QUARTERLY PROGRESS REPORT

Project Title:	Acquisition of bridge deck tester
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Paul Thomas
TASK ORDER NUMBER: TO 252/ RU Acct 4-32112	PRINCIPAL INVESTIGATOR: Patrick Szary, Ph.D.
Project Starting Date: 2/1/2010 Original Project Ending Date: 12/31/14	Period Covered: 3rd Quarter 2014

Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
Acquisition of bridge deck tester	100.00%	$3,000,000	28.60%	$ 858,000	75.00%	$2,250,000
TOTAL	100.00%	$3,000,000		$ 858,000		$2,250,000

Blue text is entered once at the beginning of the project

Green text is updated every quarter

Black text is automatically updated or static

NOTE: The vendor has incurred costs this quarter. However as per our contracts' invoicing schedule, two invoices have been paid totaling $1,950,000 and the next anticipated invoice totaling $750,000 will be submitted to Rutgers in September 2014. As of the submission time of this report (August 29) we estimate an interim billing of $300,000 is appropriate to capture the cash flow and anticipated invoicing schedule.

Project Objectives:

In order to fully understand the deterioration process for bridge decks, and thus develop reliable performance models and early-detection and intervention technologies, the fundamental mechanisms and root causes of deterioration need to be clearly identified. To reliably accomplish this it is necessary to (1) identify the potentially influential parameters that contribute to bridge deterioration

and (2) vary these parameters in a controlled sense and observe performance/deterioration over time. In this manner, the causal relationships between parameters (such as, temperature cycles, freeze-thaw, applications of deicing chemicals, bridge materials, coating systems, repetitive live load actions, etc.) can be discerned. Further, since deterioration processes operate over long durations and at a glacial time-scale, time compression is highly desirable. That is, innovative manners to accelerate deterioration processes have to be found without distorting them, in order to provide bridge owners with critical information in the near-term.

Project Abstract:
Given the importance of overcoming the challenges associated with aging and deteriorating bridges, and the need for a full scale proving ground for evaluation of new and advanced materials and devices, acquisition of a full-scale load testing instrument that will be housed at Rutgers University is proposed. This instrument, for the first time, will allow the scientific study of deterioration processes on full-scale bridges. In general, three lines of inquiry are urgently needed with the proposed instrument.

1. The first involves the development of reliable predictive models for the remaining life of primary bridge components, most specifically bridge decks. By developing reliable means to forecast and estimate deck performance and safety through the proposed instrument, owners would be in a far more informed position to deploy maintenance and replacement activities as they continue to deal with difficult trade-offs and dwindling financial resources.
2. The second line of inquiry is related to the evaluation of numerous technologies, materials, and components, which are being developed to enhance bridge durability and performance. Through the proposed instrument, realistic and reliable estimates of the effectiveness of these new developments can be obtained in a timely manner. This will not only directly aid owners in decision-making, but will also help developers refine their products in a timely manner.
3. The third line of inquiry is related to validating new technologies that are being developed for augmenting bridge inspections. The proposed instrument will enable validating new inspection technology by maintaining full-scale superstructures with well-documented and realistic deterioration, defects and damage that are common in various types of bridges.

1. Progress this quarter by task:

Task Activity	Accomplishments this Quarter
Logistics	• Completed Monthly Reports • Provided rough order of magnitude cost and schedule for Bridge slope changes • Submitted contract modification to provide the 13.2KV transformer in order to meet schedule • Signed contract modification to provide site civil engineering and plan drawings for utility relocation, bridge abutments, all concrete work, etc. • Design drawings submitted, reviewed and

	approved • Ordered 13.2kV transformer in order to meet schedule
Systems Engineering	• Continue to develop a 3-D block model with major system components. • Worked site interface details with civil engineering vendor • Worked environmental enclosure interface with main structure. • Ordered & completed electrical upgrades to ARA site for on-site testing • Completed excavation at ARA to accommodate the delivery of the beams. • Selected electrician for end frame wiring
Civil Engineering	• Attended call with the Rutgers and Civil engineers to review 90% progress • Submitted 100% site/civil drawings • Site/civil contract documents submitted for bid • Distributed site/civil contract documents to bidders and completed bid. • Selected contractor for site/civil work
Structure	• Finalized sheave and winch support design • Tracked beam fabrication • Continued end frame lock design analysis • Began E-stop bracket design • Received power bus bars for carriage power • Continued electrical cabinet layout and design • Received load rails • Received rail clips • Ordered festoon • Met with the Beam vendor twice and checked on beam fabrication. • Finalized end frame design and ordered • Approved Festoon detailed design • Received beams • Received end frames
Portability	• Tracked Rail cart delivery • Received rail carts
Load	• Continued lower/upper carriage design • Continued to work with vendors for a custom built lower dolly. • Selected swing arm suspension concept • Designed rail roller shafts and completed

