



Bond Behavior of Reinforcing Steel in Ultra-High Performance Concrete

Description

Meta Fields

Category : Completed Projects

Group : Ultra-High Performance Concrete (UHPC)

Subject : Bond

Abstract :

Ultra-High Performance Concrete (UHPC) is a relatively new class of advanced cementitious composite materials, which exhibits high compressive [above 21.7 ksi (150 MPa)] and tensile [above 0.72 ksi (5 MPa)] strengths. The discrete steel fiber reinforcement included in UHPC allows the concrete to maintain tensile capacity beyond cracking of the cementitious matrix. The combination of the matrix and fiber performance allow for a reduction on the development length of reinforcing bar, thus providing the potential for a redesign of some structural systems such as field-cast connections between prefabricated bridge elements. The bond behavior of deformed reinforcing bar in UHPC is investigated in this study by conducting direct tension pullout tests. Over 200 tests were completed and the effect of embedment length, concrete cover, bar spacing, concrete strength, bar size and type on bond strength were investigated. It was found that the development length of embedded reinforcement in UHPC can be significantly reduced. Guidance on the embedment of deformed reinforcing bars into UHPC is provided.

Key Words : Ultra-high performance concrete, UHPC, fiber-reinforced concrete, reinforcing bar, bond strength, anchorage, development length, splice length

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