Further Development in Nondestructive Methods to Gauge Life Expectancy in Ferromagnetic Components

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Introduction

- Nuclear power plant components experience high stresses under extended life operations.
  - Thermal
  - Mechanical
  - Irradiation
- Need to quantify material condition & remaining service life

“Nondestructive Material Characteristics”

Nondestructive Methods

- Magnetic Barkhausen Noise
- Sensitive to crystal defects & dislocations in ferretic steels

Barkhausen Measurements

Setup

- Microscan 600
- Rollscan 300

Research and Results

Parallel vs Perpendicular Magnetization (relative to strain)

Average Standard Deviation Parallel vs Perpendicular

Measurement Difference (with Position)

Future Research

- Quantify measurement uncertainty due to Barkhausen noise measurement
- Identify measurement features for better correlation with damage

References:


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