Contribution ID: **62** Type: **Poster**

# Application of Digital Industrial Radiographic Testing in the Inspection of Welds Based on European Standards

Industrial Radiographic Testing (RT) is a fundamental method within Non-Destructive Testing (NDT), widely applied for quality assurance and the evaluation of material integrity in metallic structures. This technique is essential for detecting internal welding defects, identifying volumetric discontinuities, and assessing both the external and internal geometries of components. RT primarily relies on X-ray and gamma-ray sources, which possess the ability to penetrate solid materials and reveal hidden flaws. With advancements in imaging technologies, digital radiography has emerged as a superior alternative to traditional film-based methods, offering higher resolution, reduced radiation exposure, and faster image processing. This study presents the core principles and practical applications of digital industrial radiographic testing, with a focus on its implementation for weld inspection in accordance with European standards such as EN ISO 17636-2 and EN ISO 10675. Four metallic blocks were examined using an X-ray tube and advanced digital radiographic systems, including imaging plates and flat-panel detectors. The testing strictly adhered to relevant protocols and procedures defined by international and European standards, including ISO EN 9712, as upheld by the International Committee for Non-Destructive Testing (ICNDT). Key image quality parameters, such as image quality indicators (IQIs) and contrast-to-noise ratio (CNR), were evaluated to ensure the accurate detection and characterization of defects. The results confirm that digital radiographic techniques are highly effective in identifying and characterizing common weld defects such as porosity, lack of fusion, cracks, and slag inclusions. The study underscores the importance of adopting standard-compliant digital radiographic methods to ensure reliable and efficient inspection of welded joints. This approach enhances safety, traceability, and performance in industrial components by minimizing the risk of undetected flaws.

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