



SILENTWOOD Newsletter

SILENTWOOD
EU FP7 project for
SME Associations
(2010-2013)

**Multilayered
wood-based
doors with en-
hanced
acoustic
insulating
properties for
dwellings,
sanitation and
educative
centres**

Background, Purpose and Benefits

The SILENTWOOD project has started on the 1st May 2010. The project is structured into six work packages and the planned duration is 36 months. The EU FP7 project SILENTWOOD aims at developing novel doors with high content of wood or other bio-based fibres and with enhanced sound-proofing properties.

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 no 243639-2.

Wood-polymer composites, WPCs, are interesting as a part of the assembled door structure. Dynamic material properties are used in com-

puter simulation of acoustic performance. Applied on WPC, the simulation model allows interpolation to any ratios of wood to matrix polymer.

Depending on the door application, end users and customer require different levels of comfort and privacy;

- Private dwellings on city areas
- Hotels, Offices
- Sanitary and educative centres

The purpose of SILENTWOOD is to allow the impacted sectors to comply with existing building regulations at European level and, at the same time, opening them the door to new market opportunities to help them face their current critical situation.

Project Co-funded by the European Commission

Call: FP7-SME-2008-2, Project No.: 243639

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Project Objectives

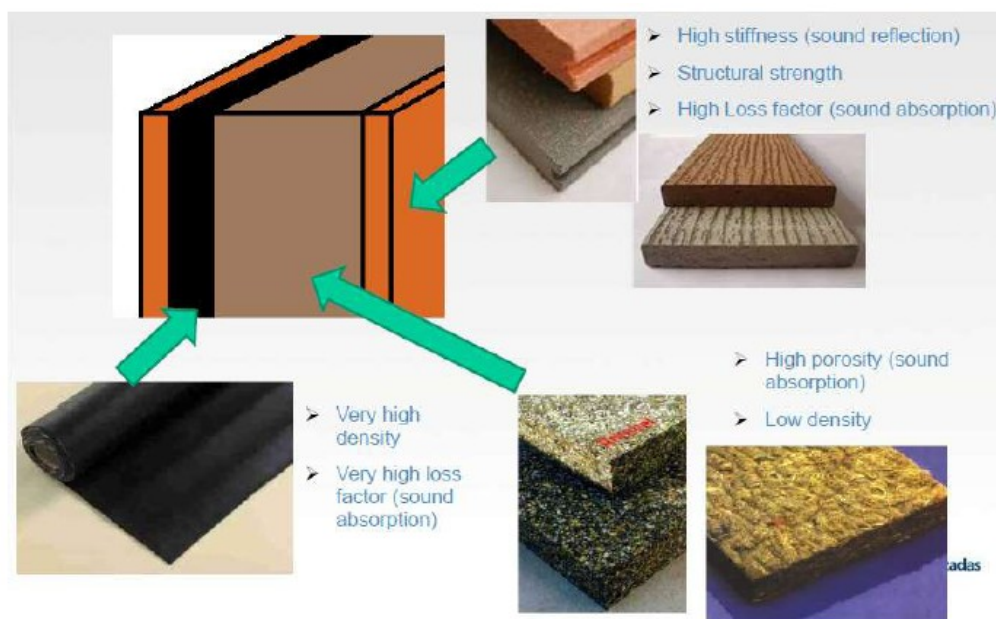
»European regulations and customers, demands from producers of doors and ceiling walls higher and higher acoustic insulation properties. Therefore technology and materials which will assure them to achieve this goal within reasonable costs will assure also higher competitiveness on the market.»

1. Develop the sound-insulating sandwich or multilayered structure, containing new noise reduction materials and designing an innovative attenuating internal geometry.
2. Design, test, validate and certify the door full system, firstly using computer models for optimization and rapid prototyping purpose and, secondly, carrying out standardized tests.

The 1st year of project has been focused on partially achieving the scientific objectives in relation to:

- Increase understanding of the laws affecting the detailed acoustic behavior of natural wood as well as the performance of complex multi-material and multilayered system in terms of composition and macroscopic and microscopic structure.

- Customizes Computer Aided Engineering (CEA) module to simulate noise transmission through multistructured panels. What is under simulation is the acoustic performance. Modeling variables are those related to noise absorption and reflection.
- The simulation module developed will aim to reduce the number of trials to be performed at laboratory level during Work Package 2 and Work Package 3 (WP) due to the previous simulation based on semi-empirical data.
- On work Package 2 the objective is to develop novel engineered wood materials to be used within the multilayered structure. The novel engineered wood will consist of wood-polymer composite with supreme strength properties in order to achieve in the WP3 a light and efficient acoustic panel.



Simulated material properties and panels acoustic performance

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

A two step simulation process is established. First, a FEM model has been developed for evaluating the material properties for differ-

ent 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.

