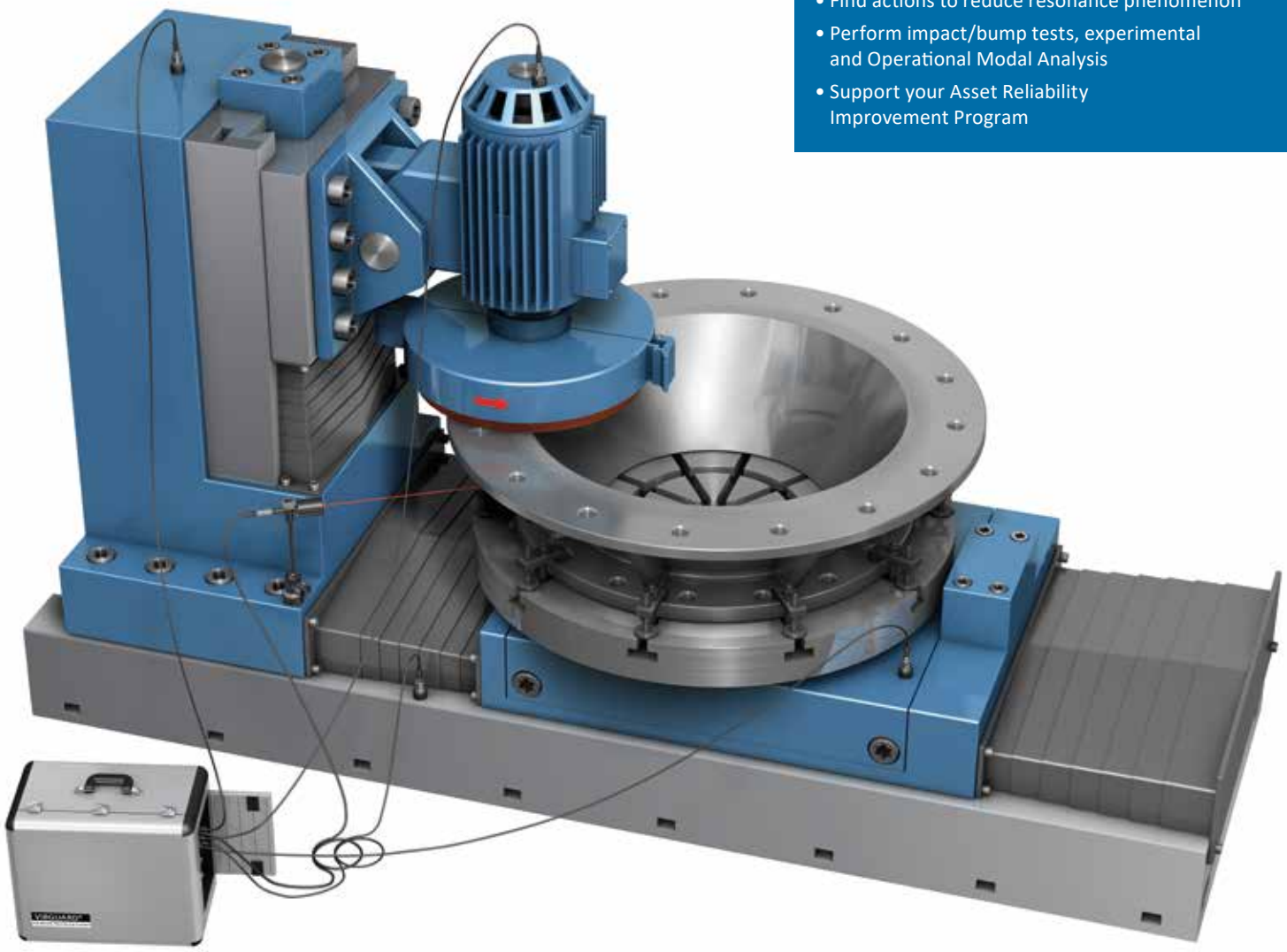
PRÜFTECHNIK

PRUFTECHNIK ServiceCenter

Resonance and natural frequency analysis

- Measurements and detection of resonances
- Find actions to reduce resonance phenomenon
- Perform impact/bump tests, experimental and Operational Modal Analysis
- Support your Asset Reliability Improvement Program



MEASURE, EVALUATE AND REDUCE VIBRATIONS

VIB 3.2 – Resonance and Natural Frequency Analyzes

Resonances result from unwanted excitations of natural frequencies. In mechanical and process engineering, a distinction is made between natural frequency in structures, shafts, components, in the electrical devices but also in the process itself. The occurrence of resonances can endanger life or lead to process uncertainty and quality deviations. Particularly high damage potential lies in the resonant vibration at low frequency.

How natural frequency can be measured? Which measurement standards exist? Which measurement techniques and parameters should be used? How can we reduce resonance excitations? Where can I be advised to proactively avoid resonances?

These are some questions to ask when carrying out natural frequency analyzes and avoiding or even eliminating resonance phenomena. PRÜFTECHNIK offers measurement and analysis of resonance and natural frequencies and consulting. There are three different approaches:

Fig. 1: Simulation of more stiffness with chain-hoists

1 Experimental Modal Analyzes (EMA)

Step 1:

Mobile vibration analysis (also with Run-up and Coast-down measurements)

Step 2:

Impact/bump tests, determination of the natural frequencies and transfer functions

Step 3:

Assessment of the risk of resonance and actions to influence the natural frequency. (e.g. through targeted stiffening or additional masses)

Fig. 2: Bump test on a housing

2 Operational Modal Analyzes (OMA)

Step 1:

- Temporarily recording the vibrations in different stationary and transient operating states
- Triggering events
- Identification and characterization of the natural frequency

Step 2:

- Targeted overlay of additional frequencies (for example via frequency convertor)
- Assessment regarding the risk of resonance

Step 3:

- Statistical evaluation of all online overall value measurements
- Recommendation of proactive measure-ments to avoid resonances (for example by avoiding critical speeds)
- Review action effectiveness remotely

3 Resonance and ODS Analyzes

Step 1:

- FMEA based asset evaluation and analysis of existing information and data
- Definition of suitable methods for targeted resonance analyzes (ODS, torques, bending moments, shaft vibrations, structure vibration)

Step 2:

- Measurements and system analyzes
- Acquire and the analyzes of the natural frequencies
- Resonance evaluations and execution of special resonance analyzes

Step 3:

- Recommendations for system modifications and simulation calculations
- Independent reporting or assessment

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- Weltweite Präsenz
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- Hohe Servicequalität

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