2019 In-Depth Web Training September 10, 2019: 11:00 am (EDT)

Latest Seismic ABC Applications

- The 2019 in-depth web training features ABC in moderate-to-high seismic regions, with a particular emphasis on seismic connections.
- It is four hours in length and consists of six modules, each a 30-minute presentation by an expert in the focus area of the module followed by a 10-minute Q&A session.
- This web training provides an opportunity for sharing the latest information in research and implementation of ABC in seismic regions. Devising connections that can accommodate inelastic cyclic deformations and are readily constructible is the primary challenge for ABC in seismic regions. Ductile behavior is desirable under earthquake loadings for both the longitudinal and transverse directions of the bridge.
- The web training demonstrates technologies for delivering bridge construction projects in weeks, rather than months, for reducing congestion, improving safety and increasing the quality of highway bridges in seismic regions.
- It addresses the use of innovative designs and materials in seismic design of prefabricated bridges. These innovative concepts include the use of ultra-high-performance concrete for precast members and connections.

ABC-UTC 2019 In-Depth Web Training – September 10, 2019: 11:00 am (EDT)

Latest Seismic ABC Applications

Webinar Organizer: Bijan Khaleghi, Ph.D., P.E., S.E., State Bridge Design Engineer, WSDOT

Module 1 – 11:00-11:40 am (EDT): ***Seismic ABC Design Requirements*** by Bijan Khaleghi, Ph.D., P.E., S.E., State Bridge Design Engineer, WSDOT; and Khashayar Nikzad, Ph.D., P.E., Principal Engineer, TranTech

Module 2 – 11:40 am-12:20 pm (EDT): ***AASHTO ABC Guide Specifications, Seismic Design Requirements for Connections, and Connection Design Examples*** by Lee Marsh, Ph.D., P.E., Deputy Director, America's Technical Excellence Center, WSP; Greg Banks, P.E., S.E., Senior Bridge Engineer, WSP

Module 3 – 12:20-1:00 pm (EDT): ***ABC Seismic Bridge System Utilizing Steel*** by Atorod Azizinamini, Ph.D., P.E., Professor and Chair, Civil and Environmental Engineering Department, Florida International University

Module 4 – 1:00-1:40 pm (EDT): ***Precast ABC Bents and Connections*** by Toorak Zokaie, Ph.D., P.E., Earthquake Engineering Specialist, Caltrans; and Dorie Mellon, P.E., Senior Bridge Engineer, Caltrans

Module 5 – 1:40-2:20 pm (EDT): ***Seismic Resilient Concrete-Filled Steel Tube Substructures*** by Dawn Lehman, Ph.D., P.E., Professor, University of Washington; and Amy Leland, P.E., S.E., Seismic and Foundation Specialist, Washington State DOT

Module 6 – 2:20-3:00 pm (EDT): ***Use of UHPC for Longitudinal Joints in Deck Bulb Tee Bridge Girders*** by John Stanton, Ph.D., P.E., Professor, University of Washington; and Timothy Peruchini, EIT, Structural Design Engineer, Reid Middleton

Common Acronyms: ABC-UTC 2019 In-Depth Web Training

ABC:	Accelerated Bridge Construction
AWS:	American Welding Society
BDM:	Bridge Design Manual
Caltrans:	California DOT
CFST:	Concrete Filled Steel Tubes
CFT:	Concrete Filled Tubes
CFVST:	Concrete Filled Vanadium Steel Tubes
CVN:	Charpy V-notch
DBD:	Displacement Based Design
DBT:	Deck Bulb Tee
EQ:	Earthquake
ER:	Embedded Ring
ERE:	Earthquake Resisting Elements
ERS:	Earthquake Resisting Systems
FBD:	Forced Based Design
FIU:	Florida International University
HRWA:	High-Range Water-Reducer
HRWRA:	High-Range Water-Reducing Admixture
HVST:	High-voltage stress **test**
ISU:	Iowa State University
AASHTO ABC:	Guide Specifications for ABC
AASHTO SGS:	Guide Specifications for LRFD Seismic
AASHTO LRFD:	LRFD Bridge Design Specifications
OC:	Overcrossing
PC:	Precast Concrete
PCN:	Plunged-No-Coupler
PEER:	Pacific Earthquake Engineering Research
RC:	Reinforced Concrete
RCFST:	Reinforced CFST
SDC:	Seismic Design Category
SDC:	Seismic Design Code
SDCL:	Simple for DL and Continuous for Live load
UHPC:	Ultra High Performance Concrete
UNR:	University of Nevada, Reno
UT:	Ultrasonic testing
UTC:	University Transportation Center
UW:	University of Washington
WSDOT:	Washington State DOT

