

Federal Highway Administration

Every Day Counts

Innovation Initiative



National Perspective Overview/Resources Update

Benjamin Beerman, P.E.
FHWA Resource Center

ASHE
June 13, 2014



Overview

- Basic terminology, context of ABC/PBES
- Resources for Implementation
 - Publications
 - Websites
- Upcoming Activities
- National Trends, paradigm shifts
- Design Considerations
- Innovations

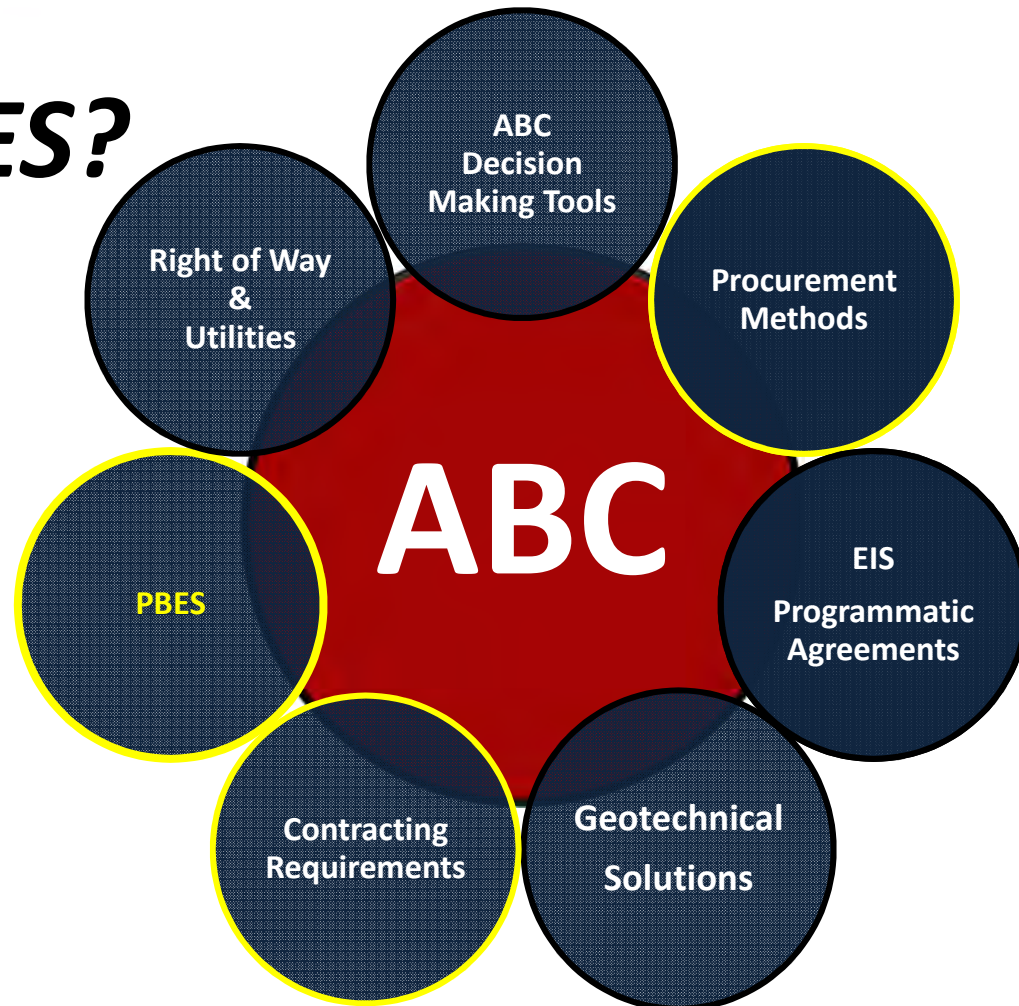


Terminology

ABC/PBES



ABC and PBES?





Definition of PBES

PBES are structural components of a bridge that are built offsite, or adjacent to the alignment, and includes features that reduce the ***onsite construction time*** and ***mobility impact time*** that occurs from ***conventional construction*** methods.



Element vs. System?

Elements



Systems





What are PBES?

Elements: single structural component of a bridge

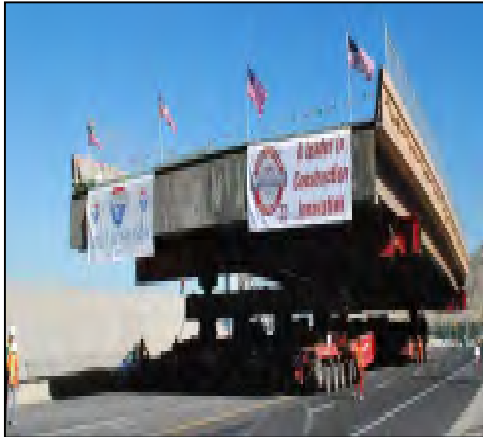
- Deck Element
- Beam Elements
 - “Deck” Beam Elements
 - “Full-Width” Beam Elements
- Pier Elements
- Abutment & Wall Elements
- Miscellaneous Elements





What are PBES?

- Systems:**
- entire superstructure,
 - entire superstructure & substructure,
 - total bridge



