Simcenter Anovis NDT

Component testing solution for mass production

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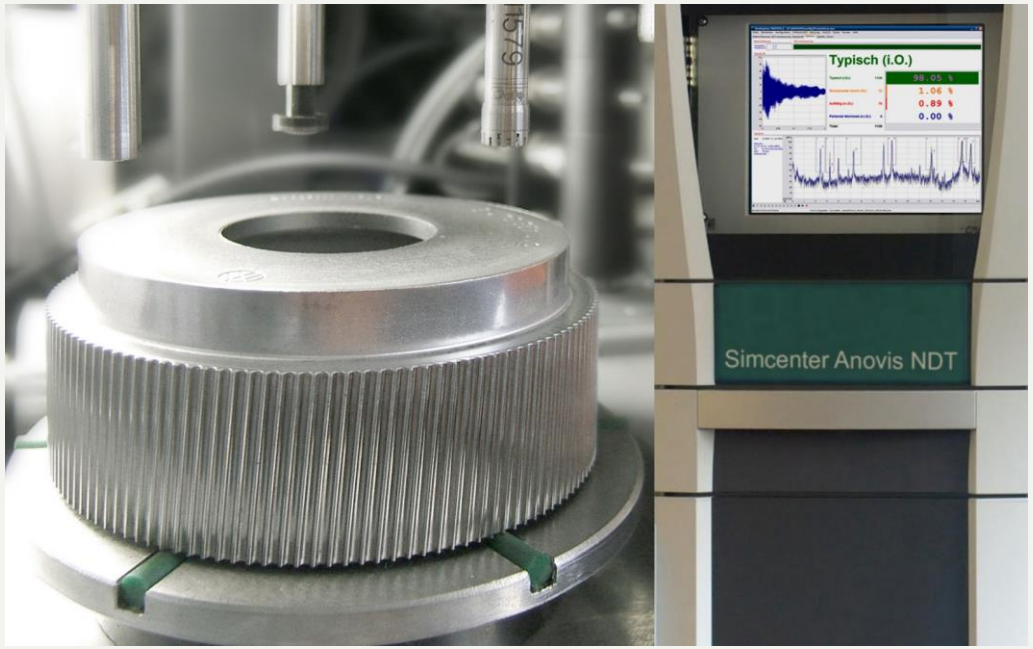
Simcenter Anovis

How does Acoustic Resonance Testing (ART) work?

Application examples



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Simcenter Anovis: Portfolio

End Of Line Testing

Fault identification
Go/no Go decision

Examples:

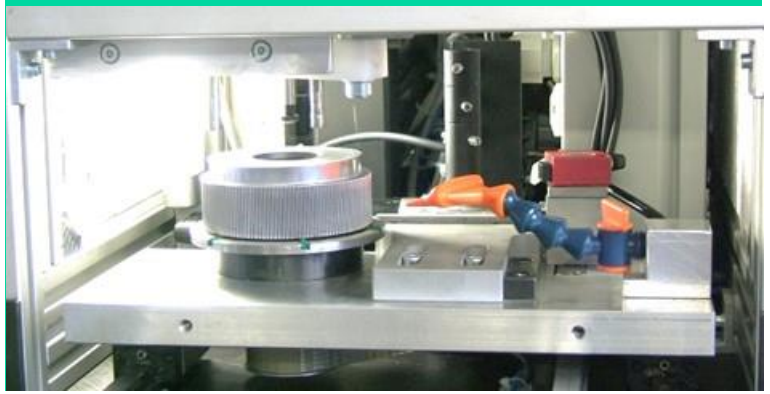
- Engines, electric drive units
- Transmissions
- E-Motors and Assemblies

Non-destructive Testing

Resonance test
Cracks, porosity, density, ...

Examples:

- Powder metal parts
- Forging and casting parts
- Car Body parts



Process Monitoring

Breakage detection
Crack detection

Examples:

- Presses, punches
- Joining machines
- Mounting of electric plugs

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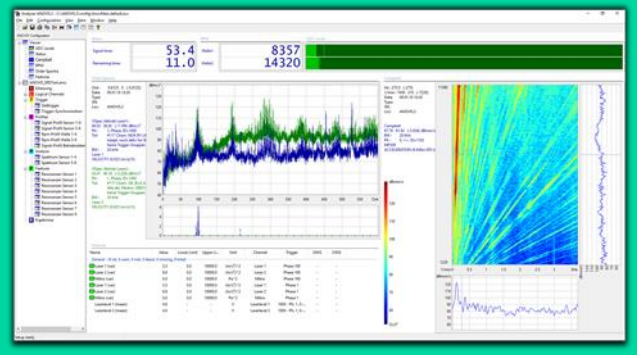
Simcenter Anovis: System Overview

