

On the structural response of bio-based adhesives for wooden hulls

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In the last years, the idea of implementing “greener” and sustainable solutions merged with the basic principles of life cycle assessment concept has turned to be of paramount importance for the boatbuilding industry. In this framework, construction technologies based on wood such as strip-planking represent possible solutions, as they allow the use of a natural-grown material for attaining refined and solid structures. However, since these techniques imply wood bonding through conventional epoxy adhesives, the global eco-friendliness of the final product is lowered. As a consequence, the adoption of innovative bio-based adhesives is a promising solution to investigate. It is known that, generally, bonded joints in wooden hulls are weak spots of the structure, so the performances of the used adhesives should be duly assessed in order to guarantee an effective bonding. In the present research activity, the assessment of the performances of bonded joints manufactured with bio-adhesives is carried out through a FEM-based methodology, starting from the data present in the technical datasheets of the materials used. In such a way, the most promising products can be preliminarily identified in order to deeply investigate their mechanical characteristics through experimental tests, so limiting expensive and time-consuming activities. The proposed methodology was validated through the comparison between the results coming from the FE analysis and the ones stemming from experimental tests. Moreover, the proposed methodology could be profitably used to analyse more complex geometries, such as real and large structures of wooden hulls.

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