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REHABEND 2024

Euro-American Congress

CONSTRUCTION
PATHOLOGY,
REHABILITATION
TECHNOLOGY AND
HERITAGE MANAGEMENT

Gijón (Spain) - May 7th - 10th, 2024

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REHABEND 2024

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

(10th REHABEND Congress)

Gijón (Spain), May 7th-10th, 2024

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**10TH EURO-AMERICAN CONGRESS ON CONSTRUCTION PATHOLOGY,
REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT
REHABEND 2024**

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ISSN: 2386-8198 (printed)

ISBN: 978-84-09-58990-6 (Printed Book of Abstracts)

ISBN: 978-84-09-58989-0 (Digital Book of Articles)

Legal deposit: SA - 132 - 2014

Printed in Spain by Círculo Rojo

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The **Euro-American Congress REHABEND 2024 on Construction Pathology, Rehabilitation Technology and Heritage Management** was held in **Gijón (Spain)**, in **May 2024**. The event was co-chaired by the **University of Cantabria** and the **University of Oviedo**.

REHABEND 2024 **continued the series of the nine previous REHABEND international events**, which had been held **since 2006 in different Spanish cities**. The previous one, in **2022**, took place in **Granada, Spain**. In 2022 edition, approximately **280 papers** from around **30 countries** were presented, making it a conference of great interest to those who attended.

Construction Pathology, Rehabilitation Technology and Heritage Management currently hold significant importance in the construction sector. This prompted the organizers to propose a **technical event on these topics in Gijón**. The event aimed to collect the **advances obtained in the last two years** in the **theoretical knowledge** and **practical realizations** carried out on the referred topics. The Congress met around **275 technical contributions** coming from professionals, academics and specialists from more than **30 countries**.

Based on previous experiences, the Congress **was once again proposed within the Euro-American cultural space**. The **official languages** were **English, Italian, Portuguese and Spanish**. Organizers understand that technical articles and oral presentations, with the support of graphic material and schemes, would be understood by participants, as evidenced by previous editions of REHABEND.

Under these premises and the success of previous editions, the Congress was sponsored by the **Government of Spain, the Regional Government of Asturias, the Municipality of Gijón, Laboral Ciudad de la Cultura, Gijón Convention Bureau, Grupo Puma, Mapei, Sika, Tecnalía, the University of Cantabria and the University of Oviedo**. Additionally, several universities, technical and professional associations, institutes, foundations and companies pledged their collaboration to ensure the success of this initiative.

The organizers of REHABEND 2024 extend their gratitude to the **sponsors and collaborating entities**; the **Scientific Committee members** for their diligent review of technical contributions to ensure the required level of quality for an international event, to the **keynote speakers**, to the different **speakers** for their valuable contributions, and **all attendees** for their confidence in the event. Sincerely, many thanks to all.



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<p style="text-align: center;">1.- PREVIOUS STUDIES</p>	<p>1.1.- Multidisciplinary studies (historical, archaeological, etc.).</p> <p>1.2.- Heritage and territory.</p> <p>1.3.- Urban regeneration.</p> <p>1.4.- Economical and financial policies.</p> <p>1.5.- Social participation processes and socio-cultural aspects in rehabilitation projects.</p> <p>1.6.- Construction pathology.</p> <p>1.7.- Diagnostic techniques and structural assessment.</p> <p>1.8.- Vulnerability studies and risk management.</p> <p>1.9.- Guides and regulations.</p>
<p style="text-align: center;">2.- PROJECT</p>	<p>2.1.- Theoretical criteria of the intervention project.</p> <p>2.2.- Traditional materials and construction methods.</p> <p>2.3.- Novelty products applicable and new technologies.</p> <p>2.4.- Sustainable design and energy efficiency.</p>
<p style="text-align: center;">3.- BUILDING INTERVENTION</p>	<p>3.1.- Intervention plans.</p> <p>3.2.- Rehabilitation and durability.</p> <p>3.3.- Reinforcement technologies.</p> <p>3.4.- Restoration of artworks.</p> <p>3.5.- Conservation of industrial heritage.</p> <p>3.6.- Examples of intervention.</p>
<p style="text-align: center;">4.- MAINTENANCE</p>	<p>4.1.- Construction maintenance and infrastructures.</p> <p>4.2.- Preventive conservation of built heritage.</p>
<p style="text-align: center;">5.- DIFFUSION AND PROMOTION</p>	<p>5.1.- Heritage and cultural tourism.</p> <p>5.2.- Teaching and training.</p> <p>5.3.- New technologies applied to the heritage diffusion.</p> <p>5.4.- Accessibility to cultural heritage.</p> <p>5.5.- Built heritage management.</p>

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CODE 348**AN EXPERIMENTAL ANALYSIS ON THE THERMAL PERFORMANCE OF
RAMMED EARTH WALLS****Luso, Eduarda¹; Cabello, Isabelle¹; Silva, Rui²; Briga-Sá, Ana^{3*}**

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Alto Douro, Vila Real, Portugal.e-mail: anas@utad.pt**KEYWORDS:** Sustainability; Earth construction; Rammed earth; Thermal performance.**ABSTRACT**

Earth has been used as a building material since the beginning of civilizations and its utilization was widespread to most regions of the world, promoted by the high availability, easy access, and low cost of the material. As result of the generalised use of raw earth as building material, many earthen building techniques were developed through time, where adobe masonry, rammed earth and wattle-and-daub are among the most important. Currently, it is estimated that one quarter of the world's population lives in buildings made of earth. However, during the last century, earthen materials fell into disuse in several developed countries with the popularization of concrete, steel and fire bricks. Nevertheless, earthen architecture has been receiving increasing attention in the last few decades, driven by its green building potential and by other features of earthen materials, which includes, among others, unique aesthetics and hygrothermal regulation capacity.

Several studies have been developed to characterize earthen solutions concerning physical and mechanical properties. However, regarding the thermal behaviour, it is known that the thermal conductivity of rammed earth is a parameter that depends on the characteristics of the soil (particle size distribution, mineralogy, etc.) and moisture content. Thus, given the soils variability, it becomes clear that further investigation should be addressed to characterize the thermal performance of rammed earth solutions, contributing to define more accurate thermal conductivity values for the design of rammed earth buildings. On this regard, this paper presents an experimental study that aims to characterize the thermal behaviour of rammed earth built with different soils and with different thicknesses. A continuous measurement allowed to obtain heat fluxes, inner surface temperatures and the thermal transmission coefficient of the tested rammed earth walls solutions. Values of 0.72 W/m°C and 1.17 W/m°C were obtained for the thermal conductivity, showing the thermal behaviour variability depending on the soil composition. It was also confirmed that thickness significantly influences the earthen solution thermal behaviour, being verified that the thermal transmission coefficient of a 50 cm thick wall is about 30% lower than the one verified for the wall with 35 cm, built with the same soil.