



PhD in INGEGNERIA DEI MATERIALI / MATERIALS ENGINEERING - 39th cycle

PNRR 118 PNRR Research Field: SUSTAINABILITY THROUGH DURABILITY OF REINFORCED CONCRETE

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

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

Concrete is ubiquitous in modern construction, yet it is largely perceived as a material with an unacceptably high environmental impact, due to the use of cement and the consumption of natural resources, such as water and aggregates. Nonetheless, it is unlikely that the need for concrete will be reduced soon. It is therefore imperative to reduce its environmental impact. Achieving long-term durability of reinforced concrete structures is another way to enhance the sustainability of the construction sector: designing new structures with service lives longer than the traditionally accepted 50-100 years as well as prolonging the residual life of existing structures, can help reduce the production of waste and the use of virgin materials. The aim of the research is to combine the selection of sustainable materials (e.g., low-clinker cements) with smart technologies (e.g., corrosion resistant rebars and galvanic anodes) to increase the service life of reinforced concrete structures.

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

The research will be based on experimental tests aimed at characterizing concrete and the corrosion behavior of the reinforcements. In particular, accelerated tests will be used to predict the long-term behavior of the material with respect to deterioration mechanisms that can occur in real exposure conditions. The PhD candidate is expected to actively contribute to develop an experimental research plan in cooperation with his/her supervisors.



Educational objectives	The PhD candidate is expected to acquire a deep knowledge – both theoretical and technological – of concrete materials and reinforcement corrosion
Job opportunities	Given the gained expertise and considering the great interest in the field of sustainability of the construction materials industry, it is expected that the possible career of the PhD graduate will be as a highly qualified researcher in the industry as well as research institutes or universities.
Composition of the research group	0 Full Professors 4 Associated Professors 1 Assistant Professors 5 PhD Students
Name of the research directors	Prof.ssa E. Redalli

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	700.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	
By number of months at the company	0
Institution or company where the candidate will spend the period abroad (name and brief description)	Eduardo Torroja Institute for Construction Sciences (IETcc) - Spanish National Research Council (CSIC) - Serrano Galvache 4 28033-Madrid (Spain) https://www.ietcc.csic.es/en/
By number of months abroad	6



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

Individual budget for research (5.700 euro): 1st year: 1.900 euro; 2nd year: 1.900 euro; 3rd year: 1.900 euro

Teaching assistantship (availability of funding in recognition of supporting teaching activities by the PhD student): there are various forms of financial 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 regulation.