

Accepted Manuscript

Damage investigation of ultra high performance concrete under direct tensile test using acoustic emission techniques

Jun-Yan Wang, Jun-Yuan Guo



PII: S0958-9465(17)30720-5

DOI: [10.1016/j.cemconcomp.2018.01.007](https://doi.org/10.1016/j.cemconcomp.2018.01.007)

Reference: CECO 2976

To appear in: *Cement and Concrete Composites*

Received Date: 11 August 2017

Revised Date: 4 January 2018

Accepted Date: 8 January 2018

Please cite this article as: J.-Y. Wang, J.-Y. Guo, Damage investigation of ultra high performance concrete under direct tensile test using acoustic emission techniques, *Cement and Concrete Composites* (2018), doi: 10.1016/j.cemconcomp.2018.01.007.

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 **Damage investigation of ultra high performance concrete under direct**
2 **tensile test using acoustic emission techniques**

3 Jun-Yan Wang^{1*}, Jun-Yuan Guo¹

4 1. *Key Laboratory of Advanced Civil Engineering Materials, Tongji University, Ministry of*
5 *Education, Shanghai 201804, China*

6 **ABSTRACT**

7 In this study, acoustic emission (AE) analysis method was applied to monitor the damage
8 evolution process of ultra high performance concrete (UHPC) under direct tensile test. Three
9 types of UHPCs, including high strain-hardening UHPC, low strain-hardening UHPC and
10 strain-softening UHPC were investigated. Meanwhile, the crack width developments of
11 UHPCs during the tensile test were measured. Test results show that high strain-hardening
12 UHPC exhibited high ductility by forming multiple microcracks invisible to naked eyes
13 (typically below 0.05mm) in the strain-hardening stage. The crack width-strain curves
14 indicate that increasing the ultimate tensile strain of UHPC can improve its crack width
15 control ability effectively. The AE analysis method could effectively detect the internal
16 damages of the high strain-hardening UHPC at a strain of 600 $\mu\epsilon$. At that time, the crack
17 width was smaller than 0.01mm that could not be detected by crack width measuring
18 instrument in this study. For three types of UHPCs, damages were generated around the
19 localized crack during the strain-softening stage. In a word, the AE analysis method provides
20 strong evidence to the multiple cracking behavior of UHPC during the strain-hardening stage,
21 and provides a clear explanation to the identical damage evolution mechanism for three types
22 of UHPCs during the strain-softening stage.

* Corresponding author.

Email address: wangjunyan@tongji.edu.cn (J.Y. Wang)

Download English Version:

<https://daneshyari.com/en/article/7883796>

Download Persian Version:

<https://daneshyari.com/article/7883796>

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