Federal Highway Administration

Every Day Counts

Innovation Initiative

National Perspective
Overview/Resources Update

Benjamin Beerman, P.E.
FHWA Resource Center

ASHE
June 13, 2014

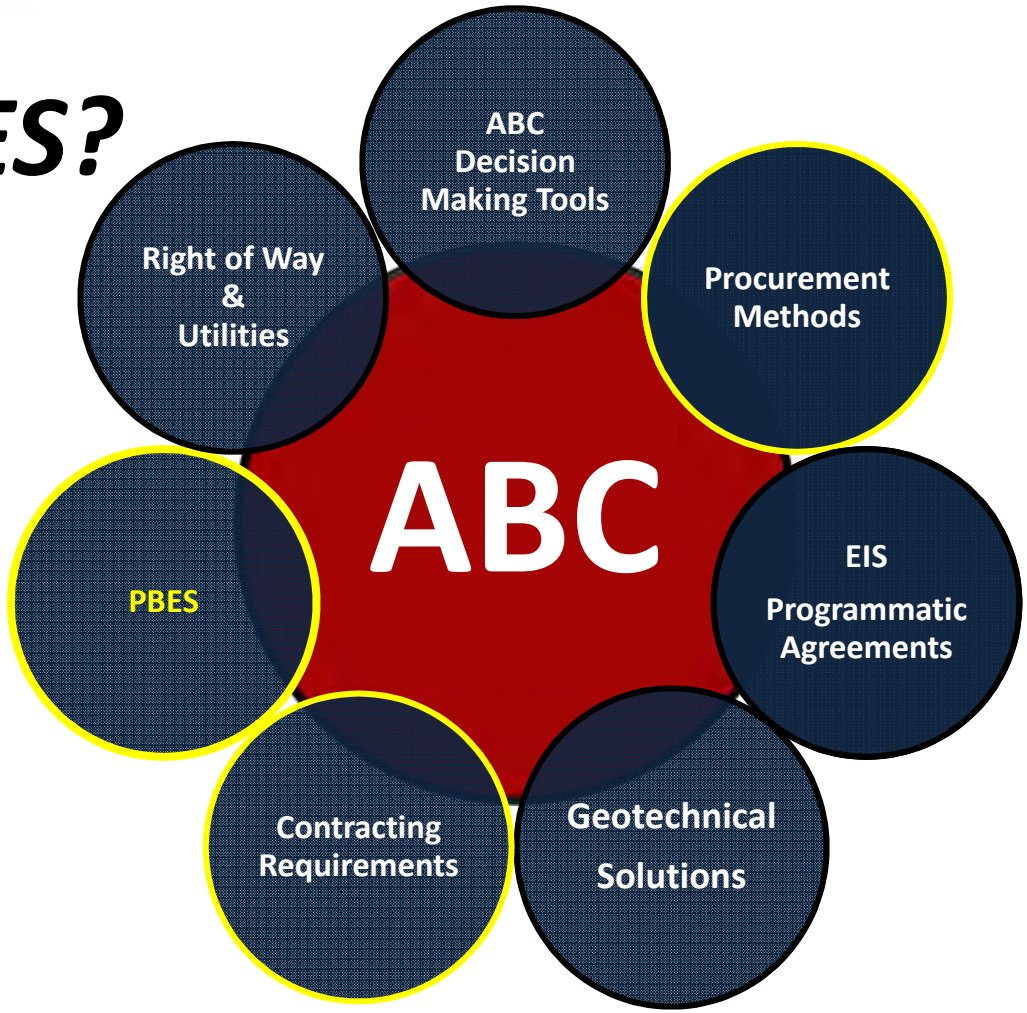
Overview

- 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?


ABC
Decision
Making Tools
Right of Way
&
Utilities
Procurement
Methods
ABC
PBES
EIS
Programmatic
Agreements
Contracting
Requirements
Geotechnical
Solutions

