Accepted Manuscript

Penetration resistance of hybrid metallic honeycomb structures with ceramic insertions against long-rod tungsten projectiles

Xuanyi An, Jie Yang, Chao Tian, Bo Wang, Hong Guo, Yongxiang Dong

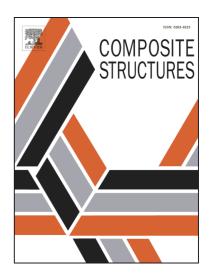
PII: S0263-8223(17)31484-8

DOI: https://doi.org/10.1016/j.compstruct.2018.01.102

Reference: COST 9342

To appear in: Composite Structures

Received Date: 10 May 2017
Revised Date: 18 December 2017
Accepted Date: 30 January 2018



Please cite this article as: An, X., Yang, J., Tian, C., Wang, B., Guo, H., Dong, Y., Penetration resistance of hybrid metallic honeycomb structures with ceramic insertions against long-rod tungsten projectiles, *Composite Structures* (2018), doi: https://doi.org/10.1016/j.compstruct.2018.01.102

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

Penetration resistance of hybrid metallic honeycomb structures with

ceramic insertions against long-rod tungsten projectiles

Xuanyi An^a, Jie Yang^a, Chao Tian^a, Bo Wang^a, Hong Guo^b, Yongxiang Dong^{a,*}

a. State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, Beijing 100081, China

b. China North Nuclear Fuel Co., Ltd, Baotou 014035, China

Abstract

To examine the effects of different core arrangements of hybrid honeycomb structures on the

penetration resistance against a vertical long-rod tungsten projectile,

artillery-launched experiments on three targets. They were fabricated using titanium alloy panels

with ceramic insertions in upright, transverse parallel, or transverse orthogonal arrangements,

respectively. Furthermore, numerical simulation was used to explore the underlying mechanisms of

these hybrid structures. The results showed that the penetration resistance of the targets is

significantly improved when the arrangement of honeycomb cores changes from upright to

transverse parallel or transverse orthogonal. Exploration of the underlying mechanisms showed that

the reasonable core arrangements of hybrid honeycomb structures directly determine the extent of

energy absorbing from the impact projectiles. The hybrid structure with transverse core arrangement

show better constraint conditions for ceramic prisms by metallic webs to blunt and erode the

projectiles compared to that with upright core arrangement, and the hybrid structure with ceramic

insertions in transverse parallel arrangement has the best penetration resistance owing to a good

constraint condition for ceramic prisms by metallic webs and proper inhomogeneity of

substructures.

Keywords: Metallic honeycomb structures; Zirconia toughened alumina; Penetration resistance;

Long-rod projectile

* Corresponding author. Tel: +86 01068915532; Fax: +86 01068915532.

E-mail: dongyongx@bit.edu.cn (Yongxiang Dong)

Download English Version:

https://daneshyari.com/en/article/6704038

Download Persian Version:

https://daneshyari.com/article/6704038

Daneshyari.com