STATE OF DYNAMIC CALIBRATION TECHNIQUES AT PTB

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ABSTRACT

To meet the increasing demands from industry and other areas, PTB has developed and implemented new and improved methods for dynamic calibrations of standard transducers and measuring instruments for various quantities. A survey will be given of the current state and specific research projects at PTB for dynamic calibrations and measurements, focusing on the mechanical quantities of mass, mass flow, force, torque, acceleration, velocity, displacement, angular acceleration, angular velocity and rotational angle.

Some of the methods, techniques and procedures presented are still on the stage of metrological research (e.g. concerning impact force and sinusoidal torque). Other methods, techniques and procedures are already well implemented in practice in compliance with international documentary standards recently developed.

For translational and rotational motion quantities in particular (e.g. linear and angular acceleration), traceability chains have been established and operated in accordance with new and upgraded ISO standards. Adequate methods are specified for rectilinear and angular vibration and shock calibration by laser interferometry in ISO 16063 parts 11, 13, 15 and for vibration and shock calibration by comparison to a reference transducer in parts 21 and 22 of the ISO 16063 series. The traceability chains will be completed considering current ISO standard projects such as ISO 16063-41 “Calibration of laser vibrometers” which will specify methods and procedures for the calibration of laser vibrometers in a frequency range from 0.4 Hz to 50 kHz, including both: laser vibrometers as measuring instruments and laser vibrometer standards applicable as reference or working standards in accredited and non-accredited calibration laboratories, respectively. A new ISO project (PWI 2005) on calibration of force transducers may well contribute to the establishment of traceability chains for other quantities such as sinusoidal and impact forces.

Advances achieved in different fields of dynamic calibrations will be demonstrated by experimental results.