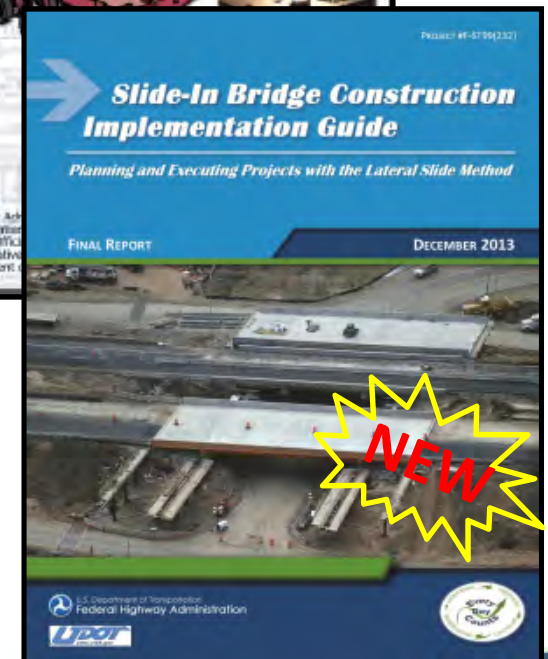
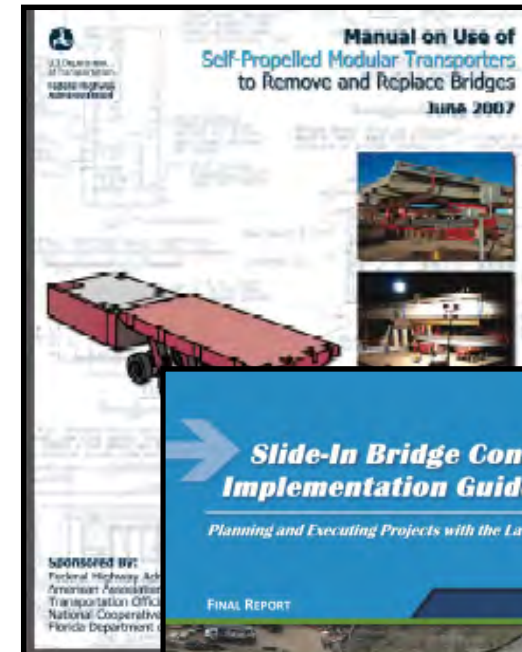
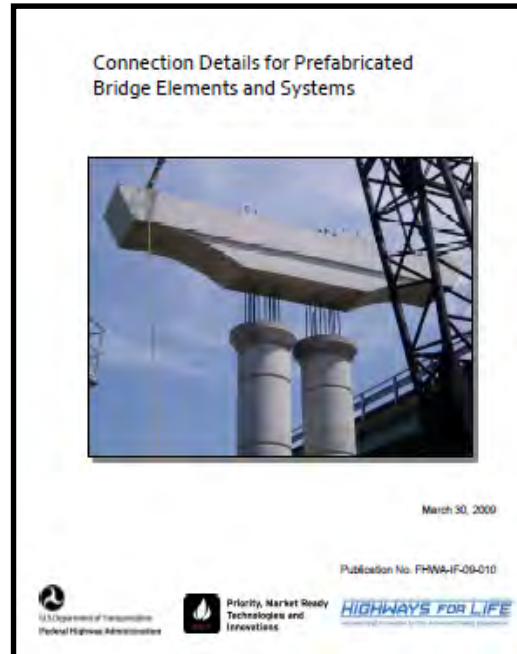
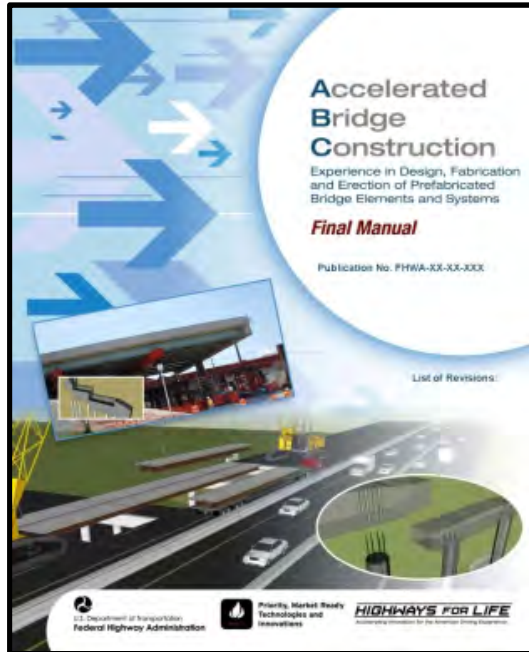


Resources

Publications



Publications - FHWA

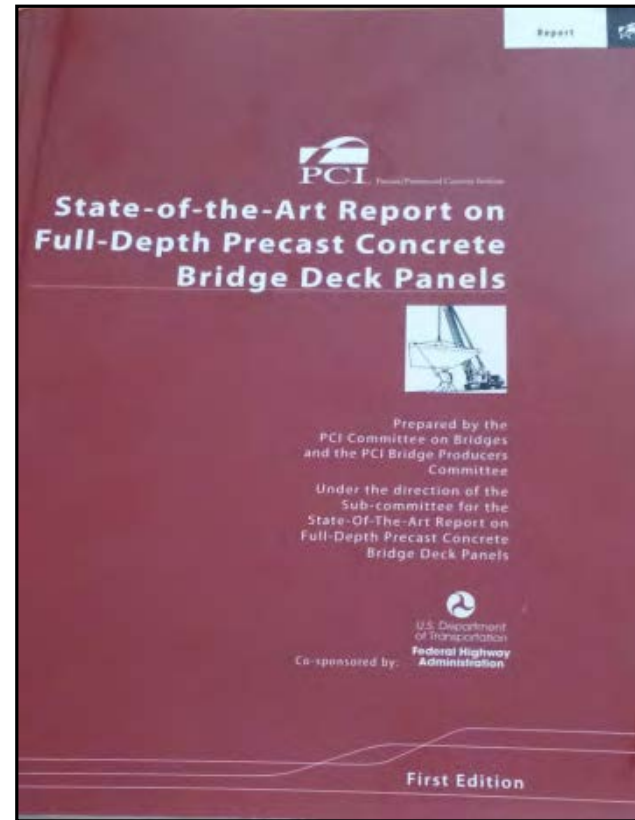
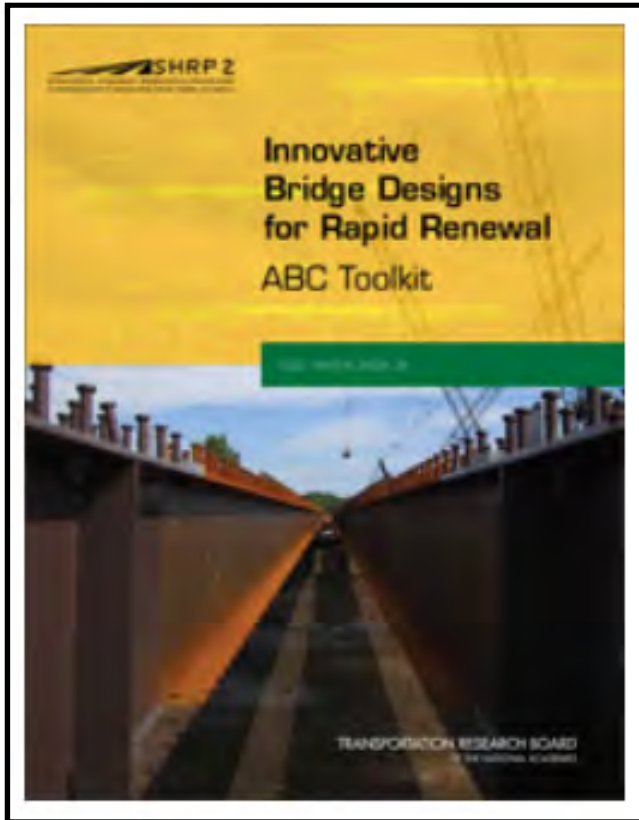


www.fhwa.dot.gov/bridge/prefab/pubs.cfm

www.fhwa.dot.gov/construction/sibc/pubs/sibc_guide.pdf



Publications





Web Resources



Formation of ABC Subcommittee
AFF10 General Structures – parent committee
AFF10(3) – Subcommittee for ABC

Chair: Ben Beerman, FHWA
Vice Chair: Mary Lou Ralls

<https://sites.google.com/site/trbaff103>



Welcome

Registration

Members

News/Events 2014

▼ ABC Research
Projects

Project Tracker

▼ Annual Meetings

2014

Comments

TRB

Committee on General Structures (AFF10)

Subcommittee on Accelerated Bridge Construction (AFF10-3)

Approximately one-fourth of the Nation's 600,000 bridges require rehabilitation, repair, or total replacement. The construction-related work used to address these needs can have significant impact to the surrounding area including mobility, safety, and other social-economic related impacts. Throughout the U.S., owner agencies are realizing that the results of using ABC strategies not only help address onsite related constraints, but can also improve how a bridge program is delivered when used in a more routine, programmatic manner.

Scope: The TRB Accelerated Bridge Construction (ABC) Subcommittee supports research, technology transfer, and implementation to advance ABC technologies related to policy, planning, procurement, design, materials, construction and contracting. The **objective** of the subcommittee is to expand the knowledge and expertise to foster the implementation of ABC related technologies.

