



# **REHABEND 2014**

## **Latin American Congress**

# **CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT**

**April 1-4, 2014**  
**Santander - Spain**

**Organized by:**



# ***REHABEND 2014***

***CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND  
HERITAGE MANAGEMENT***

*(Fifth REHABEND Congress)*

**Santander (Spain), April 1-4, 2014**

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## TOPICS

### **1.- PREVIOUS STUDIES**

- 1.1.- Multidisciplinary studies (historical, archaeological, etc.).
- 1.2.- Heritage and territory.
- 1.3.- Urban regeneration.
- 1.4.- Economical and financial policies.
- 1.5.- Social participation processes and socio-cultural aspects in rehabilitation projects.
- 1.6.- Construction pathology.
- 1.7.- Diagnostic techniques and structural assessment (no destructive testing, monitoring and numerical modeling).
- 1.8.- Guides and regulations.

### **2.- PROJECT**

- 2.1.- Theoretical criteria of the intervention project.
- 2.2.- Traditional materials and construction methods.
- 2.3.- Novelty products applicable and new technologies.
- 2.4.- Sustainable design and energy efficiency.

### **3.- BUILDING INTERVENTION**

- 3.1.- Intervention plans.
- 3.2.- Rehabilitation and durability.
- 3.3.- Reinforcement technologies.
- 3.4.- Restoration of artworks.
- 3.5.- Conservation of industrial heritage.
- 3.6.- Examples of intervention.

### **4.- MAINTENANCE**

- 4.1.- Construction maintenance.
- 4.2.- Preventive conservation of built heritage.

### **5.- DIFFUSION AND PROMOTION**

- 5.1.- Heritage and cultural tourism.
- 5.2.- Teaching and training.
- 5.3.- New technologies applied to the heritage diffusion.
- 5.4.- Accessibility to cultural heritage.
- 5.5.- Working networks in the cultural heritage.
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**CODE: 2.2.06****DIMENSIONAL STABILITY OF WOOD IN PRESENCE OF WATER****Ferreira, Débora<sup>1\*</sup>; Pinto, Cristina<sup>1</sup>; Borges, Paula<sup>1</sup>; Pinto, Tiago<sup>2</sup>; Fonseca, Elza<sup>1</sup>**

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**KEYWORDS:** wood, hygroscopic, dimensional changes.

**ABSTRACT**

Wood is our most important raw material. It is important not only because it is used for literally hundreds of products, but also because it is a renewable natural resource. Through a carefully and planned use, forests could provide a perpetual supply of wood. All wood in growing trees contains a considerable amount of water as part of the photosynthesis and the growing processes. This water is commonly called sap. The main goal of this work is to study the water movement in wood: first of all, the drying process, which occurs before the manufacture and use as finished wood products, and secondly the gain and loss of water in response to changes in environmental conditions that surround the wood. The moisture content relationship has an important influence on wood properties and performance.

Wood is dimensionally stable when moisture content is greater than the fibre saturation point (MCfs). Below MCfs wood dimensional changes and it gains moisture (swells) or loses moisture in the form of bound water. The level of MCfs depends on the relative humidity and temperature of the surrounding air. Shrinkage and swelling are the cause of many of the problems that occur in wood during drying and in use, therefore, an understanding of them will help minimize such problems. Splitting, warping, and open joints are examples of problems that occur due to uneven shrinkage.

An experimental program was defined with the aim to evaluate the dimensional stability of hardwood and softwood species. The Pine softwood and the Ash hardwood of the North-east region of Portugal will be analysed. A group of thirty specimens were made for each specimens of wood. The assumed geometry for the specimens is 40×40×10 mm, based on NP EN 614 recommendations. Before running the tests, one half of the specimens of each species were dried in an oven at 103°C ± 2°C, while the other one half was saturated in a water tank until a constant mass is attained. The tests were carried out in a climatic chamber with a constant internal environment of 20°C and 60% (RH), during a period time equal to 24 hours or more, until stabilization of dried and saturated specimens. Mass is considered constant when the difference between two consecutive weight measurements, delayed 2 hours, is less than 0.5%.

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