Wisconsin Highway Research Program
Structures Technical Oversight Committee
Request for Proposals for

**Staged Concrete Bridge Deck and Overlay Pours Adjacent to Live Traffic**

Questions regarding the content of this RFP are due no later than
4:30 PM (CST) on December 10, 2014

Responses to questions will be posted to the WisDOT Research and Library website
http://wisdotresearch.wi.gov/rfps-and-proposals by
4:30 PM (CST) by December 17, 2014

Proposers must submit a PDF version of their proposal by
4:30 PM (CST) by January 23, 2015
to this secure email address: upload.FY16_RF.5lvu691ai6@u.box.com
Submitter will receive an emailed auto-confirmation of proposal receipt.

Proposers will be notified by May 1, 2015

For further information regarding this RFP contact:
Angela Pakes Ahlman
email: apakes@sustainability.wisc.edu

**Researcher Questions on RFP**

Please refer all questions on this RFP to the WHRP Technical Director, Angela Pakes Ahlman by the aforementioned due date. Questions must be in writing. No response will be provided to questions received after the due date.

**Researcher Proposal Preparation Guidelines**

WHRP Proposal Guidelines are available on the WisDOT Research and Library website http://wisdotresearch.wi.gov/rfps-and-proposals. Please refer to these instructions in preparation of your response.
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I. **Background and Problem Statement**

Given the need to maintain traffic operations during the construction, maintenance, and repair of bridges, designers and construction staff are faced with designing and constructing bridges in stages with longitudinal joints in bridge decks. These stages often require cold joints between stages of the decks or the stages of the overlays that are poured adjacent to live load. These stages may compromise the integrity of the cold joint in the decks or the overlays. Given that one side of the joint is subject to cyclical live load movement while the other side of the joint is subject to movement due to the dead load of the yet to be composite deck, the quality and integrity of the cold joint maybe compromised. If these joints are compromised, it is highly likely that there will be intrusion of moisture and chlorides as well as inadequate bond on transverse reinforcement. Ultimately, the long term performance of the bridge deck may be compromised by inadequate longitudinal construction joints.

Design and construction staff needs better understanding of how adjacent traffic may affect the quality of construction joints in decks and overlays. This understanding will lead to promoting details and construction practices that help achieve durability and desirable long-term performance of bridge decks.

II. **Objectives**

The objective of this research is to develop an understanding of the impact of traffic operations on the quality of the longitudinal staged construction joint in bridge decks. Other objectives of this research include development of guidelines for designers and construction staff to design and construct high quality longitudinal joints in bridge decks.

III. **Scope of Work**

**Phase I Research**
A. Literature search and review of policy, details, specification, and practices related to the design and construction of bridge deck staged construction joints. Results should document:
   a. Current and past WisDOT design/construction policy and guidance
   b. Past WisDOT Projects, Plans, & Specifications
c. Related practices of other Midwestern & Regional DOTs with similar environmental factors (freeze/thaw, chloride use, epoxy reinforcement)

B. Examine existing WisDOT in service bridge decks that have cold joints that were constructed under staged construction to determine the aspects of quality and related practices and issues.

C. Conduct analytic modeling of bridges under staged construction to quantify the nature of deflections and movements encountered by the joints during placement.

**Phase II Research**

D. Conduct Laboratory test on mocked up joints to quantify implications of live load, deflections, and time elements in joint construction. This testing should be specific to Wisconsin DOT Deck Concrete Specifications and typical bridge deck mixes, reinforcements, and details. Testing should quantify aspects of quality joint construction and durability. The opportunity or possibility of recovering/salvaging actual construction joint specimens from bridges being demolished or re-decked for forensic testing should be considered and discussed with Project Oversight Committee.

E. Develop guidance for designers on best practices to achieve high quality joints in staged construction that discuss:
   a. Guidance on how long to keep all or select live load off of stages to achieve quality joints.
   b. Guidance on how to mitigate the adverse effect of construction joints including the position of live loads relative to joint location during construction, the necessity of temporary loosening or removing diaphragms beneath the construction joint during construction, and consideration for closure pour between two stages.
   c. Guidance on joint details and specifications that promote durable well performing joints in bridge decks.

IV. **Specific Results, Findings, Tools, etc. (Deliverables)**

A. Reporting Requirements: 7 hard copies and electronic files must be delivered to WHRP by the contract end date. This includes the report, special provisions, and structural details.
   - Please refer to the Implementation section (VI.) for further details.

B. Presentation Requirements: All projects require the PI to give a closeout presentation to the TOC after submittal of the draft final report.

V. **Budget and Schedule**

A. Project Budget shall not exceed $140,000.

B. Proposed project duration is 24 months.
   - Deadline for submittal of draft final report is three months prior to contract end date to allow for report review activities.
   - Deadline for research close out presentation is 4-6 weeks prior to contract end date.
   - Deadline for submittal of the Final Report is the contract end date.
VI. Implementation

Successful implementation of this research will be achieved through the development of the following items:

- Understanding of how construction under traffic loading affects the quality of staged construction joints.
- Development of recommendations and guidance on design and construction practices that improve the quality of construction joints made under traffic loading. This information will be in a format that can be incorporated into the WisDOT Bridge Design Manual.
- Improved Special Provision (SPV’s) and construction details for the construction of staging joints in bridge decks.

Work will be conducted with project oversight by the WisDOT Bureau of Structures and WHRP Structures TOC.