Are you familiar with our industrial-grade accredited inspection services?

- Accredited laboratory in line with DIN EN ISO / IEC 17025, to qualify and validate new non-destructive testing (NDT) processes for industrial applications
- Accelerated time-to-market and opportunity for qualified, norm-compliant deployment in industrial applications as well as for new in-house developments or custom adaptation of innovative NDT technologies, even in fields where norms have not been established
- Certification of the corresponding quality management system in accordance with DIN EN ISO 9001

**inspECT – DeepFlawDetector**

Rapid, large-scale testing for deep-seated flaws such as cracks or corrosion under metal or non-metal coverings using GMR line arrays
low-frequency eddy current testing. These characteristics allowed developing a compact line array sensor that can detect deep-seated flaws (with a covering of up to 30 mm above them) over a wide range. Using the “inspECT” eddy current module (see cover) developed at the Fraunhofer IZFP and its software allow performing a C-scan showing the exact position and extension of the flaw within the test specimen.

**Advantages**

Using GMR receiver elements allowed developing a sensor system that is not only capable of detecting flaws at great depths, but also has additional advantages over conventional eddy current or ultrasound testing. These include, e.g.:

- Rapid testing without a need to use means of coupling
- Constant frequency-independent testing sensitivity with high local resolution
- Rapid adaptation to different test situations (by transferring the GMR sensors into the existing technical hardware)
- Sensor systems with 8 or 16 GMR sensors are available and/or individually configurable
- Real-time test data display in the C-scan currently available with simplified indicator interpretation
- Robust, mobile industrial laptop system that can also be connected to conventional eddy current sensors

**Situation**

Due to the electromagnetic skin effect, the depth range of the eddy current method is limited to the surface-near area of test objects. In addition, it depends on the selection of the eddy current testing frequency used. This is why the eddy current method in nondestructive testing is considered and applied as a test method near the surface.

However, the depth range can be increased by reducing the testing frequency. This allows detecting faults that are not accessible to normal eddy current testing and that are also difficult to detect by ultrasound testing, due to its dead zone near the surface. As the measuring effect of the conventional eddy current sensor (coil) is based on electromagnetic induction, which decreases in proportion to the testing frequency decrease, alternative receiver elements must be found for this application.

**inspECT – DeepFlawDetector**

Our goal was developing a sensor system that can detect deep-seated flaws despite the use of low testing frequencies, and provide useful test results. The following requirements had to be met:

- Testing for deep-seated flaws (cracks, corrosion, etc.) for different applications
  - Testing for corrosion in sheet-metal connecting structures or inaccessible sheet-metal structures with a thick coating material
  - Testing interior faults in pipes that are only accessible on their exterior
- Rapid area testing with optional C-scan display
- No-contact testing with an eddy current device that is suitable for industrial applications, robust, and mobile

Contrary to conventional eddy current testing, which uses coils as receiver elements, the DeepFlawDetector system uses so-called “GMR” sensors. Thanks to their key characteristics – high magnetic field sensitivity, even at low frequencies and small dimensions – GMR sensors are predestined for low-frequency eddy current testing.