

# Accepted Manuscript

Macroscopic and microstructural properties of engineered cementitious composites incorporating recycled concrete fines

Junxia Li, En-Hua Yang



PII: S0958-9465(16)30892-7

DOI: [10.1016/j.cemconcomp.2016.12.013](https://doi.org/10.1016/j.cemconcomp.2016.12.013)

Reference: CECO 2759

To appear in: *Cement and Concrete Composites*

Received Date: 1 October 2015

Revised Date: 25 July 2016

Accepted Date: 29 December 2016

Please cite this article as: J. Li, E.-H. Yang, Macroscopic and microstructural properties of engineered cementitious composites incorporating recycled concrete fines, *Cement and Concrete Composites* (2017), doi: 10.1016/j.cemconcomp.2016.12.013.

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.

1 **Macroscopic and Microstructural Properties of Engineered Cementitious Composites**  
2 **Incorporating Recycled Concrete Fines**

3 Junxia Li<sup>a,b</sup>, En-Hua Yang<sup>c,1</sup>

4 <sup>a</sup>Interdisciplinary Graduate School, Nanyang Technological University, 50 Nanyang Avenue,  
5 Singapore 639798

6 <sup>b</sup>Residues & Resource Reclamation Centre, Nanyang Environment and Water Research  
7 Institute, Nanyang Technological University, 1 Cleantech Loop, Singapore 637141

8 <sup>c</sup>School of Civil and Environmental Engineering, Nanyang Technological University, 50  
9 Nanyang Avenue, Singapore 639798

10

11 **ABSTRACT**

12 Recycled concrete fines (RCF) are fine aggregates and particles from the demolition waste of  
13 old concrete. Unlike recycled coarse aggregates, RCF is seldom used to replace sands in  
14 concrete due to its high surface area and attached old mortar on the surface of RCF. This  
15 study investigated potential use of RCF as microsilica sand substitute in the production of  
16 engineered cementitious composites (ECC), a unique high performance fiber-reinforced  
17 cementitious composites featuring extreme tensile strain capacity of several percent. The  
18 results showed that it is viable to use RCF as microsilica sand substitute in the production of  
19 ECC and the resulting RCF-ECCs possess decent compressive strength and strain capacity.  
20 Microstructure investigation on the component level revealed that RCF size and content  
21 modify matrix toughness and fiber/matrix interface properties. The influence of RCF size and  
22 content on ECC properties was clearly revealed and explained by the resulting fiber bridging  
23  $\sigma(\delta)$  curves of RCF-ECCs calculated from the micromechanical model. Micromechanics-

---

<sup>1</sup> Corresponding author. Tel.: +65 6790 5291; fax: +65 6791 0676. *E-mail address*: ehyang@ntu.edu.sg (E.H. Yang)

Download English Version:

<https://daneshyari.com/en/article/5436922>

Download Persian Version:

<https://daneshyari.com/article/5436922>

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