



University Transportation Research Center
RFP Cover Sheet

Title: Design & Fabrication of Orthotropic Deck Details
Proposal Number: 2011-14
Sponsor: NJDOT
Date Issued: September 28, 2011
Pre-Proposal Meeting: TBD
RFP Due at NJDOT: by November 7, 2011
RFP Closing Date: November 7, 2011

If you plan to apply:

1. Please contact Camille Crichton-Summers (camille.crichton-summers@dot.state.nj.us) or Stephanie Nock (609-530-5637 or STEPHANIE.NOCK@dot.state.nj.us) to request a pre-proposal meeting, and so that you will receive information about this meeting if it is held. *This meeting will be your only opportunity to ask questions about this proposal.*

2. If you plan to submit a proposal through UTRC, please notify us by email at peickemeyer@utrc2.org and ckamga@utrc2.org. Please indicate whether you are open to teaming up with faculty at other universities on this project.

Proposal submission guidelines:

Please contact Penny Eickemeyer (peickemeyer@utrc2.org, 212-650-8074) to discuss submission logistics. After UTRC confirms that the proposals' budgets meet UTRC and NJDOT guidelines, please use the UTRC cover sheet available at <http://www.utrc2.org/research/resourcesforpis.php> for submission of printed proposals to NJDOT.

Proposals must be prepared in accordance with NJDOT's Information and Instructions for Preparing Proposals. Please visit: <http://www.state.nj.us/transportation/refdata/research/pdf/techpropresproj.pdf>

For questions about budget preparation, contact: Penny Eickemeyer, peickemeyer@utrc2.org
NJDOT has not specified a budget or timeline for this project. Please note that matching funds up to \$35,000 are available from UTRC for this RFP.

Please visit the NJDOT Research Website for important information about this RFP:
<http://www.state.nj.us/transportation/refdata/research/news.shtm>

New Jersey Department of Transportation
Bureau of Research
RESEARCH PROJECT
Request for Proposals
2011 Program

Date of RFP
October 5, 2011

Closing Date
November 7, 2011

Design & Fabrication of Orthotropic Deck Details

Project No. 2011-14

(Proposals must be prepared in accordance with NJDOT's *Information and Instructions for Preparing Proposals*. Please visit:

<http://www.state.nj.us/transportation/refdata/research/pdf/techpropresproj.pdf>

Revised Proposal Evaluation Forms are available for your information on the website.)

Proposals will be based on the merit of the information contained in the proposal. Budgets will be evaluated separately. Please place three (3) copies of the budget for this project in a separate sealed envelope.

1. RESEARCH PROBLEM STATEMENT, BACKGROUND AND OBJECTIVES

The experience with the use of orthotropic steel decks (OSD) revealed the following challenges:

- Fillet weld between deck plate and trough rib
- Fillet weld between floorbeam and trough rib
- Butt weld connection of trough rib
- Fillet weld between vertical stiffener and deck plate

Recently, due to improved detail design for fatigue resistance and advanced fabrication technology, this application is applied to long span suspension bridges such as in Washington State's Tacoma Narrows Bridge, and San Francisco Bay Bridge, and several bridges in New York City, to take advantage of relatively light weight. However, these recently constructed orthotropic decks were fabricated in foreign countries and required welded details that called for advanced automatic weld facilities, rigorous fabrication quality control, labor-consuming grinding, partial or full penetration welds, and NDE tests which were very costly. Design of NJDOT Rt.7 Wittipenn Bridge proposed an orthotropic deck integrated box girders for the lift span. High design truck traffic (ADTT) for this bridge brings us concern about fatigue. The orthotropic deck details proposed are intended to have simpler fillet weld details to reduce labor intensive fabrication work. However, the details of the intersection of longitudinal rib and floor beam require very highly rigorous tolerance and quality control. There is lack of information on fatigue strength for this type of details, domestically and internationally, in practical experience, design specifications and fatigue test data to fully support the design.

