

Abstract

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Identifying Different Types of Defects in Butt-Welded Steel Plates using Acoustic Emission Technique

Welding defects can create a catastrophic failure in industrial equipment and pressure vessels during service. Monitoring of weld quality is considered a crucial part of any component risk assessment procedure life cycle determination process. Acoustic Emission (AE) technique is an effective in-service method that is implemented in nondestructive evaluation and monitoring of large structural components. In this research, a laboratory scale investigation was performed in an attempt to identify different types of defects presented in seam welds. Carbon steel plates with three different types of weld defects (i.e. porosity, slag and lack of fusion) were characterized non-destructively using the AE technique. The changes in the AE properties generated from Pencil Lead Break (PLB) showed increase in the energy of AE activity in specimens with slag defects. The results showed that the AE technique could be used only to identify and monitor different types of welding defects qualitatively. The specimens with slag defect have showed the most influence on the AE signatures, followed by the existence of porosity and lack of fusion respectively. Further investigation should be carried out on different shapes and positions of defects along with different welded materials. This will provide further understanding of using AE method as an inspection and monitoring technique for welding defects.