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REHABEND 2014

Latin American Congress

CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

April 1-4, 2014
Santander - Spain

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REHABEND 2014

CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

(Fifth REHABEND Congress)

Santander (Spain), April 1-4, 2014

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FIFTH LATIN AMERICAN CONGRESS ON CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

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ISBN: 978-84-606-6738-4 (book of abstracts)

ISSN: 2386-8198 (print)

Legal deposit: SA - 132 - 2014

Printed in Spain by Gráficas Iguña, S.A.

Photograph of cover belongs to the Santa María Cathedral Foundation - Quintas Fotógrafos -

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ABSTRACTS

2.- PROJECT

2.1.- Theoretical criteria of the intervention project.

2.2.- Traditional materials and construction methods.

CODE: 2.2.06

DIMENSIONAL STABILITY OF WOOD IN PRESENCE OF WATER

Ferreira, Débora[1]*; Pinto, Cristina[1]; Borges, Paula[1]; Pinto, Tiago[2]; Fonseca, Elza[1]

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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 103ºC ± 2ºC, 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 20ºC 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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