



ACCELERATED BRIDGE CONSTRUCTION

UNIVERSITY TRANSPORTATION CENTER

2014 HIGHLIGHTS



FIU FLORIDA
INTERNATIONAL
UNIVERSITY

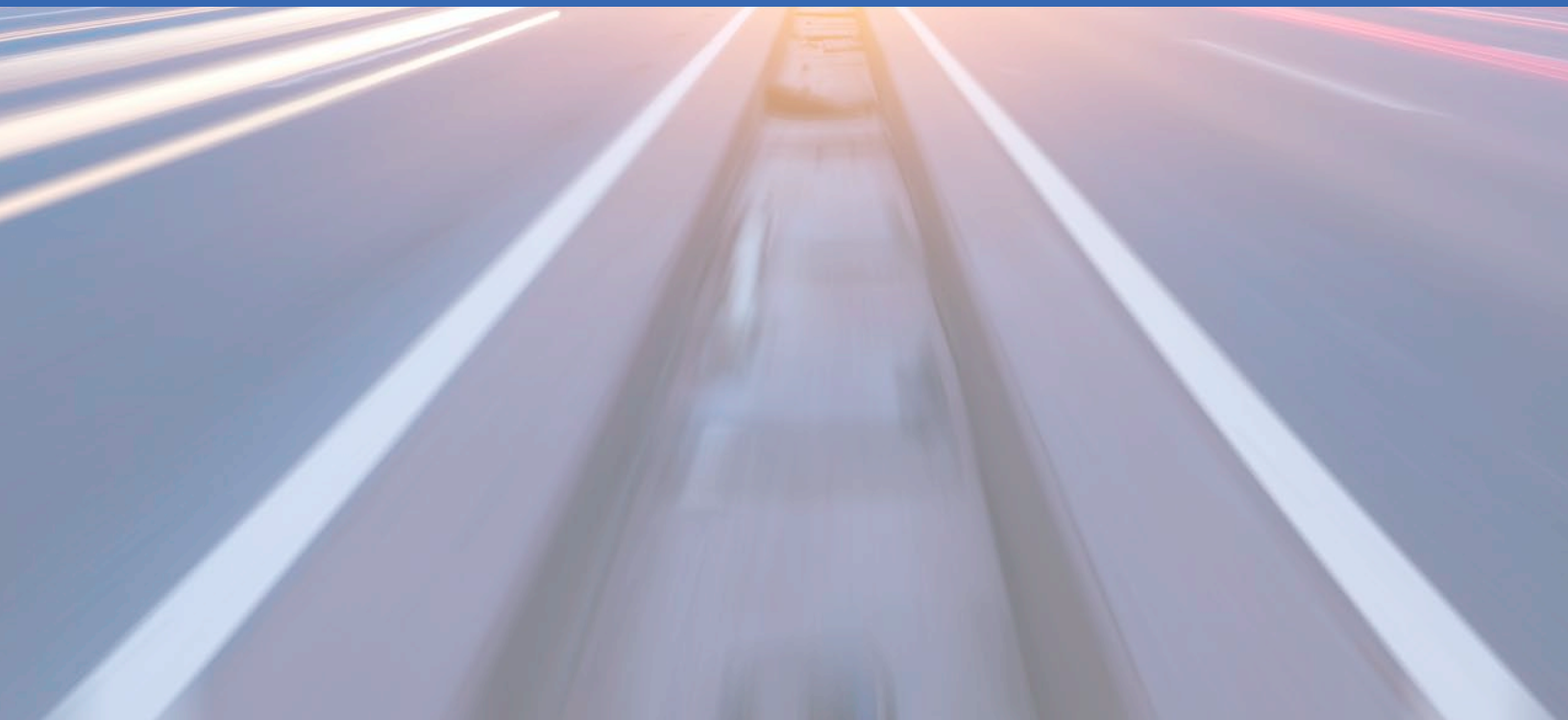
IOWA STATE
UNIVERSITY



University of Nevada, Reno



The mission of ABC-UTC is to reduce the societal costs of bridge construction by reducing the duration of work zones, focusing special attention on preservation, service life, construction costs, education of the profession, and development of a next-generation workforce fully equipped with ABC knowledge.



Letter from the Director



Dr. Atorod Azizinamini
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To address the need for a dedicated center for ABC, a group of U.S. bridge engineering professionals gathered at FIU in Miami, Florida, in November 2010. The group established – without external funding, using only volunteer support along with seed funding and staff from FIU – the Center for Accelerated Bridge Construction, with the goal of helping the bridge profession more effectively implement ABC. The ABC Center at FIU officially commenced activity in January 2011, with a concentration on the technology transfer of existing knowledge. That March, the Center began offering free monthly webinars to engineers and other bridge professionals. These webinars attract an average of 4,000 participants each month.

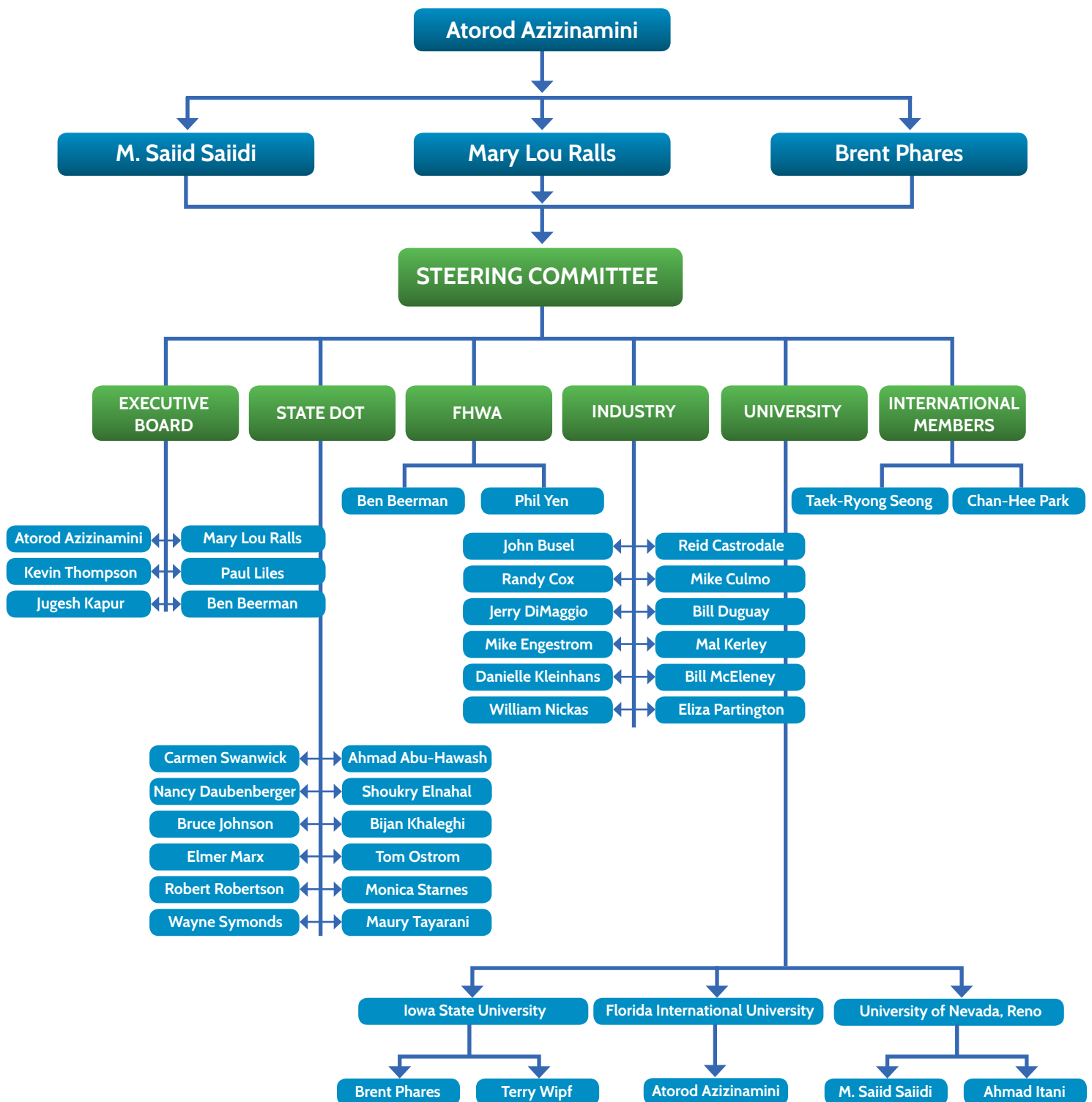
In September 2013, the U.S. DOT designated a consortium of universities led by FIU to be the recipient of a Tier One UTC with focus on ABC. The newly established Accelerated Bridge Construction University Transportation Center (ABC-UTC) allows the founders of the ABC Center at FIU to further their mission of aiding the bridge profession by embarking on ABC-related research emphasizing state of good repair, by undertaking various educational and workforce development activities, and by continuing and extending technology transfer activities.

The ABC-UTC consortium of universities – Florida International University, Iowa State University, and the University of Nevada, Reno – is working in partnership with stakeholders to provide the schools' students and the profession with the best possible service. A distinct feature of the ABC-UTC is its close collaboration with AASHTO members, FHWA, and the bridge profession. The eleven ongoing research projects at the ABC-UTC were selected, through collaborative discussions, as those best suited to filling knowledge gaps in the ABC area. Consultants have joined the consortium in these efforts, for example as mentors to assist in the development of a more knowledgeable workforce capable of implementing new frontiers in ABC. In November 2014, the ABC-UTC held its first in-depth web training sessions. In December 2014, it held the first National ABC Conference. This first annual highlights report summarizes the ABC-UTC's efforts during its first year. The organization welcomes your thoughts and suggestions on how it might better support the bridge profession in the effective implementation of ABC across the U.S.

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Organizational Chart



Leadership - Reflections of Accomplishments

Atorod Azizinamini, Professor and Chair of the Department of Civil and Environmental Engineering Department of the College of Engineering and Computing at Florida International University (FIU), Miami, Florida



The year 2014 was a banner year for the ABC-UTC at FIU. The establishment of the ABC-UTC has allowed the team to significantly elevate ABC activities and to serve the bridge community both locally and nationally. The FIU team initiated five ABC-UTC research projects and is working closely with stakeholders to ensure that their work is beneficial and easy to implement. Through its webinars and other activities, the ABC-UTC is delivering the information and services needed to ensure the adoption of ABC as a norm.

