Special Equipment and Instrumentation

- **Radar** with a 1600 MHz and 2700 MHz antenna, odometer and laser position marks for profile measurements
- **Network analyzer** for calibration of measuring equipment and for ultrasound phase spectroscopy
- **Eddy current**; multi-frequency eddy current system for crack detection of metallic objects
- **BondMaster** to identify and characterize delamination and near surface damages in wood and fiber-reinforced materials
- **Videoendoscopy** for visual inspections
- **Simulation algorithms** for modeling the propagation of elastic or electromagnetic waves
- **Moisture analyzer** for the determination of concrete, pavement and wood moisture; microwave devices

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**Head and Contact**

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Chair of Non-destructive Testing  
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Field of Activities of the Chair

The chair is as working group 6 (AG6) part of the center for building materials in Munich-Pasing and member of both the Faculty of Civil, Geo and Environmental Engineering and the Faculty of Mechanical Engineering. Field of activities are developments and applications of non-destructive testing methods for the investigation of materials, parts, facilities, buildings as well as the education of students in techniques of non-destructive testing as part of bachelor and master programs.

Special Topics:

Quality control prior to, during and after construction
• Investigation of cementitious materials during setting and hardening
• Assessment of the quality of components and constructions

Inspection of buildings
• Condition assessment of structures
• Development of strategies for quality assurance and inspection of components and structures
• Failure analysis and recommendations for repair and rehabilitation of buildings
• Success of restoration measures

Continuous monitoring
• Monitoring of structural elements using Structural Health Monitoring (SHM) techniques
• Development of miniature sensors and sensor nodes for SHM applications

Applications / Materials
• Construction (concrete, steel, timber, natural stone)
• Mechanical engineering (wind turbines, aviation and aerospace structures, automotive)
• Buildings of cultural heritage (condition monitoring and non-destructive testing)
• Biomechanics
• Concrete, reinforced concrete, steel, wood, composite materials (e.g. CFRP, GFRP), stone, ceramics, polymers

Service Range / Techniques

Ultrasound
• Ultrasound in transmission and in reflection, e.g. for determination of elastic properties (Young’s modulus, porosity, etc.)
• Localization of flaws (cracks, voids, honeycombing)

Infrared-Thermography (active/passive)
• Detection of near-surface defects
• Detection of moisture
• Measurement of heat flow in structures

RADAR (Georadar)
• Localization of reinforcements (weak reinforcements, ducts, pre-stressed elements, defects and moisture)
• Analysis of layered components

Acoustic emission analysis
• Detection of defects (cracks, delaminations)
• Representation of spatiotemporal damage development
• Localization (1D, 2D, 3D); automatic localization
• Analysis of damage parameters with inversion methods (crack size, fracture type, orientation of the crack planes)

Modal and vibration analysis
• Determination of modal parameters (resonance frequency, logarithmic decrement, frequency response, etc.) even without contact (laser vibrometry)
• Identification of elastic properties (dynamic Young’s modulus) and detection of damage
• Local acoustic resonance spectroscopy for the analysis of components

Research and Development
• Development of testing and evaluation methods for data analysis and damage assessment
• Method combination and integration of NDT in visual inspection practices and procedures
• Methods for continuous monitoring of structures
• Instruments, sensors and sensor combinations
• Calibration methods for example for sensors

Cooperation in Committees
• Technical committees of the German Society for Non-destructive testing (DGZfP)
• Technical committees of the International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM)
• Membership of the German Wind Energy Association, the German Geophysical Society, the European Association of Geoscientists and Engineers (EAGE) and the Carbon Composites e. V.

Consulting Service
• Service for companies, organizations, public administrations and private customers in all areas of non-destructive testing concerning inspection of installations, structural members in civil and mechanical engineering, structural health monitoring and quality assurance
• Damage assessments and preparation of audit reports, as well as evaluating the testability of objects
• NDT methods for lifetime prognosis and life cycle assessment of structures and components

Teaching
Courses in all areas of non-destructive testing