<https://sites.google.com/site/trbaff103/home>



- 2015 Annual Meeting
 - PBElement Workshop
 - ABC Paper Session
 - Sign up as a Subcommittee Friend!!!



National ABC/PBES Project Exchange

Project Examples use PBES/ABC

- Project Summary
- Contract Plans
- Specifications
- Bid Tabs
- Schedule
- Pictures

I-93 Bridge over Loudon Road (Route 9)

Folders ▸ PBES_Example_Projects_by_State ▸ UT ▸ UT-2007-4500 South Bridge

UT-2007-4500 South Bridge

Download More Actions

<input type="checkbox"/>	Title
<input type="checkbox"/>	2-Contract Plans
<input type="checkbox"/>	5-Construction Schedule
<input type="checkbox"/>	3-Specifications
<input type="checkbox"/>	1-Photos
<input type="checkbox"/>	4-Bid Tabs
<input type="checkbox"/>	0-110829 ABC New UT 2007 4500 So over I-215.do



- **ABC Project Exchange User's Guide:**

Refer to the **July 25, 2013** (National ABC Project Exchange) webinar hosted by the FIU ABC Center

<http://www.abc.fiu.edu/archive-of-past-events/>


- **FHWA External Collaboration Portal**


1) Register &

2) Request Site Access

<https://www.transportationresearch.gov/dot/fhwa/default.aspx>

National ABC Project Exchange
User's Guide
July 18, 2013

 U.S. Department of Transportation
Federal Highway Administration





Monthly Webinars - FIU

FIU

Accelerated Bridge Construction (ABC) Center
FLORIDA INTERNATIONAL UNIVERSITY


Thursday, May 15, 2014 – 1:00 to 2:00 p.m. Eastern

**Precast Substructures, Part I: Comparison of Non-seismic
and Seismic Connection Details for ABC**

Lee Marsh, PE
www.abc.fiu.edu



Regional Peer Exchange



EVERY DAY COUNTS
PBES/ABC PEER EXCHANGES

HOME

SOUTHWEST REGION
Austin, Texas
February 7-8, 2012
[View post-meeting materials](#)

MID-NORTH REGION
Detroit, Michigan
May 1-3, 2012
[View post-meeting materials](#)

NORTHEAST REGION
Durham, North Carolina
July 21-August 2, 2012
[View post-meeting materials](#)

NORTHWEST REGION
Seattle, Washington
November 13-14, 2012
[Agenda](#) [Event Info](#) [Registration](#)


SOUTHEAST REGION
2012
[View info coming soon](#)

The PBES peer exchanges are regional forums comprised of bridge practitioners from State and Local Agencies, Contractors, Suppliers, Academia, and Government Officials in the sharing of bridge practices using PBES in each region.

The gatherings provide a forum to discuss PBES strategies in the areas of planning, engineering, materials, research, contracting, and construction. The goal for each exchange is to promote the benefits of PBES through education and application, and to seek out opportunities to improve upon the methods that are used for implementation.

Why PBES?

PBES are structural components of a bridge that are either built off site, or adjacent to the site, in a manner to reduce the onsite construction and mobility impact times that can adversely impact the travelling public. Because of their versatility, PBES can be used to address many common site and constructability issues. Remote site locations, limited construction seasons, material availability, and consistent quality in workmanship present opportunities where the use of PBES can provide more practical and economical solutions over conventional construction practices. Use of PBES has demonstrated proven benefits to agency owners, contractors, and the travelling public. Compared to conventional construction methods it is faster, safer, lowers mobility impacts, provides better quality, lowers cost, and is easily adaptable to many site conditions.



◆ DC
◆ PR

◆ N.E. Region	◆ M.N. Region
◆ S.W. Region	◆ N.W. Region
◆ S.E. Region	

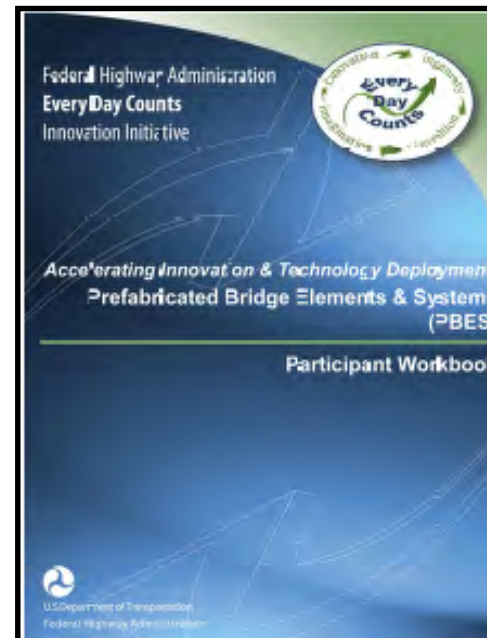
<http://p2p.ara-tracker.com/>



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



[www.fhwa.dot.gov/everydaycounts/
technology/bridges/pbeswebinartraining](http://www.fhwa.dot.gov/everydaycounts/technology/bridges/pbeswebinartraining)



Other Websites

Members Only | Login | Subscribe to Our Enewsletter | Contact

Home | About Us | Members | News/Events | **Technical Resources** | Products & Systems | Education | Projects | Sustainability

PCI NORTHEAST
A Chapter of the Precast/Prestressed Concrete Institute

NORTHEAST BULBTEE (NEBT)

Home > Technical Resources > Bridge Resources > Northeast Bulbtee (NEBT)

Technical Resources dropdown menu:
Building Resources
Bridge Resources
Infrastructure Resources
LEED Information
Quality Control Resources
Designer's Notebook Series

General Electric Healthcare
Precaster: Oldcastle Precast Building Systems
View Full Project »

www.pcine.org/

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PUBLIC | DOING BUSINESS | **INSIDE UDOT** | MEDIA | PROJECTS AND STUDIES | TRAFFIC | **CONSTRUCTION**

Home | Inside UDOT | Project Development | Structures Design and Bridge Operations | Accelerated Bridge Construction (ABC)

UDOT Mission, Objectives, and Funding
Director and Deputy Director
Alphabetic List of Divisions
Administrative Services
Operations
Systems Planning and Programming
Project Development

Accelerated Bridge Construction (ABC)

- ### Helpful Links
- [UDOT ABC Decision Making Process](#)
 - [ABC Manuals](#)
 - [ABC Special Provisions](#)
 - [ABC Drawings](#)
 - [ABC Acceptance and Documentation](#)
 - [ABC Measurement and Payment](#)
 - [ABC Conferences and Workshops](#)
 - [ABC Project Highlights](#)
 - [ABC Lessons Learned Reports](#)

www.udot.utah.gov/



Resources - Summary

- **ABC Project Exchange:**
 - User Guide (FIU – July 25, 2013 webinar) <http://www.abc.fiu.edu/event-on-07252013/>
 - FHWA Collaboration Portal <https://www.transportationresearch.gov/dot/fhwa/default.aspx>
- **PBES Webinar Training:**
 - www.fhwa.dot.gov/everydaycounts/technology/bridges/pbeswebinartraining
- **PBES Peer Exchanges:**
 - <http://p2p.ara-tracker.com/>
- **ABC/PBES Publications:**
 - www.fhwa.dot.gov/bridge/prefab/pubs.cfm
- **Ongoing monthly ABC webinars via FIU:**
 - www.abc.fiu.edu
- **SHRP2 R04 Product:**
 - <http://www.fhwa.dot.gov/goshrp2/>
- **PCI North East:**
 - www.pcine.org/
- **Utah DOT:**
 - <http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:1991>
- **TRB ABC Subcommittee AFF10(3):**
 - <https://sites.google.com/site/trbaff103>
- **MAP 21:**
 - <http://map21.transportation.org/Pages/MAP21Bill.aspx>
- **Innovative Funding Grant Program:**
 - <http://www.fhwa.dot.gov/accelerating/grants/index.cfm>



