

Novel applications of Pulsed Eddy Current (PEC) inspections in Power and Oil & Gas industries

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Pulsed Eddy Current Technique (PECT) is established in the Power and in the Oil & Gas industries for in-service inspections for Corrosion Under Insulation (CUI) without insulation removal. The growth of PECT for CUI is evident from the incorporation in the ASME BPVC in 2021. Less well-known is that there are many other inspection challenges in which the steel surface is not readily accessible and where PECT can add great value. For instance, PECT is beneficial for inspections of boiler tubes of power plants, flow-accelerated corrosion in steam systems, fireproofed equipment, repair wraps, in-service inspection of storage tanks, splash zone coatings and marine growth of harbor structures and offshore installations. PECT has also demonstrated its value for long-term corrosion monitoring at high temperature, including permanently installed sensors. PECT is well suited for robotic deployment for instance to inspect underwater pipelines with concrete weight coatings down to 2500m water depth. Another example of robotic PECT inspection uses a crawler for internal inspection of industrial filters in Waste to Energy plants. Compared to CUI inspection, these novel applications often not only add greater economic value to the asset owners, but are also easier from the technical point of view. In evaluating these novel applications, the limitations of the PECT technology needs to be taken into account, which is its large 'footprint' over which the test specimen is examined. This makes PECT less sensitive to localized wall loss and holes in the steel. The present paper aims to present a balanced view of the strength and weakness of PECT, based on over 25 years application experience in the oil & gas industry. To this end, a model is presented to predict the PECT response to localized wall loss. The model helps to quantify the sensitivity of PECT to localized wall loss and this make an informed decision on the suitability of PECT for practical applications. This will be illustrated with several examples of corrosion monitoring and robotic PECT inspections.