

A new holistic approach for the rehabilitation of the existing reinforced concrete

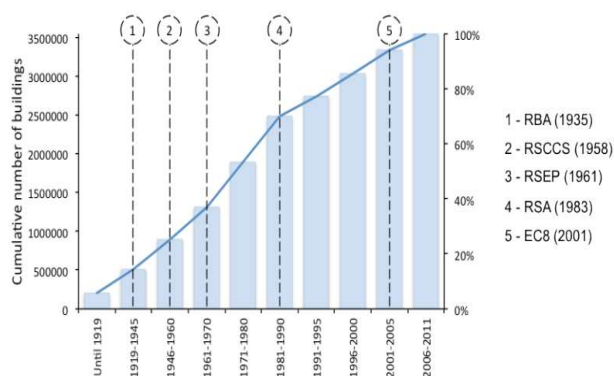
Summary

The main objectives are (i) characterization of the Reinforced Concrete Structures (RCS) in the Portuguese building stock, built before 1983, with the identification of priority regions (regions with high seismic hazard and high heating/cooling). This identification will result in analyzing data relative to average annual energy consumption and seismic risk (the types of RCS will also be identified); (ii) development of a Holistic Methodology for Performance Assessment (HMPA) for RCS that will simultaneously evaluate energy efficiency, seismic vulnerability, and life cycle. It is expected that this HMPA will aggregate these performance indicators in terms of economic costs, (i.e., costs due to annual energy consumption, expected annual seismic losses, and costs associated with the life cycle of the building) followed by: (iii) evaluation of independent (seismic or energy) and combined in RCS impact. Succeeding the use of existing literature strengthening techniques to test and calibrate the numerical models which will be performed, to compare the data obtained by the numerical model to the original existing condition of the building; (iv) evaluation of the impact on retrofitting techniques from micro-level (buildings) to the macro-level (regional and national) and finally (v) the development of guidelines for applying the new HMPA and to develop/propose a new policy measure to stimulate the implementation of this new holistic approach for future rehabilitation interventions of existing HMPAs.

The objectives of this project are in line with the Sendai Framework Action Plan for DRR 2015-2030, the United Nations SDG 2030 Agenda, the new European Bauhaus, the Paris 2021 Agreement, the new Urban Agenda for sustainable cities and the First Circular Economy Action Plan. The achievement of these objectives will directly contribute to supporting government agencies in the design of instruments that aim to modernize the existing housing stock, changing the current paradigm of construction by creating synergies among different areas.

Keywords

Reinforced Concrete Structures (RCS), seismic vulnerability, thermal performance, life cycle analysis.



Cumulative distribution of buildings in Portugal according to the period of construction, at the time of the 2011 Building Census.



Non-structural damage in the envelopes of a residential building in Turkey (6th February 2023).



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Period

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Funding

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