

Accepted Manuscript

Time dependent behavior of FRP-strengthened RC beams subjected to preload:
Experimental study and finite element modeling

Shiyong Jiang, Weilai Yao, Jin Chen, Shuai Tao

PII: S0263-8223(17)33830-8
DOI: <https://doi.org/10.1016/j.compstruct.2018.05.110>
Reference: COST 9749

To appear in: *Composite Structures*

Received Date: 9 November 2017
Revised Date: 20 March 2018
Accepted Date: 18 May 2018



Please cite this article as: Jiang, S., Yao, W., Chen, J., Tao, S., Time dependent behavior of FRP-strengthened RC beams subjected to preload: Experimental study and finite element modeling, *Composite Structures* (2018), doi: <https://doi.org/10.1016/j.compstruct.2018.05.110>

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.

Title Page

Time dependent behavior of FRP-strengthened RC beams subjected to preload: Experimental study and finite element modeling

Shiyong Jiang^{a,*}, Weilai Yao^a, Jin Chen^a, Shuai Tao^a

^a Department of Military Infrastructure Engineering, Army Logistics University of PLA, Chongqing, 401311, China

Abstract: This paper deals with the influence of preload and FRP stress-lagging on the time dependent behaviors of strengthened concrete beams. For this purpose, three concrete beams were fabricated: one (B1) strengthened directly without any preload; one (B2) preloaded, fully unloaded and then strengthened; one (B3) preloaded by the same value of force as B2, but strengthened with the preload remaining. Sustained loads were applied to test beams and their deformations and cracking patterns were recorded for comparison. According to the test results, B1 presented the largest long-term deformation with the most evident crack propagation in load sustained period, followed by B2 and B3. Accordingly, non-linear finite element (FE) analyses were performed. The validity and accuracy of the FE models were demonstrated by comparing theoretical and experimental results. The effect of adhesive creep was also investigated on the basis of the proposed FE approach. It could be concluded that adequate development of cracks before sustaining loads may have positive influence on better controlling the long-term deformations, while higher level of shear stress in bonding interfaces may present negative effects.

Keywords: Sustained load; Concrete beam; FRP; Stress-lagging; Cracking pattern

Acknowledgement

This study was financially supported by the Chongqing Science and Technology Committee, China [grant numbers: cstc2015shmszx30006, cstc2011ab0043].

* Corresponding author. Prof. Shiyong Jiang
E-mail address: jiangshiy@163.com

Download English Version:

<https://daneshyari.com/en/article/6703176>

Download Persian Version:

<https://daneshyari.com/article/6703176>

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