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Numerical investigations on seismic performance of reinforced concrete columns with corroded rebars

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ABSTRACT

In reinforced concrete (RC) structures, steel corrosion induces splitting cracking in concrete cover, resulting in bond loss between reinforcing bars and concrete. This study numerically investigated the seismic performance of corroded reinforced concrete columns using OPENSEES. To this end, quasi-static cyclic loading test results of RC column specimens with and without corrosion damage were collected from literature, and macro analytical model was generated including strain penetration effect. The macro analytical model well-traced the degradations of ultimate capacity and deformation capability due to corrosion. Based on the validated macro analytical model, parametric analysis was conducted with corrosion degree (ω_{corr}) and axial load ratio (λ) as key variables, and the hysteresis response, crack pattern, strength degradation, ductility, and energy dissipation according to ω_{corr} and λ were analyzed and discussed comprehensively.

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