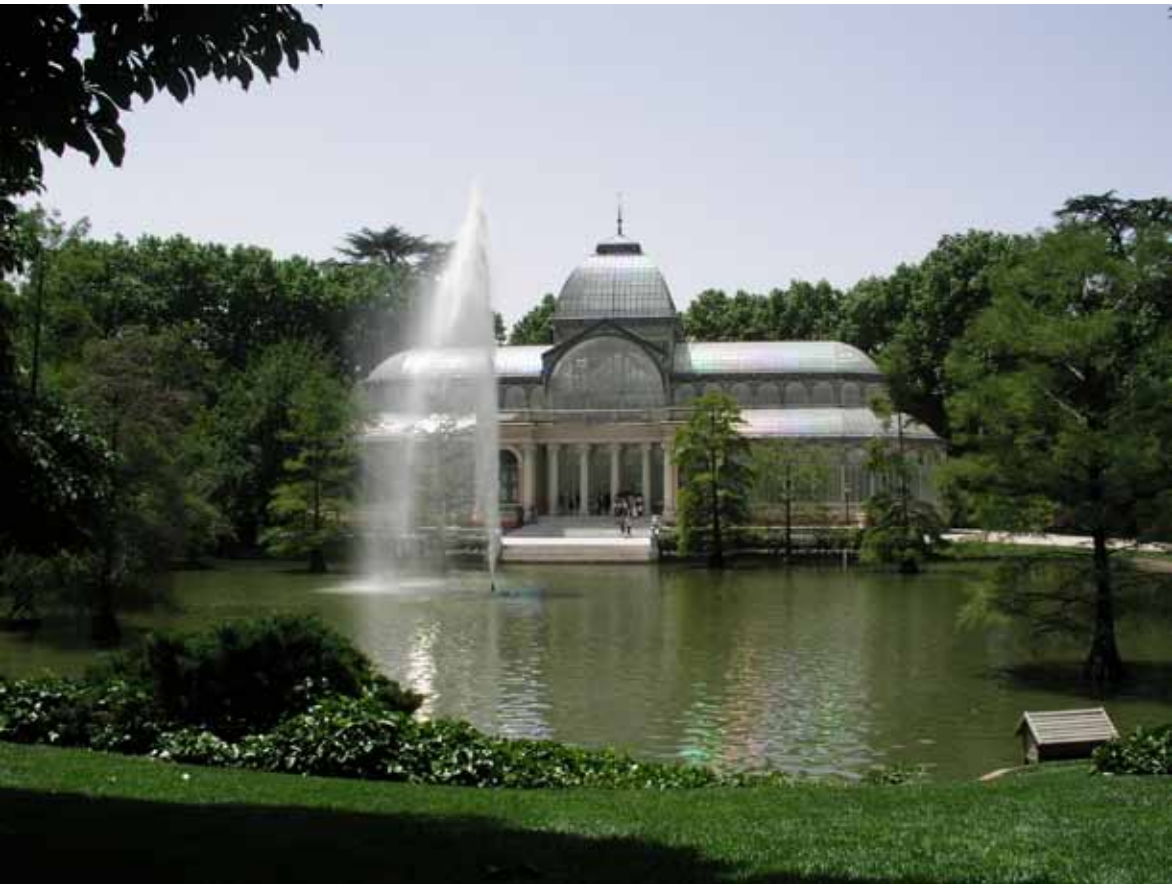
ICCS madrid 16

Second International Conference on Concrete Sustainability

13-15 June 2016



Book of Abstracts

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ICCS16

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ICCS16 – Concrete Sustainability

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PREFACE

This volume collects the abstracts of all contributions to the Second International Conference on Concrete Sustainability (ICCS 16), held at *Escuela de Ingenieros de Caminos, Canales y Puertos of Universidad Politécnica de Madrid (Civil Engineering School of the Technical University of Madrid).* Madrid, Spain, 13-15 June 2016.

