



ACCELERATED BRIDGE CONSTRUCTION  
UNIVERSITY TRANSPORTATION CENTER

| <b>UTC Project Information</b>  |  |
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| Project Title   | Development of ABC Course Module – The Risk Due to Induced Earthquakes and Accelerated Solutions   |
| University  | Oklahoma University  |
| Principal Investigator  | P. Scott Harvey  |
| PI Contact Information  | <a href="mailto:harvey@ou.edu">harvey@ou.edu</a>   |
| Funding Source(s) and Amounts Provided (by each agency or organization) | ABC-UTC Funds: \$60,000  |
| Total Project Cost  | \$60,000   |
| Agency ID or Contract Number  | Accelerated Bridge Construction University Transportation Center (ABC-UTC) 69A3551747121   |
| Start and End Dates   | 03/01/2019-02/01/2020  |
| Brief Description of Research Project                                   | <p>In recent years, the central United States has experienced increased seismic activity due to induced earthquakes. States such as Kansas, Oklahoma, and Texas historically averaged one to two earthquake of magnitude 3.0 and larger per year, but are now experiencing significantly more. For example, Oklahoma had over 900 earthquakes in 2015 and four earthquakes larger than magnitude 5.0 since 2011. The bridges in these states were, however, originally designed for small seismic loads based on low historic seismic hazard, which has raised concern with state DOTs about the potential impact of increased seismic activity on their bridges. While collapse is unlikely for the induced earthquakes currently observed, they may lead to damage requiring rapid repairs to avoid acute traffic control issues at the affected bridge sites. To reduce impacts to the driving public, accelerated bridge construction (ABC) techniques have been developed over recent years, which may be used for rapid post-earthquake repair of damaged structures, for example accelerated column repair/replacement with carbon fiber wrapping and steel casings. This continuing education course will provide the bridge community, especially bridge engineers in states impacted by induced seismicity, with the opportunity to learn about (a) the seismic demand due to induced earthquakes, (b) an approach to quantifying the cumulative seismic demand, (c) tools developed through this ABC-UTC project for quickly characterizing the potential impact from the determined cumulative seismic demand, and (d) a brief overview of available accelerated methods to repair/retrofit damaged bridges based on material. The objective of this 1-hour web-</p> |

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|   | <p>based continuing education course is to provide the bridge community with the opportunity to learn how to estimate the cumulative seismic demand on bridges, both accelerated and conventional, due to a large number of small-to-moderate earthquakes and to educate engineers on the potential use of ABC repair/retrofit technologies. The course will provide training on the <i>ABC-UTC Guidelines for Assessing Effect of Frequent, Low-Level Seismic Events</i>. Also, a brief survey of available ABC repair techniques appropriate for cumulatively damaged bridges will be provided.</p> |
| <p>Describe Implementation of Research Outcomes (or why not implemented)<br/>Place Any Photos Here</p>  | <p>The outcomes will be tracked and reported once they are identified.</p>  |
| <p>Impacts/Benefits of Implementation (actual, not anticipated)</p>                                     | <p>Texas DOT, with similar issue, approached research team for advice, May 2020 (see also C1-OU02)</p>  |
| <p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project website</li> </ul> | <p><a href="https://abc-utc.fiu.edu/research-projects/ou-research-projects/development-of-abc-course-module-the-risk-due-to-induced-earthquakes-and-accelerated-solutions/">https://abc-utc.fiu.edu/research-projects/ou-research-projects/development-of-abc-course-module-the-risk-due-to-induced-earthquakes-and-accelerated-solutions/</a></p>  |