2. TASKS

[Provide a listing of appropriate general tasks divided into phases based on types of work (e.g., Laboratory, Fabrication & Analysis etc.) or other appropriate milestones]

*The NJDOT is seeking the insight of proposal responders on how best to achieve the research objectives. Proposers are expected to describe **a research effort that can realistically be accomplished as expeditiously as possible**. Proposals must present the proposers' current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach for conducting the required research.*

PHASE I – Research Approach and Anticipated Results

Provide a clear description of how you will address challenges.

The primary objective of this research study is to verify fatigue resistance of the orthotropic deck welded details through analytical and experimental study. The research will simulate fabrication conditions that satisfy (as well as not satisfy) the design and fabrication requirements, such as the effect of different gap tolerances. In addition, in the wake of the issuance of FHWA Manual for Orthotropic Design and Fabrication in 2012 and adoption of AASHTO LRFD new provisions for orthotropic design, this research is expected to validate and verify the design requirements for this particular bridge.

The research will include both analytical and experimental studies. The researchers are expected to work closely with NJDOT, fabricator and a testing contractor. A fatigue test facility should be available to the “Research Team”. The researchers should have experience on a steel bridge decks, and fully understand the insight of the practical problems. In addition, the researchers should verify the effectiveness of an orthotropic deck overlay.

Cost of orthotropic decks in fabrication and maintenance is another important issue that needs to be addressed. To achieve a cost-effective life-cycle cost (LCC), the study is expected to conduct a cost evaluation and compared this with other types of light weight deck types.

Work may be divided into phases (e.g., Laboratory, Fabrication & Analysis) as necessary to clarify tasks. *Exit Criteria* must be developed during this phase.

During the study, Principal Investigator (PI) will conduct a more comprehensive literature search for reference purpose.

3. IMPLEMENTATION AND TRAINING PLAN

The result of the studies is expected to apply to the real projects.

4. DELIVERABLES:

[List of minimum deliverables necessary to complete the project]

- Discussion to Support and Refine the Project Tasks
- Project work plan.
- Technical memorandum on the measures that are working or not working
- Technical memorandum on actions taken
- Presentation of Summary of Literature Reference
- Interim Status reports suitable for Senior Leadership if required
- Quarterly Reports and Final report, in color, with appropriate tables, graphs and charts in hard copy

version, PDF file format, Word, and on CD ROM. Two copies plus one per RSIP member of each presentation, technical memorandum, draft final report and Final Report (plus 10 copies).

The Final Report and Tech Brief are due three (3) months before the end date of the project to allow time for review by the Research Project Selection and Implementation Panel. Final Acceptance will be granted upon receipt of ten copies of the approved final report.

5. CONTRACT TIME:

Since the practical research requires quick turn-around solution, it is expected to be completed as soon as possible. The duration of study can be estimated as 12 months, and the final report within 18 months.

***Researchers have to keep in mind that this schedule will not be extended beyond the scheduled date.**

6. CONTACTS:

Questions on this topic **shall not** be directed to any Research Project Manager, Research Customer, or any other NJDOT person. Contact Camille Crichton-Summers (Camille.CrichtonSummers@dot.state.nj.us) with all questions. All questions and answers shall be addressed **through email and responses posted on the internet**. Copies of GASCAP and related material will be provided upon request.

DEADLINE

<p>Proposals (10 single-bound copies) are due at the NJDOT Bureau of Research No later than 5:00 p.m. November 7, 2011</p>

Authorization to Begin Work: To Be Determined

7. DELIVERY INSTRUCTIONS:

For private, paid messenger services such as Federal Express, DHL, UPS, etc., or for hand-carried deliveries:

2011 PROPOSAL-NJDOT
New Jersey Department of Transportation
Bureau of Research
1035 Parkway Avenue
Trenton, New Jersey 08625-0600

For U.S. Postal Service mail:

New Jersey Department of Transportation
ATTN: Camille Crichton-Summers
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