ICOSADOS 2016

7th INTERNATIONAL CONFERENCE ON SAFETY AND DURABILITY OF STRUCTURES

10th - 12th May 2016

Universidade de Trás-os-Montes e Alto Douro
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7th International Conference on Safety and Durability of Structures

ICOSADOS 2016

May 10 - 12, 2016, UTAD, Portugal

Book of Abstracts

Editors:

Jorge Tiago Pinto
Andrzej Pawłowski
Anabela Paiva
Ulvis Skadin

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PREFACE

This book contains the abstracts of the papers presented in the 7th lnternational 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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CFRP FIRE BEHAVIOUR – PASSIVE FIRE PROTECTION MATERIALS

Débora Ferreira[1,2 a], Luís Duarte[1, b], Luís Mesquita[1, c], and Paulo Piloto[1, d]

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Keywords: CFRP, Passive fire protection, Fire resistance, Cone calorimeter

ABSTRACT

The technique of reinforcing concrete structures by means of bonding composite fibre reinforced polymers (FRP) has been applied in the construction industry. There are several examples of application of these materials in bridges and in buildings, both in new construction and rehabilitation and/or strengthening of damaged structures. With the increasing use of FRP new problems and challenges are inevitably found. Among these subjects, there are legitimate concerns about the behaviour of FRP materials when exposed to fire action.

It is the aim of this work to analyse the behaviour of composite materials exposed to fire, in particular composite materials based on carbon fibres (CFRP). Therefore a set of tests on 100 × 100 × 40 mm concrete specimens with CFRP are to be analysed using the test method recommended by EN ISO 13927. The CFRP sheet is glued on the top surface of the specimens using epoxy resin and exposed to thermal action.

The surface of the reinforcement system is exposed to the action of different radiative heat fluxes, from 35 kW/m2 to 75 kW/m2, from a cone calorimeter and changes in temperature are determined by thermocouples placed between the surfaces of both materials, and the material heat release rate by the use of a thermopile.

The influence of passive fire protection systems on the CFRP fire reaction is analysed considering different fire protection materials (gypsum boards, ceramic fibre sheets and intumescing paints). The temperature variation during the period of thermal exposure is measured across the surface of the different material layers, allowing to assess the influence of these fire protection materials to the CFRP structural reinforcement capabilities at elevated temperatures.

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