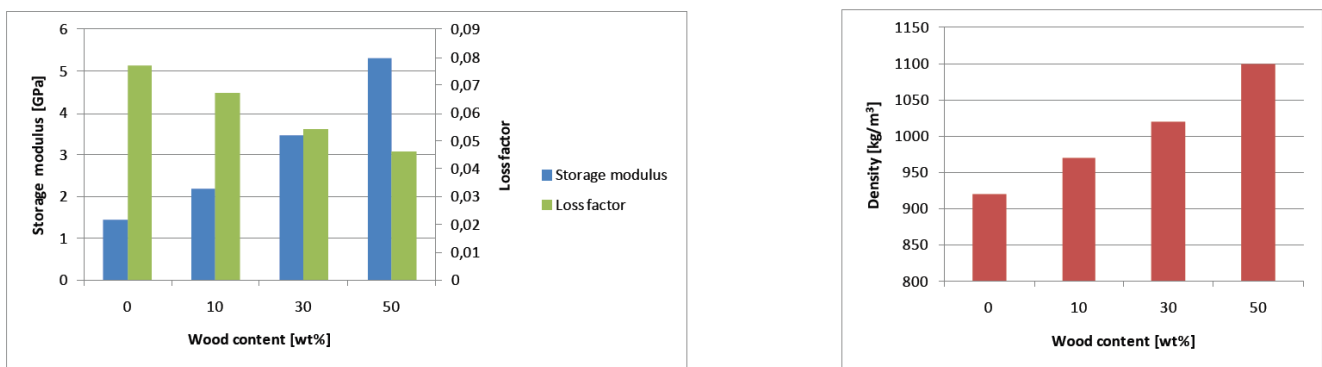


Figure 1. Experimental data for injection moulded polypropylene/wood composite. Left: dynamic mechanical properties determined by flexural vibration – resonance curve method (EN ISO 6721-3). Right: Density

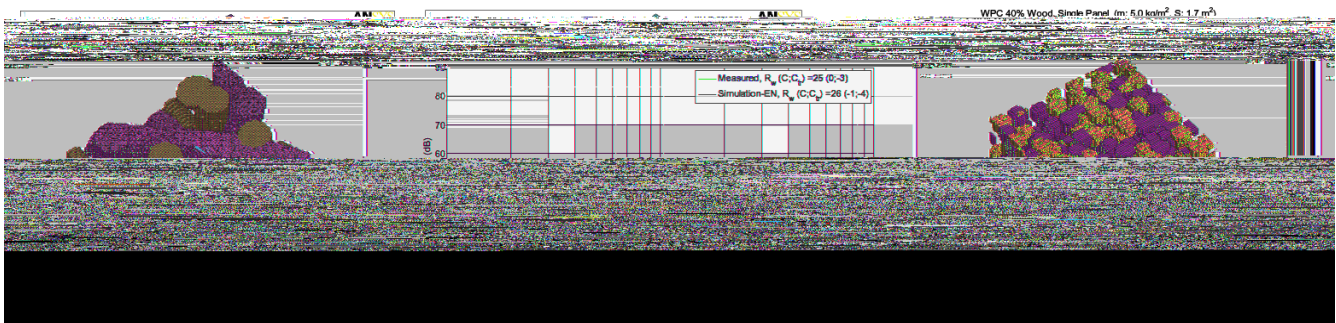


Figure 2. An example of the geometry and finite element of composite made of two types of wood/fibre particles with low (left) and high (center) aspect ratios. Sound reduction, measured and computed, of a 5 mm thick single panel (right)

Dissemination and Exploitation Activities

- Disseminate generated knowledge and extend industry awareness of the existence of the project
- Get market feeling and feedback about the technology on customers
- Increase awareness of the technology on customers
- Software for rapid prototyping
- Wood-plastic composite material manufacture
- Fiber-porous composite material manufacture
- Panel integration and distribution
- Door and wall panel manufacture



Consortium meetings

Twice a year are held a meeting of consortium members. During this meeting are presented the current activities of the members. Until April 2012 following meetings were held:

- Kick-off Meeting of the Consortium, 10th of June 2010, Madrid, Spain
- Second Meeting of the SilentWood Consortium, 26. and 27th of January 2011, Stockholm, Sweden
- Meeting on REA, 18th July 2011, Brussels, Belgium.
- Third Meeting of the SilentWood Consortium, 26th of January 2012, Ljubljana, Slovenia



Consortium members



Tecnolías Avanzadas Inspiralia, Spain
<http://www.itav.es/>



SP Sveriges Tekniska Forskningsinstitut AB, Sweden
<http://www.sp.se/>



Asociación Empresarial de Investigación Centro Tecnológico del mueble y la Madera de la region de Murcia, Spain
<http://www.cetem.es/>



Centro Tecnológico de la Madera de Castilla la Mancha, Spain
<http://www.portalmadera.net/>



Wood Based Panels Producers, Poland
<http://www.sppd.pl/>



Falegnameria Valsecchi S.A.S. di Valsecchi Roberto e C., Italy
<http://www.valsecchis.com/>



MELU, Mizarstvo d.o.o., Slovenia
<http://www.mizarstvo-selisnik.si/>

Lesarski grozd
Wood Industry Cluster

Wood Industry Cluster, Slovenia
<http://cluster.sloles.com/>



Artema Puertas SA, Spain
<http://www.artema.es/>

Contact:

TECNOLOGÍAS AVANZADAS INSPIRALIA (ITAV)

C/ Estrada, 10B, 5ª Planta
28034 Madrid - Spain

Contact: Mr Luis Segui
(Coordinator)

Phone: +00 34 91 417 04 57
Fax: +00 34 91 556 34 15
E-mail:
Luis.Segui@inspiralia.com

Visit our website:
<http://www.silentwood.eu/>