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Center for Advanced Infrastructure and Transportation

Project Overview Report

1. UTC Identifying Number

   DTRT13-G-UTC28

2. Center Identifying Number

   CAIT-UTC-NC34

3. Project Title

   Installation of Embedded Accelerometers in Precast Girders for the Nibley Utah Bridge

4. Principal Investigator & Contact Information

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   Utah State University
   Logan, UT 84322

5. Rutgers/CAIT Project Manager

   Patrick Szary, Ph.D.

6. Customer Principal

   Shaun Dustin
   Engineering Manager
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7. Project Description

   This research provides a research and educational platform that is ideal for a variety of bridge studies. The work included in this proposal is the design and installation of embedded accelerometers, strain gages, and thermocouples throughout the bridge structure which can then be used for dynamic studies in the future. Additionally, this proposal covers the initial characterization of this bridge using the dynamic data and the comparison of that data with a validated structural model.

   The temperature data will be synthesized with the bridge acceleration data to allow for ongoing studies of the effects of a thermo-gradient of the deck and girders to the dynamic response of a bridge. The bridge modal frequencies and mode shapes will be correlated with the many temperature sensors on the bridge.

   All dynamic data will be collected from ambient vibration of the bridge. These ambient vibrations are provided by traffic, both on and near the subject structure, as well as vibrations provided by wind and the river flowing under the bridge.

8. Implementation of Research Outcomes (or why not implemented)

   Global dynamic testing and monitoring is a relatively inexpensive method of assessing the condition of a bridge. As this technique improves through this research it will be more valuable throughout the country and the world.

   In addition to the benefit of this current project, this educational bridge will be used for demonstrations and educational purposed for many years to come.

9. Impacts/Benefits of Implementation (actual, not anticipated)

   TBD

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10. Dates and Budget

    Start Date: 4/1/2016
    End Date: 8/31/2017
    UTC (CAIT) Dollars: $ 39,194
    Cost Sharing: $ 45,950
    Total Dollars: $ 85,144

11. Keywords

    bridge instrumentation, damage detection, temperature, modal analysis, ambient vibration, bridge field testing

12. Web Links (Reports and Project Website)

    https://cait.rutgers.edu/cait/research/installation-embedded-acclerometers-precast-girders-nibley-utah-bridge