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Timber-mortar composites: the effect of sol-gel surface modification on the wood-adhesive interface

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ABSTRACT

Timber-mortar composite structures require rigid, strong, but also ductile connections to optimize their performances. Up to now, the preferred connection systems were based on metal fasteners and notches in wood. In this study, an alternative approach based on a fully glued connection was studied (using an epoxy-based system), and a wood pre-treatment was applied in order to enhance the compatibility and the adhesion properties at the interface between beech wood and mortar. The wood surface was functionalized with a xerogel obtained by means of a sol-gel process, consisting of two layers of silane nanofilms – namely tetra-ethoxysilane and (3-Aminopropyl) triethoxysilane. Chemical analysis of the wood surface confirmed the chemical bonding of the silanes. Microscopy images revealed that the

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