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 PBE**S**?*

Systems: - entire superstructure,

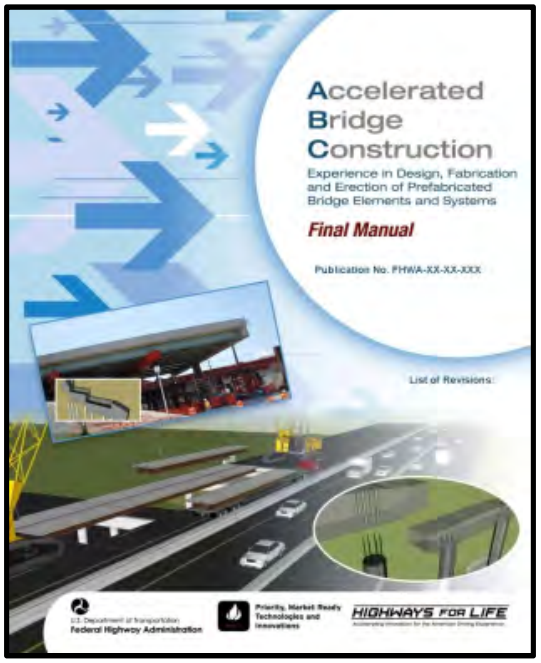
- entire superstructure & substructure,

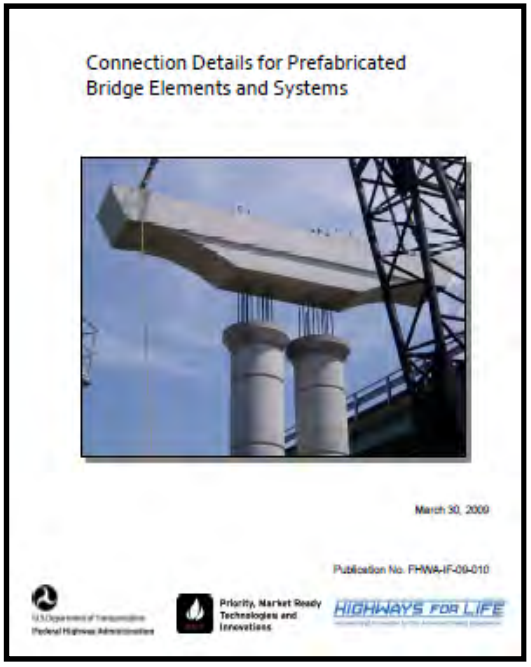
- total bridge

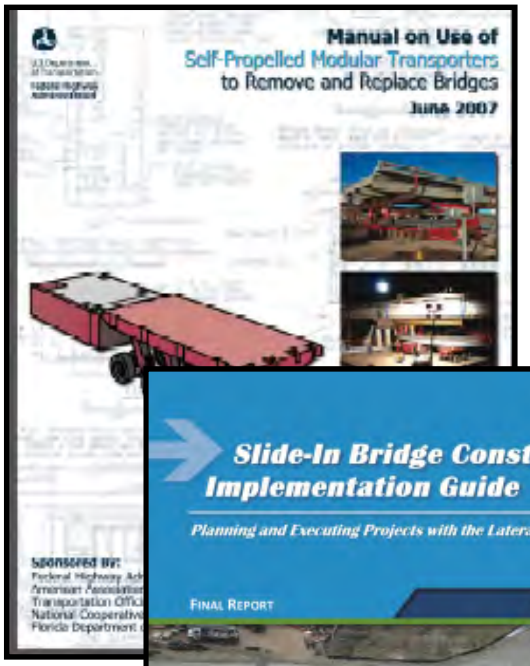
Resources

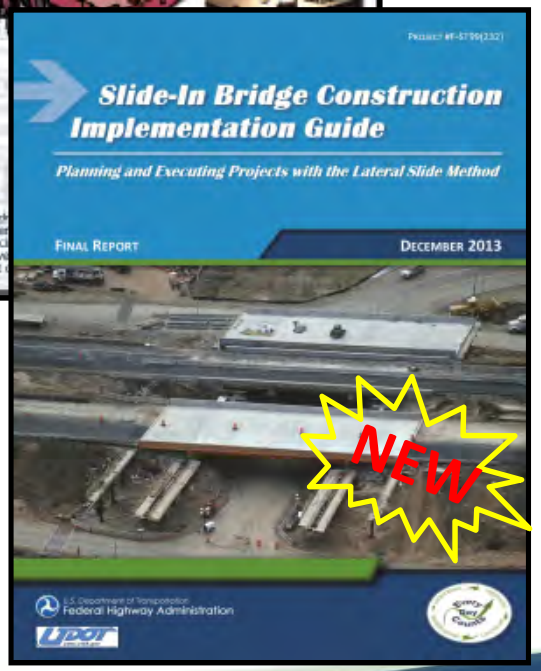
Publications

