



# Behavior of Reinforced High-Strength Concrete Short Columns Subjected to High Temperature

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## Abstract:

The increasing use of high-strength concrete (HSC) for structures has been widely noticed in recent years. The risk of exposing these HSC structures to high-temperatures during a fire has increased significantly in Egypt. Consequently, the safety of such structures during and after a fire is important which depends on the mechanical properties of HSC structure elements subjected to high-temperature. The main objective of this study is to investigate the residual mechanical properties of high-strength concrete short columns with regard to high-temperature effects. This study presents the results of twenty-nine high-strength short columns 100×100×400 mm exposed to high-temperature cycle and tested under static loading up to failure. Different parameters were considered during this study such as percentage of longitudinal reinforcement, thickness of concrete cover, and temperature degree level. Experimental results showed that the compressive strength of high strength concrete has a little change until 400°C; however, beyond this degree of temperature a 55% reduction in the compressive strength was noticed compared with specimens at room temperature. Also, cooling of heated samples in water decreased the residual strength by 36% compared with their counterparts cooling in air.

## Keywords:

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