

Accepted Manuscript

Influence of recycled aggregates and high contents of fly ash on concrete fresh properties

Rawaz Kurad, Jorge de Brito, José D. Silvestre



PII: S0958-9465(17)30245-7

DOI: [10.1016/j.cemconcomp.2017.09.009](https://doi.org/10.1016/j.cemconcomp.2017.09.009)

Reference: CECO 2907

To appear in: *Cement and Concrete Composites*

Received Date: 10 March 2017

Revised Date: 7 September 2017

Accepted Date: 15 September 2017

Please cite this article as: R. Kurad, J. de Brito, José.D. Silvestre, Influence of recycled aggregates and high contents of fly ash on concrete fresh properties, *Cement and Concrete Composites* (2017), doi: 10.1016/j.cemconcomp.2017.09.009.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Influence of recycled aggregates and high contents of fly ash on concrete fresh propertiesRawaz Kurad¹, Jorge de Brito², José D. Silvestre³

¹ PhD student in Civil Engineering, CERIS-ICIST, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1049-001 Lisbon, Portugal; e-mail: rawaz.saleem@gmail.com

² Full Professor, CERIS-ICIST, DECivil, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1049-001 Lisbon, Portugal; e-mail: jb@civil.ist.utl.pt, Corresponding author

³ Assistant Professor, CERIS-ICIST, DECivil, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1049-001 Lisbon, Portugal; e-mail: jose.silvestre@ist.utl.pt

Abstract:

This study presents the fresh properties of concrete with supplementary cementitious materials (SCM) and recycled concrete aggregates (RCA), with emphasis on the feasibility of using high volumes of fly ash (FA) in RCA concrete. For this purpose, two mix families (0% coarse RCA and 100% coarse RCA) were produced, both with and without superplasticizers (SP). The coarse natural aggregates (NA) were replaced with coarse RCA at 0% and 100%, respectively. For each of the mentioned families, three incorporation levels (0%, 50% and 100%) of fine RCA were used with 0%, 30% and 60% of FA, resulting in 28 compositions. Each mix was tested in the fresh state by means of slump, density and air content. The results of this study show that RCA decreased the slump of concrete mixes, but the required water content can be minimized by incorporation FA. Regardless of the water absorption of the aggregates, for a given fine RCA incorporation ratio and the same ratio of FA, no increase in water content is required to obtain the same target slump as in the reference concrete. On the other hand, for a given coarse RCA incorporation ratio, a five times lower FA ratio is enough to obtain the same target slump as in the reference concrete. Air voids in concrete mixes were more affected by the shape of the aggregates than by their water absorption. The air content of concrete mixes increased as the incorporation levels of FA and RCA increased. However, in comparison with the individual effects, the air content decreased by combining the incorporation of both FA and RCA. Moreover, the rate of reduction in fresh density by increasing the incorporation of RCA and FA was similar in concrete mixes with and without SP.

Keywords: Recycled aggregates, fly ash, concrete, fresh state, air content, fresh density.

Acronyms list: FA - fly ash; NA - natural aggregates; OPC - Ordinary Portland cement; RCA - recycled concrete aggregate; SCM - supplementary cementitious materials; SP - superplasticizers; w/b - water to binder (ratio); w/c - water to cement (ratio); SSD - saturated surface dry.

Download English Version:

<https://daneshyari.com/en/article/5436763>

Download Persian Version:

<https://daneshyari.com/article/5436763>

[Daneshyari.com](https://daneshyari.com)