

Effect of reinforcement corrosion on flexural behavior of concrete slabs
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Abstract: The effect of reinforcement corrosion on the flexural strength of a uniformly loaded and simply supported one-way slab was investigated. In addition to the flexural strength, the effect of different degrees of reinforcement corrosion on the deformational behavior, ductility, and the mode of failure of the slabs were also evaluated. The critical level of reinforcement corrosion that renders the strength contribution of steel negligible was evaluated by comparing the strengths of slabs with highly corroded reinforcement with the strengths of plain concrete slabs. In order to induce different levels of reinforcement corrosion, a calibration curve establishing a relationship between the duration of the impressed current and reinforcement corrosion was prepared. The magnitude of reinforcement corrosion was measured as gravimetric loss in weight of the steel bars. The results indicate a sharp reduction in the ultimate flexural strength of slabs with an up to a 29% reinforcement corrosion; thereafter, the strength decreased at a somewhat reduced rate with further increase in reinforcement corrosion. The ultimate deflection of the slabs decreases with an increase in the magnitude of reinforcement corrosion, leading to a marked and progressive reduction in the ductility of the slabs. Furthermore, the strength of plain-concrete slabs and those reinforced with steel bars of less than 60% corrosion was almost similar.