The team organized the first National ABC Conference in December 2014. Highlights of the conference are available at http://www.2015abc.fiu.edu/2014Conference_video.html. There are ten Ph.D. students working on ABC-UTC research projects at FIU. The FIU team has also hired five undergraduate students as interns, all of them belonging to minority groups, and is working closely with them. The team has developed the framework of a summer camp for minority students, to be held in the summer of 2015, and has reached out to practitioners, asking them to help ABC-UTC graduate students at FIU by becoming mentors. Locally, FIU has signed an agreement with Miami-Dade County to assist in bridge engineering. In short, the ABC-UTC at FIU has become a focal point for ABC.

Brent Phares, Director, Bridge Engineering Center and Associate Research Professor, Civil, Construction and Environmental Engineering, Iowa State University

Iowa State University has made several notable accomplishments during the first year of ABC-UTC activities. For example, the university's ABC-UTC partner has initiated an AASHTO RIDES outreach program in the state of Iowa. Working with primary- and secondary-school educators, the ISU team has been working to bring hands-on activities to science, technology, engineering, and math (STEM) classes. The team has also created an hour-long video discussing how local systems engineers can use ABC techniques and technologies to achieve their own unique bridge construction needs. In addition, working with a world-renowned group of ABC experts, ISU researchers have initiated three research projects, which will lead to a practical state-of-the-practice manual and two much-needed bridge construction details.



Leadership - Reflections of Accomplishments

M. Saiid Saiidi, Co-Director, University of Nevada-Reno



The ABC-UTC Seismic at UNR embarked on three research projects, educated research assistants in ABC, and was involved in ABC technology transfer. The research projects, one funded completely by UTC and the other two co-funded with other sources, addressed innovative connections that could improve the seismic performance of precast bridge piers, integrated research on the seismic responses of mechanical couplers, and started the development of the seismic design of precast cap beams. One Ph.D. student and a half-time post-doctoral fellow were involved in these projects and were trained to prepare the next generation of skilled labor in the seismic aspects of ABC. An undergraduate student was recruited in January 2015 for research projects on furthering workforce development. With respect to tech transfer, the UNR team developed a course module on ABC seismic design, organized two technical sessions at conferences on the earthquake engineering aspects of ABC, presented several articles on ABC at conferences, and gave several presentations to AASHTO T-3 and the TRB Committee AFF50 on seismic design considerations for ABC and on the activities of ABC-UTC.

Mary Lou Ralls, Director of Technology Transfer

The ABC-UTC initiated a number of technology transfer activities in 2014. Its popular monthly webinar series featured presentations on ABC projects and technologies that drew between 600 and 1,000 registered sites, many of them with multiple participants, resulting in thousands of participants each month. The ABC-UTC hosted its first in-depth web training session in November 2014, created its website (<http://abc-utc.fiu.edu/>), and populated it with research, education, and technology transfer information. This information includes monthly webinar announcements, with online registration and archives of featured presentations; announcements of upcoming ABC-related events, including the National ABC Conference; reports of the ABC-related activities of various groups, with links to their websites; and other ABC-related resources and news items. Work is underway with FHWA to move its national ABC projects database to the ABC-UTC website and to improve the accessibility and functionality of this database to more fully address the needs of bridge owners. Academics and staff members of ABC-UTC attended the annual meeting of the American Association of State Highway and Transportation Officials 2014 Subcommittee on Bridges and Structures, where they gave presentations on ABC-UTC activities to several of its technical committees. They also participated in other national and regional bridge meetings to spread the word about the ABC-UTC and its activities. The ABC-UTC hosted its first National ABC Conference in December 2014 in Miami, Florida.



ABC-UTC Steering Committee

PARTNER UNIVERSITIES

- Atorod Azizinamini, Florida International University
- Saiid Saiidi, University of Nevada, Reno
- Brent Phares, Iowa State University
- Ahmad Itani, University of Nevada, Reno
- Terry Wipf, Iowa State University

ABC CENTER EXECUTIVE BOARD

- Atorod Azizinamini, Florida International University
- Mary Lou Ralls, Ralls Newman, LLC; former State Bridge Engineer, Texas
- Kevin Thompson, AECOM; former State Bridge Engineer, California
- Jugesh Kapur, Burns & McDonnell; former State Bridge Engineer, Washington State
- Paul Liles, former State Bridge Engineer, Georgia
- Ben Beerman, Federal Highway Administration

STATE DEPARTMENTS OF TRANSPORTATION AND STATE AGENCIES

- Carmen Swanwick, AASHTO SCOBS T-4 Chair, Utah DOT
- Wayne Symonds, AASHTO SCOBS T-4 Vice-Chair, Vermont Agency of Transportation
- Ahmad Abu-Hawash, Iowa DOT
- Nancy Daubenberger, Minnesota DOT
- Shoukry Elnahal, Delaware River & Bay Authority
- Bruce Johnson, Oregon DOT
- Bijan Khaleghi, Washington State DOT
- Elmer Marx, Alaska DOT&PF
- Tom Ostrom, California DOT
- Robert Robertson, Florida DOT
- Maury Tayarani, MassDOT
- Monica Starnes, Transportation Research Board

FEDERAL HIGHWAY ADMINISTRATION

- Ben Beerman, Resource Center
- Phil Yen, Office of Infrastructure

INTERNATIONAL MEMBERS

- Taek-Ryong Seong, RIST, South Korea
- Chan-Hee Park, RIST, South Korea

ABC-UTC Steering Committee

INDUSTRY PARTNERS

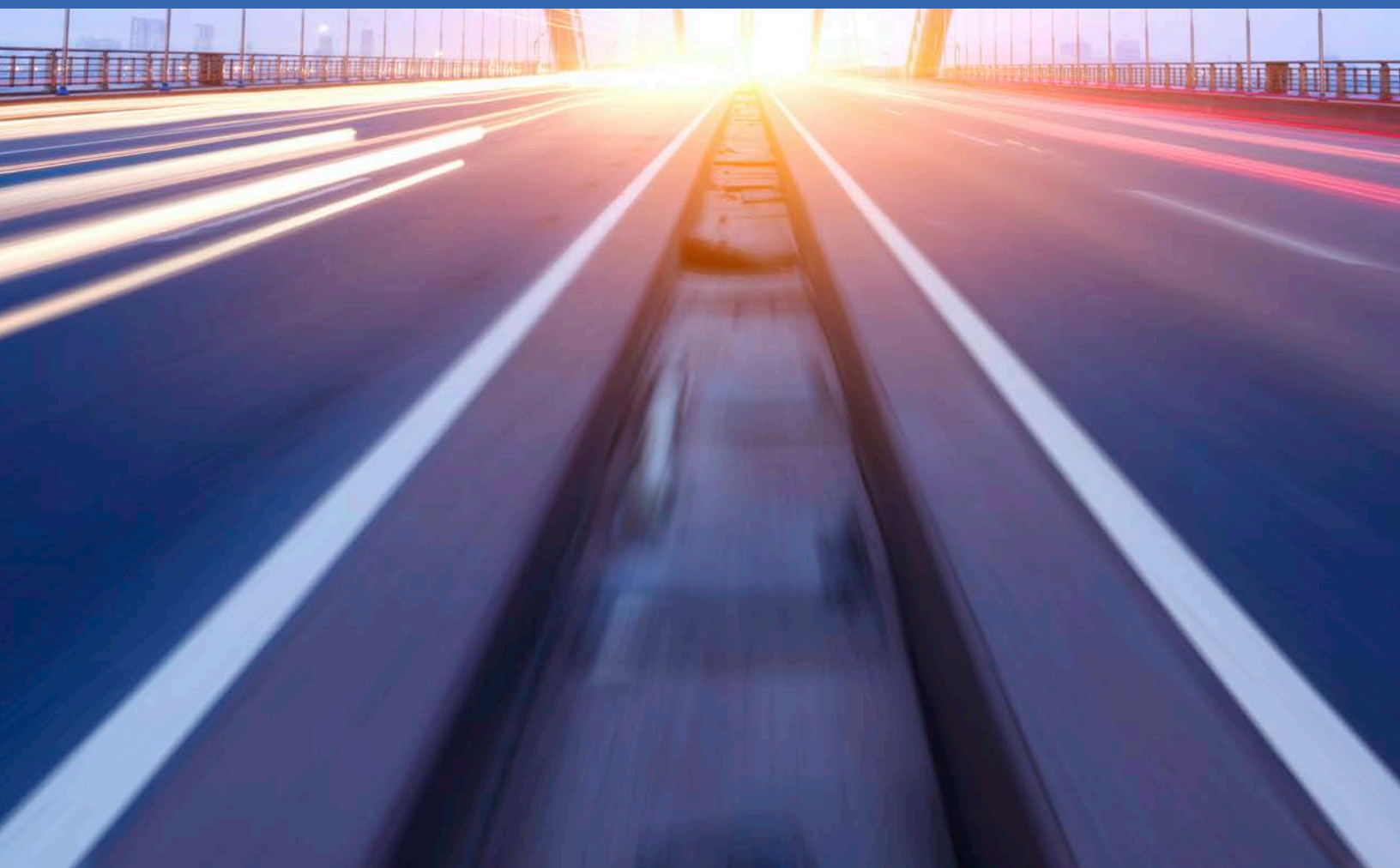
- John Busel, American Composites Manufacturers Association (ACMA)
- Reid Castrodale, Lightweight concrete rep.
- Randy Cox, American Segmental Bridge Institute (ASBI)
- Mike Culmo, CME Associates, Inc.
- Jerry DiMaggio, Applied Research Associates, Inc.
- Bill Duguay, Associated General Contractors of America (AGC), rep.; J.D. Abrams, LP
- Mike Engestrom, Short Span Steel Bridge Alliance (SSSBA)
- Mal Kerley, NXL Construction Services, Inc.
- Danielle Kleinhans, National Concrete Bridge Council (NCBC), rep.
- Bill McEleney, National Steel Bridge Alliance (NSBA)
- William Nickas, Precast/Prestressed Concrete Institute (PCI)
- Eliza Partington, FIGG

FLORIDA INTERNATIONAL UNIVERSITY FACULTIES

- Amir Mirmiran, Professor and Dean
- Atorod Azizinamini, Professor and Chair
- Albert Gan, Professor
- Mohammad Hadi, Associate Professor
- Wallied Orabi, Assistant Professor
- Xia Jin, Assistant professor
- Ali Mostafavidarani, Assistant Professor
- Seung Jae Lee, Assistant Professor
- David Garber, Assistant Professor
- Hesham Ali, Professor of Practice
- Fabian Cevallos, Transit Program Director
- Yan Xiao, Research Associate
- Jawad Gull, Research Associate



ABC-UTC RESEARCH



International Database of ABC Research

PI: David Garber

Student Research Assistant: Nazanin Rezaei



In recent years there has been a significant push for the development of more durable bridges that are less expensive and take less time to construct. This desire on the part of the bridge community has led numerous federal, state, and local agencies to encourage the use of accelerated bridge construction (ABC) practices. As with any newly emerging engineering topic, it is essential that measures be taken to prevent the repetition of research and to provide a source of information for stakeholders.

