

REQUEST FOR PROPOSALS

LTRC No. 20-2ST, SIO No. DOLT1000343

Skew Detection System Replacement on Vertical Lift Bridges (Phase I)

Louisiana has one hundred and forty-one (141) movable bridges. Of those bridges, there are one hundred and one (101) on-system bridges and forty (40) off-system bridges. Of those bridges, there are forty-seven (47) vertical lift bridges: thirty-eight (38) on-system and nine (9) off-system. The remaining ninety-four (94) bridges fall in categories of swing-span, bascule-span, and pontoon-span bridges.

The vertical lift bridges are equipped with skew detection systems. Those systems are comprised of selsyn motors that are mounted to right angle gearboxes which, in turn, are attached to two (2) sheave trunnions located diagonally from each other. As the bridge moves, the trunnions rotate. The differential selsyn compares the rotation. If the deck is skewed too far, the span drive motors are disabled thus preventing damage to the deck or towers. Figure 1 shows a vertical lift bridge where the deck got skewed too far.



Figure 1

The Buquet vertical lift bridge, a Terrebonne parish-owned bridge in Dulac

The problem that is being faced with those skew detection systems is that the components are no longer manufactured. One alternative is to use programmable logic controllers (PLC). However, those controllers can be complicated, are more sensitive to power surges and lightning strikes, and present a maintenance problem to the districts.

The Louisiana Department of Transportation is looking for a new skew detection system that its maintenance personnel could repair without advanced training and equipment or by having to bring in outside personnel under contract. The Department prefers, if practical, that the system be comprised of off-the-shelf components for ease of replacement.

OBJECTIVE

The objective of the study is (1) to perform a thorough literature search about skew detection systems in vertical lift bridges, their benefits, and drawbacks, and (2) to report on the findings.

RESEARCH APPROACH

The Louisiana Transportation Research Center (LTRC) is seeking the insight of proposers on how best to achieve the research objectives. Proposers shall describe research plans that can be realistically accomplished within the constraints of available funds and contract time as allowed in this RFP.

Proposals must present the candidate's current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach. Task descriptions are intended to provide a framework for conducting the research. The proposal shall address at a minimum, the following tasks:

Task 1 – Literature Review

In this this task, the selected principal investigator (PI) will gather the current state-of-the-practice for moveable bridges both in the U.S and worldwide. The PI is expected to gather all information on skew detection systems for vertical lift bridges in other states and countries and the benefits and drawbacks of each system. The PI shall evaluate each of these systems on several criteria: ease of operation, ease of maintenance, off-the-shelf components vs. specialized components, and how it compares to the specifications currently outlined below:

- a. Adjustable between 1 and 5 feet of skew measured at each end of the movable span, and repeatable to within +/- six (6) inches.
- b. Use components that:
 1. Have a history of reliable service in similar applications.
 2. Operate on 120 V to limit susceptibility to power surges and lightning strikes.
 3. Have a mean time between failure (MTBF) of at least 60,000 hours.
 4. Are maintainable and adjustable by DOTD maintenance personnel who are general electricians without control or instrumentation experience.
 5. Are of heavy duty construction, and are rated for "severe" or "marine" duty applications (if available).
 6. Are readily available within two weeks from multiple manufacturers.
- c. All components that are not mounted in an area protected from the weather (such as the operator's/machinery house), shall be mounted in an enclosure that is corrosion resistant and rated IP66 or better. Enclosures shall include a heater for moisture removal.

Task 2 – Final Report

The (PI) is expected to submit a final report and give a presentation documenting regarding the literature search conducted in Task 1. The PI is expected to provide a recommendation regarding purchasing such available systems (meeting criteria stated in Task 1) if available and their costs; or designing a new system with readily available components.

DELIVERABLES

The proposal shall include project deliverables for appropriate tasks. Deliverables shall be due as defined in the proposal. The proposal shall include at a minimum the following deliverables:

- Task 2: Literature search report and presentation of findings to the PRC

SPECIAL NOTES

Due to the limited research objective, some of the special notes below may not apply.

- A.** LTRC research projects will be conducted in accordance with the LTRC Manual of Research Procedures, 2016 edition.
(http://www.ltrc.lsu.edu/pdf/2016/LTRC_RESEARCH_MANUAL_FINAL.pdf)
- B.** Any work that is anticipated to be required from LTRC or DOTD shall be specifically detailed in the proposal.
- C.** Any surveys or questionnaires developed by the research team shall be reviewed and approved by the PRC prior to distribution.
- D.** LTRC projects are intended to produce results that will be applied in practice. It is expected that the implementation of the results of this 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.
- E.** To assist in the implementation process, the investigators of this research shall present the final results to LA DOTD officials in an oral presentation to be held in Baton Rouge, Louisiana at LA DOTD Headquarters after acceptance of the final report.
- F.** 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. Funds budgeted for travel shall be limited to what is necessary for the conduct of the research. Funds shall not be budgeted for conference travel. Funding for technology transfer of research results are available upon request subject to LTRC approval and available funds.
- G.** LTRC’s mission includes the support of higher education in Louisiana. Consultant and out-of-state institutions submitting proposals are encouraged to cooperate and collaborate with Louisiana universities for the purpose of sharing of knowledge and increasing transportation expertise in the academic community.
- H.** Graduate assistance stipends are allowed. Tuition reimbursement or tuition remission rates applied to stipends are not allowed.
- I.** To equitably answer any questions regarding this Request for Proposals, the Louisiana

Department of Transportation and Development (LA DOTD) website will be updated with questions and answers and related documents regarding the project.

<http://webmail.dotd.louisiana.gov/agrestat.nsf/WebAdvertisements?OpenPage>

LA DOTD makes these documents available for informational purposes only to aid in the efficient dissemination of information to interested parties. LA DOTD 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.

- J. Consultants and business entities shall be registered with the Secretary of State in order to be able to work in Louisiana prior to award of contract.
<http://www.sos.la.gov/tabid/1011/Default.aspx>
- K. If Sub-Consultants/Entities are used, the Prime Consultant/Entity must perform a minimum of 51% of the work for the overall project.
- L. LTRC reserves the right to withhold invoice payments for delinquent deliverables as defined in the proposal.

ESTIMATED COST OF RESEARCH

\$50,000

ESTIMATED COMPLETION TIME

Nine (9) months *(include three months for review and approval of final report - i.e. final report due 6 months)*.

LTRC PRIMARY CONTACT

Walid Alaywan, Ph.D., P.E.
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AUTHORIZATION TO BEGIN WORK:

February 2020 (Estimated)

PROPOSAL FORMAT

All proposals are required to be formatted according to LTRC Manual of Research Procedures. Chapter 3.3 provides guidance on proposal development. A copy of the Manual may be downloaded from our website (<http://www.ltrc.lsu.edu/downloads.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 proposal review form.

SUBMISSION OF PROPOSAL

Submit proposals in one of the following manners: (1) Electronically in PDF format, or (2) 10 hard copies. Proposals must be received by LTRC by 12:00 PM (Noon), Monday, January 6, 2020.

Proposals are to be submitted to:

Samuel Cooper, Jr., Ph.D., P.E.

Director

Louisiana Transportation Research Center

4101 Gourrier Ave.

Baton Rouge, LA 70808

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