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Classification of Wear by Means of Acoustic Emission and Signal Processing Techniques

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Usually inner material effects damage the system internally before those effects can be detected visually at the material. Hence, an optical (surface) inspection cannot reveal the inner state-of-damage. Once the surface is affected e.g. by a crack, the normal reactive monitoring and maintenance procedures may not prevent the systems' failure. Therefore a need to develop reliable and efficient condition monitoring systems able to detect damage, determine the actual state-of-damage, realize diagnostics and predict the remaining use time occurs. The goal of this paper is to introduce a system for online classification and examination of wear phenomena in metallic structure based on the application of the acoustic emission (AE) technique and time-frequency analysis. In this purpose, short-time Fourier transform (STFT) and wavelet transform (WT) were applied to AE signals indicating tribological effects occurred during the process. The results obtained from the two signal processing techniques were compared, good results with respect to advanced applications for fault detection as well as diagnostic purposes are obtained.

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Ключевые слова:

Содержание

Abstract
Introduction
Sources of acoustic emissions
Measurement and signal processing
Experimental results
Summary and conclusion