



PhD in INGEGNERIA STRUTTURALE, SISMICA, GEOTECNICA / STRUCTURAL SEISMIC AND GEOTECHNICAL ENGINEERING - 38th cycle

**PNRR_352 Research Field: INNOVATIVE LOW-CARBON SOLUTIONS FOR THE SEISMIC
RENOVATION OF EXISTING MASONRY BUILDINGS**

Monthly net income of PhDscholarship (max 36 months)
€ 1195.5
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	<p>Most part of Italian existing buildings is in masonry. Being Italy a seismic-prone country, a significant share of its building stock is vulnerable, being building capacity not adequate to accommodate the effects of seismic action, when both capacity and action are evaluated according to modern building codes. Consequently, such buildings, in the future, will need retrofiting.</p> <p>In this context, safety of such buildings is strictly related to the design of both structural and ancillary components in retrofitting and restoration works. Reliable solutions are strongly related to the connection between seismic resisting elements and masonry members. Such fastening solutions are mostly provided by specialized industry, on the basis of cooperative research and development with universities. The project aims to develop a comprehensive framework for the development of a new assessment and design methods which will also allow to evaluate the sustainability of the fastening solutions.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The research project aims to investigate the behavior of post-installed fasteners in masonry under seismic action to the scope of defining new robust and reliable design methods, currently not defined neither in national nor international building codes. A holistic approach will be adopted, not only combining experimental, analytical and numerical approaches, but also accounting for the current</p>



	manufacturing capabilities and their potential evolutions.
Educational objectives	The candidate will become confident with advanced topics in the field of post-installed fastening to masonry under seismic action, mastering advanced experimental and numerical methods. Additionally, she/he will have also an insight into broader issues, with high technical and socio-economical impact, also accounting for a manufacturing and marketing perspectives.
Job opportunities	An in-depth research activity in the field of masonry retrofitting represents an excellent opportunity for any structural engineer in the forthcoming decades. In addition, specific knowledge in the field of connections can guarantee a career in the R&D department of manufacturing companies.
Composition of the research group	1 Full Professors 2 Associated Professors 1 Assistant Professors 2 PhD Students
Name of the research directors	Giovanni Muciaccia

Contacts	
giovanni.muciaccia@polimi.it	

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	597.76 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	Fischerwerke GmbH & Co, Fischer Italia srl. - www.fischer-international.com
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	University of Stuttgart - Civil and Environmental Engineering - Institution of Construction Material (IWB) (https://www.iwb.uni-stuttgart.de) - Purdue University - Lyles School of Civil Engineering (https://engineering.purdue.edu/CE)
By number of months abroad	6



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

Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research:

- University of Stuttgart(Stuttgart,Germany)
- Nottingham Trent University (Nottingham, UK)
- UPC (Barcellona,Spain)
- CSTB (Paris, France)
- Purdue University (West Lafayette, IN, US)

Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): The Ph.D. course supports the educational activities of its Ph.D. students with an additional funding equal to 10% of the scholarship, starting from the first year.

Teaching assistanship (availability of funding in recognition of support to teaching activities by the PhD student): Ph.D. students are encouraged to apply, upon prior authorization, to the calls to support teaching activities at the undergraduate and Master levels at Politecnico, being paid for that. The teaching assistantship will be limited up to about 80 hours, maximum half of them devoted to teaching and classroom activities and the rest to support classworks and exams.

Computer availability and desk availability: Each Ph.D. student has his/her own computer for individual use.Each Ph.D. student has his/her own desk, cabinet and locker.