1. National Update of PBES/ABC
2. Resources (current/upcoming)
3. Project Planning
Every Day Counts - Program

Safety

Quality

Overall Program Delivery
Prefabricated Bridge Elements & Systems (PBES)

• Built:
  – Offsite, or
  – Adjacent to alignment

• Include features that reduce:
  – Onsite construction time
  – Mobility impact time
Element vs. System?

Elements

Systems
Examples:

- Full-depth precast deck panels
- FRP deck panels
- Steel grid decks
Deck Beam Elements:

- Modular beams with decks
- Adjacent deck bulb-tee beams
- Adjacent double tee beams
- Adjacent box beams
- Adjacent slab beams
Examples:

- Prefab caisson caps
- Prefab pile cap
- Prefab columns and/or caps
- Precast footings
Abutment & Wall Elements

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

- Precast approach slabs
- Prefab parapets
- Closure pours
- Overlays
What are PBES? 

**Systems**: rolled, launched, slid, etc.

- Superstructure
- Superstructure/pier
- Total bridge
EDC Goals - elements

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
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<tbody>
<tr>
<td>Authorized Projects</td>
<td>1,200</td>
<td>1,600</td>
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<tr>
<td>PBES</td>
<td>143</td>
<td>200</td>
</tr>
<tr>
<td>PBES w/ Fed Aid</td>
<td>132</td>
<td>168</td>
</tr>
</tbody>
</table>

2010 to June 2012: 802 bridges Elements
What they are selecting

SYSTEMS:
- Super .................. 35
- Sub & Super ........ 24
- Total Bridge ......... 6
What are we realizing?
Paradigm Shift – old practices

PBES:
- Pile Lagging

Conventional

PBES:
- Pile Pockets
Paradigm Shift – future rehab
Paradigm Shift – standards

Typical section
Principal Arterial
Owners Reasons to use PBES

- Remote Locations
- Limited Construction Season
Other Reasons to use PBES

Project Delivery Comparison by Phase
Measured in Months

Conv. Const.

12 60 3 24 99

ABC

12 24 3 12 51

Scoping  Design  Procurement  Construction
Other Reasons to use PBES

2,000 Fatal Accidents/yr in work zones
Public and Political Capitol
<table>
<thead>
<tr>
<th></th>
<th>Weighing Factor</th>
<th>Aggregate Industries</th>
<th>Las Vegas Paving</th>
<th>Meadow Valley</th>
<th>Wadsworth Brothers</th>
<th>W.W. Clyde</th>
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</thead>
<tbody>
<tr>
<td>Maintenance of Traffic</td>
<td>20%</td>
<td>38</td>
<td>70</td>
<td>50</td>
<td>51</td>
<td>70</td>
</tr>
<tr>
<td>Management Approach</td>
<td>25%</td>
<td>51</td>
<td>76</td>
<td>50</td>
<td>51</td>
<td>70</td>
</tr>
<tr>
<td>Other Technical Issues</td>
<td>55%</td>
<td>50</td>
<td>63</td>
<td>50</td>
<td>51</td>
<td>70</td>
</tr>
<tr>
<td>Technical Score</td>
<td>30%</td>
<td>47.85</td>
<td>67.65</td>
<td>50</td>
<td>51</td>
<td>70</td>
</tr>
<tr>
<td>Proposal Price</td>
<td></td>
<td>$18,775,000.00</td>
<td>$20,500,000.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Price Score</td>
<td>60%</td>
<td>75.94</td>
<td>69.55</td>
<td>86.15</td>
<td>100.00</td>
<td>98.24</td>
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<tr>
<td>Total Score</td>
<td>100%</td>
<td>61.10</td>
<td>71.60</td>
<td>74.62</td>
<td>82.61</td>
<td>88.27</td>
</tr>
<tr>
<td>Ranking</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Waterbury, CT

I-84 / Route 8 Interchange – Deck replacement
Curved ramp structure (straight beams)
6 Span Bridge (700 ft) w/ continuous spans
Single lane, Full closure with detour
Constructed in 48 days
Waterbury, CT (20 years later)

- Excellent condition
- Used membrane waterproofing and
- Asphalt Wearing surface
- No leakage through joints
Edison Bridge, Fort Myers, Florida