Over the course of this project, a comprehensive database will be assembled that is both user-friendly and easy to navigate. It will incorporate both published studies (gathered via a thorough review of the available literature) and unpublished and ongoing studies (gathered through ABC-UTC resources and possibly a short survey of state departments of transportation).

<http://abc-utc.fiu.edu/index.php/research/>

A screenshot of the ABC Research Database website. The header is blue with the ABC-UTC logo and the text "ACCELERATED BRIDGE CONSTRUCTION UNIVERSITY TRANSPORTATION CENTER". Below the header is a navigation bar with links: Home, Research Projects, Education, Technology Transfer, Resources, Events, and News. The main content area is white and features a section titled "Lateral Connections for Double Tee Bridges". This section includes "Key Words", "Group", "Subject Area", "Deliverables", and "Related Projects". A specific project is highlighted with a photo and details: "2005 - O'Malley Bridge (AK)", "Adj. decked bulb-T's", "Grouted keys", "Urban location", "Two spans", and "223 ft. long". To the right of this section is a sidebar titled "ABC Research Database" with links: Home, Full Database, Database Search, Downloadable Database, and Recommend Project. Below the main content area is a section titled "Related Research" with a red border around the first entry: "1. Behavior of Double-Tee Flange Connectors Subjected to In-Plane Monotonic and Reversed Cyclic Loads - J. Pincheira, M. Oliva, W. Zheng".

“This is an excellent source of information for ABC users who want to learn how ABC projects are done and who want to keep up with the latest technologies that are being used on these projects.”

—Paul Liles, former State Bridge Engineer, Georgia DOT

Compilation of ABC Solutions

PI: David Garber

Co-PI: Jawad Gull

Student Research Assistant: Mohamadreza Shafieifar



Accelerated bridge systems have been under development across the country, often in isolation from each other. Although FHWA, state DOTs, and others have been working to improve communication between these efforts, there is still no comprehensive resource for helping designers select an appropriate system for a particular project.

This project will expand and enhance the existing FHWA ABC projects database. The objective of the project is to compile information on accelerated bridge technologies and to present it in a way useful to designers. The database will include all bridge types constructed from any material using ABC techniques. Alternatives and objective information will be provided for each, allowing the end user to make an informed decision about the suitability of each system to their circumstances.



“The sharing of information is a critical aspect of the deployment of new technologies. Through this database, owners and designers can build on past successful projects leading to continuous improvement in the technology.”

–Carmen Swanwick, Chief Structural Engineer, Utah DOT

Extending the Application of the Simple for Dead Load and Continuous for Live Load Steel Bridge System to ABC Applications in Seismic Regions

PI: Atorod Azizinamini

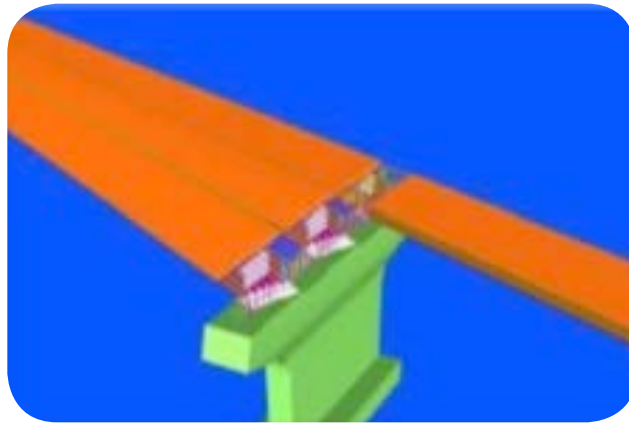
Student Research Assistant: Ramin Taghinezhad



Systems for accelerating the construction process are at the heart of accelerated bridge construction. Building the individual spans off-site, transporting them to the final location, and then joining them over the middle piers to create continuity for live loads is one useful technique.

A new steel bridge system, called “Simple for Dead Load and Continuous for Live Load” (SDCL) has recently gained popularity in non-seismic areas of the country. Research conducted over the past ten years (Azizinamini et al.) has resulted in the development of complete design and detailing provisions for this new system in non-seismic applications.

To date, no research has been conducted on extending the applicability of this system to seismic regions, either for conventional or ABC approaches. The main objective of proposing this concept as a research area is to examine the data generated over the past decade and conduct a mixture of experimental and numerical work to develop the details and design provisions necessary for extending the applicability of the SDCL bridge system into highly seismic areas.



“Our State DOT has used the ‘Simple for Dead and Continuous for Live’ concept for many years in precast concrete girder designs and in a few cases for steel girder designs, where it provided significant advantages in durability, due to removal of deck joints, and in design efficiency. We are very interested to see this concept extended to ABC applications, due to its inherent advantages.”

–Bruce Johnson, State Bridge Engineer, Oregon DOT

Estimating the Total Cost of Bridge Construction Using ABC and Conventional Methods of Construction

PI: Mohammed Hadi

Co-PIs: Ali Mostafavi, Wallied Orabi, Yan Xiao

Student Research Assistants: Mohamed Ibrahim, Jianmin Jia



Estimating the total costs, including direct and indirect construction costs, agency overhead costs, and user costs, associated with both Accelerated Bridge Construction (ABC) and traditional construction is essential to proper decision making in many stages of the bridge-construction life cycle, including planning, design, construction, operation, and maintenance. Documenting these costs is critical to maximizing the value of bridge construction.

The objective of this project is to estimate the total costs of bridge construction that can be used as part of a framework that would incorporate other tools, methods, and processes to support ABC decision making. This will be accomplished using data and modeling analysis of the construction, agency, and user costs involved in ABC bridge construction. Data from several ABC case studies will be used for the documentation and analysis of costs. The data will then be analyzed to develop robust models for cost estimation and decision-making.

The project team will first develop a synthesis of the state-of-the-art and the state-of-the-practice on the subject. It will then identify several components of the total costs of ABC and conventional methods of bridge construction. The results will be used in determining criteria, methods, and tools that can be used in the cost-estimation and decision-making processes as part of the recommended framework. The framework itself will be tested in scenarios of conventional and accelerated bridge construction and fine-tuned on the basis of the results.



“

“As with all new initiatives, the cost.....or the unknown or uncertainty of the cost....is the major reason that impacts acceptance. While ABC construction provides an obvious benefit to the traveling public, the ability to estimate the total project costs of a project, using both ABC and traditional construction methods, will provide bridge owners with the ability to make the best possible decisions in developing their projects. This effort will give bridge engineers a resource to help answer the question.....“How much will it cost?”

”

—Malcolm T. Kerley, P.E., President NXL Construction Services, Inc.

Development of Manual for Enhanced Service Life of ABC Projects



PI: Atorod Azizinamini

Co-PI: Jawad Gull

Student Research Assistants: Azadeh Jaberri & Morgan Dickinson

The nationwide application of ABC to bridge design and construction is still at an early stage. Nevertheless, a few ABC projects are already decades old, and the number of ABC projects is increasing rapidly. It is essential to observe the performance of ABC projects in service at the national level and to produce a manual for assisting designers and owners in developing design, construction, and maintenance practices that will extend the service lives of ABC bridges. The main objective of this project is thus to develop a manual devoted to the service life performance of ABC projects.

In the development of this document, ABC projects nationwide will be considered. The manual will include case studies and examples as well as design, inspection, and maintenance information. It will be flexible and will easily accommodate new information as it becomes available. Tools will be developed to make the document user-friendly. The general framework for the document will be similar to that described in the Guide for Design of Bridges for Service Life.



“This work can help to answer the second most asked question about ABC: Is it durable?”
—Michael P. Culmo, Vice President of Transportation and Structures, CME Associates, Inc.

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FIU Student Research Assistants



Alireza Mohammadi is a Ph.D. candidate in structural engineering at Florida International University in Miami, Florida. He received his M.Sc. from Sharif University in Tehran, Iran, in 2008, and his B.S. in 2006 from Tabriz University in Tabriz, Iran. For his master's degree, he worked on the experimental study of semi-rigid connections. He worked at Zelzeleh Mohaseb Consulting Engineering Company for four years, and entered his doctoral program in 2012. He has been involved in several bridge engineering research projects during his three years at FIU, in particular "Assessment and Evaluation of Timber Piles Used in Nebraska for Retrofit and Rating" and "Phase and Widening Construction of Steel Bridges," which were conducted mainly by him under the supervision of Professor Azizinamini. He is currently working on several ABC-UTC research projects. For his doctoral dissertation, he is researching the dynamic response of high-rise buildings under wind excitation.

Huy V. Pham is a Ph.D. candidate in structural engineering at Florida International University in Miami, Florida. He received both his master's and bachelor's degrees with highest honors in civil engineering from the Georgia Institute of Technology. In his master's research, he utilized an novel material called shape-memory alloy to add a self-centering capacity to steel buckling-restrained braced frames (BRBFs). This capacity was able to fix the problem of large residual deformation/drift in BRBFs. He started the doctoral program in the summer of 2013. Currently, he is working on redundancy evaluation of twin steel box-girder bridges where one tension member (bottom flange or web) of one box-girder is fractured, under the supervision of Professor Azizinamini. He is also involved in conducting numerical studies as part of a project to develop new hybrid steel-concrete bridge systems that will utilize A1010 steel and UHPC. This project is an extension of the ABC-UTC "Compilation of ABC Solutions" project.

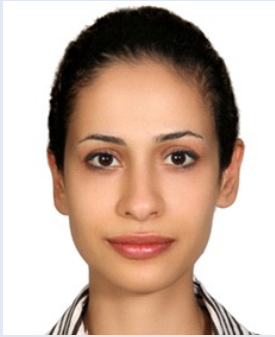


Ramin Taghinezhad is a Ph.D. candidate in structural engineering at Florida International University in Miami, Florida. He received his M.Sc. in structures from Urmia University in Urmia, Iran, in 2004, and his B.S. in civil engineering from Ferdowsi University of Mashhad in Mashhad, Iran, in 2001. In his master's research he worked on the effect of shear wall locations in planes on the seismic behavior of structures and the optimum height of shear walls. His experience includes the design and construction of more than one hundred commercial, residential, and industrial steel and concrete structures. He has published more than 20 papers and a book entitled Seismic Design and Rehabilitation of Structures Under Pushover Analysis. He has taught at Azad University and Svaneh Tabiee University in Tehran, Iran. He started his Ph.D. program in 2013. He has been involved in several bridge engineering research projects since, including "Assessment and Evaluation of Timber Piles Used in Nebraska for Retrofit and Rating" and "Non Destructive Test of Fort Lauderdale Bridge," under the supervision of Professor Azizinamini. He is currently working on an ABC-UTC research project to extend the application of the simple for dead load, continuous for live load (SDCL) steel bridge system to ABC in seismic regions.