Hardware

- Anovis-SRD
- Impact device
- If required:
  PCs, interface cards

Software

- Anovis-professional
- Anovis-lite
- Anovis-Chameleon
- …

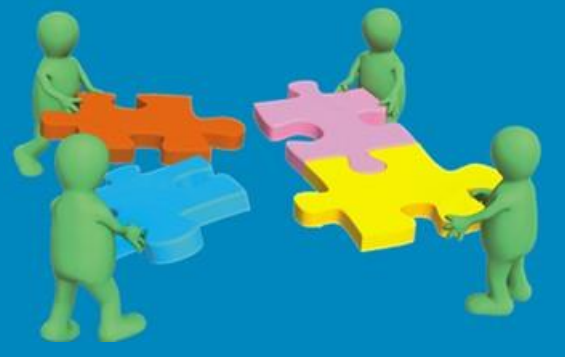


Sensors

- Microphones
- Accelerometers
- Laser vibrometers
- …

Deployment Service

- Technical consulting
- Preliminary studies
- Commissioning
- Training
- After-sales support



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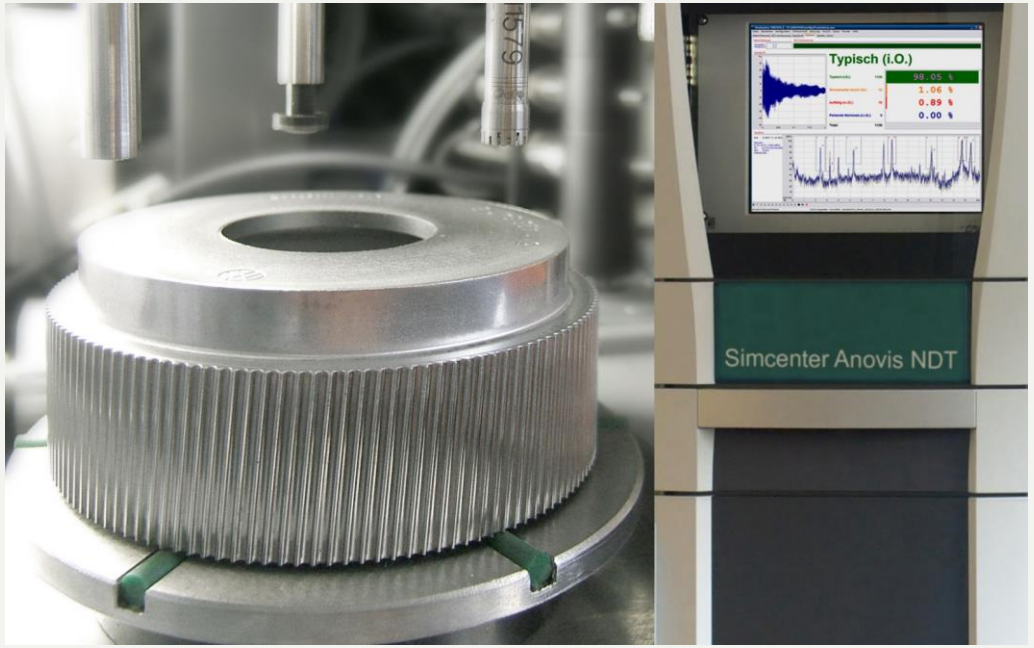

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Principle of Acoustic Resonance Testing (ART)

ART evaluates the state of a component based on its natural frequencies.

Natural frequencies are physical properties of a component, which are determined only by its internal characteristics.

Conspicuous parts are sorted out.

