



Evaluation of mechanical properties of high strength woven fabric material

Shintaro TSUKAMOTO¹, and Takuma MATSUO^{2,*}

¹ Department of Mechanical Engineering, Graduate School of Science and Technology, Meiji University
*1-1-1 Higashi-mita Tama-ku, Kawasaki-shi, Kanagawa, 214-8571, Japan
ce182040@meiji.ac.jp, +81-44-934-7737

² Department of Mechanical Engineering, School of Science and Technology, Meiji University,
* 1-1-1 Higashi-mita, Tama-ku, Kawasaki-shi, Kanagawa, 214-8571, Japan
matsuo@meiji.ac.jp, +81-44-934-7737

Abstract

Currently, membrane materials utilizing high-strength fibers have been developed, and its application is being studied in various fields including aerospace field utilizing its flexibility and light weight. However, fibrous materials, especially woven materials, are known to exhibit special behavior due to their complex structure, which is a problem in design. In this research, we aim to clarify the mechanical properties of the woven fabric using acoustic emission (AE) method. AE methods that analyze the elastic waves generated by defects inside the material can facilitate the evaluation of internal damage. In this research, the failure mechanism of the woven fabric was estimated by monitoring the tensile test of the woven fabric by the AE method. Furthermore, the possibility of real-time monitoring of woven fabric failure by AE method was shown by classifying the detected AE signal according to the shape, amplitude and frequency of the waveform.

Keywords: High-strength fibers, Woven fabric material, Acoustic Emission, Nondestructive inspection,