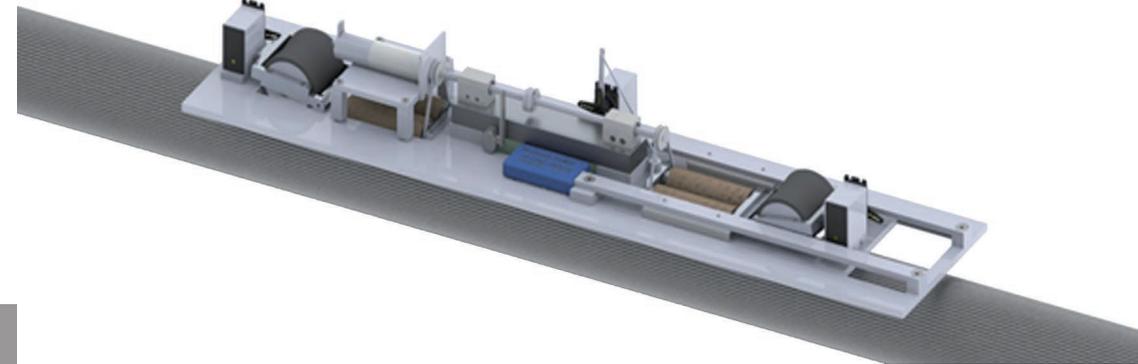




By the way, you already know our industrial grade accredited inspection services?

- Accredited laboratory in line with DIN EN ISO / IEC 17025, to qualify and to validate (new) non-destructive testing (NDT) processes for industrial inspection applications
- Accelerated time-to-market and opportunity for qualified, norm-compliant deployment in industrial applications as well as for complete new developments (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



CAD model of FluxCrawler on a wire rope

Fraunhofer-Institut für Zerstörungsfreie Prüfverfahren IZFP

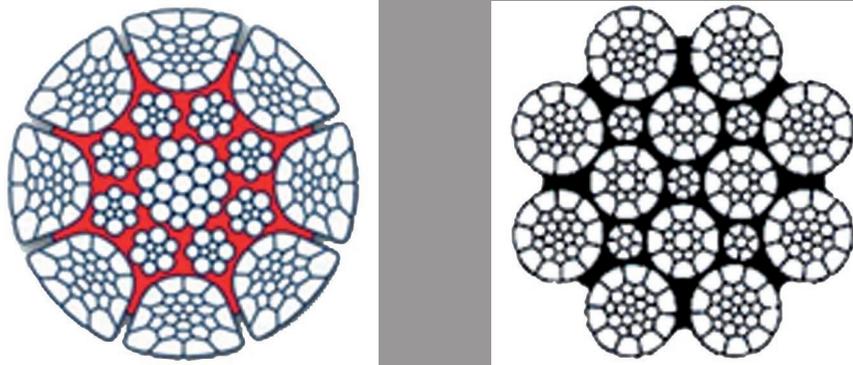
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Different types of wire ropes, possible damage (scheme)



Damaged wire rope (optical image)

Situation

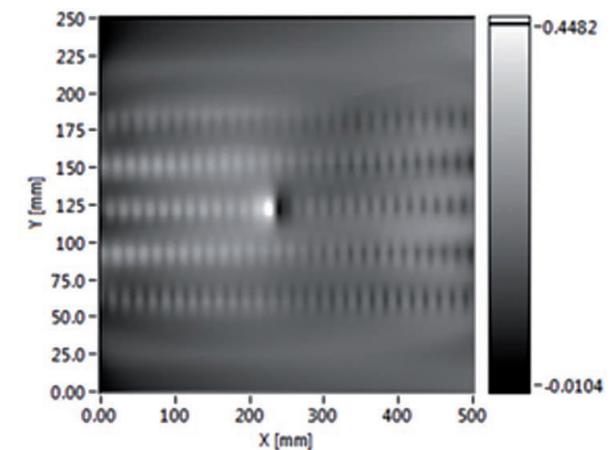
The infrastructure of the economically leading countries is ageing. This concerns especially Germany and France as the backbone of trade of the European Union and rely on a highly developed infrastructure. Also the US National Research Council published a report in 2007 with the title "Sustainable Critical Infrastructure Systems – A Framework for Meeting 21st Century Imperative" which outlined the scope of deterioration of so-called lifeline systems. This can be observed in new infrastructure projects as well, which are now often performed as a private public partnership, i. e. a company builds a structure and guarantees the maintenance service for the designed lifetime. Therefore, reliable inspection and monitoring tools are required.

A main focus of the current research at Fraunhofer IZFP set on external metallic elements of civil engineering structures like prestressing strands, embedded stay cables, prestressing strands and similar metallic rod-like structures. The development of the combination of different nondestructive techniques should be used to enhance the diagnosis. The developed and improved NDT methods can be delivered as a service tool and used e. g. for bridge maintenance.

Regarding the on-site inspection of wire ropes, we are facing a large variety of rope constructions, dimensions and possible damage scenarios (figure 2). Existing testing systems which use the magnetoinductive or flux leakage method for the detection of cracks and filament ruptures are optimized for certain wire diameters, often do not offer precise localization of flaw indications, and require main power or heavy controlling equipment which restricts the on-site application.

Solution

As a result of the ongoing Franco-German collaboration project "FilameNDT", the one-sided access testing platform "FluxCrawler" for the flux leakage inspection of steel wire ropes was developed at Fraunhofer IZFP (figure 1). This testing platform is applicable to most types of wire ropes, requires a minimum diameter of just 3-4 cm and employs a caterpillar-like motion mechanism which combines the motion around and along the wire. The platform contains a strong permanent magnet which serves as magnetizer for the flux leakage inspection and attracts the inspection platform to the wire rope. A low-power electronics board performs the scanning process and controls the caterpillar motion. The platform is powered by a Lithium polymer battery which is sufficient for hours of operation. The magnetic leakage field which indicates imperfections and flaws in the wire rope is scanned with high lateral resolution, the resulting data are transferred to a mobile controlling PC via a fast long-range Bluetooth connection. The expected testing results will be similar to the ones shown in figure 3, delivering a vivid image of the leakage field distribution across the wire rope surface.



Typical flux Leakage signal of localized damage in submerged steel