

Study of the effect of rust and corrosion of reinforcement on bond behavior.

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Abstract

Exposure of rebar to the atmosphere for a long time rusts the rebar surface. Rusting of the rebar surface has some effect on the bond behavior between steel and surrounding concrete. Steel bars have been rusted by atmospheric exposure for different periods of time and their bond behavior has been studied using pullout and beam specimens.

Corrosion of steel reinforcement affects bond behavior between steel and concrete as follows: cracking of concrete; changing the bar deformation in height and shape; changing bar surface. All of these affect the three components of bond: chemical adhesion; friction: mechanical interlocking. Electrolysis has been used to corrode the reinforcement inside the concrete at an accelerated rate. Direct current was impressed on the pull-out and beam specimens to accelerate the corrosion of reinforcement so that the cracking of concrete could be observed within the time limit of this investigation. The current was impressed until the concrete was cracked. With reference to cracking level some levels were chosen before cracking and after cracking designated as precracking and postcracking levels of corrosion. To compare the bond behavior at these levels of corrosion a zero corrosion level was tested as a reference level.

The effect of preventive measures such as application of epoxy coating to the rebars (as direct preventive measure) and introduction of fiber to concrete (as indirect preventive measure) to prevent corrosion, has been evolved.

Therefore, the effect of rusting and corrosion on bond behavior is reported here and the effect of the epoxy coated rebars and fiber concrete is evolved and compared with uncoated rebars and plain concrete respectively.