Increasing strengths and ductilities in PVC-tube protected prepacked aggregate concrete columns

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Abstrak

One method of increasing the durability of cylindrical concrete columns in aggressive surroundings is by providing a PVC skin around the columns. Beside protection added mechanical benefits have been investigated in this study. Results of this endeavor are reported in this paper. One hundred and fourteen specimens were prepared utilizing prepacked aggregate concrete (PA-Concrete), Consisting of andesite coarse aggregates and cement grout with 30% fly ash as partial cement replacement. Cylindrical specimens with varying length over diameter ratios (LID) and ages have been tested for their strength and ductilities. Results have shown the prevalence of beneficial composite behavior in PVC-confined specimens. Strength increases of 30% to 50% above those of unconfined specimens have been observed. Displacement ductilities lA > 7 have been derived, implying an increase of more than 8 times of those of unconfined specimens. Strains ductilities /l. > 2.4 and residual strength ratios R> 0.52Rp have been observed. Results indicate that strength increase with increasing ages while ductilities decrease with increasing un values. Toward the end of this paper, attempt is made to explain the mechanics of confinement in generating high load capacities of PVC protected columns.