

Fields of application

Applications are found wherever existing infrastructure is subject to ageing or to possible damage so that a periodic monitoring is important to prevent physical injury or loss of property.

This comprises amongst others

- Conveyance / operated lifts
- Steelwork
- Power plants / duct systems
- Pressure vessels
- Tendons
- Marker systems of roads or interstates (traffic lights, high-poles, etc.)
- Bridges

Are you already familiar with our industry-standard services?

- Accredited testing laboratory in accordance with DIN EN ISO/IEC 17025 for various NDT methods
- Certificate of competence of the accredited laboratory to qualify and validate (new) nondestructive testing methods for industrial testing practice in the field of ultrasonic testing
- Rapid transfer to market readiness for qualified, standard-compliant use in industrial applications, both for new developments (in-house developments) or for adaptations
- Our associated quality management system is certified in accordance with DIN EN ISO 9001

Contact

Fraunhofer Institute for Nondestructive
Testing IZFP

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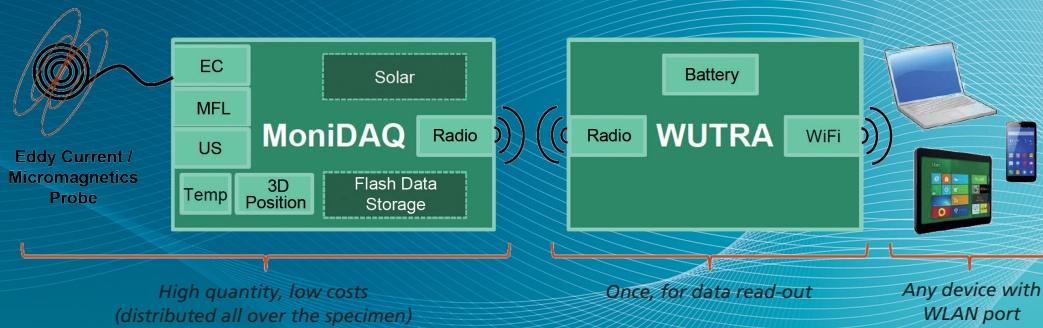
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**Self-sufficient, cognitive sensor platform
for permanent monitoring of infrastructure
constructions**

Condition Monitoring



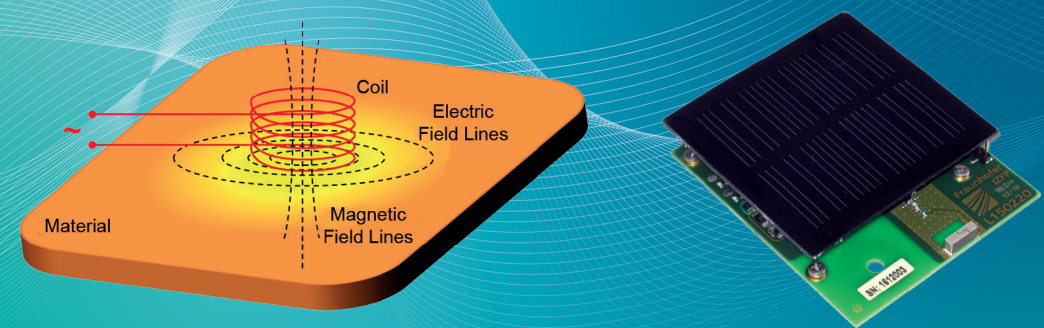
System overview – overview (EC: Eddy Current, MFL: Magnetic Flux Leakage, US: Ultrasound, WiFi – WLAN standard)

Permanent condition monitoring of infrastructure constructions

Many buildings and infrastructure elements currently reach their projected lifetime limits and require regular condition assessment in order to ensure safe subsequent using and to identify the possible need for repair or replacement. Periodic inspections as prescribed by law can not comply this task with absolute certainty, since they were not designed for the conditions in the lifetime limits.

Permanent condition monitoring is a strategy of choice to provide both need-based examination of structures and early detection of potentially dangerous defects. To this, the ability of permanent condition monitoring to reliably identify structural deviations that require further examination is crucial. Such deviations

include formation and growth of cracks or corrosion damage, changes in the inclination angle or material aging. Additionally, the detection of short-term mechanical overloads may be of interest. The detection of some special types of defects is even more reliable by means of permanent monitoring, since often it's easier to track the change of a state than to detect the mere existence or even the location of a defect. Such condition monitoring requires nondestructive measurement devices which are constantly attached to the specimen. Nowadays, nondestructive sensors are able to detect and to track most of the mentioned damage processes long before failure.



Left: Principle of eddy current inspection; right: Mainboard with integrated photovoltaic cell

Fraunhofer IZFP developed cognitive sensors:

- modular, energy self-sufficient electronics which is able to provide eddy current inspection, inclination measurement, magnetic flux leakage inspection and ultrasonic inspection, etc. and to record all sampled data over long periods of time while dissipating extremely low amounts of energy
- read-out of the storage can be carried out easily and fast by means of a radio-controlled interface

These minute electronics require neither a crosslinking among themselves nor a server connection. The conceptual design of the boards was specified with special view for cost-effectiveness to enable their use for urban environment or industrial enterprises in huge quantity. The power supply is provided by an integrated photovoltaic cell.

The read-out is carried out on-site by a service provider which can additionally offer

data processing and result assessment or specific inspections in case of need. Considering the steadily ageing infrastructure, Fraunhofer IZFP faces a huge market for development of customer-specific adaptations including the integration of further NDT methods and the assessment of long-term data. This comprises traffic constructions such as bridges, poles and wall anchors but at same time wastewater systems or industrial pressure vessels and others.

Benefits

- Self-sufficient and eco-friendly power supply by integrated photovoltaic cell
- Long-term stand-alone operation
- Supersensitive defect detection
- Telemetric data recovery by radio-controlled interface
- Low costs per unit
- Unique combination of Fraunhofer IZFP's proven nondestructive sensor technology