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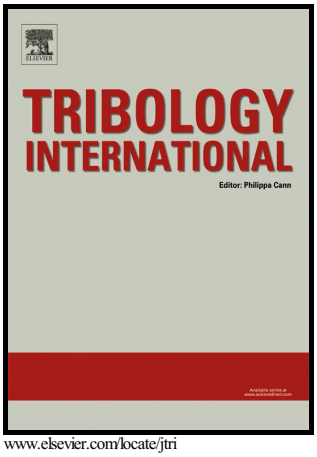


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# The Detection of Plastic Deformation in Rolling Element Bearings by Acoustic Emission

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**Abstract**

The detection of plastic deformation caused by particle contamination in rolling element bearings using acoustic emission is reliable at low speeds as shown in several studies. However, there are no studies at greater speeds of the detection of plastic deformation by acoustic emission in rolling element bearings. The acoustic emission signals of rolling element bearings have, however, been shown to be dominated by transient force signals which are elastic waves caused by transient forces acting at the raceway surface. The results of the test showed a dominance of transient force signals at elevated speeds, which masks signals caused by plastic deformation and prohibits the detection of particle contamination, while at low rotational speed plastic deformation is detected by acoustic emission.

*Keywords:* Rolling Element Bearings, Acoustic emission, plastic deformation, RMS



## 1. Introduction

According to the ASTM standard [1], acoustic emission is defined as:

"...Rapid release of energy, due to stresses within a material..."

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