

# **QUARTERLY RESEARCH REPORT**

**Quarter Ending: October 31, 2005**

Pooled Funds Study No.: TPF-5(113)

Project Title: Load Rating of Reinforced Concrete Bridges by Load Tests

Research Agency: Drexel University Intelligent Infrastructure Institute

## **SUMMARY OF PROGRESS FOR THIS QUARTER:**

1. Conducted review of commercially available, off-the-shelf sensors and data acquisition systems and developed list of sensors and systems that met the project objectives.
2. Completed site visits to three RC bridges (slab, single-span arch, and two-span arch) identified as candidates for load testing. Took field measurements of the bridge geometries, noted rebar sizes and spacing from exposed areas, and marked locations where material samples would be taken for testing.
3. Developed preliminary load ratings for two bridges based on field measured dimensions and assumed structural details (rebar size, spacing, and material properties). Developed preliminary finite element models of these bridges from the field measured geometries and structural details, and assumed material properties.
4. Developed instrumentation layout for each bridge, and load cases for test trucks. Designed sensor installation methods, and developed a list of hardware and supplies needed to install the sensors.

## **PROPOSED WORK FOR NEW QUARTER:**

1. Test material samples removed from the two bridges at WVDOT's laboratories in Charleston, WV.
2. Perform instrumentation and load testing of the two bridges.

## **IMPLEMENTATION:**

NA

## **PROBLEMS AND RECOMMENDED SOLUTIONS:**

1. Wireless data acquisition system ordered, but delivery of equipment not expected in time to use during the load tests. A conventional hardwired data acquisition system will be utilized during the load tests.

**EQUIPMENT PURCHASED:**

1. Wireless data acquisition system ordered from Microstrain, Inc.
2. Sensors ordered from various manufacturers. These included weldable strain gages, bondable strain gages, and two types of displacement gages. The displacement gages can be removed from the bridges following the load tests and used for future tests.

**CONTACTS AND MEETINGS:**

1. Preliminary planning meeting with FHWA at NDE Validation Center (TFHRC)
2. Meeting with WVDOT personnel in Charleston, WV
3. Site visits to three bridges in West Virginia with DOT representatives