Mohamadreza Shafieifar is a graduate research assistant at Florida International University in Miami, Florida. He received his M.Sc. in civil engineering from Sharif University of Technology in Tehran, Iran, in 2012, and his B.S. in civil engineering from Tabriz University in Tabriz, Iran. In his master's thesis, he worked on the behavior of base plates with various rigidities. He worked as a lecturer at ABA University in Tehran, Iran for two years. He also worked as a building designer for three years at the Bandab and Yekom consulting engineering firms in Tehran, Iran. He started his Ph.D. program in 2014. He has been involved in several ABC projects, such as modeling buildings and bridges using Abaqus and SAP2000 software. He is currently working on connections for precast members for ABC projects in seismic regions, under the supervision of Professor Azizinamini. He is also involved in an ABC-UTC research project to compile ABC solutions and technologies.

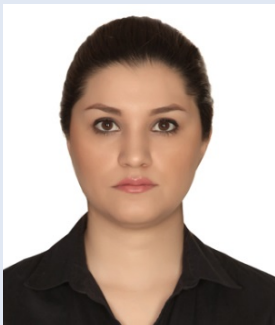
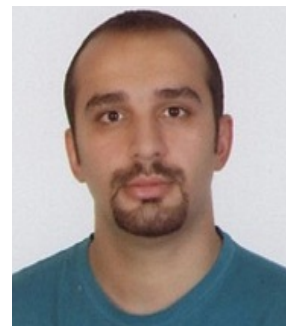


FIU Student Research Assistants



Mahsa Farzad is a graduate research assistant at Florida International University in Miami, Florida. She received her M.Sc. in civil engineering from Sharif University of Technology in Tehran, Iran, in 2013, and her B.S. in civil engineering in 2010 from Shahrood University of Technology in Shahrood, Iran. For her master's thesis, she worked on an experimental study of building bracing systems using semi-rigid connections. She started her Ph.D. in structural engineering in the fall of 2014. She is currently involved in experimental studies of a project to develop a new hybrid steel-concrete bridge system utilizing A1010 steel and UHPC. This project is an extension of the ABC-UTC "Compilation of ABC Solutions" project.

Alireza Valikhani is a graduate research assistant at Florida International University in Miami, Florida. He received an M.E. in structures from the University of Buffalo in 2014, and an M.Sc. in earthquakes from Sharif University of Technology in Tehran, Iran, in 2011. He also received an M.S. in environmental studies from Tehran University in 2009. He earned his B.S. in civil engineering from Tabriz University in Tabriz, Iran, in 2006. For his master's thesis, he worked on the experimental study of innovative steel shear walls and energy optimization in buildings. He worked as a consultant in Iran and as a supervisor for several projects during the past three years. He started his Ph.D. program in August 2014. Currently, he is working on finding defects of strands in bridges by using NDT, and on an ABC-UTC investigation of the applicability of robotics in ABC projects.



Azadeh Jaber is a graduate research assistant at Florida International University in Miami, Florida. She received her M.Sc. from Iran University of Science in Tehran, Iran, in 2012, and her B.S. in civil engineering from Tabriz University in Tabriz, Iran, in 2006. The focus of her M.Sc. research was on retrofitting RC bridges with FRP and the characterization of plastic hinges in RC bridge piers. She also worked as a structural designer at Mapna Group in Tehran, Iran for seven years. She started her Ph.D. program in 2015. Currently, she is working on evaluating the conditions of concrete slab ABC bridges using the impulse-response method, under the supervision of Professor Azizinamini. She is also involved in an ABC-UTC research project to develop ABC service life guidelines.

Morgan Dickenson is a graduate research assistant at Florida International University in Miami, Florida. He has more than 36 years of experience providing construction material testing, construction engineering and inspection, engineering management, geotechnical engineering, and threshold building inspection services. Mr. Dickinson has successfully managed operations for firms specializing in construction materials testing and inspection and in geotechnical engineering for more than 29 years, and he previously served as a project engineer for seven years. He has managed Florida Department of Transportation (FDOT) contracts as both a prime- and a sub-consultant, is a threshold special inspector in Florida, and is a professional engineer in both Florida and Colorado. He has worked on numerous bridge, roadway, and airport projects, including the Fort Lauderdale-Hollywood International Airport runway expansion project, in which a bridge carries the runway over a federal highway. As a Ph.D. candidate, he is involved in the ABC-UTC research project to develop ABC service life guidelines.

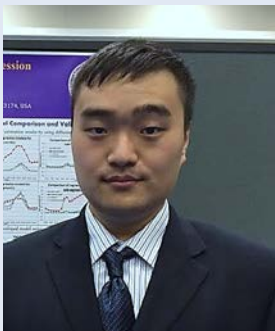


FIU Student Research Assistants



Nazanin Rezaei is a graduate research assistant at Florida International University in Miami, Florida. She received her M.Sc. from Iran University of Science and Technology (IUST) in Tehran, Iran, in 2012, and her B.S. in civil engineering from Arak University in Arak, Iran, in 2009. For her master's thesis, she worked on an experimental and numerical study of the effects of TDA (Tire Derived Aggregate) on track vibration reduction. She also worked as the head of the Structural Department at E-lood Consulting Engineers in Tehran, Iran, for three years. Currently, she is studying the effects of CNTs (Carbon Nano Tubes) on concrete under the supervision of Professor Garber. She is also involved in an ABC-UTC research project to compile all ongoing and completed ABC research.

Mohamed Ibrahim is a Ph.D. candidate in construction at Florida International University. He received his M.Sc. from Cairo University and his B.Sc. degree from the American University in Cairo, Egypt. He also has an M.B.A. from the American University in Cairo. Mohamed has more than 10 years of working experience as both a site engineer and an engineer consultant in Egypt and the Middle East. He started his Ph.D. program in 2012. Currently, he is working on decision-making processes for alternative contracting methods for highway pavement rehabilitation projects. Mohamed worked on an NSF research project entitled "Foster Complex Systems Thinking in Construction Engineering Education Using a Case-Based Multidimensional Virtual Environment" under the supervision of Professor Yimin Zhu from 2012 to 2014. He is also currently working on an ABC-UTC research project entitled "Estimating Total Cost of Bridge Construction using ABC and Conventional Methods of Construction."



Jianmin Jia has been a Ph.D. candidate in the transportation engineering program at Florida International University in Miami, Florida since August 2013. He received his M.S. in civil engineering from Shandong University in Jinan, China, in 2013, and his B.S. in mathematics from Shandong University in 2010. For his master's thesis, he worked on an integrated evaluation system for urban green transportation. He is currently working on the ABC-UTC research project "Estimating Total Cost of Bridge Construction using ABC and Conventional Methods of Construction," under the supervision of Professor Hadi in the Lehman Center for Transportation Research (LCTR). He has participated in the project for SHRP 2 L38(C), "Pilot Testing of SHRP 2 Reliability Data and Analytical Products," and the project for optimizing emergency management systems (EMS) through the use of ITS technologies.

FIU Internship Program

FIU has an undergraduate research internship program. The internships are used to attract undergraduate students to transportation-related employment. Qualified students are recruited to conduct research at the ABC-UTC.

FIU has hired three undergraduate interns to promote the involvement of undergraduate students in the ABC-UTC.



Julian Gomez is a highly motivated student pursuing a bachelor's degree in civil engineering at Florida International University. He is set to graduate in the summer of 2015. Julian is currently an intern at the ABC-UTC Center at FIU, where he helps research associates with a variety of tasks.

Joselaine Pateau is an undergraduate at Florida International University. She earned an associate's degree in civil engineering at Miami Dade College, and is now working toward a bachelor's degree in civil engineering. She is currently working as an intern at the ABC-UTC Center at FIU. Joselaine is a member of Chi Epsilon and is set to graduate in the summer of 2016.



Vanessa Castillo is an undergraduate ABC-UTC assistant at Florida International University. She is set to graduate in December 2014 with a B.S. in civil engineering, after which she hopes to pursue an M.S. in construction management.

Development of Prefabricated Bridge Railings

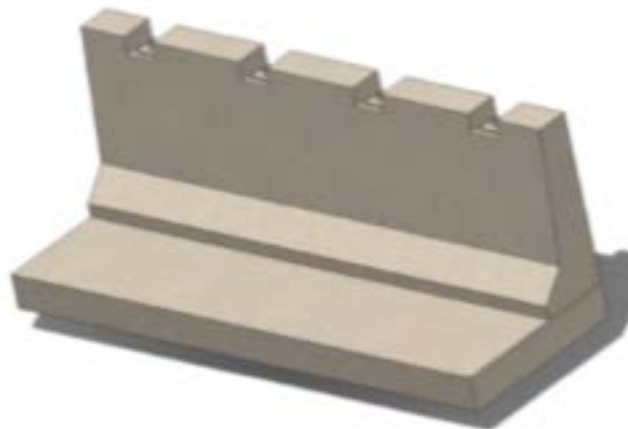
PI: Terry Wipf

Co-PIs: Sri Sritharan, Brent Phares

Student Research Assistant: Ashley Ecklund

IOWA STATE UNIVERSITY
Institute for Transportation

One of the most common means of achieving ABC is to use prefabricated elements which can be brought together on-site to construct the bridge in place. The purpose of this research is to begin the development of crash-tested, prefabricated bridge railings with durable anchorage details. The significant recent interest in ABC has led to valuable research in many important areas. However, one area that has not yet seen notable research is the area of prefabricated, crash-tested barrier rails. As a result, ABC projects to date have tended to rely on systems that integrated crash-tested components into other, larger prefabricated elements. To achieve the objective of developing prefabricated, crash-tested bridge railings, a two-step process will be followed, involving (1) the development and laboratory testing of prototype concepts, and (2) the crash-testing of promising concepts. The work to be completed here will be restricted to (1). The proposed research will develop and laboratory-test several options in order to identify the most viable among them. These would then undergo full-scale crash-testing with other researchers.



