

(175)

Weld Joints Inspection Using Multisource Data and Image Fusion

Tomasz Chady¹, Ryszard Sikora¹, Mariusz Szwagiel², Michał Szydłowski¹, Paweł Waszczuk¹, Barbara Grochowalska¹, Bogdan Grzywacz¹, Leszek Misztal¹, ¹West Pomeranian University of Technology, Szczecin, Poland; ²Pratt&Whitney Rzeszów S.A., Rzeszów, Poland

The problem of inspecting weld joints is very complex, especially in critical parts of machines and vehicles. The welded joint is typically inspected visually, chemically or using radiography imaging. The flaw detection is a task for specialized personnel who analyze all the data on each stage of the inspection process separately. The inspection is prone to human error, and is labor intensive. In the stages of weld joint visual control geometrical measurements are performed, joint alignment, straightness, deformation, as well as the weld's uniformity. Coloration may show the heat impact zone, and melted parts of the base material. Also during this stage the unwanted cracks, pores and other surface defects can be spotted. On the other side during the X-ray inspection other flaws can be discovered. Pores, cracks, lack of penetration and slag inclusions can be observed. The author's goal was to develop a multisource data system of easier flaw detection, and possibly inspection process automation. The methods consisted of three image sources: X-ray, laser profilometer, and imaging camera. The proposed approach consists combining spatial information in the acquired data from all sources. A novel approach of data mixing is proposed to benefit from all the information. The signal from the profilometer enables geometrical information extraction. Deformation and alignment error assessment. The radiogram provides information about the hidden flaws. The color image gives information about texture and color of the surface as well as helps in combining multiple sources.

Acknowledgements:

A financial support of The National Centre for Research and Development Project No INNOLOT/I/9/NCBR/2013 "Advanced methods for manufacturing of aero engine case module components" is gratefully acknowledged.