

PhD in MECHANICAL ENGINEERING

Research Title: Active thermography approach for defect detection in welded joints: influence of process parameters and working conditions

Funded by	Alstom
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Context of the research activity	<p>The defect detection on material and components by means of NDT is becoming a critical topic for the industrial environment. The Infra-Red Thermography (IRT), as a full field, non-contact, environmentally friendly, in situ technique is becoming more and more interesting and appealing. This topic involves aspects related to the environment and the safety, critical for industrial context. In particular, it contributes to the development of lighter, safer, more performant components</p> <p>This interest is witnessed, for example, by recent Calls for Proposal in Clean Sky2 EU financed program, dedicated to Active IRT (AIRT).</p> <p>In PoliTo the IRT is deeply investigated, mainly related to fatigue damage related phenomena in metallic materials. Recently, due to the acquisition of AIRT in J-TECH laboratory the defect detection in welding joints and the fatigue damage detection in materials are investigated.</p> <p>The industrial interest for this research activity is witnessed by the PhD scholarship granted by ALSTOM.</p>
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<p>Objectives</p>	<p>Object of the PhD proposal is the investigation of damage phenomena and of damage detection in welded joints by means of active AIRT.</p> <p>The following topics will be investigated:</p> <ul style="list-style-type: none"> • the detection performance of different thermal sources (flash, induction, laser..) and of different excitation configuration • thermal phenomena related to different kind of defects and microstructural modifications due to welding process <p>By processing data obtained from surface temperature acquisition after thermal excitation (AIRT) the performance of the different IR NDT procedures will be compared on different defects, damage, alloys.</p> <p>The research will be developed also thanks to the J-Tech laboratory where the experimental setup is already present.</p>
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<p>Skills and competencies for the development of the activity</p>	<p>MD in Mechanical Engineering</p> <p>Experience in experimental testing with IR equipment</p> <p>Matlab programming</p> <p>Knowledge of English technical language (IELTS minimum requirements)</p>
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