### Accepted Manuscript

Failure mechanisms of CFRP-wrapped protective concrete arches under static and blast loadings: Experimental research

Peng Wang, Hailong Chen, Jiannan Zhou, Yinzhi Zhou, Bo Wang, Meirong Jiang, Fengnian Jin, Hualin Fan

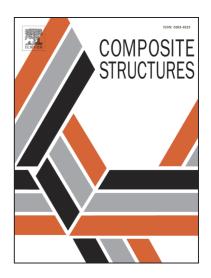
PII: S0263-8223(17)33414-1

DOI: https://doi.org/10.1016/j.compstruct.2018.05.063

Reference: COST 9702

To appear in: Composite Structures

Received Date: 17 October 2017
Revised Date: 24 March 2018
Accepted Date: 9 May 2018



Please cite this article as: Wang, P., Chen, H., Zhou, J., Zhou, Y., Wang, B., Jiang, M., Jin, F., Fan, H., Failure mechanisms of CFRP-wrapped protective concrete arches under static and blast loadings: Experimental research, *Composite Structures* (2018), doi: https://doi.org/10.1016/j.compstruct.2018.05.063

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.

## **ACCEPTED MANUSCRIPT**

# Failure mechanisms of CFRP-wrapped protective concrete arches under static and blast loadings: Experimental research

Peng Wang <sup>a</sup>, Hailong Chen <sup>a, \*</sup>, Jiannan Zhou <sup>a,\*</sup>, Yinzhi Zhou <sup>a</sup>,

Bo Wang <sup>a</sup>, Meirong Jiang <sup>a</sup>, Fengnian Jin <sup>a</sup>, Hualin Fan <sup>b, \*</sup>

<sup>a</sup> State Key Laboratory for Disaster Prevention & Mitigation of Explosion & Impact,

PLA University of Science and Technology, Nanjing 210007, China

<sup>b</sup> State Key Laboratory of Mechanics and Control of Mechanical Structures, Nanjing

University of Aeronautics and Astronautics, Nanjing 210016, China

Corresponding authors: fhl15@nuaa.edu.cn (Hualin Fan);

lona1185@126.com(Hailong Chen); zjn\_0414@163.com (Jiannan Zhou)

Abstract: In this research, failure mechanisms of carbon fiber reinforced polymer (CFRP) wrapped protective arches under static and blast loadings were investigated through experiments. Adopting bonding and partially-wrapping scheme, the plain concrete (PLC) arch is strengthened and its load carrying ability achieves the level of steel bar reinforced concrete (RC) arch in the static loading experiment. Adopting bonding and fully-wrapping scheme, it's akin to apply hollow CFRP tubular arch to reinforce plain PLC arches. Load carrying capacity of the CFRP composite arch achieves twice as much as that of the RC arch and the composite arch fails in a shear mode. Subjected to explosive loading, anti-blast ability of the CFRP tubular concrete arch is much better than the PLC arch. Critical scaled distance to prevent the arch from dynamic broken is considerably reduced. According to the research, it is confirmed that using the composite technique an efficient composite protective arch

#### Download English Version:

# https://daneshyari.com/en/article/6703080

Download Persian Version:

https://daneshyari.com/article/6703080

<u>Daneshyari.com</u>