

Arkansas Department of Transportation
Transportation Research Committee
RESEARCH PROBLEM STATEMENT

DATE: 09/11/2017**PROJECT AREA:** Construction**TITLE:** Improved staged deck pour procedures for highly skewed and curved steel bridges**PROBLEM STATEMENT:**

In steel bridge construction, concrete deck pours are often staged such that positive and negative moment regions receive concrete at different times. For highly skewed or curved steel bridges that have differential displacements across the bridge profile during deck pours, proper understanding of the dead load deflections are needed to ensure that the staged deck pours line up properly. While construction plans may specify deck pour sequences to help mitigate deck misalignment at joint closure pours, fabrication tolerances, the steel "fit-up" condition, and actual construction practices may affect the final result. This project focusses on identifying deck sequencing issues to provide better prediction of dead load deflections during staged bridge deck pours. The project will involve comparisons between engineered sequencing plans, fabricator fit-up conditions, and actual construction processes to identify "best practices" and understand the effects of specific bridge conditions (skew angle, curve radius, span length, etc.) on deck pour issues.

OBJECTIVES:

The objectives and tasks of the proposed project are to: 1) develop advanced finite element simulations of steel bridge superstructures corresponding to the steel fit-up condition (consisting of several bridge geometries with various levels of skew, curvature, and span length); 2) perform a parametric study investigating dead load deflections at deck joints, comparing engineered sequencing plans (using standard prediction methods) with actual construction practices; and 3) identify conditions where common deck sequencing methods provide inadequate estimations of dead load deflection and develop alternative strategies for deck pour sequencing. Field measurements during actual bridge deck construction will be used to validate analysis techniques.

FORM OF RESEARCH IMPLEMENTATION:

Findings from the proposed research will result in enhanced bridge deck construction procedures, and be documented in a field-handbook for direct implementation. Additionally, two seminar presentations will be developed to educate the industry and ensure appropriate implementation of the research findings. All project details and results will be included in annual reports and peer reviewed journal publications.

Estimated Project Duration: 24 months**PREPARED BY:** Gary S. Prinz**AGENCY:** University of Arkansas**PHONE:** (479) 575-2494**REVIEWER:** Chris DaileyStanding Subcommittee
RankingAdvisory Council
RankingStatement Combined with
Statement Number(s)4 / 520 / 44