“

“A prefabricated bridge railing system will be a great addition to the ABC tool box.”

–Ahmad Abu-Hawash, Chief Structural Engineer, Iowa DOT

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Strength, Durability, and Application of Grouted Couplers for Integral Abutments in ABC Projects

PI: Travis Hosteng

Co-PIs: Lowell Greimann, Brent Phares

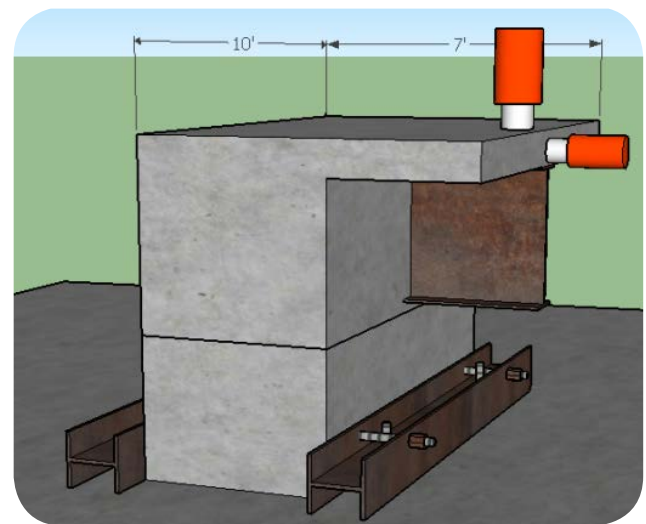
Student Research Assistant: Sam Redd

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Institute for Transportation

Accelerated bridge construction (ABC) projects are becoming more and more commonplace, and are now often critical to meeting the needs of the traveling public. In the development of various ABC designs and techniques, several technologies have been particularly important for accelerating the process or for providing greater bridge sustainability. Significant steps have also been made in improving bridge durability by moving toward bridges with integral abutments. To date, however, these two factors have not been paired together for ABC, and in general, integral abutments have seen little or no use in ABC in spite of their long-established and widespread use in conventional bridge construction.

The development of an integral abutment design using grouted couplers and other innovative connection details would have the potential to make bridges constructed using ABC techniques more efficient and economical, and could increase service life by eliminating expansion joints. Furthermore, these designs would allow all the benefits that conventional bridges with integral abutments have



realized to be transferred and applied to ABC projects. To fully understand the strength, durability, and construction limitations of an ABC integral abutment constructed with grouted rebar couplers, and to meet the complete objectives of this work, a three-step process will be required, involving: (1) the development of design details for integral abutments using grouted couplers for ABC projects, (2) an evaluation of the strength and durability characteristics of the grouted coupler in an integral abutment detail, and (3) laboratory testing of one or two of the most promising prototype designs.

“

“Integral abutment bridges are our first choice but often the precast elements are large, creating challenges in shipping and handling. This research has the potential to provide durable details that will allow us to use smaller pieces and improve constructibility of ABC integral abutment bridges.”

–Wayne Symonds, Structures Program Manager,
Vermont Agency of Transportation

”

A Synthesis of Bridge Rehabilitation Methods

PI: Brent Phares

Student Research Assistant: Meghan Cronin

IOWA STATE UNIVERSITY

Institute for Transportation

Accelerated bridge construction (ABC) has received significant research attention in recent years. For the most part, this research has focused on means and methods for decreasing the impact on the traveling public during new bridge

construction. However, there are also great opportunities for reducing the traffic impact by decreasing the construction time involved in bridge rehabilitation. Most bridges undergo several small rehabilitations and one or two major ones during their useful lives, and decreasing the traffic impact of these events could have significant benefits. Fortunately, many of the new construction concepts can be adapted for use in rehabilitation scenarios. In other cases, new means and methods may be needed. This research will synthesize the rehabilitation alternatives and solutions that could be used to

carry out rapid rehabilitation projects. Some of these alternatives will be adaptations of new construction methods. Others will be strictly for rehabilitation activities. This document will provide a comprehensive summary of the available solutions. Where appropriate, design and construction procedures will be provided.



“In the 1950’s, the interstate was born with the Federal Aid Highway Act of 1956; we are now 60 years past. The bridge structures are beginning to crumble, and limited funding is available to replace them. We need to have a comprehensive program, tools, and techniques to rehabilitate from the ground up in a timely manner (get in, get out, and stay out) so they can last past another 60 years. This would reduce traffic, initial, and user’s cost and help the economy of the United States, which is totally dependent on our transportation modes.”

–Maury Tayarani, Project Manager, Massachusetts DOT

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ISU Student Research Assistants



Ashley Ecklund is a graduate research assistant at Iowa State University in Ames, Iowa. She received her B.S. in civil engineering from Iowa State University in 2013. She is working toward her M.S. in structural engineering. Currently, she is working on an ABC-UTC research study in the Bridge Engineering Center at ISU. The purpose of the research is to begin the development of crash-tested prefabricated bridge railings with durable anchorage details. Ashley is set to graduate in the fall of 2015.

Samuel Redd is from Bloomington, Illinois, and holds a B.S. cum laude in construction engineering from Iowa State University. He is continuing his education at Iowa State, this time working on his master's degree in structural engineering. He is currently working on the ABC-UTC research project to conduct laboratory testing of new connection details that will result in integral abutments in ABC projects.



Meghan Cronin graduated from Marian High School in 2010. She earned a bachelor's degree in civil engineering in May 2014 from ISU. Since then, she has been working as a research assistant on the ABC-UTC project to develop a synthesis of accelerated bridge rehabilitation techniques.

Development and Seismic Evaluation of Pier Systems with Pocket Connections and Hollow PT/UHPC Columns

PI: M. Saiid Saiidi

Co-PI: Ahmad Itani

Student Research Assistant: Alireza Mohebbi



University of Nevada, Reno

Research in the past half-decade has focused on various earthquake-resistant connections that might be suitable for accelerated bridge construction (ABC) in high seismic regions. This study will focus on post-tensioned square columns with pocket connections because these have shown promising results without violating current seismic codes. The seismic performance of precast hollow columns that have been prestressed with either unbonded carbon-fiber-reinforced polymer (CFRP) or steel tendons, and connected to footings and cap beams via pocket connections, will be investigated experimentally and analytically. Two single columns and one two-column bent have been designed and will be tested on one of the UNR shake tables. Two advanced materials, engineered cementitious composite (ECC) and ultra-high performance concrete (UHPC), will be incorporated into the plastic hinges of columns to improve their seismic performance.

The overall objective of the study is to develop and evaluate resilient bridge piers consisting of prefabricated columns and cap beams that have been subjected to simulated earthquake loading on shake tables. The post-earthquake damage is minimized by using prestressing tendons to control residual displacements and plastic hinge damage by using ECC or UHPC. Six tasks will be carried out to achieve the project's goals: (1) conducting a literature search; (2) developing preliminary designs for the test models; (3) conducting nonlinear finite element analysis of the models; (4) building the test models, conducting shake table tests, and processing test data; (5) conducting analytical studies of the models; and (6) developing design methods and numerical examples.



“Combining prefabricated bridge elements with high performance materials will produce resilient bridge substructure components that are rapidly constructed and will provide enhanced seismic performance and post event serviceability.”

—Tom Ostrom, Acting State Bridge Engineer, Caltrans

Evaluation of Seismic Performance of Bridge Columns with Couplers and Development of Design Guidelines

PI: M. Saiid Saiidi

Co-PI: Ahmad Itani

Student Research Assistants: Kshitij C. Shrestha, Mostafa Tazarv



University of Nevada, Reno

Accelerated bridge construction (ABC) relies heavily on prefabricated reinforced concrete members. One method for connecting prefabricated columns to footings and cap beams is through the use of mechanical couplers. It is convenient to locate these couplers in the plastic hinge zone of the columns, and recent research has shown the feasibility and performance sufficiency of such an arrangement, but current seismic codes do not allow couplers in the plastic hinge in moderate or high seismic areas.

The overall objective of the proposed study is to compile and interpret data on the seismic performance of different types of couplers, and thus establish the characteristic plastic hinge behavior for different coupler types. The study will further categorize the couplers with respect to their seismic performance. The results will be transformed into draft design guidelines for possible adoption by AASHTO. Five tasks will be involved in this project: (1) conducting a literature search, (2) determining the characteristic seismic performance of different couplers, (3) evaluating the constructability of different coupler types, (4) developing methods for estimating plastic hinge length and rotational capacity, and (5) developing draft design guidelines for prefabricated columns with coupler connections.



“Quantifying the effects of mechanical couplers in the plastic hinge region will greatly advance the acceptance of ABC in high seismic regions.”

—Elmer E. Marx, Senior Bridge Engineer, Alaska Department of Transportation and Public Facilities

Behavior and Design of Precast Bridge Cap Beams with Pocket Connections

PI: M. Saïid Saïidi

Co-PI: Ahmad Itani

Research Assistant: Mostafa Tazarv



University of Nevada, Reno

In conventional reinforced concrete bridge construction, cap beams and their connections to columns are designed to be capacity-protected under strong earthquakes. This is because cap beams and connections are difficult to repair. The same design philosophy is mandatory for the precast cap beams that are used in accelerated bridge construction (ABC), particularly in moderate and high seismic zones. ABC relies heavily on prefabricated reinforced concrete members. The NCHRP Report 698 provided a synthesis of promising ABC connections. Pocket connections were identified as a practical means of joining prefabricated columns and pier caps. The AASHTO Scan 11-02 surveyed more recent studies on the seismic performance of pocket connections.

The main objective of this study is to compile and interpret data on the seismic performance of cap beams with pocket connections and to identify the behavior, design, detailing, and construction considerations important to the successful implementation of this category of connections. The results will be transformed into design guidelines for possible adoption by AASHTO. Six tasks will be carried out: (1) conducting a literature review, (2) determining the seismic performance and behavior of pocket connections and cap beams, (3) evaluating the constructability of pocket connections, (4) evaluating different cap beam and pocket detailing methods to ensure capacity-protected behavior, (5) developing design and detailing guidelines for cap beams with pocket, and (6) summarizing the investigation and the results in a draft final report.



“Development of reliable precast bridge bent systems with pocket connections will advance ABC in high seismic regions.”

