

OSE - Problem Statement (FY 2003)

RESEARCH TITLE:

Evaluation of the effectiveness of Strategic Initiative No. 5 Pilot Bridge Concepts.

SUBMITTER/LIAISON:

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PROBLEM STATEMENT:

Since at least 1995, ODOT's customer focus has lead the department to improve its maintenance -of- traffic practices. Maintenance of traffic concerns are driven by ODOT's desire to respond to the public and because of the department's growing realization of delay and inconvenience construction projects cause.

The magnitude of delay caused by construction is greater in Ohio than in many states because of Ohio's large transportation system. Ohio has the 10th largest highway network, the fifth highest volume of traffic, the fourth largest interstate network, the fourth largest amount of freight shipments and the second largest inventory of bridges.

As the department's maintenance of traffic policy has been established, the role of bridge construction stands out as a limitation. Generally the speed of bridge construction and repair is the limiting factor in the completion date of a project and therefore the length of time traffic is affected. Since Ohio has the second largest inventory of bridges of any state, we must excel at bridge construction practices.

To achieve this excellence in bridge construction practices, a strategic initiative was established to develop bridge systems or construction methods that eliminate the bridges as a construction critical event. The initial result of this initiative was to identify six structural concepts to be demonstrated in FY 03 and 04. These six concepts are as follows:

1. Steel stay-in-place bridge deck forms.
2. Prestressed, precast bridge decks that are match cast, post tensioned and ground to final profile.
3. Exodermic grid bridge decks (e.g., steel grid overfilled with concrete).
4. Precast bridge substructure units.
5. Study and perform accelerated tests which validate methods, materials or admixtures that reduce curing time of concrete CIP bridge decks.
6. Transversely post tensioned box beams with integral wearing surface field ground to achieve profile grade and compatible with bridge standard TST-1-99 railings. Precast parapets are to be considered when over the side drainage is not acceptable.

PROPOSED RESEARCH:

Since any initial or future concepts represent a departure from the current practice of bridge construction in Ohio, we must systematically study if demonstration projects have the ability to solve the stated problem. The study will involve monitoring demonstration projects, performing financial analysis and time studies as necessary to answer the following concerns:

1. Determine if we have reduced the duration of construction verses conventional construction. Did we remove the bridge as a construction critical event. The study will include an analysis of the Contractors CPM schedule.
2. Can increased cost be justified, based upon time savings verses conventional construction with innovative contracting methods.
3. Have additional lead time activities been created for prefabricated elements verses conventional construction.
4. Have we created manufacturing or supplier difficulties or sole source conditions verses conventional construction. This analysis must include determination of additional capital cost or training requirements that may be necessary for the contractor.
5. Have we created long term maintenance issues or shortened the expected life of a bridge component verses conventional construction.
6. Is this concept applicable to a large number of target bridge projects.
7. Establish a study matrix to evaluate and weigh the listed concepts. The field observations, time studies and actual cost data must be used to calibrate the matrix.

IMPLEMENTATION:

Recommend, with the use of a logic matrix, the concepts which are effective for statewide use. Along with the study of effectiveness, provide observations and recommendations necessary to optimize the bridge design manual, standard construction drawings and supplemental specifications.

COST ESTIMATE:

Cost will be distributed over FY 03 and 04. It is expected that FY 03 will consist of site visits, data collection and interviews at the demonstration sites and manufacturing locations. FY 04 will consist of data analysis and report writing. It is expected that only three pilot projects will be needed to demonstrate the six concepts. The cost is expected to be approximately \$ 80,000 per year or \$ 160,000.

BENEFITS:

1. Development of a systematic matrix to evaluate proposed innovative bridge design/construction techniques. This system can also be utilized to evaluate the acceptance of future proposals, Design Build projects and Value Engineering proposals.
2. Highlight issues that limit implementation of the six proposed concepts.
3. Better understand time and cost issues that make bridges a critical construction event.

SUCCESS CRITERIA:

Evaluation and recommendation of proposed innovative concepts using a matrix tool developed by the researcher. That actual field observations and data would be used to populate the matrix tool.

DELIVERABLES:

Development of a calibrated matrix tool to evaluate proposed innovative design/ construction techniques.

Recommendation of best innovative concept.

Identification of concerns, for the department, contractor or suppliers.

EXISTING RESEARCH:

This research will follow research project 14791(0) Innovative Bridge Design /Construction Techniques to Expedite Construction. Additional studies and demonstration projects are being undertaken at Texas DOT, New York Dot, Virginia DOT and Illinois DOT.

ADDITIONAL USE:

Local agencies and other Departments of Transportation.