



**Soutenance d'une thèse de doctorat
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Ecole Doctorale	ED162:Mécanique, Energétique, Génie civil, Acoustique
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Composition du Jury

Civilité	Nom	Prénom	Grade / Qualité	Rôle
M	BINETRUY	Christophe	Professeur des Universités	Rapporteur
M	HOCHARD	Christian	Professeur des Universités	Rapporteur
M	BOISSE	Philippe	Professeur des Universités	Directeur de these
MME	RICHARD	Caroline	Professeur des Universités	Examineur
M	COLMARS	Julien	Maître de Conférences	Examineur
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M.	POLIT	Olivier	Professeur	Examineur

Résumé

This thesis is devoted to study the bending behaviour of textile reinforcements and thermoplastic prepregs by experimental and numerical methods. A bending stiffness test method was proposed for thermoplastic prepregs at manufacturing temperature. It was operated in an environmental chamber. A CCD camera was used to take the bending deflection shape. Bending moment and curvature were calculated along its midline. The slope of moment-curvature curve is bending stiffness. With

this method, bending tests were conducted on several thermoplastic prepregs at elevated temperature.

In order to simulate the bending deformation of thick fibrous materials, a specific shell element was developed. It was composed of continuous fiber segments. Both tensile and bending stiffnesses of fiber were taken into account. Local curve was constructed for fiber segment to compute its tensile and bending deformations. Several simulation tests were performed. Comparisons between experiment and simulation clearly show the efficiency of the proposed element.