FACTORS AFFECTING SEISMIC BEHAVIOUR OF REINFORCED CONCRETE STRUCTURES AFTER FIRE EXPOSURE

Author(s): Alper Ilki¹, Ugur Demir²


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Abstract:
In the areas under high earthquake risk, the impact of fire damage on the seismic performance of the reinforced concrete (RC) structures ought to be realistically taken into account while assessing the fire damage to develop reuse/repair/replace strategies through the remaining service life. In the scope of this study, a literature review is conducted on the changes of mechanical characteristics of concrete and reinforcement caused by a fire with a particular emphasis on the post-cooling stage. Post-cooling behaviour of RC members is different than the behaviour under elevated temperatures and hence it is of vital importance on structural seismic performance assessment after a fire. Apart from material-wise assessment methodologies, post-fire seismic performance of RC structural members is also discussed through post-fire simulated seismic loading tests conducted on full-scale cast-in-place and precast columns. The test results pointed out to a reduction in lateral load bearing capacity of the cast-in-place columns subjected to fire whereas fire-exposed precast columns demonstrated better performance in terms of residual lateral load capacity due to the lower axial load and larger heights. All columns exhibited satisfactory performance in terms of ductility.

For full paper, contact:
Prof Muhammad Masood Rafi
Editor-in-Chief, NED University Journal of Research
Ph: +92 (21) 99261261-8 Ext: 2413; Fax: +92 (21) 99261255
Email: NED-Journal@neduet.edu.pk
Website: http://www.neduet.edu.pk/NED-Journal

¹ Professor, Civil Engineering Faculty, Istanbul Technical University, Istanbul, Turkey, Ph. +90 212 285 38 38, Email: ailiki@itu.edu.tr.
² PhD student, Civil Engineering Faculty, Istanbul Technical University, Istanbul, Turkey, Email: udemir@itu.edu.tr.