



WFDT · *Lab of Wood Technology*
Brief overview of research projects

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Research projects

■ Applications in field

- ❖ *Accoya wood: testing in ground contact*
- ❖ *Plato wood: application of “block-test”, cladding vs. UV*
- ❖ *Kebony: deck testing in the Greek climate*
- ❖ *Vapour sorption studies of **DMDHEU** treated wood*
- ❖ *Testing of new nanocompounds for wood protection*
 - Biological resistance (fungi + termites + mold)*
 - Resistance against UV radiation*

■ Development of new technologies

- ❖ *Oil heat treatment of beech, pine and Greek fir woods*
- ❖ *Melamine treatment of wood · “new modified wood”*
- ❖ *New **FR nanocompounds** for wood*

A1. Testing **Accoya**[®] wood in ground

Outdoor testing of **Accoya wood**
(Oregon pine), **soil-test**

- *Mass losses of wood*
- *Visual grading for fungi attack*
- *Estimation of MOR losses over a period of 3 years*



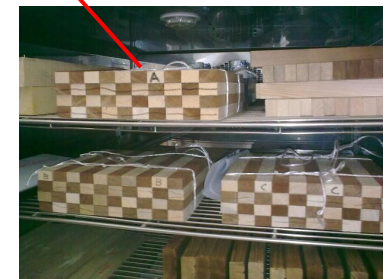
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A2. **Plato**[®] “block-test” & cladding test

“Block-test” of **Plato wood**
(spruce, fraké) & **cladding test**

- **Weathering test & UV resistance**
- **Assessment of fungi attacks**
- **Evaluation of MOE losses using a non-destructive Grindosonic[®]**



A3. **Kebony**[®] deck testing in Greece

Weathering test of **Kebony** decks (maple, radiata pine, yellow pine)

- Discolouration & black stains
- Cupping & warping
- Cracks & end-splitting

**Boat
decks**



Decking



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A4. Vapour sorption studies

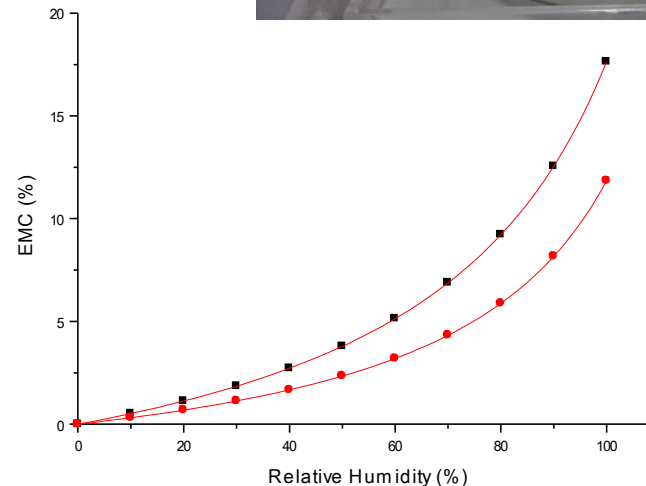
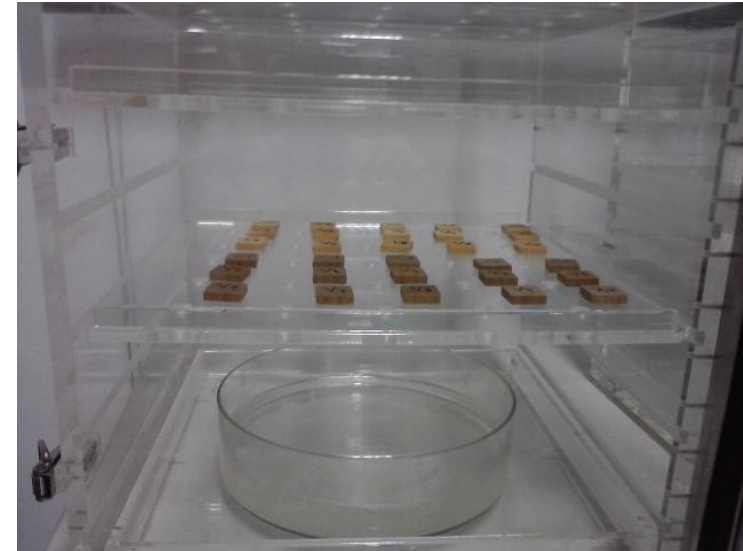
RH conditioning room

VAPOUR SORPTION STUDIES OF PINE WOOD (*PINUS SYLVESTRIS* L.) TREATED WITH DMDHEU

Abstract

In this study, the water vapour sorption of Scots pine (*Pinus sylvestris* L.) wood, treated with a dimethylol-dihydroxy-ethylene urea in an industrial process, is fully investigated. The sorption isotherms were analysed using the **Hailwood-Horrobin model**. This modified wood was shown lower total sorption by 34.7%, polymolecular sorption by 32.8% and monomolecular sorption by 41.3% at saturation, as compared with the untreated pine wood. Regression analysis of the equilibrium moisture content values at saturation, revealed that the variation shown in the water sorbed at the polymolecular level plays the main role in the variation in total water sorbed. In addition, it was found that only the reduction in monomolecular sorption can be primarily attributed to the decrease in site accessibility.

In: *Maderas. Ciencia y tecnologia* (2012)



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A5a. Testing of *new nanocompounds*

Testing of new nanocompounds for *biological resistance* of wood

- *Sol-Gel technique*

- * *Vacuum treatments*

- * *Treatment by immersion*



Termite tests (at RISH Kyoto University)

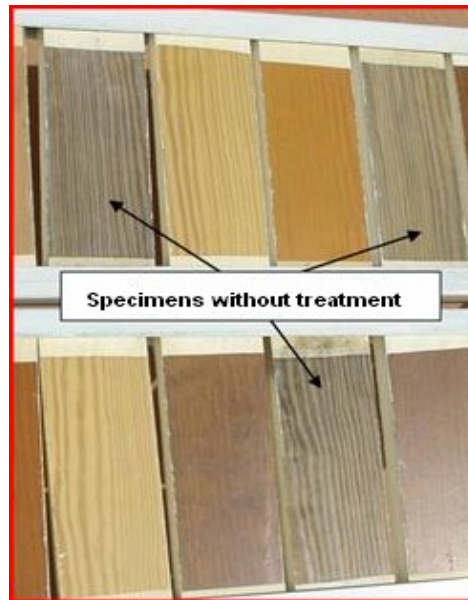


A5b. Testing of *new nanocompounds*

Testing of new nanocompounds for **UV resistance** of wood in Greece

- **Sol-Gel technique** •

brushing



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Outdoor testing area – WFDT Dept.

D1. Oil heat treatment of wood

Development -at lab scale-
of an **oil heat treatment** for
wood preservation

- green process
- utilise underestimated species
- use of a pilot plant at TEI/L
- utilise ecological oils



D2. *Melamine* treatment of wood

Development of a new approach
impregnation - modification

- *use of new resin system*
- *use of high pressures*
- *field testing of treated wood, i.e. block-test, fungi test etc.*



D3. New *FR* nanocompounds

Exploit the use of *nanotechnology* on wood · *fire tests*

- *use of special nanocompounds*
- *halogen-free system*



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Thanks for your attention

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