Risk-Based Assessment of Structural Robustness

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Abstract text:
Providing safety of structures is one of the main aims of design. In traditional design it is achieved by designing structural components against specified limit states. However, as showed the Ronan Point collapse in UK in 1968, when a gas explosion in one of flats on the 18-th floor of the residential building caused the failure of an entire section of the building, this approach is not sufficient. The approach does not exclude the risk of local damage to a structure due to accidental events that can occur during service life of the structure. While probability of occurrence of such events for ordinary structures is low, and, therefore, they are not considered explicitly in design, their effect on structural safety becomes significant if the structure is not robust, that is when some local damage can trigger a chain reaction of failures causing collapse of the whole structure or of a major part of it, the so called progressive collapse. The purpose of this paper is to outline the basic premises for the utilization of risk assessment in evaluating the robustness of structures. In the following the robustness assessment is understood as a process of decision making based on risks.
Key Words:
robustness of structures; risk assessment; decision making; conse-quences evaluation; index of robustness.

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