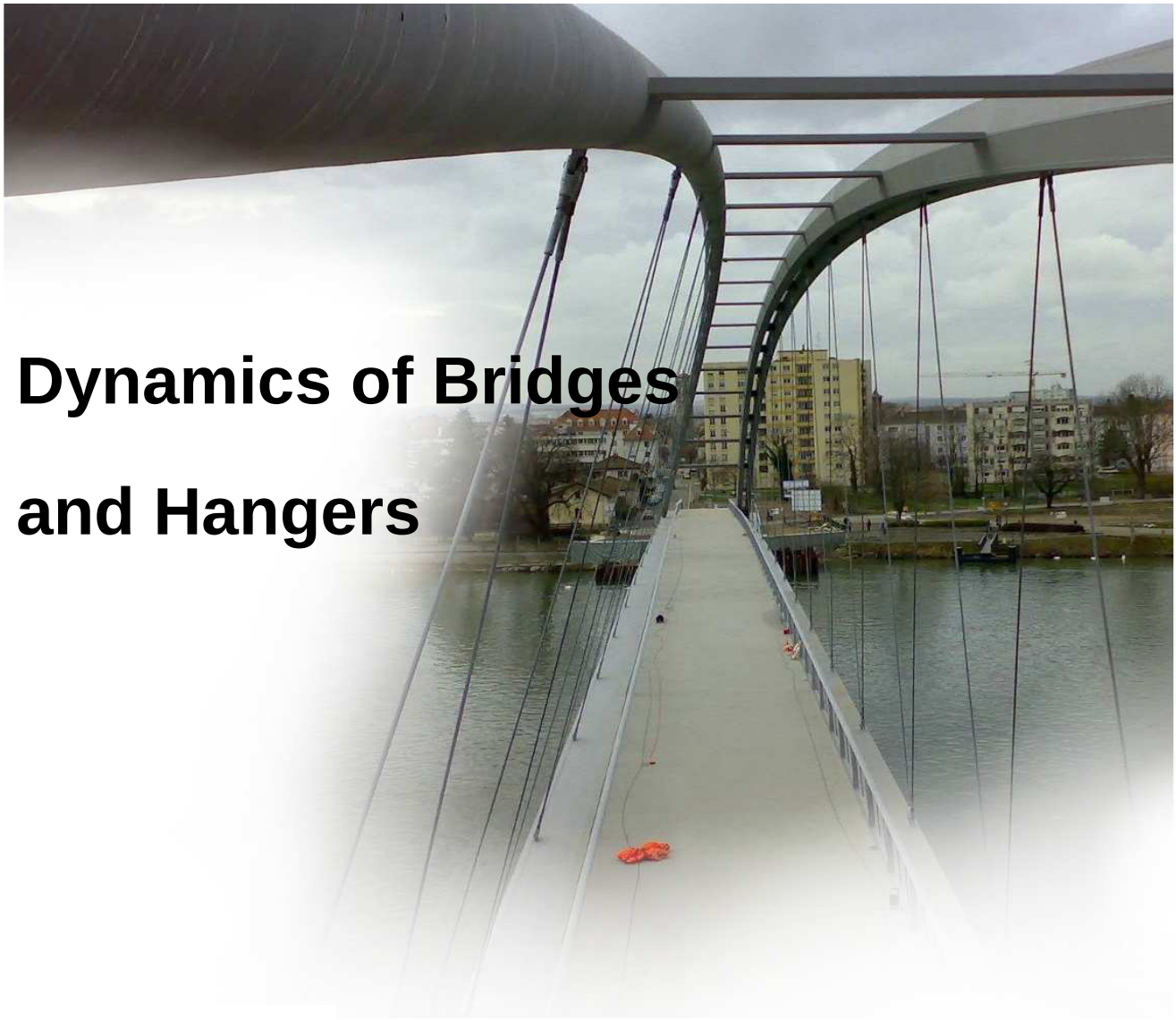

Dynamics of Bridges and Hangers

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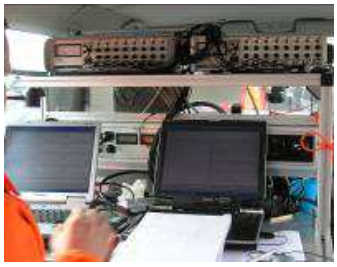

Filigree structures like bridges are vulnerable to dynamic excitations like traffic, foot passengers, vibrations induced by wind and rain or earthquakes. The most important parameters are the natural frequency and the damping and as well the associated modal shape so that e.g. theoretical models can be calibrated.

Because of its own special measurement equipment, the Baudynamik Heiland & Mistler GmbH is able

- to **identify** the **modal shape** of large structures
- to **monitor** large structures (fatigue problems, serviceability)
- to measure the **dynamic stiffness** of structures
- to analyse and assess the **serviceability** of structures.







Year	Reference Projects (Extract)
2014	**Railway bridges, Oberbayern, Germany** Measurements on 22 bridges to determine the characteristic parameters of natural frequency, damping and displacement under load.
2013	**Footbridge between buildings, Hamburg, Germany** Vibration measurements on a covered pedestrian bridge beween two buildings (HELM AG and Hansehaus). Assessment according to VDI 2038 of the necessity to apply dampers.
2013	**Stressed-Ribbon Bridge Tirschenreuth, Germany** Measurements of oscillation and natural frequency with different dynamic loads.
2012	**Footbridges, „Gut Eichtal“, Overath, Germany** Measurements of oscillation and natural frequency with different dynamic loads. Determination of natural frequency and assessment of comfort level.
2011	**Footbridge Schlosssteg, Freiburg, Germany** Dynamic calculation and servicability checks of the bridge and preliminary dimensioning of tuned mass dampers.

Year	Reference Projects (Extract)
2011	**Footbridge „Am Golfplatz“, Flöha, Germany** Evaluation of oscillation of a footbridge and serviceability check.
2011	**Footbridge "Neue Caroline", Holzwickede, Germany** Evaluation of oscillation of a footbridge and serviceability check.
2010	**Footbridge, Aachen, Germany** Dynamic structure investigation of two footbridges. Vibration acceleration measurement for the tuning of mass dampers. Identification of natural frequency.
2009	**Footbridge for a garden festival in Hemer, Germany** Serviceability testing for pedestrian use. Identification of natural frequency for dimensioning mass dampers.
2007	**Footbridge, Weil am Rhein, Germany** (Longest pedestrian Bridge) Modal shape identification by measurement. Identification of the dominant natural frequency due to pedestrian induced horizontal excitation. Analysis of the lock-in-effect, i.e. of the possibiliy of a self induced oscillation in a test with about 1000 people. Analysis the cable forces by means of natural frequency measurements of the hangers.
2008	**Roadbridge Wesel-Datteln-Kanal, Ahsen, Germany** Investigation of natural frequency and damping of hangers.
1999	**Inner Harbour Duisburg, Germany** Measurements of the dynamic stiffness and the damping were necessary for the installation of vertical and horizon-tal dampers. Different load levels and different excitation cases were analysed. Bracings with cables were used in order to enforce different modal shapes.

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Year	Reference Projects (Extract)
1998	**Road Bridge Nordbrücke, Oberhavel, Germany** Serviceability checks as part of planning and design for vehicular use.
2008	**Natural frequency determination*** for the evaluation of the seismic vulnerability of bridges in Germany. (Bridge in the near of Emmerich / Nieder-rhein, motorway bridge Aachen, cable-stayed bridge Severinsbrücke / Rhine).

* during the time as scientific assistant at the RWTH Aachen university

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