Last inspection: October 26, 2011
The bridge Health Index Rating is

• NB – 99.05 (Age is 20 years)
• SB – 99.65 (Age is 19 years)
Resources for Implementation
PBES/ABC Regional Peer Exchanges

- N.E. Region: July/2012
- S.W. Region: Feb/2012
- N.W. Region: Nov/2012
- M.N. Region: May/2012
- S.E. Region: ?/2013
- S.E. Region: N.E. Region: July/2012
- DC
- PR
P2P Temporary Website

http://p2p.ara-tracker.com/
Publications
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
Other Website Resources
Webinar Training - FIU

Wednesday, November 7, 2012 – 1:00 to 2:00 p.m. Eastern

Continuity Details over Piers
Simple for Dead Load/Continuous for Live-Load
Part 1: ABC Concrete Girder Bridges

www.abc.fiu.edu
FHWA PBES Deployment Team

Workshops

Scanning Tours

Project Reviews

Project Showcases

Regional Peer Exchanges
Project Showcase - SPMTs

BW Parkway/West Nursery Road Bridge
Superstructure Replacement Showcase
Accelerated Bridge Construction Using SPMT

October 27 - 28, 2012
Linthicum, MD
Sheraton Baltimore Washington Airport
1100 Old Elkridge Landing Road
Linthicum, MD 21090

Showcase Includes:
- Project Site Tour
- Technical Workshop
- Professional Development Hours

Visit http://www.fhwa.dot.gov/ltf/showcases/md for more information!

The Maryland State Highway Administration will use innovative Accelerated Bridge Construction technologies to replace two bridge superstructures on West Nursery Road over the Baltimore-Washington Parkway (90,000 ADT). The prefabricated structures will be built in the existing median. On separate weekends, each existing structure will be removed and a new one installed in less than 34 hours! Each structure is 76 feet long, 39 feet wide, and weighs 215 tons. Join us for a site visit to witness the bridge move and hear the success stories, challenges, and lessons learned from the perspective of the various project team members.

You are invited to a project showcase
PBES – Tools being developed

National ABC/PBES Project Exchange

2 Project Examples use PBES
- Contract Plans
- Specifications
- Bid Tabs
- Schedule
- Pictures
Submit Projects To...

Mary Lou Ralls, P.E.

ralls-newman@sbcglobal.net
(512) 422.9080
Publications - future

PBES

Planning

Engineering Materials

Construction Contracting
When to use PBES/ABC?
3.14 Accelerated Bridge Construction

Some prefabricated bridge elements and systems may offer significant advantages over onsite cast-in-place construction. Advantages can include a reduction in field construction time, lower costs resulting due to off-site fabrication and standardized components, and improved safety because of reduced exposure time in the work zone. The controlled environment of off-site manufacturing helps ensure consistent quality of components for durability and long-term performance.

There are considerable rewards that can be attained with thorough planning, design and execution of accelerated bridge construction contracts. A detailed evaluation should be made to determine if a job should be accelerated. Consideration must be given to the applicability of the design, the contracting industry’s abilities, project site conditions, costs and construction schedules. The Region and the Contractor must be committed to the accelerated schedule to ensure success. Shared responsibility, risk and control are needed for a successful project. Reduced schedules save money for all parties. When properly implemented, accelerated bridge construction can and should result in an inexpensive and durable bridge that meets schedule and budget requirements.

Additional information and guidance on selecting accelerated bridge construction for a project is available at www.fhwa.dot.gov/bridge/prefab/framework.cfm.
II. Flowchart for High-Level Decision on Whether a Prefabricated Bridge Should Be Used in This Project