Upcoming Events



170 Technical Papers
Nine 4-hour workshops

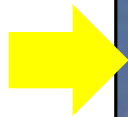
www.abc-utc.fiu.edu/index.html



2014
**NATIONAL ACCELERATED BRIDGE
CONSTRUCTION CONFERENCE**

December 4 - 5, 2014

Workshops December 3, 2014
Hyatt Regency, Miami, Florida





Lateral Slide Showcase
Second Week of August
US-131 North/Southbound
bridge over 3 Mile Road
(Grand Rapids)



Webinar



**Thursday, June 12, 2014 – 1:00 to 2:00 p.m. Eastern
Milton-Madison Bridge
Contractor/Construction perspective**

FHWA/CDOT/Walsh Construction

www.slideinbridgeconstruction.com/



Monthly Webinars - FIU

FIU

Accelerated Bridge Construction (ABC) Center
FLORIDA INTERNATIONAL UNIVERSITY

Thursday, June 19, 2014 – 1:00 to 2:00 p.m. Eastern

Precast Substructures, Part II: Comparison of Non-seismic and Seismic Connection Details for ABC

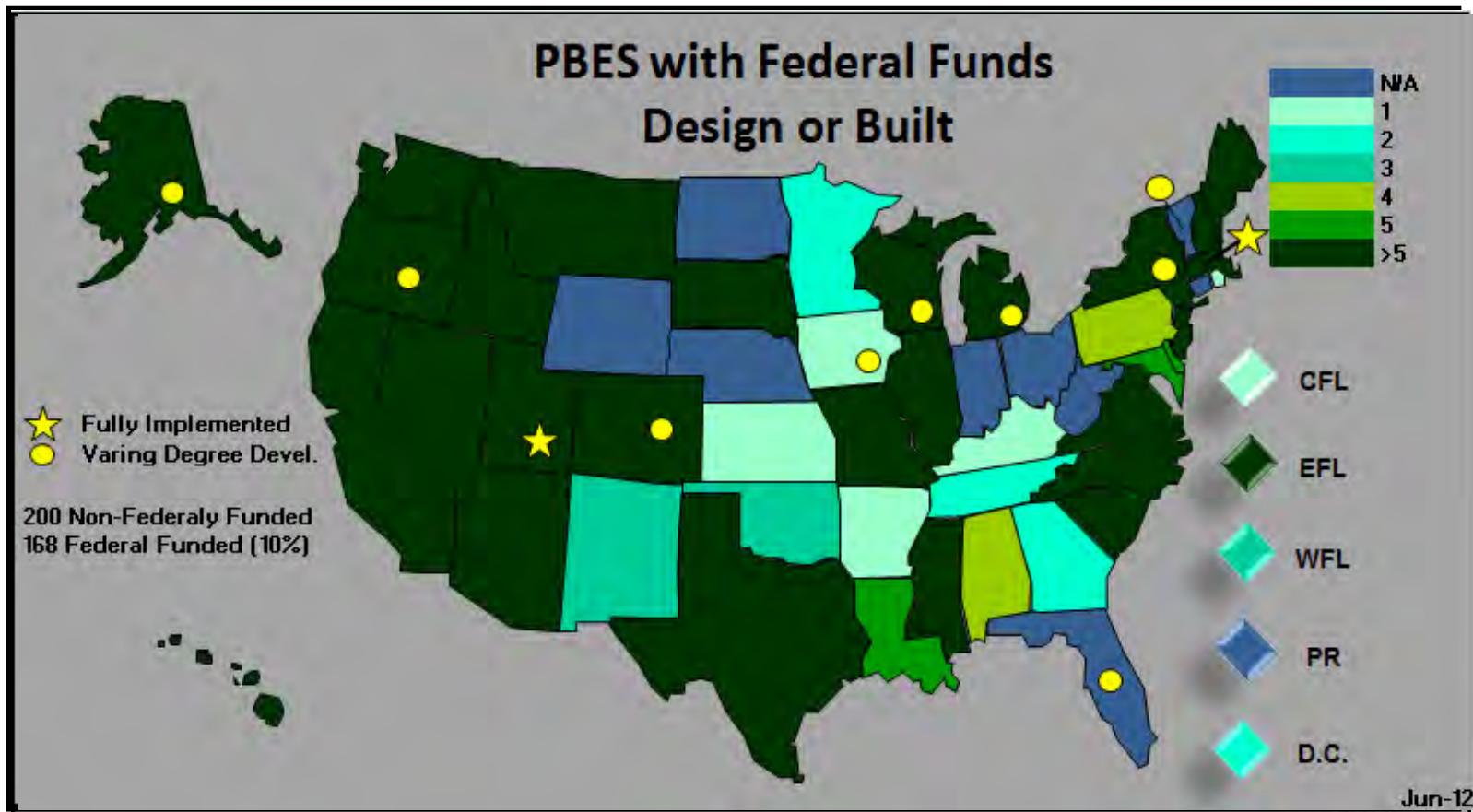
Lee Marsh, PE
www.abc.fiu.edu



National Perspective



What has been done? 850 bridge projects





Paradigm Shift old practices



PBES

PBES:
Pile Lagging



PBES:
Grouted Couplers



PBES:
Pile Pockets





Abutments



Drive the piles
Weld the temporary supports



Erect the modules on Piles



Abutments



Form the vertical joint – shear key



Grout the shear keys and pile block outs

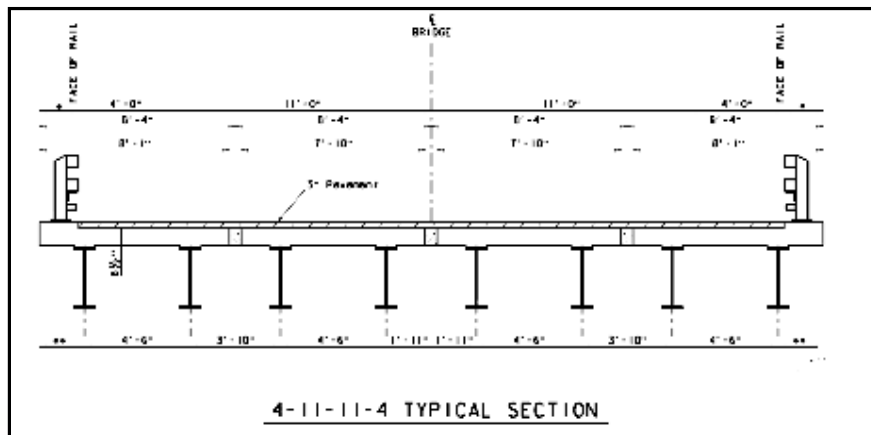
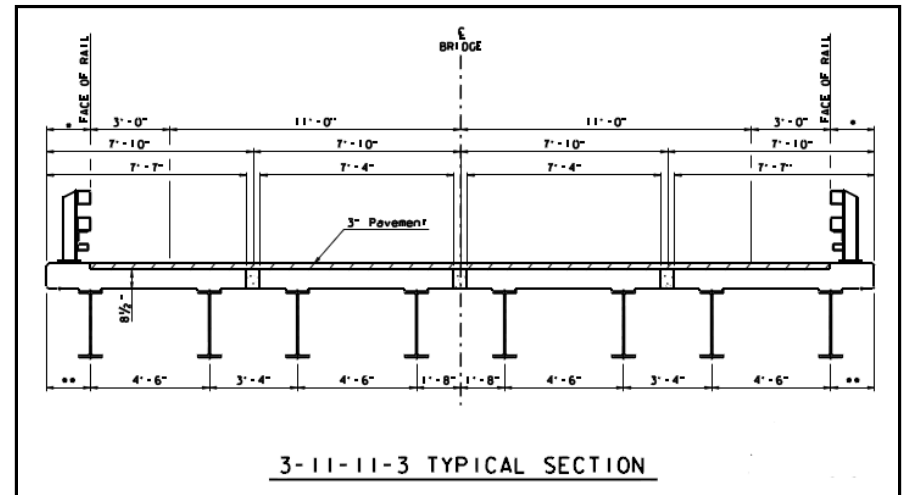
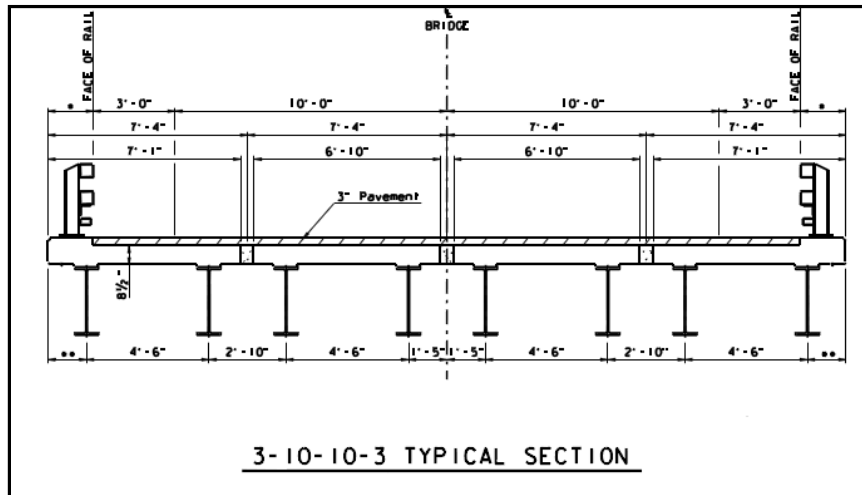