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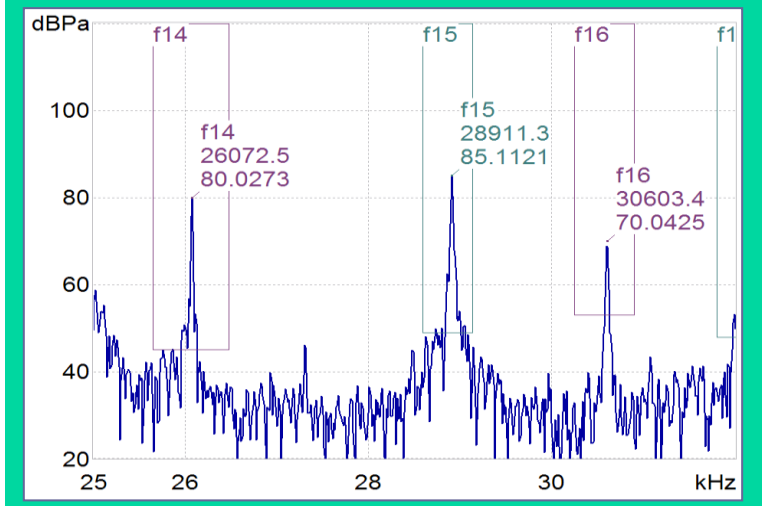
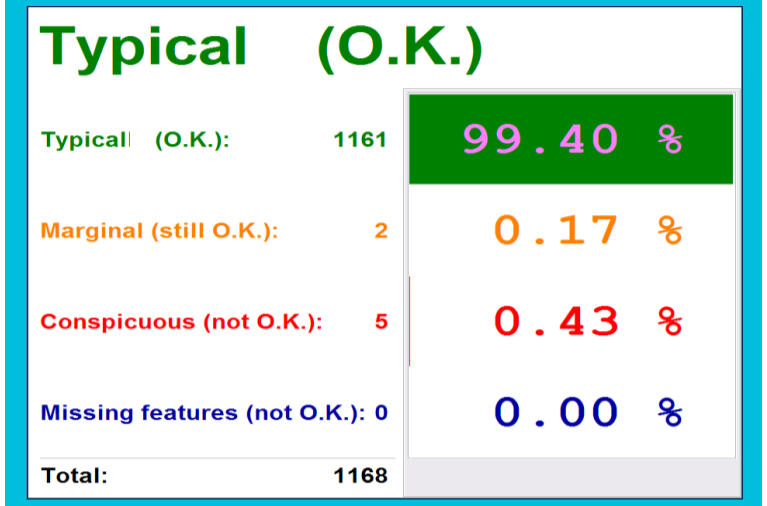
Principle of Testing with Anovis NDT

geometry, density, mass, stiffness, elastic modulus



frequency, level, damping



assessment OK / NOK

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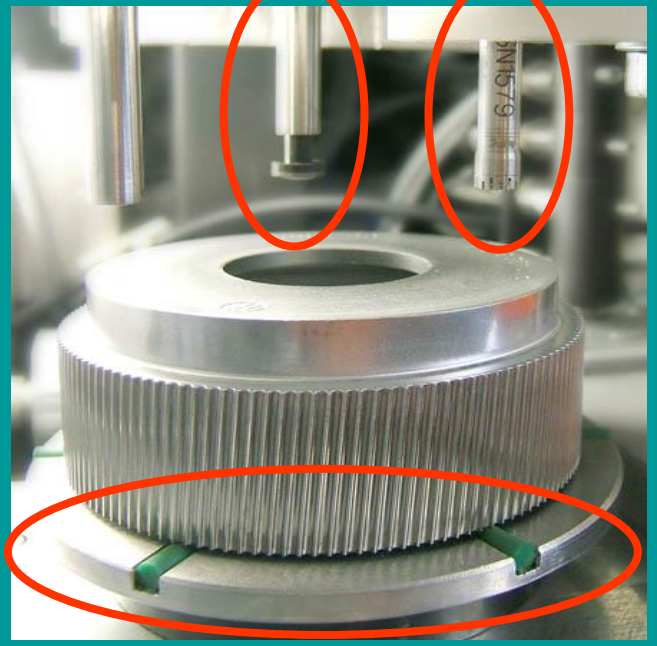
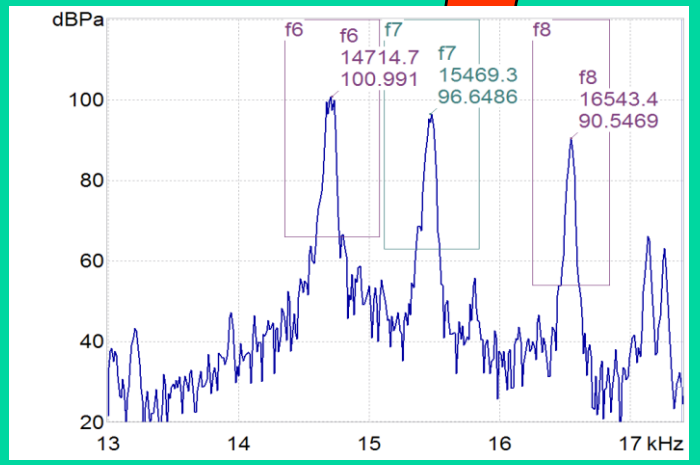
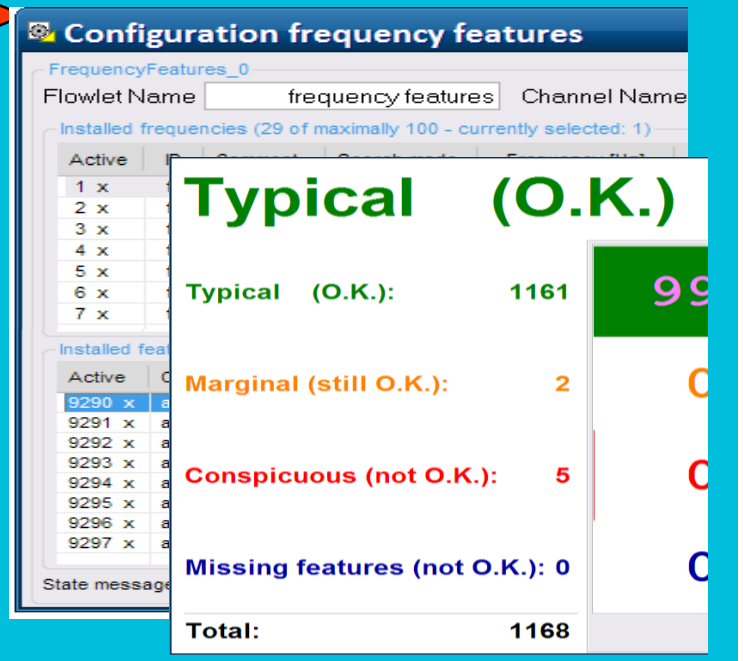
Standard Measurement Chain of ART



