2012 Annual Virginia Concrete Conference

FHWA Prefabricated Bridge Elements & Systems Update

March 8, 2012
Every Day Counts - Program

Going Greener

Shortening Project Delivery

Accelerating Deployment Technology and Innovation
EDC Initiatives

Shortening Project Delivery
- Design-build
- Construction Manager/General Contractor
- Planning and Environmental Linkages
- Legal Sufficiency Enhancements
- Expanding Programmatic Agreements
- In Lieu Fees and Mitigation Banking
- Clarifying the Scope of Preliminary Design
- Flexibilities in Right of Way
- Flexibilities in Utilities
- Enhanced Technical Assistance on EIS

Accelerate the Deployment of Technology and Innovation
- Safety Edge
- Warm Mix Asphalt
- Adaptive Single Control
- Prefabricated Bridge Elements and Systems
- Geosynthetic Reinforced Soil Integrated Bridge
EDC and PBES/ABC

Preliminary Design
Utilities
Right of Way
NEPA/EIS/Programmatic Agreements
Contracting Methods
Geotechnical Solutions
The EDC program has paved the way to allow bridge practitioners the opportunity to **advance PBES and other innovations into the mainstream of the bridge industry.**
Prefabricated Bridge Elements & Systems (PBES)

1) Structural Components built:
   - Offsite, or
   - Adjacent to alignment

2) Include features that reduce:
   - Onsite construction time
   - Mobility impact time
• Safer:
  – Public
  – Contractor Personnel
• Improve Quality:
  – Off the Critical Path
  – Controlled Environment
• Build in an accelerated manner more efficiently
Other Reasons to use PBES

Remote Locations
Limited
Construction
Season
PBES becomes the *standard* method of bridge construction, and the use conventional construction methods - such as on-site CIP operations, are used in a limited manner.
Challenges – current/future

- Aging Infrastructure
- Increased Traffic Volume
- Increased Work Zones

**Congestion Costs**

- 4 billion hours/year
- 3 billion gallons/year
- $80 billion/year
Elements vs. Systems

Elements

Systems
Examples:
• Full-depth precast deck panels
• FRP deck panels
• Steel grid decks
• Aluminum deck panels
Beam Elements

Deck Beam Elements:
- Modular beams with decks
- Adjacent deck bulb-tee beams
- Adjacent double tee beams
- Adjacent box beams
- Adjacent slab beams
**Full-Width** Beam Elements:
- Truss span without deck
- Arch span without deck
- Precast segmental
Abutment & Wall Elements

Examples:
- Precast backwalls, wingwalls, footings
- Sheet piling – steel or precast
- Precast full-height wall panels
- MSE walls
Miscellaneous Elements

Examples:
- Precast approach slabs
- Prefab parapets
- Closure pours
- Overlays
Prefabricated Systems

Systems: rolled, launched, slid, etc.

• Superstructure
• Superstructure/pier
• Total bridge
Raise the Bar

PBES: Pile Lagging

Conventional

PBES: Grouted Couplers

PBES: Pile Pockets
Implementing PBES
PBES 2012 Goals

• **100 cumulative bridges** have been designed and/or constructed rapidly using PBES

• **25 percent** of bridge projects authorized using Federal-aid have at least one major prefabricated bridge element

• PBES **decision making framework** in the design process and **20 projects in 3 years**
EDC Goals

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<td>PBES w/ Fed Aid</td>
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PBES with Federal Funds
Design or Built

Fully Implemented
200 Non-Federally Funded
168 Federal Funded (10%)
What they are selecting

- Beams: more efficient shapes
- Partial-depth deck panels
- Full-depth deck panels
- Pier cap, Column and/or Footing
- Abutment, Wingwalls
- Partial-depth deck panels

2nd Quarter 2011
PBES Tools - website

What is ABC?

ABC is a paradigm shift in the project planning and procurement approach where the need to minimize mobility impacts which occur due to onsite construction activities are elevated to a higher priority.

Intrinsic benefits of the ABC approach include improvements in:

- Safety

www.fhwa.dot.gov/bridge/abc/
Publications
Publications - future

PBES

Planning

Engineering Materials

Construction Contracting
Webinar Training - Industry

- Webinars
- Intro PBES for ABC
- ABC: the Keys to Success from an Owners Perspective
- FHWA PBES Decision-Making Framework
- Costs
- ABC/PBES Specifications, Contract Drawings and Details
- PBES Connections
- Concrete
- Steel
- Composites
- LWC
- Construction
- Multi-State ABC Decision Tool
- Closeout
4/2011
UHPC

5/2011
Decision Making

8/2011
PC Bent System for Seismic

10/2011
MassDOT Fast 14
Archive of Past Events

- Webinar held on 01/17/2012 (Everyday Solutions: ABC Standard Designs from SHRP2)
- Webinar held on 12/15/2011 (Recent Durability Performance Results in Closure Joints of Modular Bridge Decks)
- Webinar held on 11/17/2011 (Full-Depth Prefabricated Bridge Deck Options for Durability and Cost)
- Webinar held on 10/11/2011 (Field-Cast UHPC Connections in Full-Depth Precast Bridge Deck)
- Webinar held on 09/29/2011 (State-of-the-Art Full-Depth Precast Concrete Bridge Decks)
- Webinar held on 08/25/2011 (A Planning Phase Decision Tool for Accelerated Bridge Construction)
- Webinar held on 07/14/2011 (Featured Presentation: Lightweight Concrete for Accelerated Bridge Construction)
- Webinar held on 06/02/2011 (A Technical Overview of FHWA’s Upcoming ABC Manual)
- Webinar held on 04/20/2011 (ABC Technical Resources Available from Utah DOT)
- Webinar held on 03/11/2011 (Inaugural Free Webinar on Accelerated Bridge Construction (ABC))
Webinar Training - FIU

Construction Contractor Series #1: Experiences with ABC Projects in Texas

Thursday, March 15, 2012
1:00 to 2:00 p.m.

http://www.abc.fiu.edu/
PBES Deployment Team

Workshops

Scanning Tours

Project Reviews

Project Showcases

Regional Peer Exchanges

### Estimate of Time Required

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3/2011
Utah DOT – Sam White

7/2011
Mass DOT – Fast14

10/2011
Iowa DOT – Kegs Creek

01/2012
Nevada DOT – West Mesquite
National ABC Project Exchange
Submit Projects to...

Mary Lou Ralls, P.E.
ralls-newman@sbcglobal.net
(512) 422.9080
Thank You!

FHWA

Benjamin Beerman, P.E.
Back Up Slides
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5/2011  
Illinois – PBES/ABC

5/2011  
Missouri – Deck Panels

6/2011  
Illinois – I-57 over SR I13

11/2011  
Idaho – Deck Panels

11/2011  
Nevada – NEON Project

01/2012  
Hawaii – Substructure

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Composite Industry