Paradigm Shift future strategies





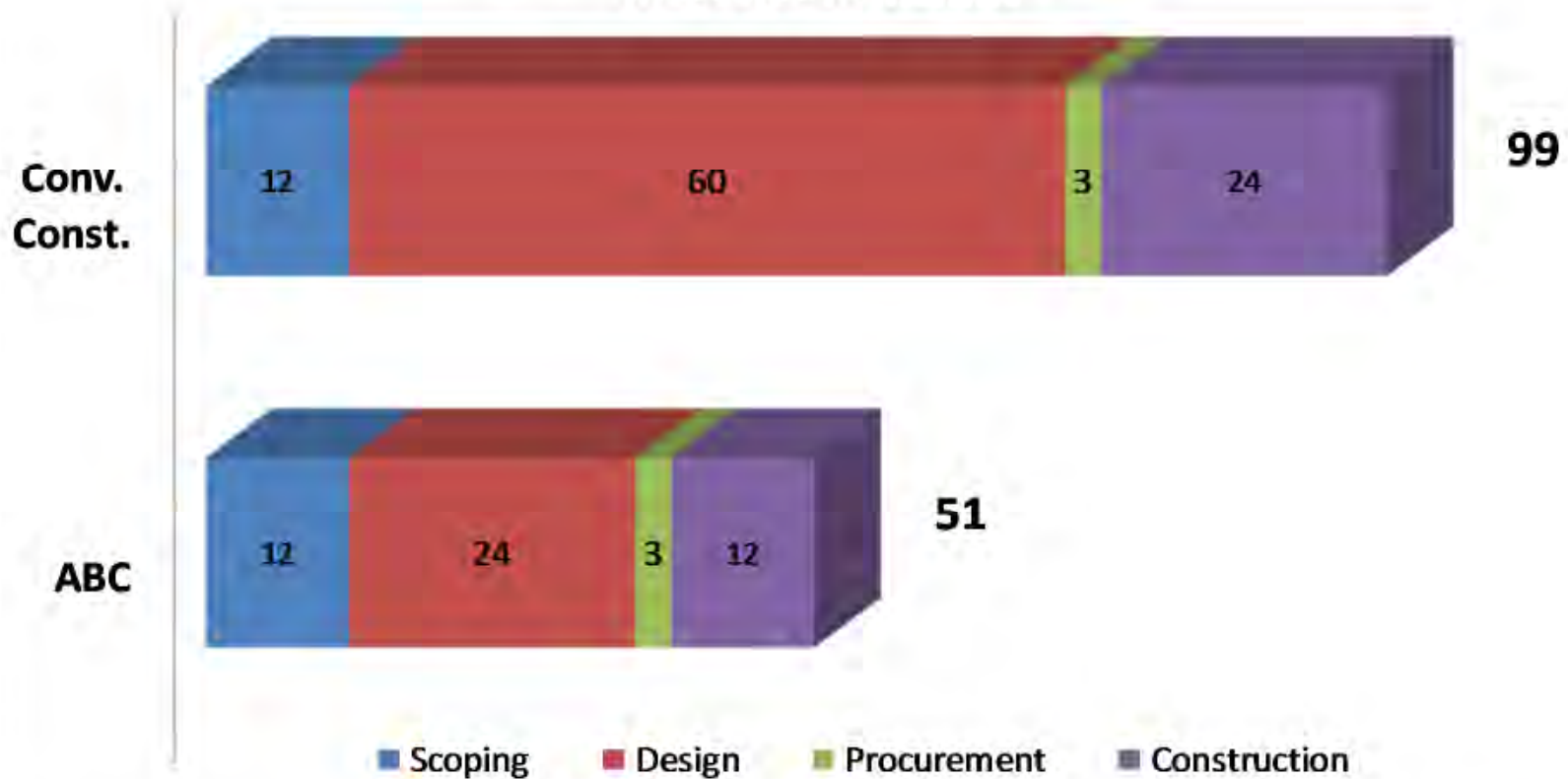
Paradigm Shift – standards





Other Reasons for PBES

Project Delivery Comparison by Phase
Measured in Months



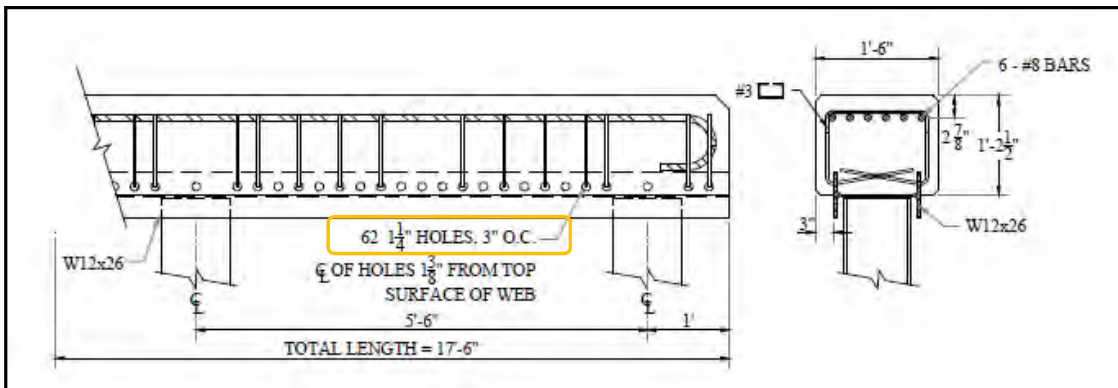
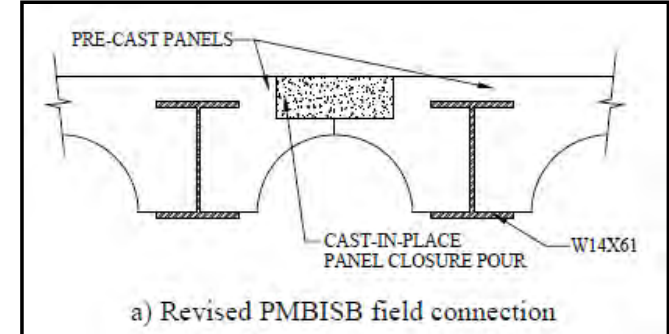


Opportunities for Improvement

Design Considerations



Opportunities for Improvement





Profile: think about it





Try to get "top down"



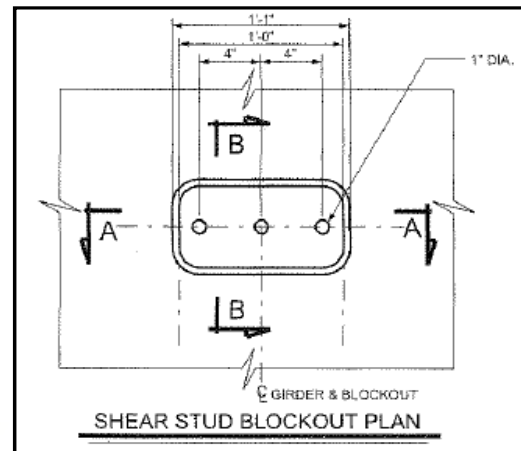
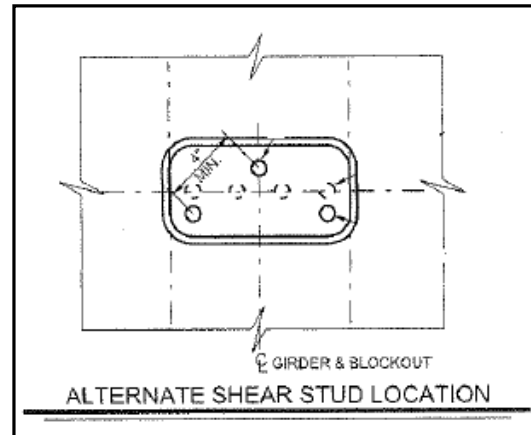


Clearances/Top Down



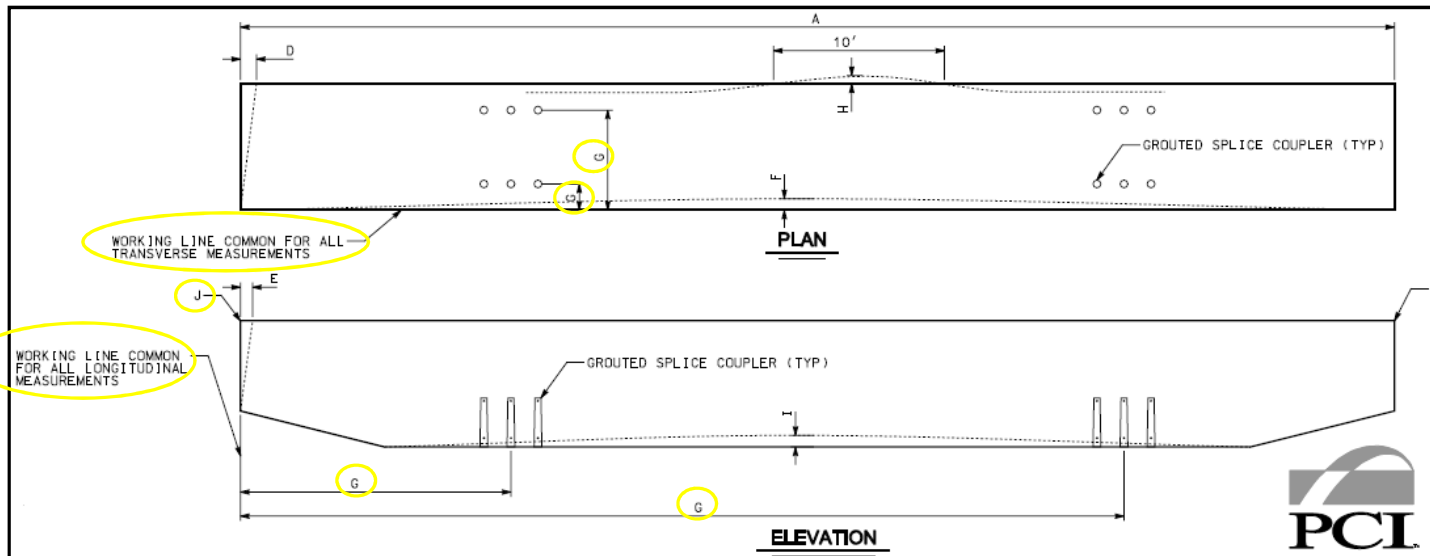


Detail with Tolerances in mind





Detail/Work off Common Line



BENT CAP FABRICATION TOLERANCES		
