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Comparative study of acoustic reflection detection using PVDF sensor

Hyo-Jeong Kim¹, Seoung-Hwan Lee^{1#}, Sin-YeopLee¹, Ju-Heon Lee¹, Hyung-Jin Park², Hee-Hwan Lee¹

Hanyang University¹

Hanyang University ERICA²

Corresponding Author / E-mail: sunglee@hanyang.ac.kr

Abstract

Acoustic emission is a phenomenon in which elastic waves are generated by the release of deformation energy accumulated by deformation or cracking in a solid material. Acoustic emission signals have a variety of information and can be used to estimate damage to objects, location and size of damage, etc. A typical sensor that can detect this signal is an Acoustic Emission (AE) Sensor, which is difficult to access due to the high cost of the sensor, and has a limited shape when attached. However, PVDF(Polyvinylidene fluoride) is relatively inexpensive and flexible, making it easy to attach to shapes such as curved surfaces. Therefore, in order to investigate the possibility of replacing the PVDF sensor with the AE sensor, the Hsu-Nielsen source is created and the characteristics are checked through the Pencile lead break (PLB) test. In addition, the generated signal can be divided into direct wave and indirect wave according to the signal position of the sensor, through which the PVDF sensor checks whether the wave can be classified and compares it with the AE sensor data. In order to compare the sensors relatively easily, the original signal is converted into a STFT(Short Time Fourier Transform) and analyzed.

Keyword(s)

PVDF(Polyvinylidene fluoride), Acousticemission(AE), AE Sensor, PVDF Sensor, STFT

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