- part settlement/slide
- sound excitation
- signal recording



- frequency analysis
- resonance frequency detection
- parameter determination



- derivation of metrics
- combination of metrics
- assessment OK/NOK

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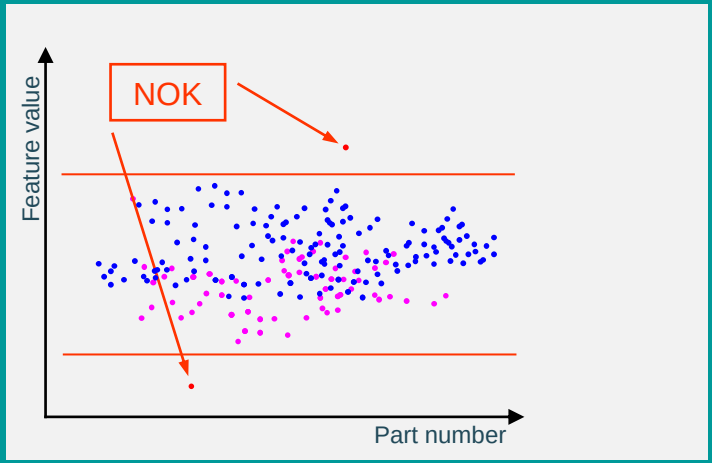
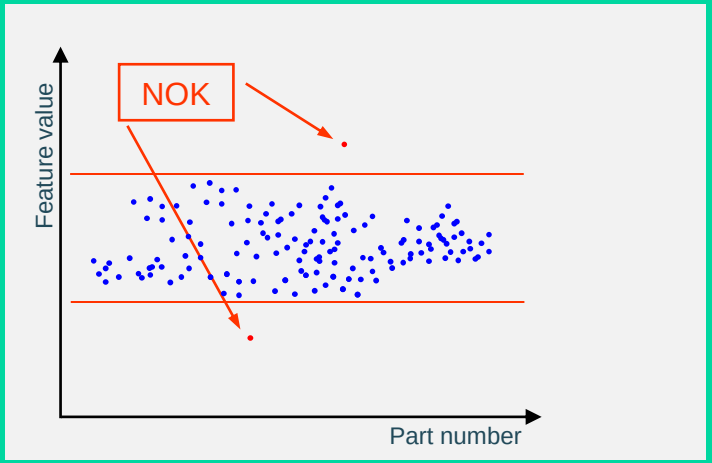
Test Regimes and Defect Detection for Anovis NDT

