Evaluation of the Sandwich Plate System in Bridge Decks Using a Plate Approach, a Comparison Between ANSYS and GT STRUDL Models

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Abstract

The push to find solutions to solve the problem with the nation's deteriorating infrastructure has allowed for the development and introduction of new materials and innovative solutions. One of these innovative solutions is the Sandwich Plate System (SPS), which is intended to serve as an alternative to conventional bridge decks. SPS is a composite deck system that consists of steel plates bonded to a rigid polyurethane core. The deck is typically prefabricated in panel sections that can be joined along the span or width of the bridge. SPS can be used in both new construction and rehabilitation projects.

With SPS being new to the bridge market there are no current design guidelines for the panel sections. This presentation focuses on a design approach developed using a plate analysis approach. A series of deck panels were evaluated for compliance with the AASHTO LRFD for strength, serviceability, and fatigue limit states. The deck panels were treated as plates sections with variable boundary conditions and subjected to vehicle design loads. The finite element method was used to evaluate the compliance of the plates with AASHTO. A comparative analysis using GT STRUDL and ANSYS models is presented along with results from limited experimental program and classical plate solutions.