REQUEST FOR PROPOSALS

LTRC 10-5ST

Development of Guidelines for Transportation of Prestressed Concrete Girders

PROBLEM STATEMENT

Prestressed concrete members are generally stiff enough to prevent lateral buckling. However, during handling and transportation, support conditions may result in later displacement of the beam, thus producing lateral bending about the weak axis (Prestressed/Precast Concrete Institute-PCI). As longer prestressed concrete girders are manufactured and transported, the stability of those girders becomes extremely important during transport and handling. Laszlo and Imper (1987) suggested an analytical procedure whereby a long span bridge beam can be designed for stability during handling and shipping. Mast (1989 and 1993) reported that, for supported beams, the tendency to roll is significantly influenced by the conditions of the supports and the roadway geometry (cross-shape). Also of concern is the cracking that a transported beam experiences due to strain from weak axis bending. In fact, this has been observed by The Louisiana Department of Transportation and Development (LADOTD) when some of its transported girders experienced cracking in the upper flange area. In an attempt to assess the live load forces' effect on transported beams, two 150-ft. prestressed Bulb-Ts were instrumented and data were collected. The speed and sharp turns subjected the girders to weak-axis bending and caused cracking in some sections.

Cracked beams may shorten the life expectancy of a bridge, delaying the construction of a bridge, and not to mention exposing the public to danger should the bridge collapse. Both events are to be avoided due to cost to LADOTD in repair and/or litigations.

OBJECTIVE

The objective of this research is to develop a set of guidelines that the Department can use for the transportation and handling of prestressed concrete bridge girders. This may be achieved in the tasks stated under Proposed Research.

PROPOSED RESEARCH

The proposal shall address at a minimum, the following tasks:

Task 1 Perform a literature search to see what other states do for transporting their girders and how transportation and handling stresses are accounted for.

Task 2 Submit an instrumentation plan to the Project Review Committee (PRC). Instrumentation plan should be prepared for two prestressed girders that are transported to different construction sites.

Instrumentation should be able to quantify stresses that a girder may experience during transportation and handling under different conditions, such as traffic speed, road geometry, sharp turns, and girder supports, and provide stress limit for transported girders.

An instrumentation plan must be submitted and approved by the PRC before any additional tasks are initiated. Instrumentation of girders and data collection needed for the study will be provided through the funds allocated for this project.

It is anticipated that the PRC will need one month for review and approval of the summary report.

Task 3 Perform field work as approved as stated in Task 2.

Task 4 Collect and analyze data for instrumented girders while being transported.

Task 5 Prepare and submit an interim/progress report regarding transportation induced stressed and girders response while being transported. The interim report shall cover work performed under Tasks 1, 2, 3, and 4. The researcher should be prepared to give a presentation to the PRC.

Task 6 Review LADOTD bridge girder design practice to ascertain safety and stability of girders during transportation. Recommend design changes if any are needed. Prepare a checklist for LADOTD bridge inspectors to use when performing their visual inspection of transported girders at the bridge site.

Task 7 Develop and conduct a workshop to train LADOTD engineers and consultants to familiarize them with use of the checklist produced in Task 6, the findings of the study and recommendations.

Task 8 Prepare a final report documenting the entire research effort. Based on the performed work, the final report should include guidelines regarding the transportation and handling of prestressed girders and design change recommendations.

SPECIAL NOTES

A. Task descriptions are intended to provide a framework for conducting the research. The Louisiana Transportation research Center (LTRC) seeking the insights of researchers on how best to achieve the research objectives. Researchers are expected to describe research plans that can realistically be accomplished within the constraints of available funds and contract time. Proposals must present researchers' current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach.

B. The summary report required in Task 5 shall be submitted within 9 months of the work order to proceed.

C. LTRC projects are intended to produce results that will be applied in practice. It is expected that an implementation plan for moving the results of the research into practice will evolve as a concerted effort during this project. The final report must contain an implementation plan to include as a minimum, the following: (a) the "product" expected from the research, (b) a realistic assessment of impediments to successful implementation, (c) the activities necessary for successful implementation, and (d) the criteria for judging the progress and consequences of implementation.

D. To assist in the implementation process, researchers shall be prepared to present the final results to LA DOTD officials in an oral presentation to be held in Baton Rouge, after acceptance of the final report. One workshop will be provided to LADOTD engineers and consultants in order to familiarize them with the findings and recommendations; and to train them in the use of the checklist as provided in Task 7.

E. The proposal should include travel to meet with the Project Review Committee for a "kick off" meeting, presentation of interim report, and presentation of the final report at a minimum.

DELIVERABLES

- Instrumentation Plan
- Interim progress report
- Presentation of findings in Tasks 1 to 4
- Visual inspection check list of transported girders for acceptance purposes
- One workshop will be provided to LADOTD engineers and consultants in order to familiarize them with the findings and recommendations
- Final report with recommendations to LADOTD on future design

ESTIMATED COST OF RESEARCH

$200,000

ESTIMATED COMPLETION TIME

24 Months ***(includes one month for review and approval of interim report and three months for review and approval of final report - i.e. final report due 21 months)***

LTRC PRIMARY CONTACT

Walid Alaywan, P.E.
Sr. Structures Research Engineer
Phone: (225) 767-9106
Email: walid.alaywan@la.gov

AUTHORIZATION TO BEGIN WORK:
February 2011

PROPOSAL FORMAT

All proposals are required to be formatted according to LTRC Manual of Research Procedures. Chapter 2 provides guidance on proposal development. A copy of the Manual may be downloaded from our website (http://www.ltrc.lsu.edu/publications.html).

PROPOSAL SELECTION

The Project Review Committee selected for this project will review, evaluate and rank all proposals received using the criteria established on the attached proposal review form.

DEADLINE FOR RECEIPT OF PROPOSALS

Ten copies of the proposal must be received by LTRC by the close of business day of Wednesday, December 15, 2010.

Proposals should be submitted to:

Mr. Harold Paul, P.E.
Director
Louisiana Transportation Research Center
4101 Gourrier Ave.
Baton Rouge, LA 70808

To equitably answer any questions regarding this Request for Proposals, the Louisiana Department of Transportation and Development (LADOTD) website, http://notes1/agrestat.nsf/WebAdvertisements?OpenPage will be updated with questions and answers and related documents regarding the project. The LADOTD makes these documents available for informational purposes only to aid in the efficient dissemination of information to interested parties. The LADOTD does not warrant the documents against deficiencies of any kind. The data contained within this web site will be periodically updated. Interested parties are responsible to be aware of any updates. Questions regarding this RFP should be submitted in writing to the LTRC contact person. Questions must be received by close of business seven calendar days prior to deadline date.