Publications - FHWA





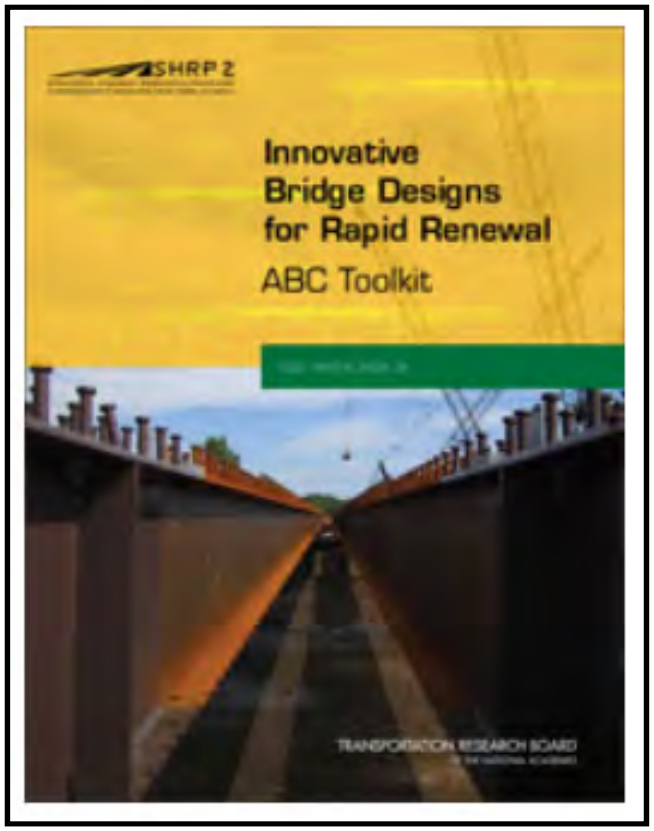


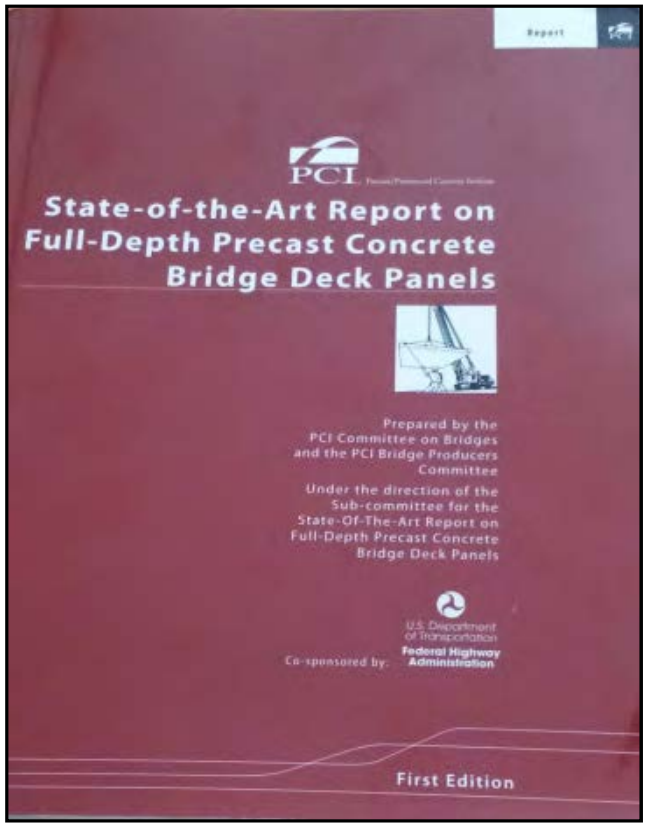


www.fhwa.dot.gov/bridge/prefab/pubs.cfm

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

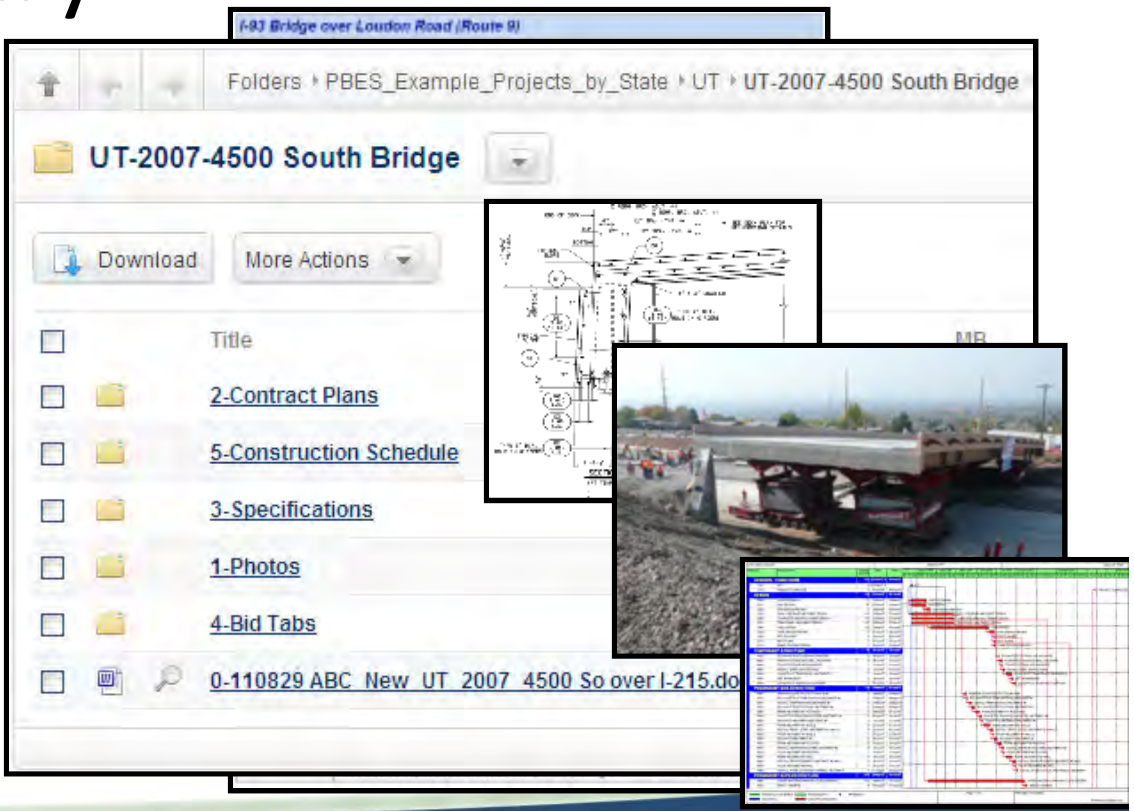
https://sites.google.com/site/trbaff103/home

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

