University of Cantabria / University of Granada

Organizers:

REHABEND 2022

Euro-American Congress

CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

Granada (Spain) - September 13th-16th, 2022

Sponsor entities:

REHABEND 2022

CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

(9th REHABEND Congress)

Granada (Spain), September 13th-16th, 2022

PERMANENT SECRETARIAT:

UNIVERSITY OF CANTABRIA
Civil Engineering School
Department of Structural Engineering and Mechanics
Building Technology R&D Group (GTED-UC)
Avenue Los Castros 34, 39005 SANTANDER (SPAIN)
Tel: +34 942 201 761 (43) Fax: +34 942 201 747
E-mail: rehabend@unican.es
www.rehabend.unican.es

9TH EURO-AMERICAN CONGRESS ON CONSTRUCTION PATHOLOGY, REHABILITATION TECHNOLOGY AND HERITAGE MANAGEMENT

REHABEND 2022

ORGANIZED BY:

UNIVERSITY OF CANTABRIA (SPAIN)
www.unican.es // www.gted.unican.es

UNIVERSITY OF GRANADA (SPAIN)
www.ugr.es

CO-ORGANIZERS ENTITIES:

CHILE-UNIVERSIDAD AUSTRAL DE CHILE

ITALY-POLITÉCNICO DI BARI

MEXICO-UNIV. MICHOACANA DE SAN NICOLÁS DE HIDALGO

PERU-UNIVIVERSIDAD NACIONAL PEDRO RUIZ GALLO

PORTUGAL-UNIVERSIDADE DE AVEIRO

PORTUGAL-INSTITUTO SUPERIOR TÉCNICO | UNIV. DE LISBOA

SPAIN-TECNALIA RESEARCH & INNOVATION

SPAIN-UNIVERSIDAD DEL PAÍS VASCO

SPAIN-UNIVERSIDAD POLITÉCNICA DE CATALUÑA

SPAIN-UNIVERSIDAD DE BURGOS

SPAIN-UNIVERSIDAD POLITÉCNICA DE MADRID

SPAIN-UNIVERSIDAD DE SEVILLA

SPAIN-UNIVERSIDAD EUROPEA MIGUEL DE CERVANTES

UNITED STATES OF AMERICA-UNIVERSITY OF MIAMI

URUGUAY-UNIVERSIDAD DE LA REPÚBLICA

CONGRESS CHAIRMEN:
IGNACIO LOMBILLO
MARIA PAZ SÁEZ

CONGRESS COORDINATORS:
HAYDEE BLANCO
YOSBEL BOFFILL

EDITORS:
HAYDEE BLANCO
YOSBEL BOFFILL
IGNACIO LOMBILLO

GUEST EDITOR:
MARIA PAZ SÁEZ

INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE:
HUMBERTO VARUM – UNIVERSITY OF PORTO (PORTUGAL)
PERE ROCA – TECHNICAL UNIVERSITY OF CATALONIA (SPAIN)
ANTONIO NANNI – UNIVERSITY OF MIAMI (USA)

ISSN: 2386-8198 (printed)

ISBN: 978-84-09-42252-4 (Printed Book of Abstracts)
ISBN: 978-84-09-42253-1 (Digital Book of Articles)

Legal deposit: SA - 132 - 2014

Printed in Spain by Círculo Rojo

Introduction…… 3

Previous Congresses…… 4

Sponsor & Collaborating Entities…… 5

International Scientific Committee…… 9

Topics..... 15

Abstracts of the Congress…… 17

Keynote Lectures..... 37

1.- Previous Studies..... 45

1.1.- Multidisciplinary studies (historical, archaeological, etc.)..... 47

1.2.- Heritage and territory..... 68

1.3.- Urban regeneration..... 83

1.5.- Social participation processes and socio-cultural aspects in rehabilitation projects 93