mixed lots: testing with globally fixed limits



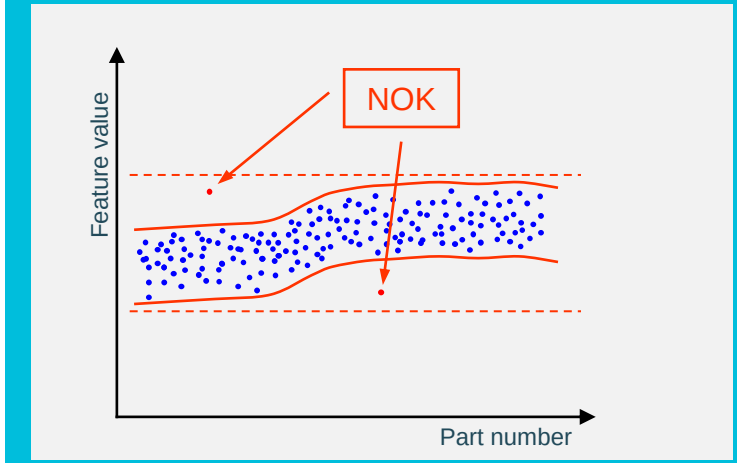
suitable for detection of large deviations

single lots: testing with fixed limits per production lot



increased sensitivity for defects

FIFO order: testing with drift adaptation



best defect detection

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Reasons for Application of Anovis NDT

Process reliability

- reliable fault detection
- no pseudo rejects
- detection of yet unknown faults

100% Testing of production & product

- short cycle time for testing: approx. 1 second
- complete automation: normal way of implementation

Documentation of production

- clear assignment of test data to the tested component
- statistics that helps to improve the production process

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Characteristics of Anovis NDT

Comparing method

- non-identifying
- non-locating
- full part assessment

Adaptation to the current production lot

- no master parts required
- no process-representative fault parts required
- universal test setup per part type

Benefits

- fast
- reliable
- automatable
- able to find unexpected faults

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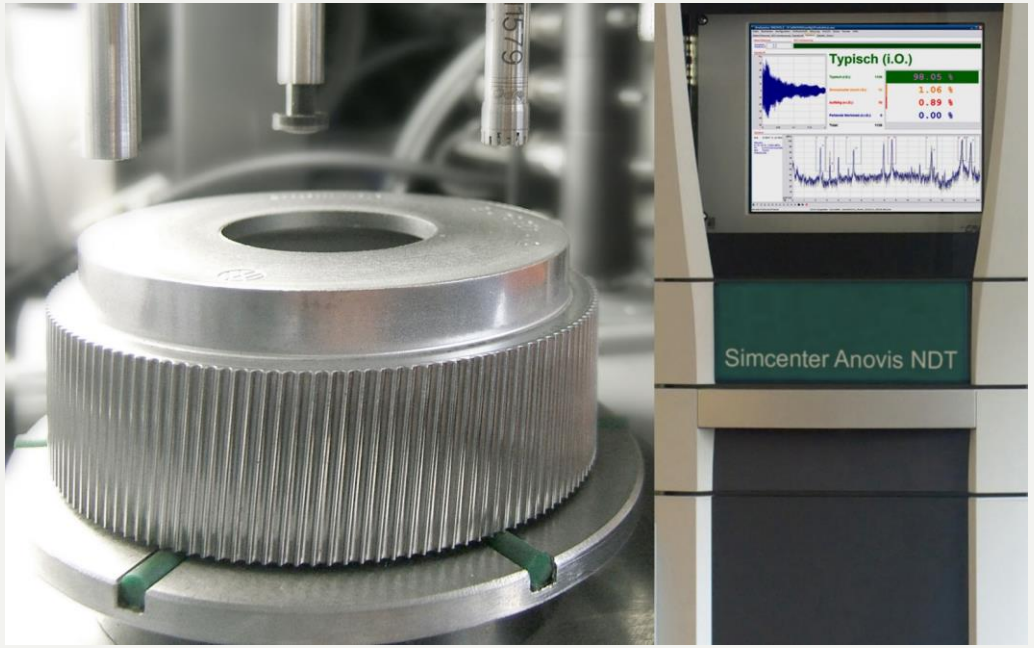

