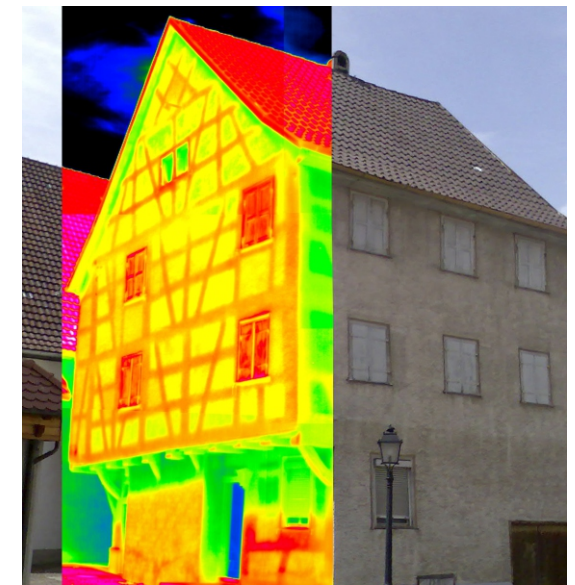


Department Building Preservation

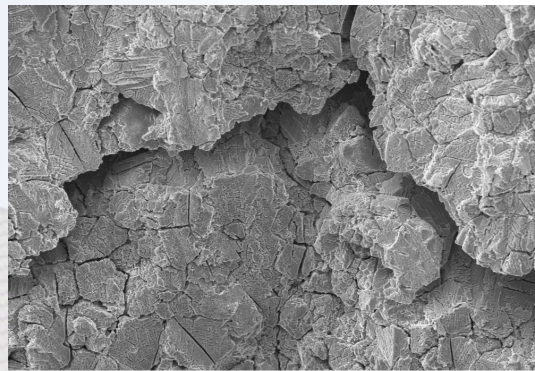
Units

- Building Protection and Restoration of Historical Monuments
- Non-Destructive Testing and Building Monitoring
- Corrosion, Sealing of Buildings



Special facilities

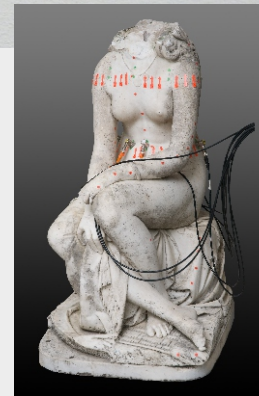
- Environmental Scanning Electron Microscope (ESEM) with energy-dispersive X-ray fluorescence spectroscopy (EDX)
- X-ray diffraction and X-ray fluorescence spectrometer
- Gas Chromatography - Mass Spectrometer (GC/MS), Thermal Desorption Mass Spectrometer (TDS)
- Fourier Transform Infrared spectrometer (FTIR), Ion and Gel Permeation Liquid Chromatography (IC, GPC)
- Outdoor exposure rigs in Stuttgart (city climate), Duisburg (industry climate) and on the Island of Helgoland (offshore seawater corrosion and splash zone corrosion)
- Non-destructive localization of corroding reinforcement (potential mapping)
- Detection and localization of ruptured prestressed wires (magnetic leakage field measurement)
- Weathering test chambers (salt spray, xenon- and UV-radiation, sulphur dioxide and moisture testing)
- Thermal analysis of synthetic materials (DSC, TG-DSC)
- 100 kN testing machine for tension and compression with temperature chamber (-30 to 80 °C)
- Ultrasonic testing equipment with P- and S-wave sensors between 20 kHz and 2.25 MHz in Transmission and Reflexion for fresh and hardened concrete, natural and synthetic stone
- Radar equipment with antennas from 400 to 2000 MHz



Transgranular stress corrosion cracking of brass



Instrumented crack monitoring with wireless sensor nodes



Ultrasonic measurements on a marble statue for the determination of the weathering state

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University of Stuttgart
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Research / Development

