

Journal Pre-proofs

Experimental investigation on the mechanical properties of a novel anchorage for carbon fiber reinforced polymer (CFRP) tendon

Kuihua Mei, Yamin Sun, Shengjiang Sun, Xiang Ren, Jianfeng Zhao

PII: S0263-8223(19)33025-9
DOI: <https://doi.org/10.1016/j.compstruct.2019.111704>
Reference: COST 111704

To appear in: *Composite Structures*

Received Date: 10 August 2019
Revised Date: 4 November 2019
Accepted Date: 18 November 2019



Please cite this article as: Mei, K., Sun, Y., Sun, S., Ren, X., Zhao, J., Experimental investigation on the mechanical properties of a novel anchorage for carbon fiber reinforced polymer (CFRP) tendon, *Composite Structures* (2019), doi: <https://doi.org/10.1016/j.compstruct.2019.111704>

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. 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.

Experimental investigation on the mechanical properties of a novel anchorage for carbon fiber reinforced polymer (CFRP) tendon

Kuihua Mei^a, Yamin Sun^{a,b,c*}, Shengjiang Sun^a, Xiang Ren^b, Jianfeng Zhao^a

^a School of Highway, Chang'an University, Xi'an 710064, China

^b School of Architecture & Civil Engineering, Xi'an University of Science & Technology, Xi'an, 710054, China

^c Postdoctoral Research Station on Civil Engineering, Xi'an University of Science & Technology, Xi'an, 710054, China

*Corresponding author

E-mail address: meikuihua@chd.edu.cn (K. Mei), sunyamin@chd.edu.cn (Y. Sun), sunshengjiang@chd.edu.cn (S. Sun), renxiang798@163.com (X. Ren), zjf2014@zjvtit.edu.cn (J. Zhao).

Abstract Carbon fiber reinforced polymer (CFRP) has the advantages of light weight, high tensile strength, superior corrosion resistance, and anti-fatigue properties. However, its low transverse compressive strength and inner-laminar shear strength render it difficult to be anchored through traditional anchorages for steel cables. This study proposes a novel composite anchorage for CFRP tendon and validates its novelty by finite element (FE) method. Then the mechanical performance of this novel anchorage was experimentally compared with that of traditional inner cone anchorage. The effects of parameters such as pre-tightening force, embedded length, inclination angle of the barrel, and grouted material on the anchorage performance of the novel composite anchorage are further studied. Results reveal that this novel composite can increase the load-carrying capacity by 60.4% and exhibits an ideal anchorage efficiency above 0.9, largely reduce the slip of the CFRP tendon under both ultimate and short-time sustained load, and prevent stress concentration at the loaded end. For further design of this novel anchorage, an empirical embedded length of $35d\sim40d$ is proposed. Besides, the anchorage performance of this anchorage does not always increase with the dosage of the sand. The optimum dosage of sand should not exceed 10%. This study provides insights into the mechanical properties of the novel

Download English Version:

<https://daneshyari.com/en/article/13419232>

Download Persian Version:

<https://daneshyari.com/article/13419232>

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