

Hygromechanical behaviour of a wooden panel: monitoring using image correlation techniques and continuous weighting

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Hygromechanical behaviour of a wooden panel: monitoring using image correlation techniques and continuous weighting

Cécilia Gauvin, PhD student in wood mechanics

Laboratoire de Mécanique et de Génie Civil (LMGC)
CNRS UMR 5508, Université Montpellier 2, France
cecilia.gauvin@univ-montp2.fr

Wooden panel paintings from cultural heritage are excellent case of study for an engineer. They are witness of ancient times and practices, and may provide keys to the understanding of long term behaviour of wooden structures [1,2]. A particularity of these objects is the permanent cupping of the panel. It seems to appear whatever the orientation of the panel cutting (quartersawn or flatsawn) and the position of the paint layer. One of the possible origin of this cupping is the compression-set [3], due to a combination of mechano-sorptive and plastic behaviour of wood. This phenomenon is more severe when the panel is restrained, so that shrinkage and swelling are prevented and stresses generated during cycling changes of humidity lead to cracking of the wooden support.

For our study, we try to reproduce a panel mock-up, taking care to characterize each component at each step until the final result: a permanently cupped panel. In the presentation we will introduce the first step, where the sorptional and mechanical behaviour of a ‘naked’ (uncoated) panel is monitored using image correlation techniques and continuous weighting.

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