National ABC/PBES Project Exchange

Project Examples use PBES/ABC

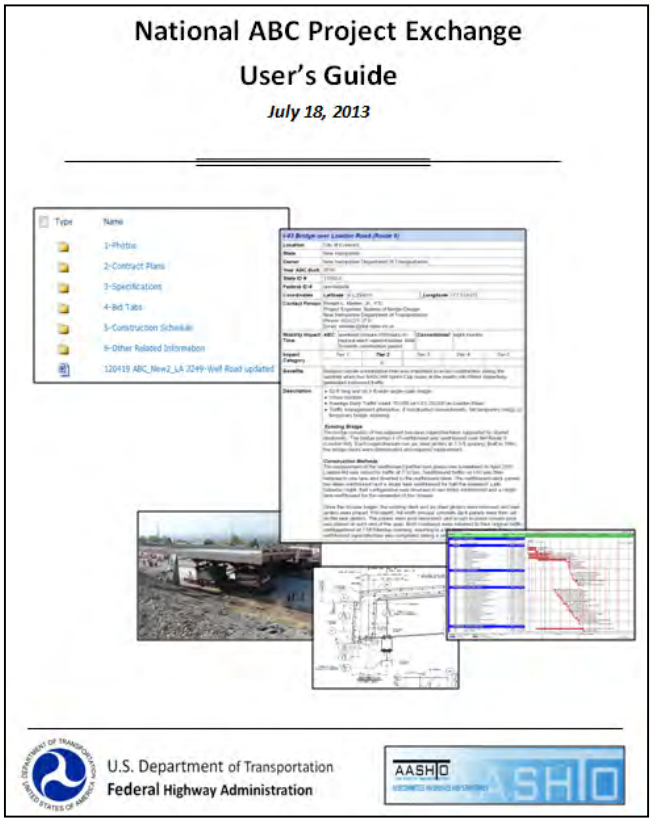
- Project Summary
- Contract Plans
- Specifications
- Bid Tabs
- Schedule
- Pictures



- **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

Monthly Webinars - FIU

FIU | Accelerated Bridge Construction (ABC) Center
FLORIDA INTERNATIONAL UNIVERSITY

