



Journal of Sustainable Cement-Based Materials

ISSN: 2165-0373 (Print) 2165-0381 (Online) Journal homepage: http://www.tandfonline.com/loi/tscm20

Proportioning of self-compacting concrete mixes based on target plastic viscosity and compressive strength: Part II - experimental validation

M.S. Abo Dhaheer, M.M. Al-Rubaye, W.S. Alyhya, B.L. Karihaloo & S. Kulasegaram

To cite this article: M.S. Abo Dhaheer, M.M. Al-Rubaye, W.S. Alyhya, B.L. Karihaloo & S. Kulasegaram (2016) Proportioning of self-compacting concrete mixes based on target plastic viscosity and compressive strength: Part II - experimental validation, Journal of Sustainable Cement-Based Materials, 5:4, 217-232, DOI: <u>10.1080/21650373.2015.1036952</u>

To link to this article: <u>http://dx.doi.org/10.1080/21650373.2015.1036952</u>



Published online: 27 Apr 2015.

ſ	Ø,
-	_

Submit your article to this journal 🖸

Article views: 58



View related articles

View Crossmark data 🗹



Citing articles: 1 View citing articles

Full Terms & Conditions of access and use can be found at http://www.tandfonline.com/action/journalInformation?journalCode=tscm20



M.S. Abo Dhaheer¹, M.M. Al-Rubaye², W.S. Alyhya³, B.L. Karihaloo* and S. Kulasegaram

School of Engineering, Cardiff University, CF24 3AA Cardiff, UK (Received 2 December 2014; accepted 29 March 2015)

A companion paper by the authors described the mix design procedure and gave several examples on the use of the design charts. This paper is concerned with the experimental validation of the mix design procedure on a series of SCC mixes in both the fresh and hardened states. A series of SCC mixes that contained different volumetric ratios of paste to solid phases were prepared using the design charts. All these mixes were extensively tested in the fresh state using the slump cone, J-ring, L-box, and Vfunnel apparatus. These tests proved conclusively the validity of the mix proportioning method in the sense that all the mixes satisfied the self-compacting criteria and achieved the desired target plastic viscosity and compressive strength.

Keywords: self-compacting concrete; mix design procedure; experimental validation; plastic viscosity; cube compressive strength

1. Introduction

A companion paper by the authors [1] developed a mix design method for SCC based on the desired target plastic viscosity and compressive strength of the mix. Design charts were provided as a guide for mix proportioning. The target plastic viscosity of these mixes varied between 3 and 15 Pa s and the characteristic cube strength between 30 and 80 MPa at 28 days age. Several examples on the use of the design charts were given.

A rigorous method for proportioning normal and high strength SCC mixes based on their plastic viscosity has been proposed by Karihaloo and Ghanbari [2] and Deeb and Karihaloo [3]. It exploits the expression for the plastic viscosity of an SCC mix developed by Ghanbari and Karihaloo [4] using micromechanical principles.

Taylor & Francis

Taylor & Francis

While the method for proportioning SCC mixes proposed in [2,3] was rigorous and based on sound physical principles, it produced a bewildering array of mixes that reached the target plastic viscosity but did not give any practical guidelines on how to choose the most appropriate mix. Moreover, the method was developed on the basis of reference mixes of a range of known cube compressive strength, but the latter was not

^{*}Corresponding author. Email: KarihalooB@Cardiff.ac.uk

¹On leave from University of Al-Qadisiyah, Iraq.

²On leave from University of Babylon, Iraq.

³On leave from University of Karbala, Iraq.