

Accepted Manuscript

Linear strain sensing performance of continuous high strength carbon fibre reinforced polymer composites

C.Q. Yang, X.L. Wang, Y.J. Jiao, Y.L. Ding, Y.F. Zhang, Z.S. Wu



PII: S1359-8368(16)31380-4

DOI: [10.1016/j.compositesb.2016.07.013](https://doi.org/10.1016/j.compositesb.2016.07.013)

Reference: JCOMB 4442

To appear in: *Composites Part B*

Received Date: 7 December 2014

Revised Date: 18 June 2016

Accepted Date: 21 July 2016

Please cite this article as: Yang CQ, Wang XL, Jiao YJ, Ding YL, Zhang YF, Wu ZS, Linear strain sensing performance of continuous high strength carbon fibre reinforced polymer composites, *Composites Part B* (2016), doi: 10.1016/j.compositesb.2016.07.013.

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.

Linear strain sensing performance of continuous high strength carbon fibre reinforced polymer composites

C.Q. Yang^{1,2*}, X.L. Wang¹, Y.J. Jiao¹, Y.L. Ding¹, Y.F. Zhang³, Z.S. Wu^{1*}

¹ Southeast University, Key Laboratory of Concrete & Pre-stressed Concrete Structures of the Ministry of Education, Nanjing 210096, China

² College of Civil Engineering & Mechanics, Xiangtan University, Xiangtan 411105, China

³ Jiangsu Transportation Research Institute, Nanjing 210017, China

Abstract: A feasible method of pre-tension was proposed to improve the sensing performances of carbon fibre reinforced polymer (CFRP) composites through reducing the misalignment and winding of carbon fibres. The CFRP composites consisted of high strength carbon fibres as active elements, epoxy resin as a matrix and sensing electrodes. Firstly, the sensing model was established based on the conductivity analysis of the CFRP composites. Then, a series of experiments were carried out to study the strain sensing linearity and stability under cyclic loading. The experiments showed that the linearity of the CFRP composites increases with increasing pre-tension amplitudes, and that a stable and linear sensing behavior can be obtained when the pre-tension amplitude is larger than $200\mu\epsilon$. The $\Delta R/R_0$ -strain curves can be linearly fitted with a correlation coefficient larger than 0.985. It was revealed that the loading manner also has some influence on the sensing behavior of the CFRP composite sensors. The gauge factors for an intermittent cyclic loading (range: 2.85-3.37) are larger than those for a continuous cyclic loading (range:

* Corresponding author. Tel: +86 25 83790903. Fax: +86 25 83793232. E-mail address: ycqjxx@seu.edu.cn.

Download English Version:

<https://daneshyari.com/en/article/7212416>

Download Persian Version:

<https://daneshyari.com/article/7212416>

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