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► To cite this version:

Raphaël Langlois, Arthur Bontemps, Rostand Moutou Pitti, Joseph Gril, Benoît Blaysat. Analysis of fractures propagating in silver fir (*Abies Alba*) using High-Resolution Full-Field Measurements. SEM Annual Conference, Society for Experimental Mechanics, Jun 2024, Vancouver, United States. hal-04857752

HAL Id: hal-04857752

<https://hal.science/hal-04857752v1>

Submitted on 28 Dec 2024

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Analysis of fractures propagating in silver fir (*Abies Alba*) using High-Resolution Full-Field Measurements

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Wood as a material is inherently multiscale, viscous, heterogeneous and anisotropic. When combined with complex stress field due to a propagating crack, it leads to both theoretical and experimental difficulties. Therefore understanding wood fracture mechanics is a scientific challenge and a topical concern in the timber engineering community. For instance, crack bridges or micro-cracking in wood are experimental issues that impedes crack tip localisation.

In this work, we propose to benefit from the recent improvements in camera resolution and the development of new accurate Full-Field measurement methods to investigate the propagation of cracks in TDCB silver fir specimens. Three samples are considered, with the initial notch positioned at different location of the annual rings. A checkerboard pattern is applied on all of them, and used to compute the displacements and strains using Localized Spectrum Analysis and assess the evolution of the crack position.

Those tests show that the crack path is dependent on the initial notch location, with a clear link between crack bridging and the topography of fracture surfaces. This talk will present the different experiments in details and an in-depth characterization of fracture propagation in wood at the mesoscopic scale.