



PhD in INGEGNERIA MECCANICA / MECHANICAL ENGINEERING - 38th cycle

Research Area n. 1 - Advanced Materials and Smart Structures

INAIL Research Field: RESIDUAL LIFE ASSESSMENT OF ALLOYS SERVICED AT HIGH
TEMPERATURES

Monthly net income of PhDscholarship (max 36 months)

€ 1450.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity

**Motivation and objectives of the research
in this field**

The PhD project will be focused on of current or potential use on high temperature, high pressure components. The increase of each parameters improves the efficiency of the process, but leads to a more rapid development of material damage up to the exhaustion of the service life of components. This latter has to be carefully estimated to prevent risks both for individuals and organizations. The project has a main objective the residual life assessment, which will be focused on one of the following alloy classes of importance in the field: martensitic steels, austenitic steels or innovative alloys.

**Methods and techniques that will be
developed and used to carry out the
research**

The research includes a survey on life assessment strategies based on the combined analyses of microstructural evolution, of the physical description of the damage process, and of the material properties which can be evaluated by specific, innovative, test methods. The survey will be followed by a phase during which a new strategy for the residual life assessment will be defined. The strategy will be validated on one material for which the microstructural evolution/properties correlation is in most part known to the project partner (INAIL), with possible ad-hoc experiments to get specific missing pieces of information. Lastly, the strategy for will be considered in an extended version considering the



	specific issues of other alloy classes.
Educational objectives	At the end of the PhD cycle the candidate will be able to define, design and carry out original research programs by working in a team or leading a research group in the field of high-performance materials. Educational activities during PhD will include research management, exploitation of research results and intellectual property.
Job opportunities	<p>As reported in art. 1 of the agreement between INAIL and Politecnico di Milano, the research project includes a period to be spent at the premises of INAIL, in accordance with the development of the research activity and in order to pursue educational objectives related to the Doctoral programme itself.</p> <p>The scholarship is subordinated to the presence of the eligible doctoral student at INAIL, consistently with the educational activities coordinated with the tutor of Politecnico.</p> <p>The project will be supervised by INAIL representatives (Engineers Corrado Delle Site and Andrea Tonti), together with POLIMI tutors (Professor Elisabetta Gariboldi).</p>
Composition of the research group	2 Full Professors 1 Associated Professors 1 Assistant Professors 3 PhD Students
Name of the research directors	Prof.ssa Elisabetta Gariboldi

Contacts	
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--



Scholarship Increase for a period abroad	
Amount monthly	725.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

Financial aid is available for all PhD candidates (purchase of study books and materials, funding for participation in courses, summer schools, workshops and conferences) for a total amount of **euro 5.900**.

Our candidates are strongly encouraged to spend a research period abroad, joining high-level research groups in the specific PhD research topic, selected in agreement with the Supervisor. An increase in the scholarship will be applied for periods up to 6 months (approx. 725 euro/month - net amount).

Teaching assistantship: availability of funding in recognition of supporting teaching activities by the PhD candidate. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.