

عنوان مقاله:

Packet Wavelet Analysis of Acoustic Emission Signals to Characterize Damage Mechanism in Composite Materials under Mode I Delamination

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نویسنده:

amir refahi oskouei - Mechanical Engineering Department, Shahid Rajaei Teacher Training University, Tehran, IRAN

خلاصه مقاله:

In this paper, acoustic emission (AE) monitoring with a wavelet-based signal processing technique is developed to detect the damage types during mode I delamination on glass/polyester composite materials. Two types of specimen at different midplane layups, woven/woven (T3) and unidirectional/unidirectional (T5), leading to different levels of damage evolution, were studied. Double cantilever beam (DCB) is applied to simulate delamination process for all specimens. Firstly, the obtained AE signals are decomposed into various wavelet levels. Each level includes detail and approximation that are called components and related to a specific frequency range. Secondly, the energy distribution criterion is applied to find the more significant components each one of which is in relation to distinct damage. The results show that the energy of AE signals has been concentrated in three significant components for both of the specimens. There is a difference in energy distribution of similar components of two specimens. It indicates that there is a dissimilar dominant damage mechanism for two different interfaces during delamination process. Additionally, the microscopic observation (SEM) is used to determine how the different fracture mechanisms are related to the dominant corresponding wavelet components

کلمات کلیدی:

Damage Mechanism, Polymer Composites, Delamination, Acoustic Emission, Packet Wavelet

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