were impacted by higher energy yielded lower burst strength. Weepage and eruption failures were observed depending on the applied impact energies.

Keywords: Filament winding; GRE composite pipe; ageing; impact loading; monotonic burst test.

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