

## Behaviour of RC Columns at Elevated Temperatures by NDT Techniques

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**Abstract :** Reinforced concrete column is an important structural element in a building. Concrete usually performs well in building fires. However, when it is subjected to prolonged fire exposure or unusually high temperatures, and then it will suffer significant distress. Because concrete pre-fire compressive strength generally exceeds design requirements, therefore an average strength reduction can be tolerated. However high temperature reduces the compressive strength of concrete so much that the concrete retains no useful structural strength. Therefore the residual strength and its performance of structure can be assessed by NDT testing. In this paper, rebound hammer test and the ultrasonic pulse velocity (UPV) are used to evaluate the residual compressive strength and material integrity of post-fire-curing concrete subjected to elevated temperatures. Also considering the large availability of fly ash in most of the countries, an attempt was made to study the effect of high volume fly ash concrete exposed to elevated temperatures. 32 RC column specimens were made with a M20 grade concrete mix. Out of 32 column specimens 16 column specimens were made with OPC concrete and other 16 column specimens were made with HVFA concrete. All specimens having similar cross-section details. Columns were exposed to fire for temperatures from 100°C to 800°C with increments of 100°C for duration of 3 hours. Then the specimens allowed cooling to room temperature by two methods natural air cooling method and immediate water quenching method. All the specimens were tested identically, for the compressive strengths and material integrity by rebound hammer and ultrasonic pulse velocity meter respectively for study. These two tests were carried out on preheating and post heating of the column specimens. The percentage variation of compressive strengths of RCC columns with the increase in temperature has been studied and compared the results for both OPC and HVFA concretes. Physical observations of the heated columns were observed.

**Keywords :** HVFA concrete, NDT testing, residual strength

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