Residual load capacity of HVFA reinforced concrete after elevated temperature heating: Experimental and analytical study

Author-M.S. Mojibi, M. Shariq, A. Masood, F. Mahdi, H. Abbas

Research has been focused on using waste materials i.e. Fly Ash, as a partial replacement of cement in concrete, for environmental, economic, resource conservation, and ecological benefits and reduction of CO2 emission from the concrete industries for sustainable development. The generation of 1 MW power produces nearly 1800 tons of total ash, which contains 20% bottom ash and 80% fly ash and disposing of such huge amount of fly ash is a big challenge especially in developing countries. Hence research has been focused on using fly ash as a replacement of cement.

Observations:-It has been observed that compressive strength of the C65F35 (Cement-65% and fly ash-35%) mix is higher than that of the C100F0 mix at 28 days.

It has also been observed that, at 28 days, C100F0 specimens subjected to ambient and 200 ◦C temperatures failed due to yielding of reinforcement (I.e. concrete strength was good). At 90 days, both C100F0 and C65F35 specimens subjected to ambient and 200 ◦C temperatures failed due to yielding of reinforcement.

The weight loss and crack pattern in reinforced HVFA (High volume fly ash) concrete were also studied. It has been observed that after heating at elevated temperature, the compression behavior of fly ash concrete is better than that of plain concrete

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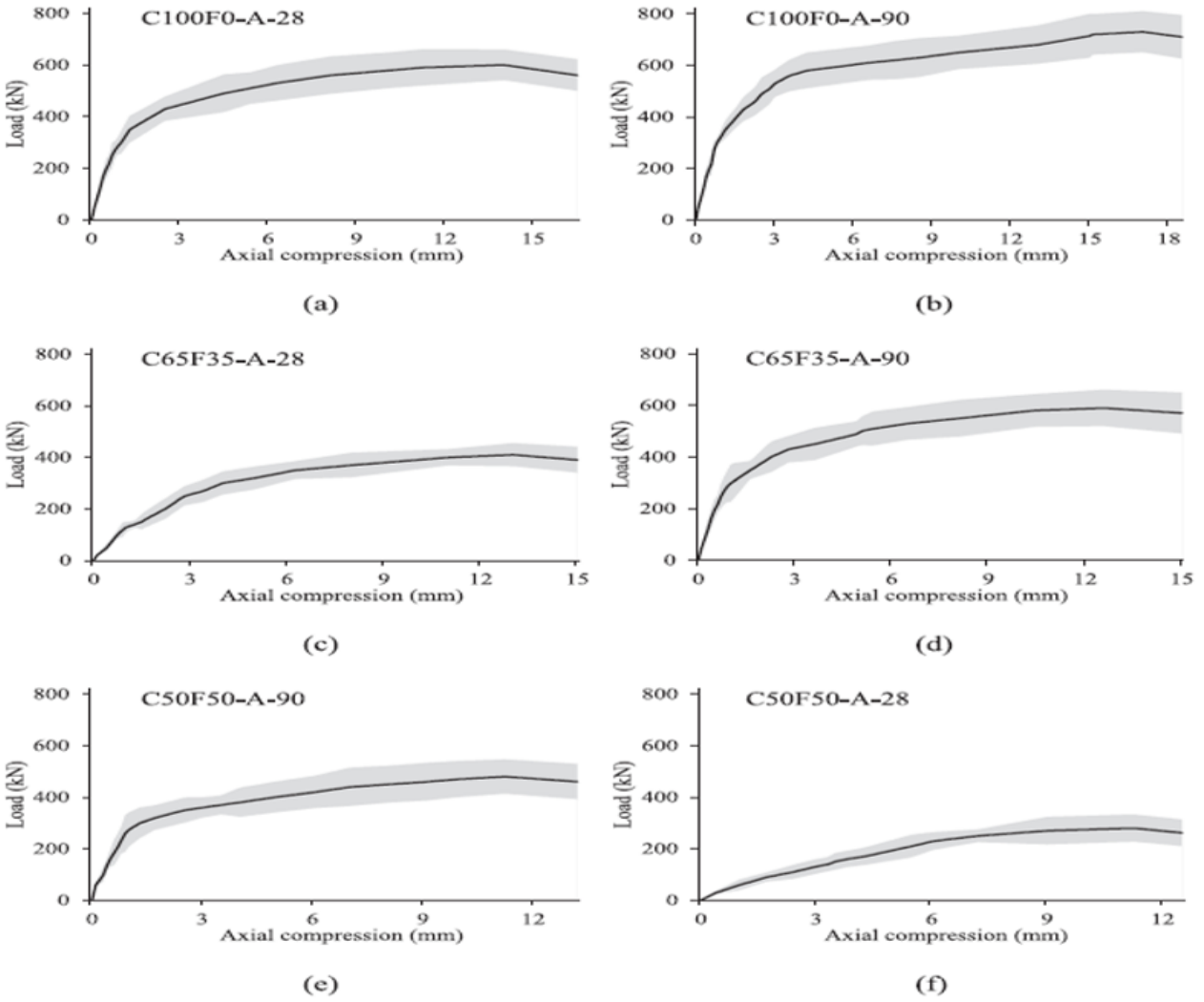
Test Results



Load-compression curves of RC columns at ambient temperature for (a) C100F0 at 28 days; (b) C100F0 at 90 days; (c) C65F35 at 28 days; (d) C65F35 at 90 days; (e) C50F50 at 28 days; (f) C50F50 at 90 days.