ENRICH PROJECT – ENHANCING THE RESILIENCE OF ITALIAN HEALTHCARE AND HOSPITAL FACILITIES

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In the last few decades, nonstructural elements (NEs) became object of paramount interest for worldwide structural and earthquake engineering researchers. Several observational, experimental, theoretical/analytical, and numerical investigation campaigns were carried out, developing significant knowledge regarding the seismic performance of NEs and defining seismic risk mitigation methods and engineering solutions. The following steps of the field research should overcome the element-based and purelyseismic assessment, by implementing more comprehensive and holistic evaluation/enhancement procedures, for example, considering NEs as systems integrated within buildings and facilities and accounting for their functioning conditions in relation to facility operativity.

The concept of resilience, which has been introduced and implemented in several engineering fields, did not find the application yet to healthcare and hospital facilities (HHFs) and NEs. Resilience of HHFs does not only involve seismic performance of NEs but also their interaction with other elements and hosting facility and their functional adaptivity. This latter property can be defined as the capacity of NEs to be adapted to alternative arrangement and functioning conditions, due to relatively rapid necessity changes. For example, in the aftermath of a moderate to severe earthquake event, or due to a sanitary emergency (such as current pandemic), it might be necessary to change the organization of HHFs by rearranging wards and spaces (i.e., mostly NEs). The (in)capability of HHFs and NEs to adapt to these changes potentially results in social, economic, and human losses, given the strategic task of HHFs. Indeed, it is public knowledge that Italian hospitals are quite poor in terms of functional adaptivity, as current sanitary emergency demonstrated. Furthermore, several recent post-earthquake events have shown that hospitals are not even adequate in terms of structural performance and damage to NEs.

ENRICH project (2022-2025), i.e., ENhancing the Resilience of Italian healthCare and Hospital facilities, aims at enhancing the resilience of HHFs regarding both functional adaptivity and seismic performance of NEs. The project was conceived and planned in the light of the abovementioned critical motivations.

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ENRICH project was recently funded by the Italian Ministry of University and Research (MUR), in the framework of PRIN 2020 grants (competitive funds for Research Projects of National Relevance). In practical terms, ENRICH will (a) provide a clear and robust assessment of the current resilience of Italian HHFs, (b) develop innovative systems and technologies that improve the seismic and functional adaptivity performance, (c) supply novel methodologies and guidelines for the improvement of the resilience of HHFs regarding NEs, (d) develop design and maintenance tools aimed at critical NEs of Italian HHFs, and (e) raise stakeholders' awareness on the resilience principles, weaknesses and mitigation regarding Italian HHFs and NEs.
The project will implement a multi-criteria approach combining multiple methodologies, i.e., (a) field data collection, (b) nondestructive experimental in situ tests, (c) laboratory experimental tests, (d) analytical/numerical simulations, (e) statistical-based analysis, (f) data management and BIM implementation and (g) communication planning and delivery. The project will contribute to both research and practice, producing a significant impact on public economy and safety and fostering further grant allocations.
The project is coordinated by Prof. Gennaro Magliulo (national scientific coordinator), associate professor at the University of Naples Federico II (Department of Structures for Engineering and Architecture). Five research units will collaborate to carry out the research activities: University of Naples Federico II (coordinator Prof. Gennaro Magliulo), University of Sannio (coordinator Prof. Giuseppe Maddaloni), University of Salento (coordinator Prof. Maria Antonietta Aiello), Construction Technologies Institute (ITC) of National Research Council (CNR) (coordinator Dr Antonio Bonati), and National Institute of Geophysics and Volcanology (INGV) (coordinator Dr Gemma Musacchio).

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