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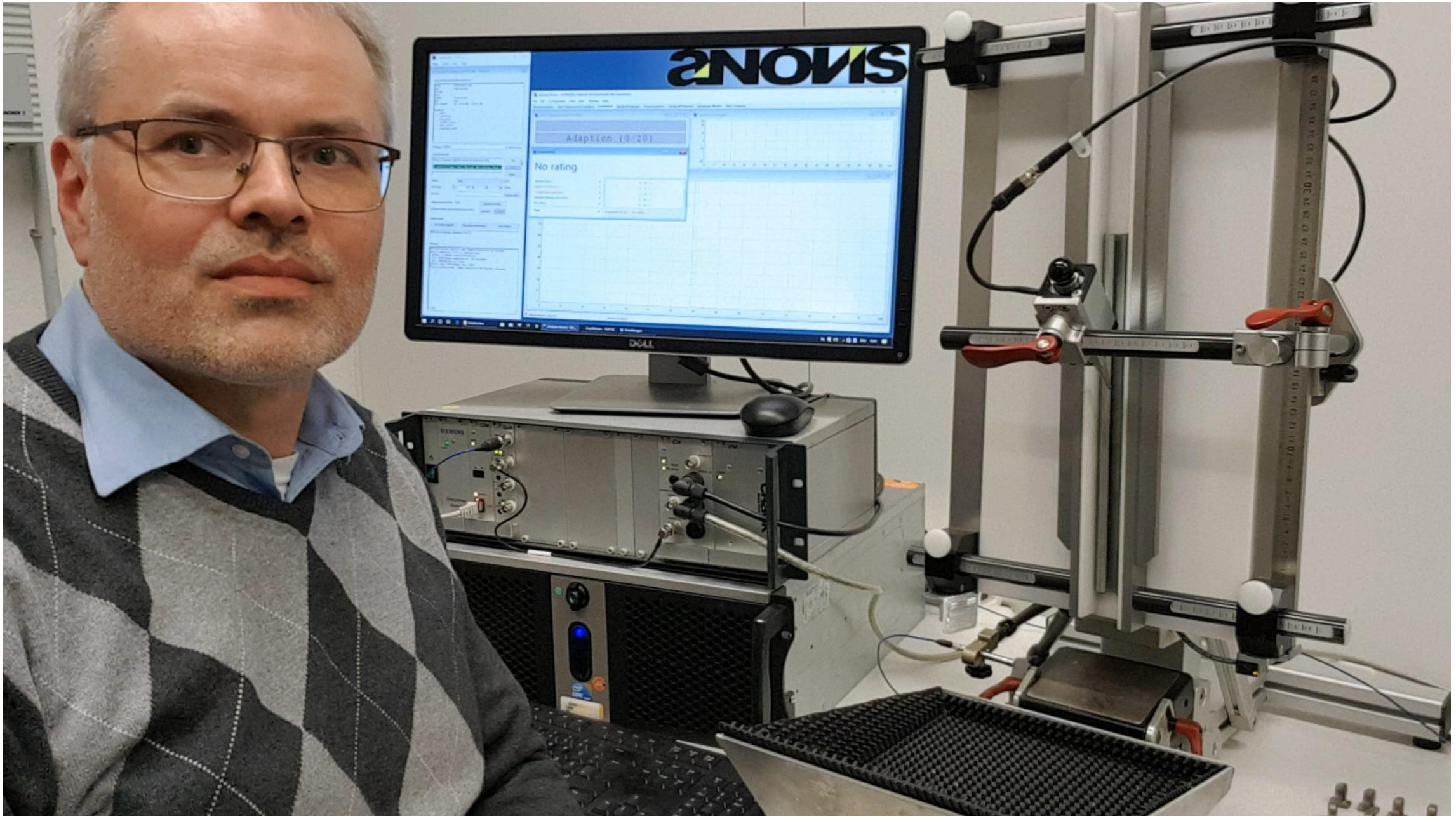

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Application Example: Pulley Testing with Impact Device

Component testing, e. g. crack detection in a pulley part for electric power steering

- **Sound excitation: impact device**
- **Sensor: broadband microphone**

- **Fully automatic, 100% testing, approx. 6 sec. cycle time, pass – fail decision**

- **Many companies use Simcenter Anovis NDT for testing of sintered parts (PM, MIM,…)**

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Application Example: Pulley Testing with Impact Device

Component testing, e. g. crack detection in a cross-coupling part

- **Sound excitation: slide device**
- **Sensor: broadband microphone**

- **Fully automatic, 100% testing, approx. 2 sec. cycle time, pass – fail decision**

- **Cast or forged parts are also tested with Simcenter Anovis NDT**

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