

ABSTRACT

Price, Stephen, Ph.D., Purdue University, May 2010. Innovative Connection Details for Full-Depth Precast Bridge Deck Panels for use on Prestressed Concrete Girders. Major Professor: Robert J. Frosch.

This research evaluates the use of precast, prestressed bridge deck panels on new and existing precast, prestressed concrete girders. The evaluation focuses on the ease of construction and the ability of the system to develop composite action with the concrete girders. A system developed by the Connecticut Department of Transportation (CDOT) was chosen for testing from available systems because it is representative of the current geometry of precast bridge deck panels. The CDOT system was evaluated in a series of large scale tests in which the panels were placed on a 40 ft prestressed concrete girder and subjected to three point loading. The CDOT system is compared to a new system developed as part of the research program. The new system addresses durability and ease of construction issues that are problematic with current joint details. The strength and geometry of both the current and new joint details are evaluated and compared in a series of direct shear tests. A final, large scale specimen was designed, constructed, and evaluated to validate the new system. This research has the potential to impact the way in which the aging highway system is rehabilitate and replaced by reducing the associated time and costs of construction while decreasing disruption to the traveling public.