The conference program includes four plenary lectures and 168 contributions articulated in 34 sessions.

Abstracts are presented in the following order:

Plenary lectures (4):

Environmental impact, performance and service lifetime - pillars of sustainable concrete construction
Harald S. Müller
President of fib
Institute of Concrete Structures and Building Materials, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

Expanding knowledge and resources for modern concrete professionals: innovation, sustainability, and resilience
Mike Schneider
President (2016-2017), American Concrete Institute
Senior Vice President, Baker Concrete Construction, Monroe, OH, USA

Recycling of construction and demolition waste an overview of RILEM achievements and state of the art in the EU
Johan Vyncke
President of RILEM
Director Research & Innovation Belgian Building Research Institute – BBRI, Brussels, Belgium

Sustainability evaluation of the concrete structures
Antonio Aguado[1], Jaime C. Gálvez[2] , David, Fernández-Ordóñez[3], Albert de la Fuente[1]
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Parallel sessions:

- Case Studies (2)
- Construction aspects (4)
- Durability (11)
- Environmental design (6)
- Materials (11)

Full papers are enclosed in the E-book available at the Conference website: www.iccs16.org

ICCS16 is the second international conference on this topic, which is organised by the Technical University of Madrid and co-organised by the Spanish Association for Structural Concrete (ACHE), the American Concrete Institute (ACI), the Latin American Association for Pathology of Constructions (ALCONPAT), the International Federation for Structural Concrete (fib), the Japan Concrete Institute (JCI), and the International Union of Laboratories and Experts in Construction Materials (RILEM).

Madrid, 20 May 2016

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Environmental design

Materials

Ladle furnace slags of low and high alumina in masonry mortars

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ABSTRACT

An important by-product from steelmaking industry is the ladle furnace (white or basic) slag, produced in the secondary or basic refining of steel. This manufacturing process yields two types of basic slag that are either low or high in alumina, depending on the saturation method.

Among other properties, in previous works, have been analyzed their instabilities, mineralogy, hydraulic reactivity and their application in construction sector by their addition in Portland cement matrixes (pastes and masonry mortars). Present research will be focused on the characterization of pastes and masonry mortars (non-structural) containing such by-product as a partial substitution of binders (cement) and fine aggregates.

This investigation will be emphasized on the reactivity of certain compounds at outdoor temperatures such as calcium aluminates, free calcium oxide and free magnesium oxide. In line with this experimental work, different techniques will be used: DRX, TGA, chemical analyses, volumetric stability and a series of controlled hydration reactions. Hence, this research work focuses on the study of such slag in itself and its performance in cement matrixes.

In order to do this, different properties will be studied: mechanical behaviour under compression and flexural loads and durability issues, under weathering ageing, mainly referred to efflorescence and wetting-drying ageing cycles.

Interesting results were achieved by the replacement of 10% and 20% in cement by weight. The white slags with a high content of alumina showed a better physical-chemical performance than mortar designs incorporating high content of silica slag.

Present research concludes that the ladle furnace basic slag can induce slight hydraulic reactivity and that a partial cement replacement, by it lower than 20% by weight, does not negatively affect the mechanical performance and durability in cement masonry mortars.

Keywords: Cement; Durability; Ladle Furnace Slag; Masonry Mortar; Pastes; Shrinkage;

REFERENCES

[1] J.M. Manso, A. Rodríguez, A. Aragón, J.J. González, "The durability of masonry mortars made with ladle furnace slag", Construction and Building Materials, vol. 25, pp. 3508–3519, (2011).

[2] J. Papayianni, E. Anastasiou, "Effect of granulometry on cementitious properties of ladle furnace slag", Cement and Concrete Composites vol. 34, pp. 400-407 (2012).

[3] T. Herrero, "Estudio del efecto de la hidratación de la escoria blanca de acería de HEA: aplicación en pastas y morteros de cemento". Ph.D. Thesis, University of the Basque Country (UPV/EHU), 2015.

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