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Modeling of the Friction Behavior of Carbon/Epoxy Prepreg Composite

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Abstract : Thermoforming of pre-impregnated composites (prepreg) is the most employed process to build high-performance composite structures due to their visible advantage over alternative manufacturing techniques. This method allows easy shape moulding with a simple manufacturing system and a more refined outcome. The achievement of complex geometries can be exposed to undesired defects such as wrinkles. It is known that interply and ply-mould sliding behavior governs this defect generation. This work analyses interply and ply-mould friction coefficients for UD AS4/8552 Carbon/Epoxy prepreg. Friction coefficients are determined by a pull-out test method considering actual velocity, pressure and temperature conditions employed in a thermoforming process of an aeronautical composite component. A Stribeck curve is then constructed to find a mathematical expression that relates all the friction coefficients with the test variables through the Hersey number parameter. Two expressions are proposed to model ply-ply and ply-tool friction behaviors.

Keywords : friction, prepreg composite, stribeck curve, thermoforming.
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