



InnovaWood

PUUSTER RAYW

TAL TECH

NON-DESTRUCTIVE CHARACTERISATION OF RECLAIMED TIMBER USING ULTRASONIC TOMOGRAPHY



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THE BARRIER TO REUSE:

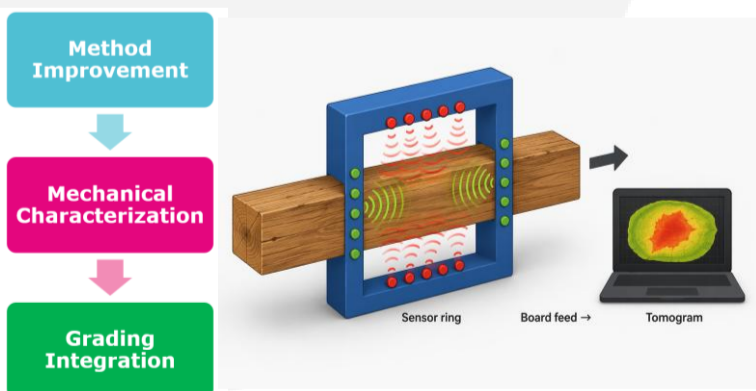
Circular and environmentally responsible construction requires the wise and regulated reuse of structural timber. Yet timber's inherent heterogeneity and internal defects (cracks, degradation, and structural damage invisible from the outside) remain critical barriers to confident regrading. **Non-destructive testing methods are essential to assess true technical integrity and unlock the structural potential of reclaimed timber.**

COMPARING NDT APPROACHES FOR STRUCTURAL TIMBER

NDT	Internal Defect Detection	Time	Cost	Portability
Visual grading	X	X	✓	✓
Acoustics/Stress wave	X	✓	✓	✓
CT Scanning	✓✓	✓	X	X
US Tomography	✓*	✓	✓	✓

*Confirmed for major defects. Resolution and sensitivity under ongoing investigation.

NEXT STEPS

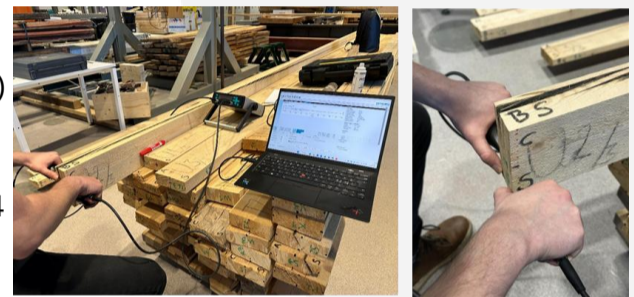


Next steps focus on improving resolution, correlating velocity data with mechanical strength, and integrating with grading standards, turning this research tool into a deployable assessment workflow for reclaimed timber.

METHODOLOGY & RESULTS

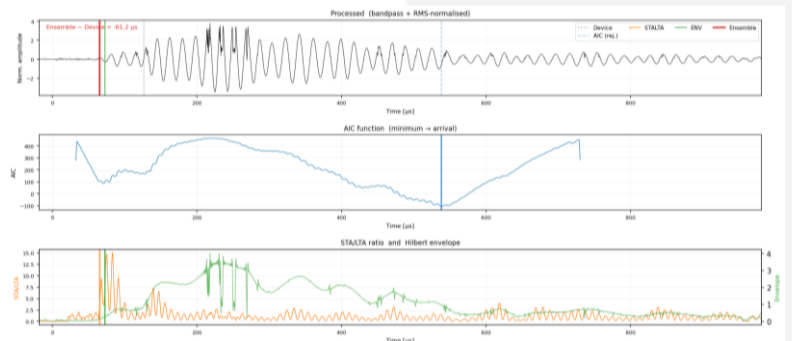
DATA COLLECTION

Cross-section measurements along the board (5 cm × 13 cm)
Proceq Pundit Lab+ 54 kHz transducers
T→B (6 vertical rays) + L→R (14 horizontal rays)
5 repetitions per ray



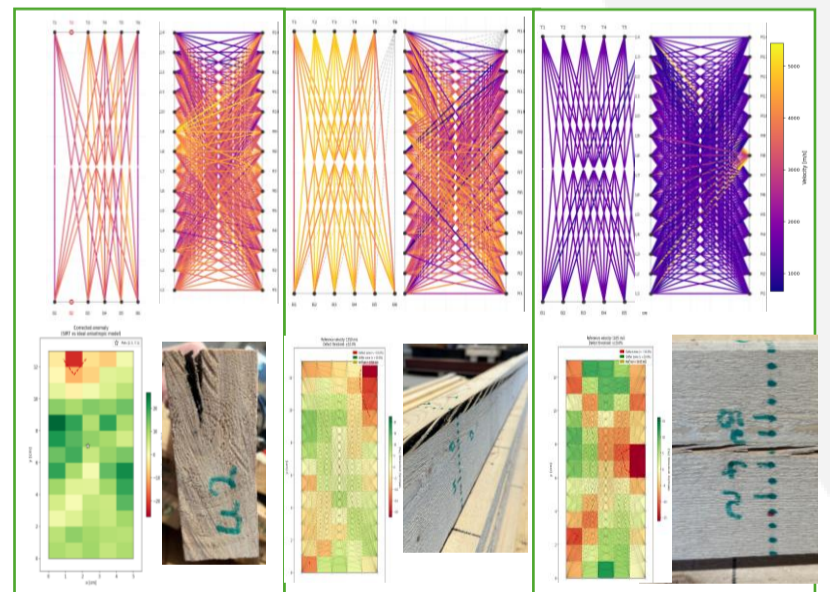
SIGNAL PROCESSING

Arrival time picking using ensemble of 3 algorithms (AIC · STA/LTA · Hilbert envelope)



RAY AVERAGING

Grouping repeated measurements · Outlier rejection (MAD) · Velocity computation · Coordinate assignment

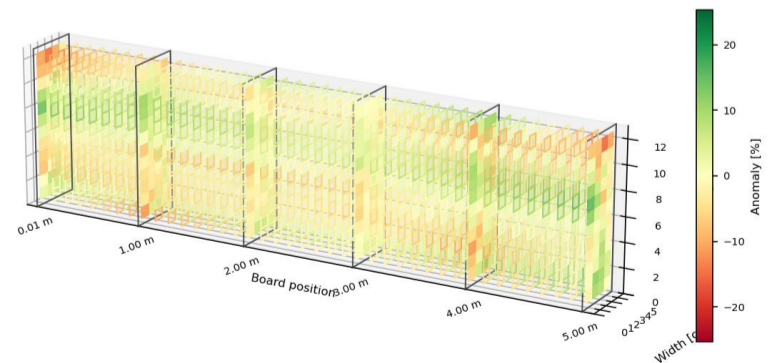


TOMOGRAPHIC RECONSTRUCTION

System matrix (straight-ray) · SIRT inversion · Anomaly map

3D VISUALIZATION

Stacking cross-sections along board length · Interpolation · Defect cloud Longitudinal profiles



INTERESTING LINKS

Website: www.rawproject.eu, www.puuster.com
Linkedin: www.linkedin.com/in/francisco-tienda/



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