

Novel electromagnetic sensors and methods for high-sensitivity, non-destructive inspection of defects and anomalies in magnetic steel structures

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Magnetic steels and alloys are widely used in infrastructure systems and industrial equipment and processes, including coiled-tubing pipes for well intervention and drilling in the oil and gas industry, and in bridge and crane cables, to name a few. These structures experience extreme forms of stresses and mechanical damage during manufacturing, deployment and operation. It is critical to regularly inspect these structures to ensure safety of operations, for maintenance, and to predict their remaining life to avoid the risks of unexpected failures.

This project involves the development of high-sensitivity, novel non-destructive electromagnetic/acoustic sensors and methods for real-time inspection and early warning detection of defects and anomalies in steel structures. The research involves multi-physics modelling and simulation of the electromagnetic sensors and materials. The research can also involve the experimental development of sensor prototypes and their characterisation using steel samples provided by industrial partners.

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