–Bijan Khaleghi, State Bridge Design Engineer, Washington State DOT



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University of Nevada, Reno

UNR Student Research Assistants



Alireza Mohebbi is a Ph.D. student of structural engineering at University of Nevada, Reno (UNR). He obtained his M.Sc. in structural engineering from UNR and studied the seismic responses of a highway bridge with structural fuses for the seismic protection of piers. In the Ph.D. program, he is working on the UNR ABC-UTC project on the development and seismic evaluation of pier systems with pocket connections and PT/UHPC columns. The objective of his research is to develop and evaluate resilient bridge piers consisting of prefabricated columns and cap beams that have been subjected to simulated earthquake loading on shake tables. His research interests include seismic responses of bridges, accelerated bridge construction, and the durability of self-consolidating concrete (SCC). He is an active member of the UNR student chapter of the Earthquake Engineering Research Institute (EERI).

Colton Schaefer is an undergraduate student of civil engineering at University of Nevada, Reno (UNR). In his program, he has put an emphasis on structural engineering courses, and he is currently studying under the newly developed accelerated B.S./M.S. program. He plans to complete a master's degree in structural engineering at UNR within a year of completing his undergraduate program. Colton is working on the ABC-UTC project "Evaluation of Seismic Performance of Bridge Columns with Couplers and Development of Design Guidelines." His academic interests include seismic responses of bridges, accelerated bridge construction, and the design of these elements. He is also an active member of the U.S. Navy Reserves, having served on two deployments in recent years.



Bahareh Abdollahi is a Ph.D. student of structural engineering at University of Nevada, Reno (UNR). She completed her B.Sc. and M.Sc. in civil engineering and earthquake engineering at the University of Tehran in Iran. In her master's degree program, she performed experimental and analytical studies on the confinement of circular columns using fiber-reinforced polymers (FRPs) and slurry-infiltrated fiber-reinforced concrete (SIFCON). She is currently working on the seismic interaction of soil-abutment systems in skewed bridges, funded by Caltrans. The objective of her research is to develop a model to simulate the seismic interaction between the soil and the skewed bridge abutment, based on large-scale shake table studies and analytical and numerical studies. Her research interests include seismic retrofit, bridge engineering, and soil-structure interaction. Caltrans is providing funds that are partially counted as UNR's ABC-UTC match.

UNR Student Research Assistants



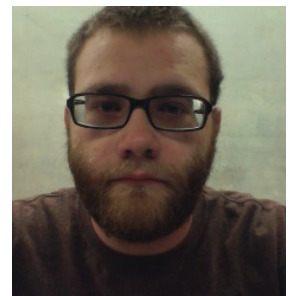
Mehrdad Mehraein is a Ph.D. candidate in earthquake and structural engineering at University of Nevada, Reno (UNR). He obtained his M.Sc. in earthquake engineering from Sharif University of Technology and his B.Sc. from Amirkabir University of Technology, both in Iran. The research focus of his master's degree was rapid analysis of bridges for performance-based design utilizing the endurance time method. In his Ph.D. program, he is working on column to pile-shaft ABC connections of bridges and is being funded by Caltrans. The objective of his research is to develop a resilient connection of bridge column to pile-shaft for accelerated bridge construction. His research interests include performance-based design of structures, precast construction, accelerated bridge construction, and experimental studies of structures. Caltrans is providing funds that are partially counted as UNR's ABC-UTC match.

Grishma Shrestha is a Ph.D. student of structural engineering at University of Nevada, Reno (UNR). She obtained her M.Sc. in structural engineering from Southern Illinois University Edwardsville (SIUE), where she worked on the nonlinear finite element analysis of reinforced concrete diaphragms. In her Ph.D. program, she is working on precast designs for seismic bridge decks and is funded by Caltrans. The objective of her research is to develop and optimize a load and resistance factor design (LRFD) ABC-PC deck that can demonstrate seismic resiliency and serviceability. Caltrans is providing funds that are partially counted as UNR's ABC-UTC match. Her academic interests include finite element analysis, seismic responses of bridges, accelerated bridge construction, and the design of these elements.



Osvaldo Arias is a civil engineering undergraduate student at University of Nevada, Reno (UNR). His studies have an emphasis in structural engineering, and he plans to receive a master's degree in structural engineering. He assists in preparing, assembling, and loading specimens onto the earthquake simulation tables, and he has developed a great interest in accelerated bridge construction, seismic bridge responses, and concrete design. He is also the mix design manager of the UNR ASCE-AGC student chapter concrete canoe team. He is currently contributing to several ABC seismic research projects funded by various agencies. Caltrans, the Nevada DOT, and Washington State DOT are providing funds that are partially counted as UNR's ABC-UTC match.

Wheeler Musnicki is an undergraduate student of civil engineering at University of Nevada, Reno (UNR). His program has an emphasis on structural engineering courses. He is a member of the ASCE concrete canoe team. He is currently contributing to an ABC seismic research project on bridge column hinges funded by Caltrans. Caltrans is providing funds that are partially counted as UNR's ABC-UTC match.



UNR Research Associates



Mostafa Tazarv is a post-doctoral scholar at University of Nevada, Reno. He received his B.S. from the University of Tabriz in Iran and his M.S. from Sharif University of Technology in Iran, after which he took a year of graduate study at Carleton University in Canada, and went on to earn his Ph.D. at the University of Nevada, Reno. His research interests include the seismic behavior of concrete structures, innovative materials, resilient infrastructures, accelerated bridge construction, large-scale testing, and nonlinear structural analysis. In his Ph.D. work, he developed a new generation of bridge columns that can be built in a relatively short time but have seismic performance equal to or better than that of conventional, cast-in-place bridge columns. He is currently working on three different projects funded by the National Cooperative Highway Research Program (NCHRP) and the ABC-UTC. The aim of the NCHRP project is to explore new bridge column performance using innovative energy dissipation systems and to propose design guidelines for innovative columns. The objective of the ABC-UTC projects is to develop design guidelines for pocket connections and mechanical bar splices, which are types of accelerated bridge construction connections.

Ali Mehrsoroush is a post-doctoral scholar at University of Nevada, Reno. He received his B.S. from the Isfahan University of Technology in Iran, his M.S. from the Sharif University of Technology in Iran, and his Ph.D. from the University of Nevada, Reno. His research interests include the large-scale testing of structural systems and components, the applications of advanced materials and details in earthquake engineering, bridge engineering, the seismic behavior of concrete structures, computational modeling of structures, and the seismic behavior of composite structures. In his Ph.D. work, he developed two types of novel resilient ABC connections for use in both cast-in-place and accelerated bridge construction. He is currently working on two projects funded by Caltrans and the Nevada DOT. The Caltrans project is intended to expand the probabilistic damage control analysis approach (PDCA) developed for standard bridge columns to substandard columns that are yet to be retrofitted in California. The Nevada DOT project is directed at identifying the most appropriate earthquake-resistant precast bridge pier system for ABC implementation in Nevada. Caltrans and the Nevada DOT are providing funds that are partially counted as UNR's ABC-UTC match.



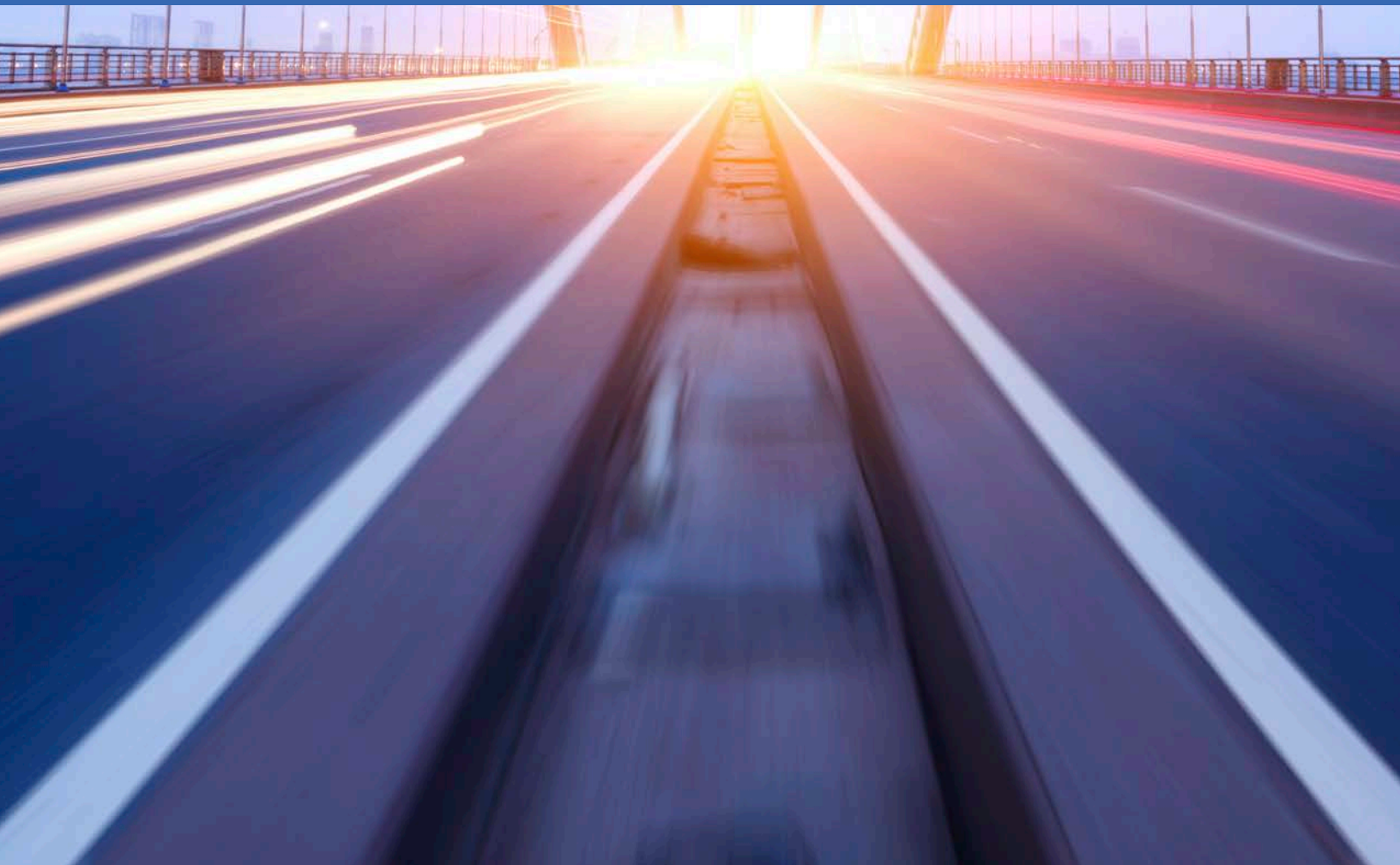
ABC-UTC ADVISORY COMMITTEES

Each ABC-UTC research project has an advisory committee. Advisory committee members are listed below:

- Ahmad Abu-Hawash, Iowa DOT
- Ben Beerman, FHWA
- Carlos Duart, CDR Maguire
- Reza Farimani, Thornton Tomasetti
- Tim Fields, Connecticut DOT
- Hamid Ghasemi, FHWA
- Kevin Goeden, South Dakota DOT
- Kristin Higgins, Vermont Agency of Transportation
- Bruce Johnson, Oregon DOT
- Bijan Khaleghi, Washington State DOT
- Ali Maher, Rutgers University
- Elmer Marx, Alaska DOT & PF
- Tom Ostrom, Caltrans



ABC-UTC EDUCATION



College Course ABC Design Module

A course module has been developed and integrated into an existing course on advanced reinforced concrete design. This module was developed in PowerPoint and is intended for a series of four or five one-hour lectures.

