Test Bench for Modal Analysis and NVH

Technical data

- Portable Signal Analyzer: National Instruments PXIe-4499
  - Analog Input Channels: 2x 16
  - Sampling Rate: 100 Hz … 208.4 kHz
  - Signal Conditioning: Current excitation Anti-Aliasing-Filter
  - Signal Resolution: 24 bit

- A/D-converter: Presonus FireStudio Project
  - Audio Interface: FireWire
  - Analog Input: 8 Microphone / Line 2 Instrument
  - Sampling Rate: 96 kHz

Equipment

- Impact Hammer with Force Sensor:
  - PCB Piezotronics 086C03
  - Current excitation: 2-20 mA

- Acceleration Sensors
  - Uniaxial: Metra Mess- und Frequenztechnik MMF KS95B-10
  - Triaxial: PCB Piezotronics 356A03
  - Microphone: Behringer ECM 8000
  - Laservibrometer: Polytec PDV-100
  - Shaker: Brüel & Kjær 4809

Measurement capabilities

<table>
<thead>
<tr>
<th></th>
<th>Amplitude</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>Force (Impact Hammer)</td>
<td>~2200 N</td>
<td>~8 kHz</td>
</tr>
<tr>
<td>Acceleration (Sensors)</td>
<td>5500 m/s²</td>
<td>0.2 – 20 kHz</td>
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<tr>
<td>Velocity (Laservibrometer)</td>
<td>500 mm/s</td>
<td>0.5 – 22 kHz</td>
</tr>
<tr>
<td>Sound Pressure (Microphone)</td>
<td>Frequency</td>
<td>0.02 – 22 kHz</td>
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</tbody>
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Current application/ Opportunities

- Experimental Modal Analysis
  - Determination of eigenfrequencies, eigenmodes and damping factors of mechanical structures
  - Determination of transfer functions between excitation and measurement points
  - Analysis of operational vibration
  - Measurement of sound pressure level (SPL)