Design of Precast Concrete Piers for Rapid Bridge Construction in Seismic Regions

Description

Meta Fields

Project Completion Year : 2005 Project Starting Year : 2005 Other Documents 0 Other Documents File : 2735 Primary Sponsor Contact Info : Washington State Department of Transportation Research Office Transportation Building, MS 47370 Olympia, WA 98504 USA Kim Willoughby 360-705-7978 Budget : 0.00 Key Words :

Rapid construction, design procedures, hybrid, bridge

Abstract :

Incorporating precast concrete components into bridge piers has the potential to reduce the construction time of a bridge and the negative impacts of that construction on traffic flow. Practical methodologies are needed to design economical and safe piers out of precast concrete components. This research developed force-based and displacement-based procedures for the design of both cast-in-place emulation and hybrid precast concrete piers. The design procedures were developed so that they require no nonlinear analysis, making them practical for use in a design office. The expected damage to piers designed with the procedures in a design-level earthquake was estimated. The evaluation considered three types of damage to the columns of a pier: cover concrete spalling, longitudinal reinforcing bar buckling, and fracture of the longitudinal reinforcing bars. Both the force-based and displacement-based design procedures were found to produce designs that are not expected to experience an excessive amount of damage in a design-level earthquake.

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