The introductory part of the module presents general earthquake-engineering aspects of ABC, with emphasis on columns and cap beams. The second part is focused on precast cap beams with pocket connections to precast columns. This part of the module is based on NCHRP Report 681, which describes NCHRP Project 12-74. A comprehensive numerical example from that report is included in the course module.

Additional courses are at various stages of development.



University of Nevada, Reno



ISU's Online E-zine Go! Putting Drivers First in Bridge Projects

Reaching out to young K-12 students about career opportunities in science and technology is essential to ensuring the continued development of the needed workforce. As part of this cultivation, Iowa State University publishes quarterly articles in the online e-zine Go! This zine has a large readership. The first two articles in the series about accelerated bridge construction focused on introducing the concepts of bridge construction – including what it means to accelerate it – and on what it means to be a bridge engineer. Future articles will discuss ongoing research projects, technology transfer activities, and workforce development activities.

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The screenshot shows the homepage of the 'Go!' e-zine. The navigation bar includes links for Home, Features, Careers, Training & Preparation, Blog, Media, Forum, and About. The main header features the 'Go!' logo with the tagline 'exploring the world of transportation' and social media icons for Twitter and Facebook. The article titled 'New challenges for bridge engineers' is prominently displayed. It discusses the challenges of bridge engineering and introduces Accelerated Bridge Construction (ABC). A photograph of a bridge under construction is included, with a caption identifying it as Figure 2: Accelerated Bridge Construction (ABC) of a bridge in Massachusetts. The article concludes with information about a meeting in Miami, Florida, in December 2014, and provides a contact for Brent Phares at Iowa State University.

Home Features Careers Training & Preparation Blog Media Forum About

Go!
exploring the world of transportation

Published by Institute for Transportation

New challenges for bridge engineers

Bridge engineering is undergoing many changes. Traditionally, for example, when a new bridge is being built, the construction activities can cause traffic delays and detours for several weeks and even months. The bridge engineering community is developing bridge construction methods that minimize such traveler delays and inconvenience. This is called Accelerated Bridge Construction (ABC), a new field about which engineers are just learning.

To share the latest information about ABC, many bridge engineers are planning to get together in Miami, Florida, in December 2014. Visit www.2014abc.fiu.edu to learn more about this exciting event.

There is going to be a great need for bridge engineers who can apply ABC technologies and concepts. We invite you to learn more about this specialized and exciting area—or see how you can become a bridge engineer. Contact Brent Phares at Iowa State University, bphares@iastate.edu, 515-294-5879.

Figure 2. Accelerated Bridge Construction (ABC) of a bridge in Massachusetts.

ABC-UTC Mentoring Program

The purpose of the ABC-UTC mentoring program is to create a conduit for communication between students working on ABC-UTC research projects and industry representatives with interests in the ABC-UTC and in ABC in general. All graduate students participating in ABC-UTC funded activities are required to participate in the mentoring program. Iowa State University facilitates the ABC-UTC mentoring program. Following are current ABC-UTC mentors.



Mike Culmo is the vice-president of CME Associates, Inc., and has more than 25 years of experience in structural engineering. He is an expert in the field of bridge design and in innovative construction strategies. He has experience in traffic engineering and materials specification and is a nationally recognized expert in ABC practices. He has authored numerous papers, articles, and manuals in the field of bridge engineering design methods and construction techniques. Mr. Culmo has also worked on several high-profile projects, including Massachusetts's Fast 14 Bridge replacement, and has helped departments of transportation including those of Utah, Connecticut, and Rhode Island in the development of pilot projects and standards using ABC methods. He serves on numerous industry committees and groups, including the Precast/Prestressed Concrete Institute (PCI) Northeast Bridge Technical Committee, the PCI Bridge Producers Committee, and several committees of the Transportation Research Board (Steel Bridges, Concrete Bridges, and ABC Subcommittee).

Reza Farimani joined Thornton Tomasetti in 2006 and has experience in the structural analysis and design of steel and concrete structures, including high-rise, commercial, educational, residential, sports, and mixed-use developments and investigations. He is responsible for the analysis, design, and preparation of drawings and for coordination and communication with outside consultants.



Finn Hubbard joined Fish & Associates, Inc. in November 2012 with more than 30 years of structural design, construction, maintenance, policy and management experience. In this time, Mr. Hubbard has been involved in a variety of structural design and construction projects in the transportation industry. He has extensive experience with simple and complex multi-phase, multi-year projects. Mr. Hubbard has designed and overseen the production of thousands of bridge plans and projects.

ABC-UTC Mentoring Program



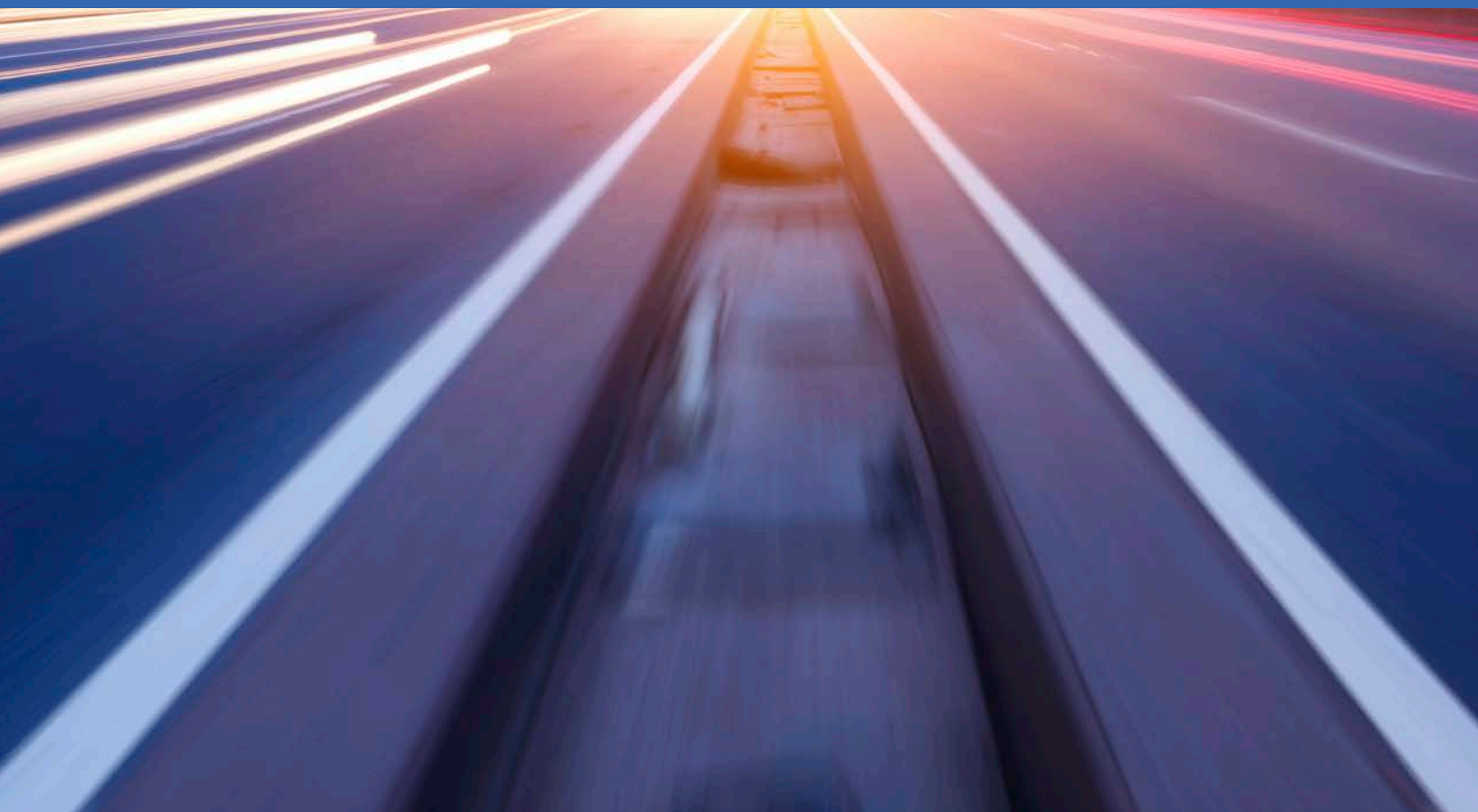
Michael LaViolette is a principal project manager with HDR, and has more than 23 years of complex bridge design and construction experience as well as extensive academic research experience. Mr. LaViolette recently served as the deputy design manager for all structures on the Tappan Zee Bridge in New York, a \$3.14B design-build project to construct two new bridges over the Hudson River. He is currently the design coordinator for the PennDOT Rapid Bridge Replacement Program, a \$900M project which will replace 558 bridges across the state in only 36 months. Both of these projects make extensive use of ABC technologies, including large-scale precast concrete substructure elements, precast deck panels, bridge sliding, and incremental launching. Mr. LaViolette is chair of the Transportation Research Board (TRB) Committee AFH40 (Construction of Bridges and Structures) and an active member of the TRB ABC Subcommittee. He is also an active member of the Precast/Prestressed Concrete Institute Committee on Bridges.

Francesco Russo is a senior structural engineer and technical and project manager at Michael Baker Corp. His experience includes all phases of engineering practice, including project engineering; staff, schedule and financial management; construction support services; forensic investigations; and report writing. He has design-build experience on multiple projects, having served on design teams, as an owner's advisor, and as director of design-quality control efforts for a multibillion-dollar design-build project.





