

Anchorage of Large-Diameter Reinforcing Bars Grouted Into Ducts

Description

Meta Fields

Category : Completed Projects

Group : Seismic

Subject : Grouted Ducts

Abstract :

The use of a few large-diameter reinforcing bars for the construction of precast concrete bridge bents allows simplified construction by reducing the number of alignments to be made in the field. These bars are grouted into ducts in a precast concrete cap beam. In the proposed precast concrete substructure system, the grouted bars carry tensile forces across the joint between the column and cap beam. This joint is the yielding element in the structural system, and it is crucial to the performance of the structure that the bars yield before other failure mechanisms, including bond failure, occur. However, the cap beam is typically insufficient to anchor the bar, as the depth of the beam is substantially less than the American Association of State Highway and Transportation Officials (AASHTO) bridge code allows. For this project, 17 pullout tests were conducted to determine the bond characteristics and development length of large-diameter bars grouted into ducts. The bars tested ranged in size from #8 to #18. Pullout tests conducted with embedment lengths of at least six bar diameters yielded the reinforcing bar, while the test conducted with an embedment length of 14 bar diameters resulted in bar fracture. The tests and subsequent analysis showed that the bond of these grouted connections is significantly better than the bond of bars cast directly into concrete. The development lengths needed to fully anchor the bar are therefore within the depth available in the cap beam.

Key Words :

Bond strength, deformed bars, cement grouts, precast concrete, bridge substructures, joint construction, bents, anchorage, ducts

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