1.6.- Construction pathology..... 96

1.7.- Diagnostic techniques and structural assessment..... 122

1.8.- Vulnerability studies and risk management..... 157

1.9.- Guides and regulations..... 172

2.- Project..... 177

2.1.- Theoretical criteria of the intervention project..... 179

2.2.- Traditional materials and construction methods..... 184

2.3.- Novelty products applicable and new technologies..... 200

2.4.- Sustainable design and energy efficiency..... 218

3.- Building Intervention..... 243

3.1.- Intervention plans..... 245

3.2.- Rehabilitation and durability..... 248

3.3.- Reinforcement technologies..... 260

3.4.- Restoration of artworks..... 270

3.5.- Conservation of industrial heritage..... 272

3.6.- Examples of intervention..... 275

4.- Maintenance..... 289

4.1.- Construction maintenance and infrastructures 291

4.2.- Preventive conservation of built heritage..... 300

5.- Diffusion and Promotion..... 311

5.1.- Heritage and cultural tourism..... 313

5.2.- Teaching and training..... 318

5.3.- New technologies applied to the heritage diffusion..... 319

5.4.- Accessibility to cultural heritage..... 328

5.5.- Built heritage management 329

118 REHABILITATION OF THE TXATXARRAMENDI BRIDGE IN BUSTURIA-SUKARRIETA (BIZKAIA)
Pérez Salazar, Laura; Barroso Prados, Fran; Piñero Santiago, Ignacio; Orbe Mateo, Aimar; Ezquerro Andreu, Mikel ……..... 281
175 MEMORIES OF IMMIGRATION - THE RESTORATION OF THE HOTEL LANFREDI
Betemps Vaz Da Silva, Juliana; Rauber Motter, Cristiane; Werner, Priscila; Lorscheiter, Aline; Matozo da Silva, Luana; Herpich, Bruna ……..... 282
178 THE RESTORATION OF SANTA CRUZ CHURCH IN ECIJA (SEVILLE): THE BUILDING AS PLOT
Rincón-Calderón, José María; de Sola-Caraballo, Javier; Galán-Marín, Carmen; Rivera-Gómez, Carlos ……..... 283
223 ANALYSIS OF LEAN CONSTRUCTION INFLUENCE IN BUILDING PROCESSES USING BIM 4D: CASE STUDY
Ferrer, Pedro A. M.; Ribeiro, Rodrigo S.; Oliveira, Rui A. F. ……..... 284
225 PLANNING AND MANAGEMENT OF AGRICULTURE WAREHOUSE CONVERSION PROJECT: A CASE STUDY
Oliveira, Rui A. F.; Abreu, Maria Isabel; Lopes, Jorge ……..... 285
228 THE ROOF OF THE SANTA LUCIA CHURCH - FERREÑAFE: INTERVENTIONS FOR THE MAINTENANCE OF THEIR STRUCTURAL AND FUNCTIONAL INTEGRITY
Chirinos, Haydeé; Zárate, Eduardo; Beltrán, Freddy ……..... 286
229 INCORPORATION OF HIGH ENERGY PERFORMANCE AND SUSTAINABILITY CRITERIA IN THE ARCHITECTONIC AND STRUCTURAL RETROFIT OF INDUSTRIAL HERITAGE BUILDINGS: THE CASE OF THE NEW COURTS IN SERENA, CHILE
Videla, José Tomás; Huenchuñir, Marcelo; Bustamante, Fermín; Martínez, Patricia ……..... 287
259 THE GOTHIC OF THE TWENTIETH CENTURY IN COLOMBIA. RESTORATION PROJECT OF THE CHURCH OF THE INMACULADA CONCEPCIÓN IN CARAMANTA, ANTIOQUIA
Carvajal Jaramillo, Henry H.; Ochoa Botero, Juan C. ……..... 288

CODE 225

PLANNING AND MANAGEMENT OF AGRICULTURE WAREHOUSE CONVERSION PROJECT: A CASE STUDY

Oliveira, Rui A. F.[1]; Abreu, Maria Isabel[2]; Lopes, Jorge[3]

Departamento Construções Civis e Planeamento
Instituto Politécnico de Bragança
1: e-mail: roliveira@ipb.pt
2: e-mail: isabreu@ipb.pt
3: e-mail: lopes@ipb.pt

KEYWORDS: Conversion project; Management; Planning; Time; Work; Project.

ABSTRACT

Planning and scheduling are crucial activities for the successful development of a construction project. Occurrence of unexpected events, which are prevalent in the construction industry activities, can have a negative impact on the development of a project even with the use of up-to-date risk management techniques.
This paper deals with the investigation of planning activities in the design phase of a building project, by analysing the project's bills of quantities, unit rates drawn from construction cost data, project duration, and construction works tasks pertaining to the conversion of an agriculture warehouse to a chapel dedicated to the Santíssima Trindade.
Two different approaches for the project duration determination were considered: i) data obtained from interviews conducted on five representatives of building contractors; ii) the duration of the project and respective construction tasks were calculated based on unit rates analyses obtained from construction cost data. These different approaches for the definition of the project duration made it possible a better determination of the time limit for the completion of the building works.
The project had some technical complexity, especially in project design specialties coordination and technical areas, such as subcontracted works and their articulation with sculpture works' activities. The weighted solution applied in the project design phase was deemed correct, well managed, and the evidenced risks were controlled. The elimination of design failures, timely management of contingencies, constraints reduction, project duration, and time limit under control had a positive contribution to the completion of the execution phase of the project in 57 working days. This study also compares the planning schedules for the different scenarios analysed with the real-time data pertaining to the conversion construction works.