# RESEARCH PROJECT CAPSULE

February 2022 [ 22-2ST ]

TECHNOLOGY TRANSFER PROGRAM

# Skew Detection System Replacement on Vertical Lift Bridges (Phase II)

## JUST THE FACTS:

*Start Date:*
*February 1, 2022*

*Duration:*
*11 months*

*End Date:*
*December 31, 2022*

*Funding:*
*SPR: TT-Fed/TT-Reg – 5*

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## POINTS OF INTEREST:

*Problem Addressed / Objective of Research / Methodology Used / Implementation Potential*

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## PROBLEM

The LTRC 20-2ST Phase I study, performed by WJE, included a review of alternatives for skew control, monitoring, and indication for tower drive vertical lift bridges based on effective management of skew and minimizing advanced electronic equipment. Based on this review, the preferred system for skew control combines the use of direct skew measurement with an inclinometer for skew monitoring and trip indication, and indirect measurement of skew using encoders for controlling skew during operation. To minimize maintenance, mean-time-to-repair, and to limit dependency on PLC systems, control integration should include the use of SMART relays that contain self-diagnostics and may easily be replaced in the event of an issue.

*Figure 1. A vertical lift bridge rendered non-functional due to a severely skewed deck*

The current work, LTRC 22-2ST Phase II, includes design and installation of a new technology system to compare its performance against the existing legacy skew control technology at the Ellender Ferry Vertical Lift Bridge over the Intracoastal Waterway, located in Calcasieu Parish.

## OBJECTIVE

The objective of this work is to prove a new technology system against the existing legacy skew-control technology on the Ellender Ferry Vertical Lift Bridge over the Intracoastal Waterway, located in Calcasieu Parish. The new skew technology shall be as recommended in the results of the Phase 1 study.

The work will include design and installation according to the following tasks:

1. Analyze the existing control system, electrical installation, and structure to determine how to interface the new technology into the existing
2. Determine the scope of work required to implement the installation
3. Perform the installation
4. Calibrate and test the installation
5. Provide support personnel and time for troubleshooting the installation for a period of 6 months

## METHODOLOGY

To achieve the objectives of this study, WJE will use several methods. First, a work plan will be designed and a review will be conducted of the existing on-site conditions. The firm will then provide preliminary drawings for review by the project team. Final installation and control modification drawings will be provided as well.

WJE will provide and oversee a temporary installation, in parallel with the existing skew control. They will then test the installation to prove the efficacy of the new skew control system. WJE will then finalize and test the installation as an integrated part of the bridge monitoring and control system.

Deliverables for this project will include the following:

- Installation of a new technology skew control equipment for performance comparison with the existing control system.
- As-built set of installation drawings providing a record of all changes to the subject bridge.
- Operation and maintenance (O&M) documents related to the installation. These will include procedures for troubleshooting and adjustment of the new skew equipment should it become necessary.

## IMPLEMENTATION POTENTIAL

If proven effective, the design provided in this work will be a viable option for future rehabilitation at other tower drive vertical lift bridges in Louisiana.