

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

Description

Meta Fields

Category : Completed Projects

Group : Seismic

Subject : Grouted Ducts

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.

Key Words :

Rapid construction, design procedures, hybrid, bridge

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