

## Accepted Manuscript

Experimental study of CFRP strengthened steel columns subject to lateral impact loads

Majid M.A. Kadhim, Zhangjian Wu, Lee S Cunningham

PII: S0263-8223(17)31442-3

DOI: <https://doi.org/10.1016/j.compstruct.2017.10.089>

Reference: COST 9064

To appear in: *Composite Structures*

Received Date: 6 May 2017

Revised Date: 28 September 2017

Accepted Date: 31 October 2017



Please cite this article as: Kadhim, M.M.A., Wu, Z., Cunningham, L.S., Experimental study of CFRP strengthened steel columns subject to lateral impact loads, *Composite Structures* (2017), doi: <https://doi.org/10.1016/j.compstruct.2017.10.089>

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.

**Experimental study of CFRP strengthened steel columns subject to lateral impact loads**

Majid M.A. Kadhim<sup>\*(1), (2)</sup>, Zhangjian Wu<sup>(1)</sup>, Lee S Cunningham<sup>(1)</sup>

*(1) School of Mechanical, Aerospace and Civil Engineering, The University of Manchester,  
Manchester M13 9PL, UK*

*(2) College of Engineering, University of Babylon, Al Hillah, Iraq*

\* Corresponding author. E-mail addresses: [majid.kadhim@manchester.ac.uk](mailto:majid.kadhim@manchester.ac.uk) (M. Kadhim)

[jack.wu@manchester.ac.uk](mailto:jack.wu@manchester.ac.uk) (Z. J. Wu)

[lee.scott.cunningham@manchester.ac.uk](mailto:lee.scott.cunningham@manchester.ac.uk) (L. S. Cunningham)

**Abstract**

In both building and civil engineering structures, the occurrence of impact loading to column elements can be a significant issue, particularly in regard to disproportionate collapse. For existing structures vulnerable to impacts, the development of appropriate strengthening techniques is key to extending service life and improving robustness. In the case of structural steelwork, composites such as carbon fibre reinforced polymer (CFRP) offer a promising means of retrofitting and improving performance under impact. Towards this, the present study experimentally investigated a total of 12 square hollow section (SHS) columns under impact loads. The test series included both unstrengthened and CFRP strengthened samples with different fibre orientations with a view to finding the optimum CFRP configuration. As a means of simulating lateral impact on axially loaded elements, a purpose-built test rig was manufactured to apply a compressive preload to the samples prior to impact. Different preloading levels were applied to the samples before they were impacted transversely. The results show that the strengthening effectiveness increased with higher preloading level. The

Download English Version:

<https://daneshyari.com/en/article/6704510>

Download Persian Version:

<https://daneshyari.com/article/6704510>

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