

Investigation of Fire Damaged Reinforced Concrete Walls with Axial Force

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Abstract : Reinforced concrete (RC) shear wall system of residential buildings is popular in South Korea. RC walls are subjected to axial forces in common and the effect of axial forces on the strength loss of the fire damaged walls has not been investigated. This paper aims at investigating temperature distribution on fire damaged concrete walls having different axial loads. In the experiments, a variable of specimens is axial force ratio. RC walls are fabricated with 150mm of wall thicknesses, 750mm of lengths and 1,300mm of heights having concrete strength of 24MPa. After curing, specimens are heated on one surface with ISO-834 standard time-temperature curve for 2 hours and temperature distributions during the test are measured using thermocouples inside the walls. The experimental results show that the temperature of the RC walls exposed to fire increases as axial force ratio increases. To verify the experiments, finite element (FE) models are generated for coupled temperature-structure analyses. The analytical results of thermal behaviors are in good agreement with the experimental results. The predicted displacement of the walls decreases when the axial force increases.

Keywords : axial force ratio, fire, reinforced concrete wall, residual strength

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