A	LENGTH	+ 3/4"
B	WIDTH (OVERALL)	± 1/4"
C	DEPTH (OVERALL)	± 1/4"
D	VARIATION FROM SPECIFIED PLAN END SQUARENESS OR SKEW	± 1/8" PER 12 INCH WIDTH ± 1/2" MAXIMUM
E	VARIATION FROM SPECIFIED ELEVATION END SQUARENESS OR SKEW	± 1/8" PER 12 INCH WIDTH ± 1/2" MAXIMUM
F	SWEEP, FOR MEMBER LENGTH (IF PRESTRESSED): UP TO 40 FEET 40 FEET TO 60 FEET OVER 60 FEET	± 1/4" ± 1/2" ± 3/8"
G	LOCATION OF GROUTED SPLICE COUPLER MEASURED FROM A COMMON REFERENCE POINT	± 1/4"
H	LOCAL SMOOTHNESS OF ANY SURFACE	± 1/4" IN 10 FEET
J	VARIATION FROM SPECIFIED CAMBER (IF PRESTRESSED)	+ 1/8" PER 10 FEET + 1/2" MAXIMUM
J	ERECTION ELEVATION TOLERANCE	± 1/4"
S3	STIRRUP PROJECTION FROM CAP SURFACE	+ 1/4", - 1/2"