III. Matrix Questions for High-Level Decision on Whether a Prefabricated Bridge Should Be Used in This Project

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>Maybe</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the bridge have high average daily traffic (ADT) or average daily truck traffic (ADTT), or is it over an existing high-traffic-volume highway?</td>
<td></td>
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<tr>
<td>Is this project an emergency bridge replacement?</td>
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<td></td>
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<tr>
<td>Is the bridge on an emergency evacuation route or over a railroad or navigable waterway?</td>
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<tr>
<td>Will the bridge construction impact traffic in terms of requiring lane closures or detours?</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Will the bridge construction impact the critical path of the total project?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the bridge be closed during off-peak traffic periods, e.g., nights and weekends?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is rapid recovery from natural/manmade hazards or rapid completion of future planned repair/replace needed for this bridge?</td>
<td></td>
<td></td>
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<tr>
<td>Is the bridge location subject to construction time restrictions due to adverse economics impact?</td>
<td></td>
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<tr>
<td>Does the local weather limit the time of year when cast-in-place construction is practical?</td>
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</tr>
<tr>
<td>Do worker safety concerns at the site limit conventional methods, e.g., adjacent power lines or over water?</td>
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<tr>
<td>Is the site in an environmentally sensitive area requiring minimum disruption (e.g., wetlands, air quality, and noise)?</td>
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<td></td>
</tr>
<tr>
<td>Are there natural or endangered species at the bridge site that necessitate short construction time windows or suspension of work for a significant time period, e.g., fish passage or sponge habitat nesting?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>If the bridge is on or eligible for the National Register of Historic Places, is prefabrication feasible for replacement/rehabilitation per the Memorandum of Agreement?</td>
<td></td>
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<tr>
<td>Can this bridge be designed with multiple similar spans?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the location of the bridge site create problems for delivery of ready-mix concrete?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the traffic control plan change significantly through the course of the project due to development, local expansion, or other projects in the area?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are delay-related user costs a concern to the agency?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can innovative contracting strategies to achieve accelerated construction be included in the contract documents?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the owner agency provide the necessary staffing to effectively administer the project?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can the bridge be grouped with other bridges for economy of scale?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the design be used on a broader scale in a geographic area?</td>
<td></td>
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</tbody>
</table>

Totals:
Is there more?

Having an ABC Policy in place is always a good start, but sometimes more guidance/direction may be needed....

1. When does a detailed evaluation occur?

2. How quickly should a project be Accelerated?

3. What methods/techniques are available?

4. What is this going to costs? (bridge vs. project vs. agency)
1) Policy without Guidance on how to Evaluate when to accelerate and what methods to consider for Acceleration

2) Guidance/Criteria to Evaluate, but no Policy in place to decide Yes/No

3) Varying levels of what to technologies to accelerate with
1.) **Policy:** establishes the Agency’s priorities.

2.) **Decision Making Tool:** evaluates the project to the policy and priorities of the Agency.

3.) **Guidelines/Flowcharts:** provide guidance on what ABC technologies are viable once a decision to accelerate a project is made.
Iowa DOT:
The overall goal of Iowa’s policy is to improve public safety, reduce road user costs, and provide better overall experience for the travelling public while building long lasting highway structures. By doing so, the Department is willing to recognize societal costs as real construction costs.

Utah DOT:
ABC is standard practice for project delivery, efficiency and fast construction. The Department has recently adopted themes that are now used as the basis of all projects in Utah. The themes are as follows:

-- Accelerate Delivery
-- Design and Construction
-- Decrease and Minimize MOT
-- Encourage Innovation
-- Get a good price
DMT - Examples
Flowcharts - Examples
Metric Based DMT
Pooled Fund Study DMT - AHP

http://www.fhwa.dot.gov/bridge/abc/fast.cfm
Too Complicated: MIDOT

Traffic volume-to-capacity ratio < .80

Work Zone Traffic Delays < 10 minutes

LOS > D, or not go from LOS A to LOS C

<table>
<thead>
<tr>
<th>NUMBER OF LANES</th>
<th>AVERAGE CAPACITY OF AVAILABLE LANES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td>OPEN</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
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<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
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<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
Too Complicasted: Iowa DOT

ADT/ADTT

User Costs = ADT*0.51/mile + ADTT*3*0.51/mile
Locally Administered Bridges

Local Bridges: 7,500
Avg. ADT: 1,400
Avg. ADTT: 50
Avg. Detour Length: 12 miles
Avg. Age: 48 years
Avg. DRUC: $4,600 /day

ADT > 5,000: 450
Avg. ADT: 12,100
Avg. ADTT: 730 (6%)
Avg. Detour Length: 3 miles
Avg. Age: 51 years
Avg. DRUC: $41,000 /day
Thank You!

FHWA

Benjamin Beerman, P.E.