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Module 1: 11:00 a.m. EDT

Module 1: Seismic ABC Design Requirements

Description: This module focuses on providing design requirements for prefabricated bridge members for projects in seismic regions where ABC is considered. It focuses on the application of the LRFD specifications for seismic design of bridges with precast components in the light of the newly published AASHTO LRFD ABC Guide Specifications. Connections are of utmost importance for ductile behavior under seismic events. Detailed numerical examples for evaluation of connections between precast beams and cap beam under capacity protection confines and connections between the superstructure and the supporting substructure to ensure required level of ductile behavior are provided.

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Module 2: 11:40 a.m. EDT

Module 2: AASHTO ABC Guide Specifications, Seismic Design Requirements for Connections, and Connection Design Examples

Description: This module focuses on the seismic provisions and concepts of the recently adopted AASHTO LRFD Guide Specifications for ABC. The module covers general guiding principles for seismic design with ABC, including classification of earthquake-resisting systems and elements, energy-dissipating elements and capacity-protected elements. Example element and connection types are discussed, and unique design considerations for each are addressed. The objective is to provide a "building-block" system of tools that designers can use to apply ABC in both low- and high-seismic hazard regions.

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Module 3: 12:20 p.m. EDT

Module 3: ABC Seismic Bridge System Utilizing Steel

Description: Simple for Dead Load and Continuous for Live load (SDCL) bridge systems have gained popularity in non-seismic applications, and many SDCL bridge systems are in service in non-seismic areas. This module provides the design, detailing, and construction sequence for using SDCL bridge systems in conjunction with the ABC philosophy in moderate to high seismic regions. The system described include precast column alternatives, alternatives for connecting precast columns to superstructures or substructures, and connection alternatives including use of Ultra-High-Performance Concrete (UHPC).

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ABC-UTC 2019 In-Depth Web Training — Module 4: 1:00 p.m. EDT

Module 4: Precast ABC Bents and Connections

Description: This module focuses on seismically-resilient precast column-to-cap and cap-to-girder connections. A number of improved details have been developed by Caltrans and have been analyzed in detail, tested, and constructed in pilot projects. The goal for these connection details is to emulate cast-in-place monolithic performance, prevent separation of girders at cap/diaphragm, and provide full capacity for formation of plastic hinges in columns. Four different categories of connections are developed for various design conditions and seismic demands.

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ABC-UTC 2019 In-Depth Web Training Module 5: 1:40 p.m. EDT

Module 5: Seismic Resilient Concrete-Filled Steel Tube Substructures

Description: Concrete-filled steel tube (CFT) columns offer an attractive ABC alternative to conventional precast concrete or structural steel construction in both seismic and non-seismic regions. Results from CFT component tests at the University of Washington demonstrate that these members have high flexural strength and stiffness and approximately 2.5 times the shear strength of a similar reinforced concrete column, making them ideal for piles subjected to large lateral forces. Internal reinforcement, including spiral reinforcement, is not needed, as the spiral is not activated where the tube is present and longitudinal reinforcement does little to contribute to the flexural strength. Over 30 tests have been conducted on two types of connections that reach approximately 8% drift without strength deterioration. Research results have been implemented in the WSDOT Bridge Design Manual. This presentation describes the test results, design expressions, and connection details and their implementation in the field.

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Module 6: 2:20 p.m. EDT

Module 6: Use of UHPC for Longitudinal Joints in Deck Bulb Tee Bridge Girders

Description: Precast decks, and precast girders such as deck bulb tees that incorporate decks, offer superstructure construction options that require less on-site time than conventional cast-in-place decks. Precast decks require joints, and UHPC is an ideal material because of the high bond strength that it can develop at early ages. This module addresses the design and construction of such precast elements and joints, including the loading demands on the joints, their expected capacities, design methodologies and construction requirements. Precast decks may be used in both seismic and non-seismic applications, because the loadings are largely controlled by wheel loads.

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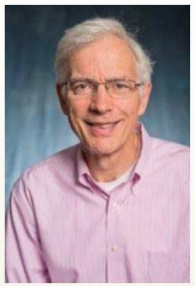

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