ABC-UTC TECHNOLOGY TRANSFER



2014 Monthly Webinar Series

The ABC-UTC hosted 12 monthly webinars in 2014 under the leadership of its executive board: Atorod Azizinamini; Mary Lou Ralls, former Texas State Bridge Engineer and Director of Technology Transfer, ABC-UTC; Kevin Thompson, former California State Bridge Engineer, now with AECOM; Jugesh Kapur, former Washington State Bridge Engineer, now with Burns & McDonnell; and Ben Beerman, FHWA Resource Center Bridge Engineer and the FHWA lead for Prefabricated Bridge Elements and Systems (PBES) for ABC Initiatives.

Below is a sampling of recently completed webinars, including the number of registered sites (many with multiple participants):

Colorado Flyover Ramp Showcases Precast Pier Caps and Curved Spliced Precast U-Girders: Dec. 18, 2014

by Mansour Mike Mohseni, P.E., Project Manager, Bridge Design, CDOT; Ken Saindon, P.E., S.E., Project Manager, Atkins; and Clint Krajnik, P.E., S.E., Structural Engineer, Tsiouvaras Simmons Holderness

No. of Registered Sites: >700

Accelerated Bridge Construction in Pennsylvania: Oct. 16, 2014

by Lou Ruzzi, P.E., District Bridge Engineer, PennDOT (Pittsburgh area); Nikki Bedillion, P.E., Senior Associate, Johnson, Mirmiran & Thompson, Inc.

No. of Registered Sites: approx. 800

(http://abc-utc.fiu.edu/index.php/technology/monthly_webinar_archive/).



Precast Substructures, Part 2 – Comparison of Non-seismic and Seismic Connection Details: June 19, 2014

by M. Lee Marsh, Ph.D., P.E., President and Chief Executive Officer, BergerABAM

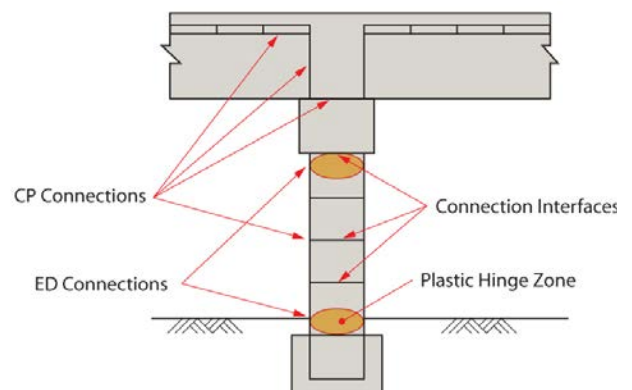
No. of Registered Sites: > 700



Performance of ABC Bridges in Utah: July 29, 2014

by Carmen Swanwick, P.E., Chief Structural Engineer, Utah Department of Transportation

No. of Registered Sites: > 700



Crane Sizing for ABC Bridges: April 17, 2014

by Michael C. Bone, P.E., Chief Engineer, Construction Engineering Consultants, Hollywood, Florida

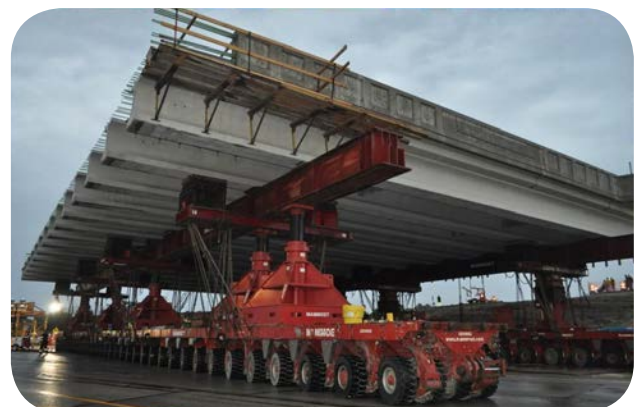
No. of Registered Sites: > 1,000



Wisconsin DOT's Rawson Avenue Bridge Replacement using Precast Elements and Systems: March 20, 2014

by William Oliva, P.E., Chief, Structures Development, WisDOT – Bureau of Structures

No. of Registered Sites: > 800



(http://abc-utc.fiu.edu/index.php/technology/monthly_webinar_archive/).

2014 In-Depth Web Training

Building upon the series of monthly, hour-long webinars hosted by the ABC-UTC at FIU, a program of in-depth web training was initiated in 2014 to provide more detailed coverage of select projects and topics related to ABC.

The first web training session was four hours long and consisted of six modules featuring MassDOT's Fast 14 Project, a 2011 signature ABC project in which 14 bridges were replaced over the course of 10 weekends along the I-93 through the city of Medford, MA. The session was held on November 4 and had 51 participants. It is also being posted on the ABC-UTC website for individual self-directed training.

Module 1: Introduction

by Tom Donald, P.E., Director of Bridge Project Management, MassDOT

Module 2: Planning and Preliminary Design

by Mike Culmo, P.E., Vice President, Transportation & Structures, CME Associates, Inc.

Module 3: Design Details – Substructure Rehabilitation

by Joe Gill, P.E., President, Gill Engineering

Module 4: Design Details – Superstructure Replacement

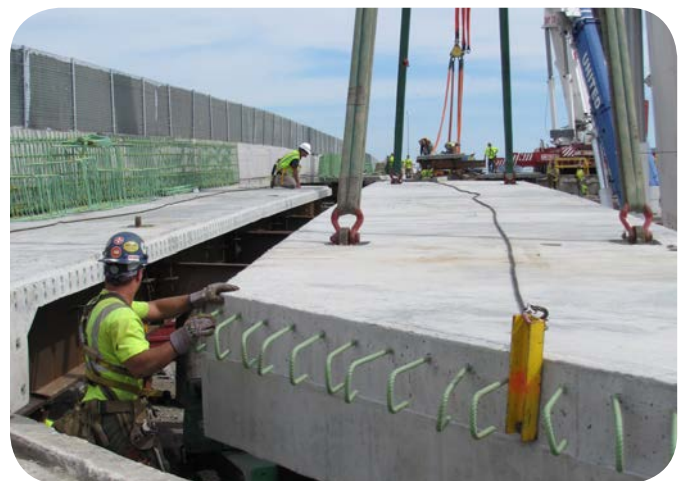
by Joe Gill, P.E., President, Gill Engineering

Module 5: Preliminary Construction Planning

by Kevin Lampron, Jr, P.E., Area Manager, J.F. White Contracting Company

Module 6: Construction

by Kevin Lampron, Jr, P.E., Area Manager, J.F. White Contracting Company



ABC Short Courses Coming 2015

ISU has developed the content of an hour-long course to provide technical information on the use of Accelerated Bridge Construction (ABC) on lower-volume roads, which are typically maintained and operated by smaller communities.

The first course will outline what ABC is, what its benefits are, how it can be implemented, and some ABC options that are suited to local highway systems. Of particular interest in this short course is a series of case-studies designed to provide engineers with ideas that can be adapted to multiple situations.

Additional short courses are under development.



**COMING
2015**

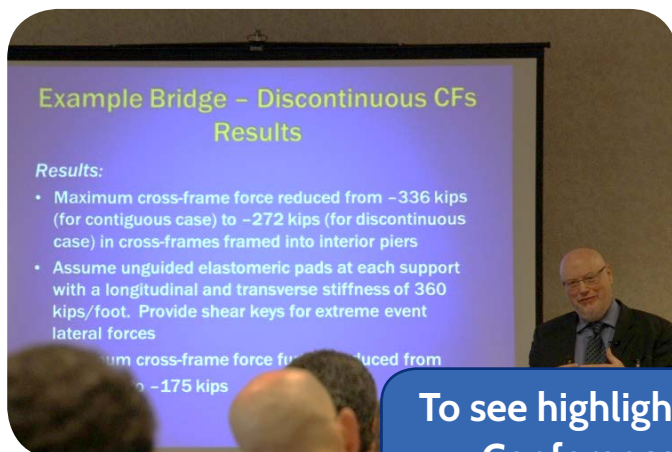


2014 National Accelerated Bridge Construction Conference, December 3-5, 2014, Hyatt Regency, Miami, Florida

The 2014 National Accelerated Bridge Construction Conference was held December 3-5, 2014, at the Hyatt Regency Hotel in downtown Miami, Florida. On Wednesday, December 3, nine pre-conference workshops were held, each of them four hours long and covering many important ABC-related topics. More than 50 companies exhibited ABC-related products and services to attendees. The conference proper ran through Thursday and Friday.

The conference was co-sponsored by 26 states, FHWA, and several non-profit organizations. It attracted more than 750 bridge professionals. The attendees included some 150 state bridge engineers, representing nearly every state, and more than 40 FHWA bridge engineers. The ABC-UTC was able to use travel scholarships to help 92 state bridge engineers participate. Approximately 170 technical presentations were given, covering every aspect of ABC. The keynote presentation was delivered by Gregory Nadeau, FHWA Acting Administrator.

The 2015 National Accelerated Bridge Construction will be held December 6-8, 2015 in Miami.



To see highlights from the 2014 Conference, please visit:

http://www.2015abc.fiu.edu/2014Conference_video.html



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2014 NATIONAL ACCELERATED
BRIDGE CONSTRUCTION CONFERENCE

Sponsored by
FIU
Accelerated Bridge Construction
University Transportation Center



- Federal Highway Administration
- Alaska Department of Transportation and Public Facilities
- Arizona State Department of Transportation
- California Department of Transportation
- Colorado Department of Transportation
- Delaware Department of Transportation
- Florida Department of Transportation
- Georgia Department of Transportation
- Illinois Department of Transportation
- Iowa Department of Transportation
- Louisiana Department of Transportation and Development
- Massachusetts Department of Transportation
- Michigan Department of Transportation
- Minnesota Department of Transportation
- Mississippi Department of Transportation
- Nebraska Department of Roads
- New Jersey Department of Transportation
- New York State Department of Transportation
- Oregon Department of Transportation
- South Carolina Department of Transportation
- South Dakota Department of Transportation
- Tennessee Department of Transportation
- Texas Department of Transportation
- Utah Department of Transportation
- Vermont Agency of Transportation
- Washington State Department of Transportation
- Wisconsin Department of Transportation
- National Steel Bridge Alliance (NSBA)
- National Concrete Bridge Council (NCBC)
- Transportation Research Board (TRB) of the National Academies
- International Association for Bridge Maintenance and Safety (IABMAS)
- American Society of Civil Engineers (ASCE)



Invitation to the 2015 National ABC Conference

2015

NATIONAL ACCELERATED BRIDGE CONSTRUCTION CONFERENCE

December 7 and 8, 2015

Workshops December 6, 2015
Hyatt Regency, Miami, Florida



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