Progressive collapse of structures: current knowledge and ongoing researches

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In structural engineering, the term progressive collapse denotes the spread of an initial local failure on a structure to other members in such a way that the final collapse state is disproportionate to the initial failure. The progressive collapse of Ronan Point tower (London) in 1968 first attracted the scientists to the special nature of such a phenomenon. In the last 50 years many developments have been made. However, there are still debated points and lots of open issues.

The first part of the seminar presents the basics of the phenomenon highlighting the various types of collapse that can occur. A short review on the numerical methods that can be adopted for the study of the phenomenon introduces the strict connection that exists between progressive collapse and structural robustness. The second part is devoted to ongoing researches on the progressive collapse of frame structures. Since it is impossible to encompass all possible causes of failure, the proposed approaches are threat-independent, meaning that the initial cause of failure is unknown, while the effects on the members are not. The behaviour of frame structures subjected to the sudden column loss scenario is deeply discussed and a novel tool for assessing the potential of progressive collapse is presented.

Short CV

Dr. Valerio De Biagi is assistant professor of Structural Mechanics at Politecnico di Torino. He got his PhD in 2014 with a thesis on structural complexity and its implications on the robustness towards extreme events. His interests encompass various fields of engineering and natural sciences, with particular attention on the interaction between natural hazards, e.g., rock-falls and snow avalanches, and constructions. He is currently working on structural robustness and progressive collapse of frame structures subjected to sudden column removal. He is author of more than 40 papers in national and international academic journals.