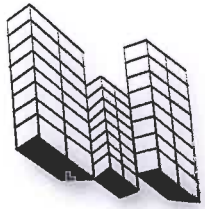

ICOSADOS 2016

7th INTERNATIONAL CONFERENCE ON SAFETY AND DURABILITY OF STRUCTUR

10th - 12th May 2016

Universidade de Trás-os-Montes e Alto Dou
Vila Real | Portug

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PREFACE

This book contains the abstracts of the papers presented in the 7th International Conference on Safety and Durability of Structures (ICOSADOS 2016), held in the University of Trás-os-Montes e Alto Douro (UTAD), city of Vila Real, Portugal, from 10th to 12th of May 2016.

A contribution in the internationalisation goal of ICOSADOS was achieved with this event taking into account that authors or members of the Scientific Committee of eight countries collaborated. These countries are Poland, Latvia, Portugal, UK, Italy, Mexico, France and Brazil.

There was also a significant participation of the industry which sponsored the conference and gave an important contribution for its success. The Civil Engineering students of UTAD also gave a relevant help in the organization of this conference.

In this conference there were four lectures presented by keynote speakers who are international references in the topics of safety and durability of structures. These keynote speakers are Professors Pawel Sniady (Wrocław University of Environmental and Life Sciences, Poland), Ulvis Skadins (Latvia University of Agriculture, Latvia), Jitendra Agarwal (University of Bristol, United Kingdom) and António Arêde (Engineering Faculty of University of Porto, Portugal).

The conference scope includes a wide range of safety and durability of structures topics such as:
S1 - Degradation: diagnostics and evaluation methods
S2 - Structural, physical and material characterisation
S3 - Numerical modelling
S4 - Natural and man-made risks
S5 - Requirements and code provisions
S6 - Assessment, conservation, repair and strengthening
S7 - Case studies

The Editors are grateful to all authors, members of the scientific committee and other colleagues that make possible the publication of this book.

The Editors
Vila Real
2016

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S1 - DEGRADATION: DIAGNOSTICS AND EVALUATION METHODS

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TEST RESULTS AND THEORETICAL STUDY OF MOMENT RESISTING CONNECTIONS

Edgars Zeltiņš[1], Jānis Kreilis[2]

Latvia University of Agriculture, Akademijas 19, Jelgava, Latvia

[1]Edgars.Zeltins@inbox.lv, [2]Janis.Kreilis@llu.lv

Keywords: steel connections, theoretical modelling, test results

ABSTRACT

Modelling of joint resistance and stiffness in steel connections has been discussed in the Eurocode EN 1993-1-8. Design of moment resisting connection is a multiparameter task, where influence of basic joint components have been taken into account. Normaly designers rely on the results, using software programmes. Alongside the equivalent T-stub method (hand calculation method), the resistance can be determined by adequate FEM software.
In this paper test results, using different steel joint models are discussed. Loading of models and a test control was carried out by universal testing machine. Test results were compared with those, produced by FEM software programme and analysis of results are presented.

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THERMAL MODEL FOR CHARRING RATE CALCULATION IN WOODEN CELLULAR SLABS UNDER FIRE

Djaafer Haddad[1, a], Elza M. M. Fonseca[2, b] and Belkacem Lamri[3, c]

[1]Master Student in IPB, UHBC – Chlef, Algeria

[2]Professor, Laeta, Inegi, Polytechnic Institute of Bragança, Portugal

[3]Professor, UHBC – Chlef, Algeria

[a] hadkar@live.fr, [b] efonseca@ipb.pt, [c] lamri_belkacem@yahoo.com

Keywords: Wood, fire, charring rate, insulation.

ABSTRACT

Wood is a natural and traditional building material, as popular today as ever, and presents advantages. Physically, wood is strong and stiff, but compared with other materials like steel is light and flexible. Wood material can absorb sound very effectively and it is a relatively good heat insulator. But dry wood does burn quite easily and produces a great deal of heat energy. The main disadvantage is the high level of combustion when exposed to fire, where the point at which it catches fire is from 200–400°C. After fire exposure, is need to determine if the charred wooden structures are safe for future use. Design methods require the use of computer modelling to predict the fire exposure and the capacity of structures to resist those action. Also, large or small scale experimental tests are necessary to calibrate and verify the numerical models. The thermal model is essential for wood structures exposed to fire, because predicts the charring rate as a function of fire exposure. The charring rate calculation of most structural wood elements allows simple calculations, but is more complicated for situations where the fire exposure is non-standard and in wood elements protected with other materials.
In this work, the authors present different case studies using numerical models, that will help professionals analysing charred woods and the type of information needed to decide whether the charred structures are adequate or not to use. Different thermal models representing wooden cellular slabs, used in building construction for ceiling or flooring compartments, will be analysed and submitted to different fire scenarios (with the standard and non-standard fire curve exposure). The same numerical models, considering insulation material inside the wooden cellular slabs, will be tested to compare and determine the fire time resistance and the charring rate calculation.