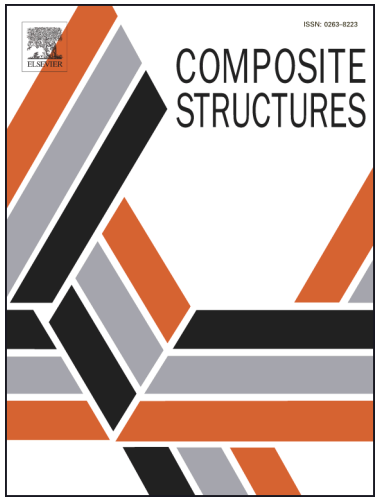

Drop-weight impact behaviors of 3-D angle interlock woven composites after thermal oxidative aging

Mingling Wang, Miao Cao, Hailou Wang, Amna Siddique, Bohong Gu, Baozhong Sun

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Drop-weight impact behaviors of 3-D angle interlock woven composites after thermal oxidative aging

Mingling Wang, Miao Cao, Hailou Wang, Amna Siddique, Bohong Gu, Baozhong Sun*

College of Textiles, Key Laboratory of High Performance Fibers &Products, Ministry of Education, Donghua University, Shanghai, China, 201620

(*: Corresponding author Email: sunbz@dhu.edu.cn Tel: +86-21-67792782 Fax: +86-21-67792627)

Abstract

This paper reports the low-velocity impact damage behaviors of 3-D angle-interlock woven carbon fiber /epoxy composites which have undergone the accelerated aging for 4-day, 8-day, 16-day and 32-day at 90℃ and 180℃ in air environment. The low-velocity impact behaviors of the un-aged composite specimens were compared with those of the aged composites. The impact load-displacement curves were recorded and the damage morphologies were observed for analyzing the aging effect on the impact behaviors. It was found that the aging influenced the impact behaviors significantly. For the aging at 90℃, owing the post-curing of the epoxy resin, impact peak loads and modulus increased with the aging time. While the impact behaviors at the room temperature and 180℃ decreased with the aging time due to the thermal oxidative degradation of the epoxy resin and the fiber/resin interface crack.

Keywords: 3-D angle-interlock woven composites; thermal aging; low-velocity impact.

1. Introduction

3-D interlock composites have been broadly used as textile structural reinforcement due to their high impact damage tolerance and de-lamination resistance [1]. The impact characterization of homogeneous and hybrid 3-D interlock composites with glass [2], Kevlar [3], and the combination of Kevlar/basalt [4] has been investigated that the 3-D interlock composites exhibited a higher