

Title: Development of innovative tooling based on high modulus pitch fibres for structural aeronautical components

Authors: Paolo Bettini¹, Paolo Grati²

1 Politecnico di Milano, Aerospace Science and Technology Department, Via G. La Masa 34, 20156 Milan, Italy

2 GP Marketing Consulting, Via Dante Alighieri 25, 20027 Rescaldina (Mi), Italy

Abstract:

Tooling for composites has to be designed to ensure general requirements like adequate stiffness, dimensional stability, wear resistance, lightness. In aerospace epoxy resin systems with high curing temperature are largely used, thus implying handling large thermal expansions. Peculiar characteristics of carbon pitch fibres offer the possibility to improve performances in term of both mechanical characteristics and thermal conductivity. The activity has involved the design and manufacturing of a mould with pitch fibres and the evaluation of its performances through the comparison with a conventional one, made out of PAN fibres. The comparison has concerned both the manufacturing process of the mould and its characteristics in operative conditions (during manufacturing of final product). The mould has been also equipped with a FO monitoring system for real-time temperature measurements and residual stress detection. First of all, this system allowed the monitoring of the mould manufacturing cycle; in a second time sensors could be used to monitor the curing cycle of the final product.