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# INFLUENCE OF PLY STACKING PATTERN ON THE STRUCTURAL PROPERTIES OF QUASI-ISOTROPIC CARBON-EPOXY LAMINATES IN FIRE

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## ABSTRACT

An experimental investigation is presented into the effect of the ply stacking pattern to quasi-isotropic carbon-epoxy laminates on their structural properties in fire. Small-scale simulated fire tests are performed on laminates with different stacking sequences of the 0, 90, +45 and -45 plies loaded in tension or compression. Testing revealed that the internal temperature and fire-induced delamination cracking of the laminates depends on the ply stacking pattern. The tension softening rate and stress rupture time of laminates also depends on the ply stacking pattern, particularly at low applied tensile stresses. However, the fire response of laminates under compression loading appears less sensitive to the ply stacking sequence, due in part to their much shorter failure times. The research reveals that the structural survivability of carbon-epoxy laminates when exposed to fire can be influenced by the ply stacking sequence, with composites with 0 mid-plane plies having superior performance.

Keywords: A: Polymer matrix composites (PMCs); B: Mechanical properties; B: Thermomechanical; Fire

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