Research Projects at Accelerated Bridge Construction University Transportation Center at FIU

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ABC-UTC

Award Announcement: September 2013

Consortium of Universities:
• Florida International University (FIU)
  • Atorod Azizinamini (lead)
• Iowa State University (ISU)
  • Brent Phares & Terry Wipf
• University of Nevada, Reno (UNR)
  • Saiid Saiidi, UNR
Focus Areas:

• Research
• Workforce Development
• Technology Transfer
ABC-UTC Collaboration

- AASHTO Technical Committee for Construction (T-4)
- AASHTO Technical Committee for Seismic Design (T-3)
- TRB ABC Subcommittee
- ABC-UTC Steering Committee
ABC-UTC Collaboration

ABC-UTC Steering Committee
• ABC Center Executive Board
• State DOTs
• National Assoc. of County Engineers
• Delaware River & Bay Authority
• Federal Highway Administration
• Industry
• Academia
Collaborative Process to Date

• Submitted proposed activities to AASHTO T-4; T-4 reviewed and commented during its November 2013 mid-year meeting

• Shared T-4 review comments with Steering Committee in advance of its December 2013 meeting; Steering Committee commented

• Asked AASHTO T-3 to comment on proposed seismic research

• Developed action plan in consideration of T-4, T-3 & Steering Committee comments
First ABC-UTC Annual Meeting
Dec 9, 10 and 11, 2013- FIU Campus
Research Projects
At FIU
Compilation of Available Short to Medium Span ABC Systems

Objective: The objective of the project is to compile information on existing accelerated bridge systems that target the short to medium span range, roughly defined as up to 140 feet, and present the information in a manner useful to designers. The information will be placed and maintained on the ABC-UTC web site.

Scope: The compilation will include all structure types constructed of any material.
Objective: The main objective of this project is to conduct combination experimental and numerical work to develop details and design provisions for extending the application of the SDCL bridge system to highly seismic areas.

Scope: Phase I, will concentrate on developing the suitable details, using numerical analysis and later in phase II, verify the recommendation using experimental testing.
Estimating total cost of bridge construction using ABC and conventional methods of construction

Objective: The objective of this project is to develop framework for comprehensive decision-making processes that will include user costs and traffic impact.
**Objective:** The main objective of this project is to develop a manual devoted to service life design of ABC projects.

**Scope:** The development of the document will consider the ABC projects nationwide. It will include case studies, examples, design, inspection and maintenance information.
Objective: The main objective of this project is to develop a comprehensive database of published, ongoing and planned research related information in the area of ABC.

Scope: The database will incorporate published studies (gathered through a thorough review of available literature) and unpublished and ongoing studies (gathered through resources available through ABC-UTC and possibly a short survey of state departments of transportation).
ABC-UTC Research Projects at ISU
Objective: The objective of this work is to complete controlled laboratory testing of several barrier rail connection detail alternatives. This work will lead to the identification of several promising concepts that will be crash tested by others.

Scope: The project will be limited to preliminary identification of barrier rail connection detail.
Objective: The objective of this work is to develop and test the strength and durability of connection details that utilize grouted couplers that can be used in an ABC environment to create an integral abutment.

Scope: This project will provide recommendations on connection details.

http://www.precastconcrete.org/seminars/2009/2009-
**Objective:** The objective of this work is to explore opportunities for applying the new ABC approaches to bridges as part of rehabilitation efforts.

**Scope:** The synthesis will provide a comprehensive summary of available solutions including, where appropriate, design and construction procedures.
ABC-UTC Research Projects at UNR
Objectives:
Utilize past/current research data to develop seismic design guidelines for prefabricated column-footing and column-cap beam connections w/ couplers

Issues:
◦ Plastic hinge length.
◦ Analysis method parallel to AASHTO Seismic Guide.

Deliverables:
◦ Design considerations for different coupler types
◦ Design examples
Objectives:
Synthesize data on performance of cap beams w/ pockets to identify design/construction considerations

Issues:
- Behavior and design under combined flexure/shear/torsion
- Detailing

Deliverables:
- Design guidelines similar to AASHTO Seismic Guide
- Design examples
Process to be Used for Selection of Research Topics for 2\textsuperscript{nd} Round

- ABC-UTC would like to collaborate to solve technical challenges, leading to expanded use of ABC
  - State DOTs
  - Industry

- ABC-UTC would like input from AASHTO T-4, AASHTO T-3, TRB ABC and NCHRP
2014 National Accelerated Bridge Construction Conference

Hyatt Regency, Miami, Florida

December 4-5, 2014
December 3 – workshops

www.2014abc.fiu.edu