

On the Comparison of infrared thermography (IT) and digital industrial radiography (DIR) flat panel system for NDT of welded joints

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Abstract

Infrared Thermography (IT) is a good tool for real-time inspection of join welds since the welding process involves large release of heat. This topic has been in fact widely studied in the literature some years ago, example, ref [1]. At that time, in the 90s, infrared (IR) cameras were bulky, nitrogen-cooled so that plant-floor applications were not practical. New technology of small rugged IR cameras allows this application to be seriously revisited, especially with also the powerful available processing power offered by today computers which allows sophisticated algorithms to be deployed real-time. Digital industrial radiography (DIR) also introduced a real time inspection through the usage of flat panel digital detector. The flat panel usually utilise amorphous silicon (aSi) or complementary metal oxide semiconductor (CMOS) detector arrays with thin film transistors for read out control and photo diodes covered with a fluorescence screen for light conversation. With an acceptable spatial resolution and noise power spectrum level, the flat panel is the most appropriate tool for this purpose. Although it is less possible to obtain real time radiographs of seam weld in very robust environment, comparison studies between IT and DIR is of interest. In fact, the two techniques can be seen as complementary. IT is sensitive to close to the surface "defects" while DIR technique probes through the specimen through the usage of real time flat panel detector. The fusion of information from those two NDT techniques can thus bring valuable information on the used welding process yielding to improved quality. An experiment is performed for both techniques on a welded steel plate. In the full paper, these issues will be discussed in details and pertinent results will be presented supporting those assessments.

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REFERENCES

- [1] see chapter on Welding in "Infrared Methodology and Technology", X. Maldague ed., 1994, Gordon and Breach, NY.

