

Recent developments in ACFM sensor technology for generic fillet welds, high temperature and galvanized structure inspections

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For more than 30 years, Alternating Current Field Measurement Testing (ACFMT or ACFM for simplicity) has established itself as a prime technique for in-service structural weld inspection. It's been developed from the ground up and extensively validated for surface-breaking crack detection and sizing in ferritic and austenitic steels. In comparison with conventional inspection methods, it performs fast and reliably, even with minimal surface preparation, through thick coating and even in challenging environments such as underwater or hard-to-reach areas. This advanced electromagnetic technique has sustained significant developments over the past four years: Firstly, with the introduction of a new generation of instruments and probes that elevated scanning speed and data quality and more recently, with some more specific application focused developments that opens up new inspection possibilities. These will be the focus of this paper in which we'll unveil the three most important new sensors and solutions, namely: 1) A method for the in-service inspection of hot steel components, at temperatures up to 500°C, 2) A method for the inspection of galvanized steel structures for the reliable detection of surface and non-surface-breaking cracks (i.e. breaking only in steel but not the galvanization layer) and more accurate sizing of cracks in the presence of the galvanization layer, 3) A simple and rugged probe for the single-pass inspection of most fillet welds. It proposes a "No moving parts" design that integrates a new crack length and depth sizing method (3BZ) not requiring surface markings nor encoders. This paper will introduce the ACFM technology and its applications and will cover the technical details and applications of the three above mentioned new developments.