- Fundamental research on the weathering of natural stone and mineral building materials
- Development of quality management strategies for the conservation of cultural heritage objects
- Preventive conservation of cultural heritage objects
- Corrosion mechanisms of metals in hot alkali-nitrate salt melts
- Corrosion and stress corrosion cracking in reinforced and prestressed concrete structures
- Corrosion of metals in contact with mineral building materials
- Development of methods for corrosion assessment of high strength steel (e.g. prestressing steel, concrete screws)
- Cracking of high strength wires (rope wires, prestressing steel), fine grained component steels and austenitic structural materials
- Corrosion protection by metallic coatings (hot dip galvanizing, spray coatings with zinc, zinc / aluminium)

Services and Consulting

- Chemical, mineralogical analyses and characterization of metallic, mineral and polymer materials in civil engineering
- Electrochemical tests of building materials for characterization of their corrosion behavior in the case of damage and for material selection
- Examination of prestressing steel
- Corrosion damage inspection of building equipment and appliances
- Protection durability of corrosion coatings and paints
- Physicochemical and mineralogical determination of characteristic values and deterioration process dependencies of natural stone and mineral materials
- Evaluation of stone conservation products for the application on natural stones and building materials such as bricks, terracotta, grout and plaster
- Analyses of building protective agents applied on mineral surfaces
- Investigation of active fire protective systems (intumescent and ablative systems)

- Examination of the ageing behavior of polymer materials under artificial weathering
- Testing of plastics and polymer modified bitumen membranes (roof, building, bridge)
- Testing of joint sealing compounds for roadworks and airfields

Application of NDT

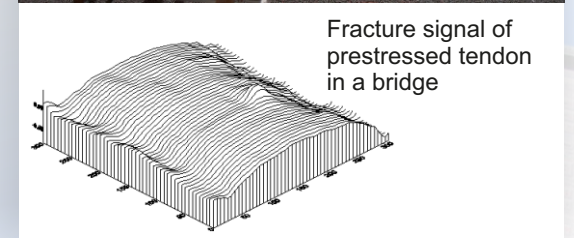
- Non-destructive structural inspection for damage assessment, evaluation of the structural integrity, remaining life and the success of rehabilitation measures
- Use of the latest technology for the instrumented monitoring of bridges, wide-span structures and historic buildings (shm.mpa.uni-stuttgart.de)
- Inspections in the context of object-related damage assessment (OSA) according to DIN 1076
- Ultrasound in transmission and reflection for the detection of flaws (cracks, voids, honeycombing) and assessment of elastic properties
- Quality control of cementitious materials during setting and hardening by determination of elastic parameters
- Ground penetrating radar for the localization of reinforcement, tendons, detection of voids, delamination and the measurement of wall thickness
- Infrared thermography (active/passive) at civil engineering structures and elements for the localization of delaminations, moisture and timber framing

Approvals / Inspection / Certification

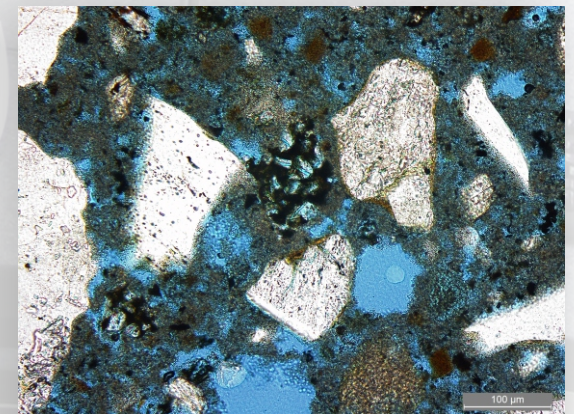
- Approval and surveillance tests on intumescent and ablative fire protection systems, coatings on catch basins and polymer- or bitumen-waterproofing sheets
- DAkkS accredited laboratory (EN 17025) and accredited surveillance body (EN 45011) for mechanical and technological tests on waterproofing sheets
- Accredited testing, surveillance and certification body according to BauPVO (PÜZ) for waterproofing sheets and 2K-adhesives for brick stone walls.
- BMVI Testing authority for joint fillers (RAP-Stra 15, ZTV Fug-StB)
- Initial Type testing and surveillance of waterproofing systems for steel and concrete bridges (accredited by the BAST)



Magnetic leakage field measurement:
Examination of longitudinal prestressing steel in a bridge deck



Fracture signal of
prestressing tendon
in a bridge



Microscopic examination of
lime-cement mortar