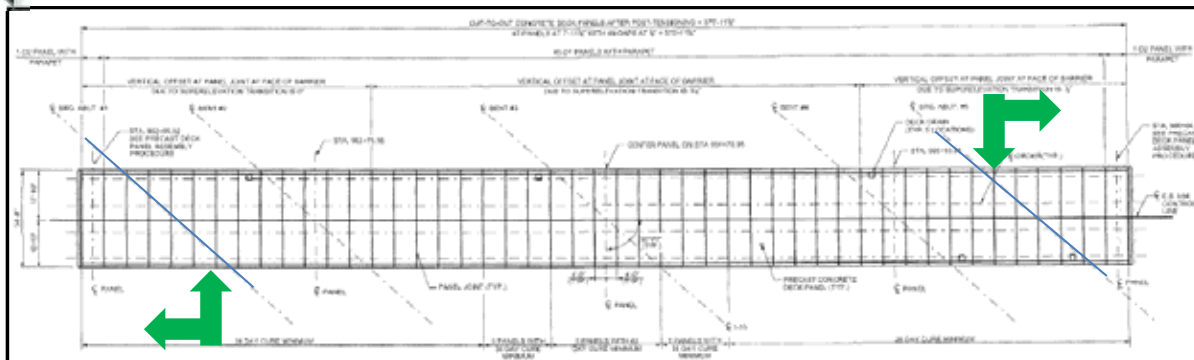
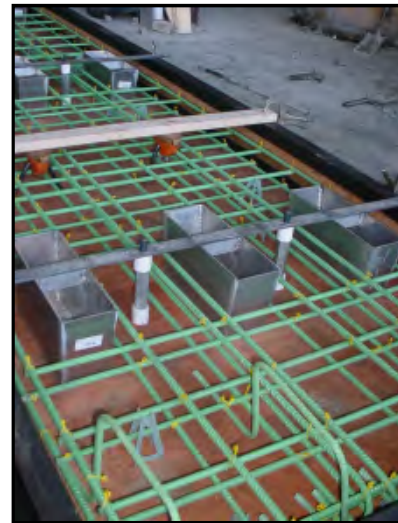
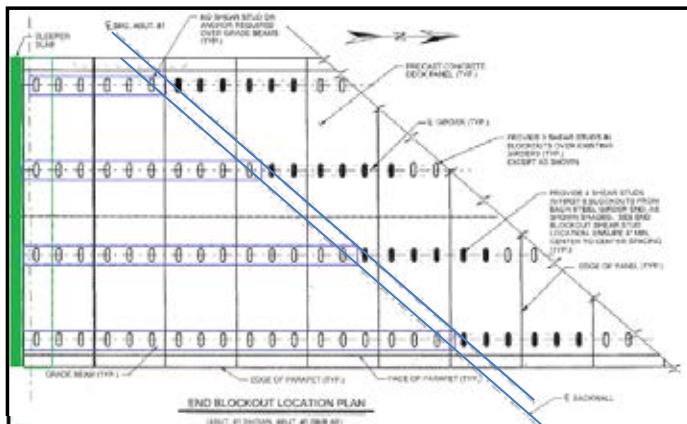


