Eddy Current as a Replacement for Magnetic Particle and Penetrant Inspection Methods

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In the field, components such as pipelines, pressures vessels, ship or any welded structures are constantly exposed to the elements. This often makes for rough surface conditions that is not ideal for inspection. Either created by corrosion, sand blasting after surface preparation or simply due to the rough finished condition of a weld, surface conditions can be detrimental to accurate inspection results. To add to the challenge, these inspections can be also performed under elements. Rain, dirt, condensation, and other can all affect the method that the inspectors might be able to use. Conversely, if the components were protected, painted surfaces or coating materials might be causing their own inspection challenges. In the past, Liquid Penetrant and Magnetic Particle where the to-go inspections for surface defects. However, over the years, these above methods have shown to be unreliable and to have a poor repeatability when the surface finish of the components is not suitable for the conditions mentioned earlier. The lift compensation technology – a new way to perform Eddy Current array– eases the inspection for rough conditions or when the components are coated. In this paper, the technology behind the lift off compensation, and the used of two different type of coils will be discussed. The goal behind the development of this new technology was to obtain a reliable and repeatable detection even on rough surface conditions. To manage two type of coils in real time, a dedicated Eddy Current array weld software was invented to maintains uniform sensitivity independently of signal lift off. This combination gives the opportunity to inspect in a new way many different types of alloys such as carbon steel, stainless steel and Inconel, regardless of their surface conditions. The technology provides an accurate detection and permits the creation of a C-Scan (mapping) image of the returned signal – building a visual reference that is easy to interpret. This paper will review this inspection solution and present results that demonstrate the solution's effectiveness for detection and depth sizing of defects.