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## Crack Detection in Cast Stainless Steel Valve Utilizing Nonlinear Acoustics

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Many structural system parts are today subjected to critical loads and the presence of damage is inspected in a variety of ways. Some of these parts are made of CAst Stainless Steel (CASS), a material commonly used in nuclear power plants. One way to verify the damage status of these parts is to use ultrasonic inspection. These inspections are very challenging to perform and, in general, success in the detection of damage remains uncertain.

However, the techniques can be improved, even for materials known to be challenging for ultrasonic inspections.

A study of crack detection in cast stainless steel utilizing a nonlinear acoustic method is reported in this work. The technique is briefly described, and is exemplified by carrying out a fingerprint measurement.

The specimen was a test block made of a valve provided from Ringhals AB which was cut in three pieces. One of these pieces is evaluated in un-cracked condition as initial reference. Subsequently, cracks are introduced and new evaluations are made.

The results show clear indications of presence of damage, and the technique's localization capability is shown.

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**Ключевые слова:**

### Содержание.

Abstract  
Introduction  
Experimental methodology  
Results  
Discussion