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## **Towards Urban and Structural Resilience in Earthquake Engineering**

In high seismicity areas, Unreinforced Masonry (UM) and even Reinforced Concrete (RC) structures recurrently set populations at risk of life due to the use of substandard materials, poor design and lack of effective quality assurance processes, therefore structural resilience is of paramount importance.

Resilience is linked to the ability of structures or urban systems to quickly recover after extreme events, to reduce any losses, and be able to sustain further aftershocks and disturbances. The main aim of resilience-based design is to minimise direct and indirect losses, and this can be achieved by increasing robustness and by reducing recovery time. In case of structural resilience, there are modern seismic design codes which can be applied to increase the robustness of new and existing structures.

However, to be able to substantially enhance urban resilience, a multi-hazard approach is required. Urban resilience requires a holistic, systematic approach to enable urban systems to prepare, respond, and recover from multi-hazard threats with minimum damage to public safety, economy and security, and the role of our structures and infrastructure is vital. A multi-risk approach needs to be developed to evaluate and rank the effect of the different types of risks and to also consider conjoint and cascade effects. Therefore, it is essential first to evaluate the performance of the existing structures under multiple actions and then to develop new types of materials and structural systems for the multi-hazard protection of the existing structures.

The concepts of urban and structural resilience are fairly new approaches. Even if there are research studies and some limited knowledge in the field, there is a lack of a widely adopted framework which, in addition to the limited expertise and the differing views across the scientific community, are the main barriers for the wide application of these concepts for the design of structures and infrastructures.

Dissemination of knowledge and enhancement of the existing practices in the field of Structural Engineering are of utmost importance for the International Association of Bridge and Structural Engineering (IABSE). More specifically, IABSE Task Group (TG) 1.1 'Improving Seismic Resilience of Reinforced Concrete Structures' and TG 5.5 'Conservation and Seismic Strengthening/Retrofitting of Existing Unreinforced Masonry Structures' are focused on the seismic resilience of RC and UM structures. TG 1.1 and 5.5 consist of experts (academics and practitioners) from more than 15 countries worldwide working on the development of strategies and practical guidelines for the enhancement of structural resilience of new and existing RC/UM structures. Aristotle the Greek Philosopher said, '*Excellence is never an accident. It is always the result of high intention, sincere effort and intelligent execution; it represents the wise choice of many alternatives...*'. In this direction, our goal is to work further to promote scientific excellence and develop strategies to facilitate the decision-making process for resilient urban futures.

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