Materials Characterization

Dr.-Ing. Klaus Szielasko

In-service Inspection and Life-cycle Monitoring

Prof. Dr.-Ing. Hans-Georg Herrmann

The core competence of the department zeroes in on the establishment of testing prerequisites for material characterization, starting with the physical foundations extending to the development of industrial-grade inspection systems. The emphasis is on the combination of processes, in the improvement of spatial resolution as well as in the optimization of methods relating to contactless measurements.

The methods are used within the frame of the development and production of new high performance materials as well as for well-tried materials. Apart from metallic materials this is also relevant for construction materials and polymers. Miniaturised inspection technology enables the employment of material characterization in microelectronics and microsystem technology.

The department’s research and development activities concentrate on NDT methods and procedures that are relevant for condition monitoring of structures along the complete life time cycle. Deployed NDT methods comprise ultrasonics, electromagneticics, eddy current, X-ray, thermography et al.

Life cycle monitoring forms a new field of research in the frame of condition monitoring. Forschungsfeld für die Zustandsbewertung.


Fraunhofer IZFP

DEPARTMENTS IN THE VALUE-ADDED CHAIN

Departments in the Value-added Chain
Alongside and jointly with system integrators, Fraunhofer IZFP’s Electronics for NDT Systems department develops new innovative electronic modules for non-destructive testing solutions.

The special emphasis lies in working with small and medium-sized companies. For this clientele, the department’s new and industrial-strength solutions provide access to the market and, in future, discrete product updating and follow-up support.

Internally, the department is a service provider for special electronics that are not available in the commercial NDT market. This comprises the transfer of laboratory prototypes in industrial-grade modules including their implementation in existing systems.

Usually production processes are mastered, optimized and are able to produce goods of quality. NDT is required, if the processes are not mastered, not optimized or are not able to produce goods of quality.

Up to now, the focus is on technical production processes such as in the automotive industry, steel production and machine and plant production.

Special department competences relate to the monitoring and inspection of production processes and products where a unique feature developed by IZFP, the 3MA inspection procedure (micromagnetic multiparameter, microstructure and stress analysis) is deployed, i.e., for press hardening, valve spring production and strip steel manufacturing.

The department deals with the development and application of inspection solutions, focussing on fast, automated 3D testing, 3D data evaluation and 3D visualisation (tomographic inspection functions), as well as data fusion of different inspection methods or modalities (ultrasound/acoustics, thermography, X-ray CT).

The existing platform technology enables the fast transfer of custom-made systems to industrial validation and implementation even in the context of complex tasks. To support this flexible and qualified transfer of latest advances to the realm of industrial practice, our laboratory is accredited according to DIN EN ISO/IEC 17025.