	analysis • Selected and ordered rail roller bearings • Selected and ordered carriage axial • Began carriage electrical box design • Began selecting compressor and carriage pneumatic components • Ordered upper and lower carriage assembly
Propulsion	• Winch vendor has begun winch assembly and fabrication • Continue developing wiring schematics for winch interface • Winch vendor has received long lead items • Signed winch electrical design documents • Received winch
Environmental	• Finalized roof enclosure design • Finalized environmental enclosure sealing • Finalized spec/source salt spray heads • Selected & ordered roof trolley truss/joist components • Identified HVAC power demands • Selected & ordered rollers • Selected roof rails • Ordered & received HVAC controller • Selected & ordered foam panels • Ordered & received HVAC components • Ordered brine maker and storage container • Assembled HVAC components for testing
Monitoring	• Continue to update draft overall system schematic and sub-schematics • Continue to refine system schematic with PLC, terminal blocks, bulkheads and connections • Ordered and received vibration monitoring system • Started programming interface between HMI and PLC • Continued control box mechanical layout and design • Assembled PLC, HMI, laptop, cameras, and sensors on benchtop for testing and programming • PLC programmed and bench tested • Software DAQ tested
Manual	• Draft outline of manual completed • Continue to update manual • Integrated Rutgers Environmental Health &

	Safety and CAIT comments to the SOP
Testing	• Started control system testing • Started HVAC testing • Final acceptance test of winch • Final acceptance test of rail carts
Shipment	• Engaged with two vendors for shipment
Installation	• Site/civil work commenced
Training	• None at this time
Closeout	• None at this time

2. Proposed activities for next quarter by task:

Task Activity	Accomplishments planned for Next Quarter
Logistics	• Submit monthly & quarterly reports
Systems Engineering	• Finalize system schematics and drawings for inclusion in the manual
Civil Engineering	• Support civil construction
Structure	• Assemble beams and end frames
Portability	• Install rail carts
Load	• Install carriage
Propulsion	• Install winch on end frame
Environmental	• Deliver and install HVAC system and finish environmental chamber
Monitoring	• Provide laptop with control software
Manual	• Provide completed manual
Testing	• Test system components at ARA • Perform acoustic testing at ARA
Shipment	• Ship all equipment to Rutgers facility
Installation	• Site/civil work completed • Install BEAST onsite
Training	• Final training provided to Rutgers personnel
Closeout	• Hold closeout meeting

3. List of deliverables provided in this quarter by task (product date):

Task	Deliverables
Logistics	• Attend required meetings
System Eng.	• Final design submittal
Civil	• None in 4th quarter
Structure	• Main beams, end frames, rails (to Rutgers)
Portability	• Load cart (to Rutgers)
Load	• Upper and lower carriage (to Rutgers)
Propulsion	• Winch (to Rutgers)
Environmental	• Roof trusses, foam panels, and HVAC system (to Rutgers)

Monitoring	• Laptop, cameras, control system and software (to Rutgers)
Manual	• Completed operation and maintenance manual (SOP)
Testing	• Final acceptance testing of installation at Rutgers facility • Perform final acoustic testing at Rutgers facility
Shipment	• Delivery of completed BEAST to Rutgers
Installation	• Installation of BEAST (at Rutgers)
Training	• Final training provided to Rutgers personnel
Closeout	• Meeting after training

4. Progress on Implementation and Training Activities:
None at this time.

5. Problems/Proposed Solutions:
None at this time.

Total Project Budget	$3,000,000
Modified Contract Amount:	
Total Project Expenditure to date	$2,250,000
% of Total Project Budget Expended	75%

NOTE: The vendor has incurred costs this quarter. However as per our contracts' invoicing schedule, two invoices have been paid totaling $1,950,000 and the next anticipated invoice totaling $750,000 will be submitted to Rutgers in September 2014. As of the submission time of this report (August 29) we estimate an interim billing of $300,000 is appropriate to capture the cash flow and anticipated invoicing schedule.

NJDOT Research Project Manager Concurrence: _____ Date: _____