Balance Pic Weights Pull a crane pic chart





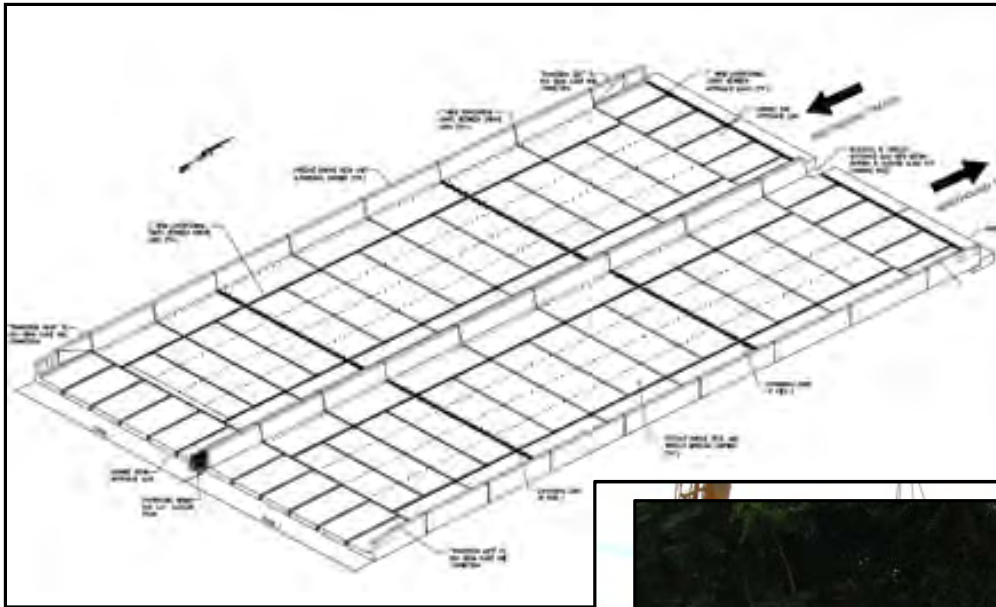
Clean Detailing/Repeatability





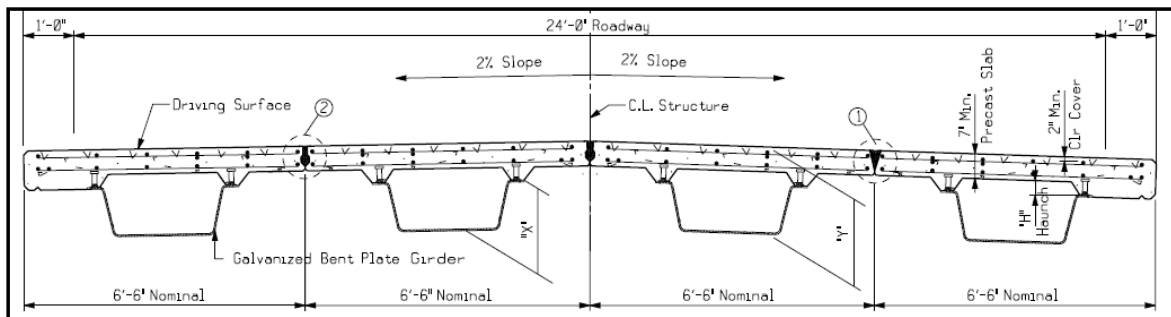
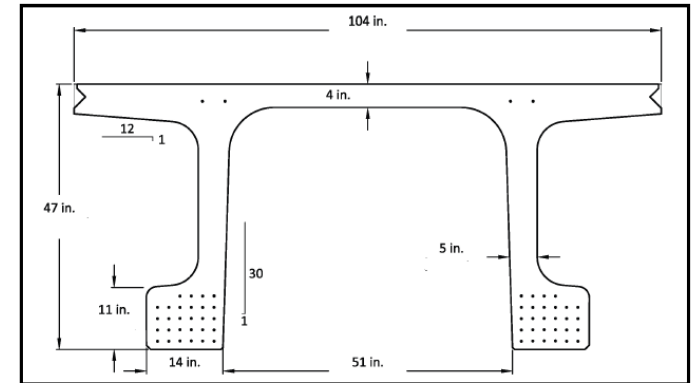
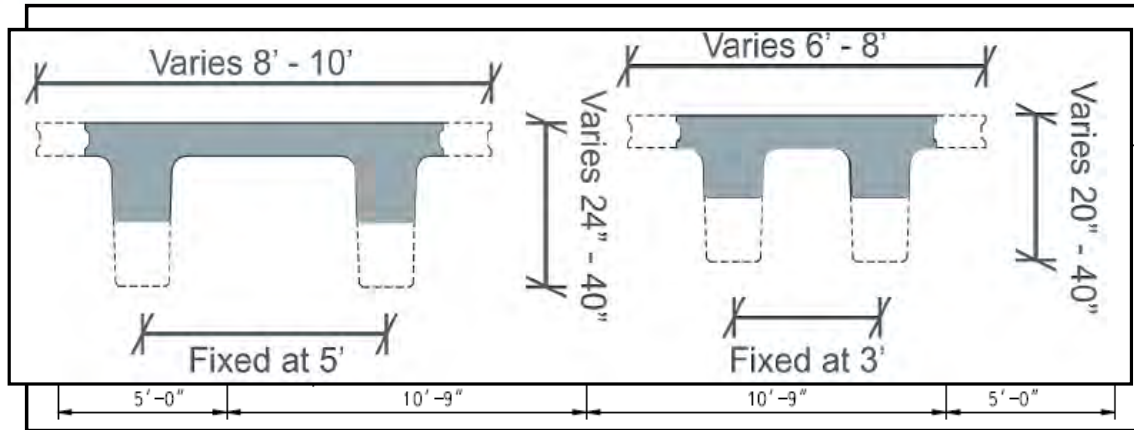


Deck Panels



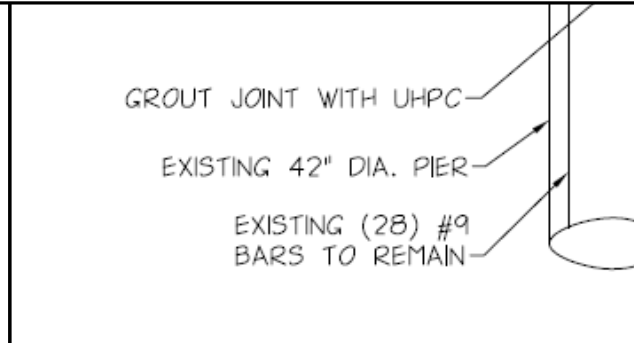
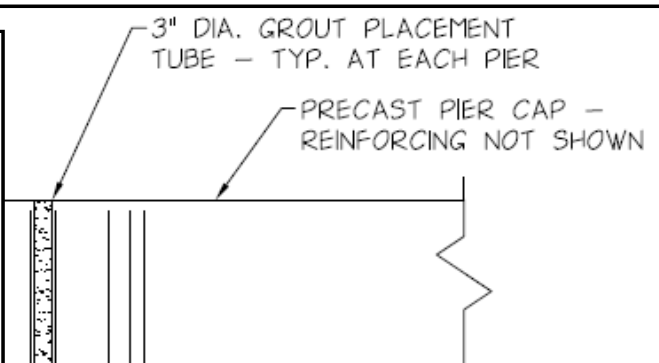
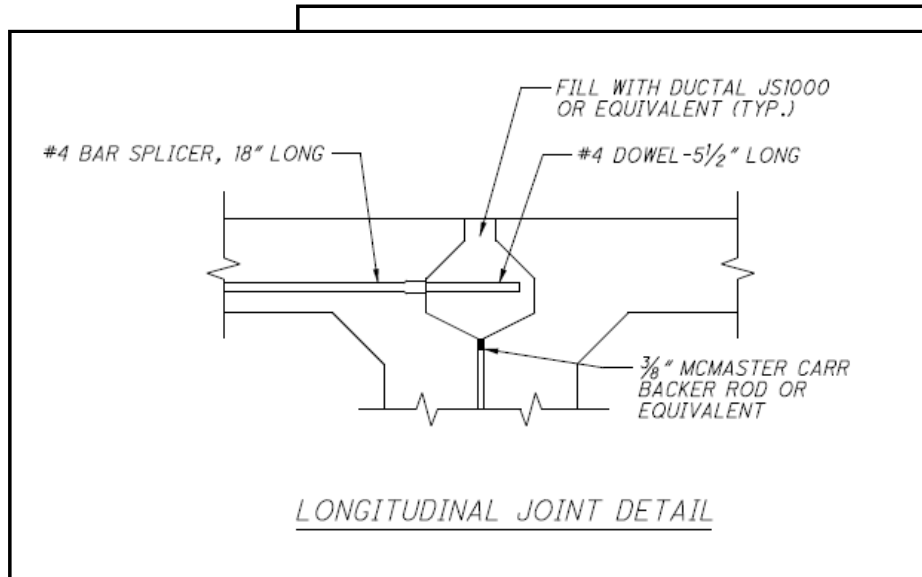


MDB Elements





UHPC





Pier Caps



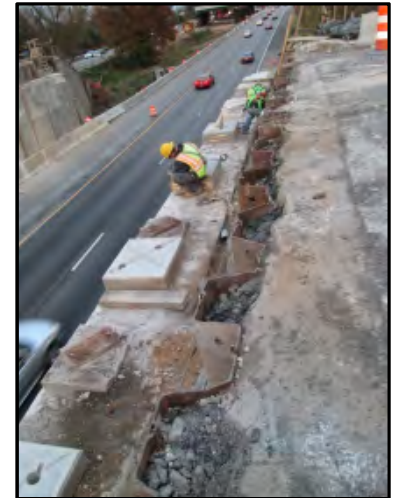
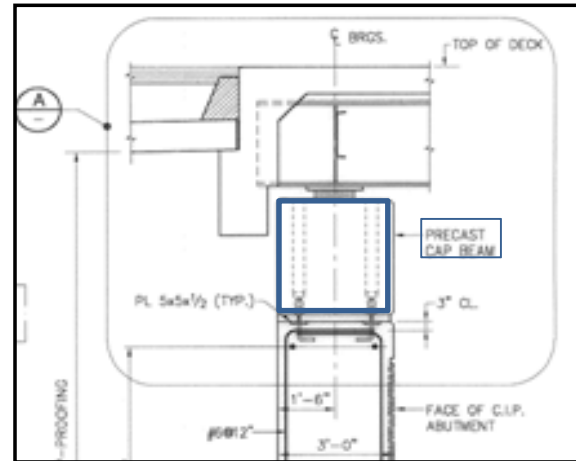


Abutments





Systems



Lateral Slides



SPMTs



Public and Political Capitol

**PBES/ABC is a
positive message!**

*“As stewards of the
transportation program, we are
doing due diligence to meet the
needs of the traveling public.”*







Thank You!

FHWA

Benjamin Beerman, P.E.

