

CIVIL AND ENVIRONMENTAL ENGINEERING

MUR DM 118 - Low-impact environmental envelope for energy renovation and seismic protection of buildings

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Dipartimento DISEG
Supervisor	DOMANESCHI MARCO - marco.domaneschi@polito.it
Contact	MARANO GIUSEPPE CARLO - giuseppe.marano@polito.it CUCUZZA RAFFAELE - raffaele.cucuzza@polito.it DOMANESCHI MARCO - marco.domaneschi@polito.it
Context of the research activity	<p>Lack of efficient design standards, such as those requiring the seismic safety and energy saving of buildings, was a prevalent feature of most European countries in the 80s, 70s, or earlier. As a result, the majority of existing structures are lacking in both energy efficiency and seismic protection. The project aims to respond in a simple, straightforward and sustainable way to the need for structural and energy retrofitting for the Italian building stock, with a particular focus on non-historical residential buildings built in the post-WWII period with cast-in-place reinforced concrete (RC) frame structures. Emerging issues related to global warming, cost of energy resource scarcity and seismicity of Italian territory require technological solutions capable of responding effectively, considering updated regulations. The research will focus on solutions that involve exoskeletons and a lightweight panels on the external envelope of buildings. The last may consists in different arrangements such as solid panels or a membrane tensioned, detached and parallel to the facade, creating a cavity that is subsequently filled with recycled bio-based materials as flakes, particles or foams.</p> <p>Progetto finanziato nell'ambito del PNRR - MUR DM 118 - CUP E14D23001710006</p>
Objectives	The area of research is seismic protection of buildings in order to reduce their vulnerability and at the same time improve their energy performance. This is in order to protect the community from natural disasters such as earthquakes, adapt to the effects of global warming by thermally insulating buildings, improve the sustainability of buildings and interventions, and improve the resilience of buildings

Skills and competencies for the development of the activity

Structural analysis, structural vulnerability assessment, optimization and identification processes.