ECOLE DOCTORALE
ED 468
« Mécanique, Energétique, Génie Civil, Procédés »

Thesis proposal for a Doctoral position 2017-2020

Title	Development and characterization of composite eco-structures
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Research project description:

Cost reduction and weight efficiency are major concerns of all transportation industry [1]. Multifunctional solutions are particularly interesting regarding those preoccupations. An alternative to classical composites materials with high performance fibers lies on wood based sandwiches [2]. Those materials booth extremely efficient in terms of CO2 and waste reduction, have proven their performance regarding static and dynamic tests previously performed in the laboratory. Sandwich structures with wood core and aluminum or flax fibers composite skins are particularly interesting for dissipating an important quantity of energy during a crash while keeping its integrity for compression after impact tests [3].
This research work will focus on indentifying manufacturing processes suitable for industrialization while allowing complex shape geometries and assembling solutions. The mechanical behavior will be characterized with static and dynamic tests. Tomography analysis will be used in order to identify damage modes in the impacted structures. A numerical model based on the approaches developed for composite materials in the laboratory [4] will be extended to wood based sandwich materials in order to describe the behavior. Finally, a crash-box structure will be manufactured and tested [5].

Other persons involved: Emmanuel De Luycker, Bruno Castanié, Christophe Bouvet
Keywords: Eco-composites, sandwich structure, forming, impact, crash.
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