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The EU FP7 project SilentWood aims at developing novel doors with a high content of wood or other bio-based fibres and with enhanced sound-proofing properties.

Wood-polymer composites, WPCs, are interesting as a part of the assembled door structure. Dynamic material properties are used in computer simulations of acoustic performance. Applied on WPC, the simulation model allows interpolations to any ratios of wood to matrix polymer.

Experimental material properties

Frequency-dependent (dynamic) data on loss factors etc. were measured by flexural vibration. Such data are scarce in the literature.

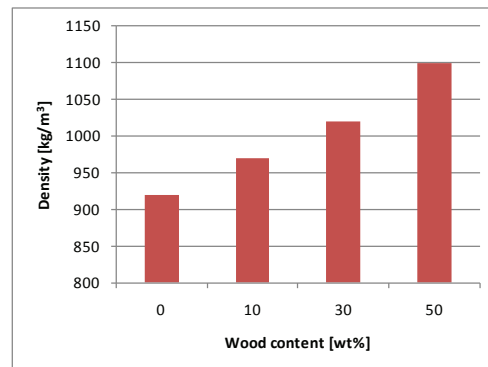
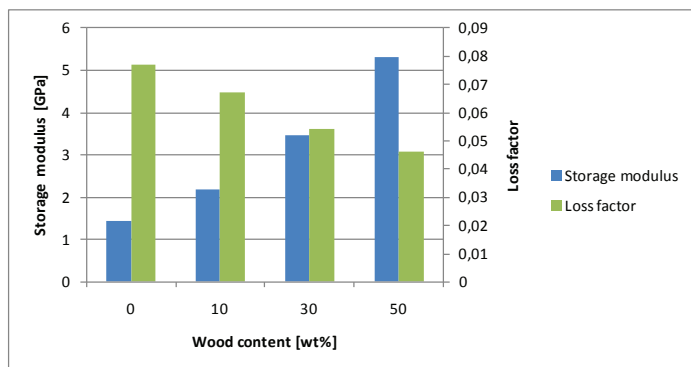


Figure 1. Experimental data for injection moulded polypropylene/wood composites. Left: Dynamic mechanical properties determined by flexural vibration - resonance curve method (EN ISO 6721-3). Right: Density.

Simulated material properties and panels acoustic performance

A two step simulation process is established. First, a FEM model has been developed for evaluating the material properties for different composite compositions. Second, a simulation tool has been implemented to evaluate the acoustic insulation of panels made of these composites. Both models were validated by experimental data. Predictions made by the simulations are used for the selection of matrix and fibre materials.

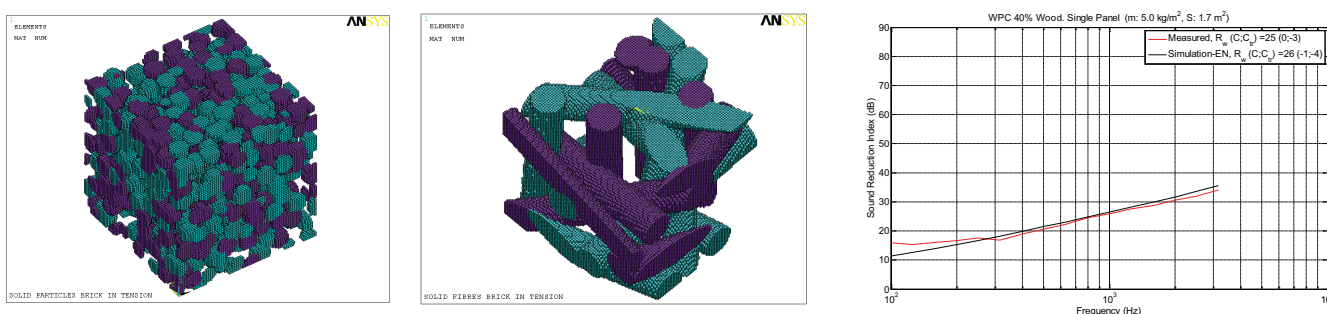


Figure 2. An example of the geometry and finite element mesh of composite made of two types of wood/fibre particles with low (left) and high (center) aspect ratios. Sound reduction, measured and computed, of a 5 mm thick single panel (right)

SilentWood - an EU FP7 project for SME Associations

The aim of SilentWood is to develop multilayered wood-based doors with enhanced acoustic insulating properties for dwellings, sanitation and educative centres. Silentwood is funded by the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 243639-2.

www.silentwood.eu