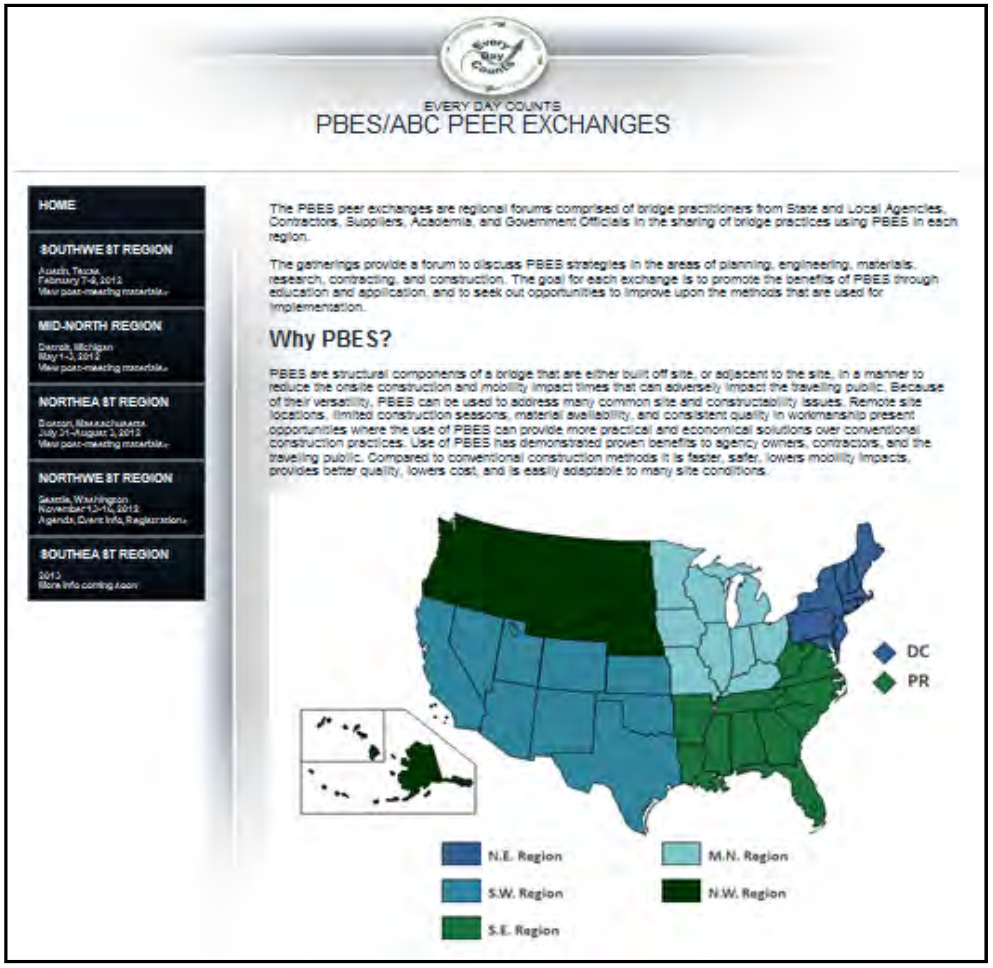
Thursday, May 15, 2014 – 1:00 to 2:00 p.m. Eastern

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

Lee Marsh, PE

www.abc.fiu.edu

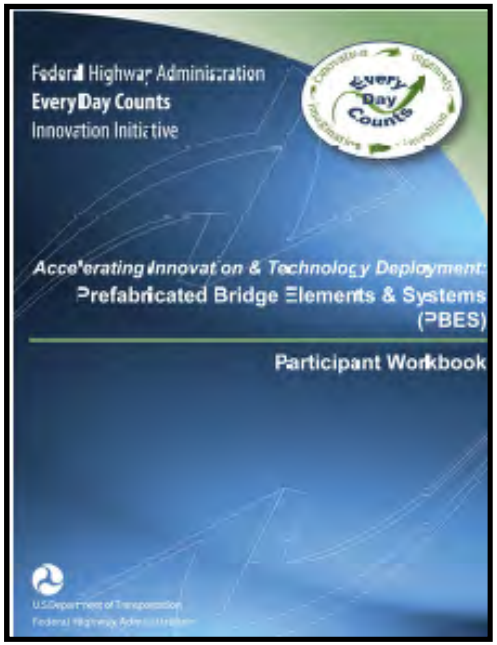
Regional Peer Exchange



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

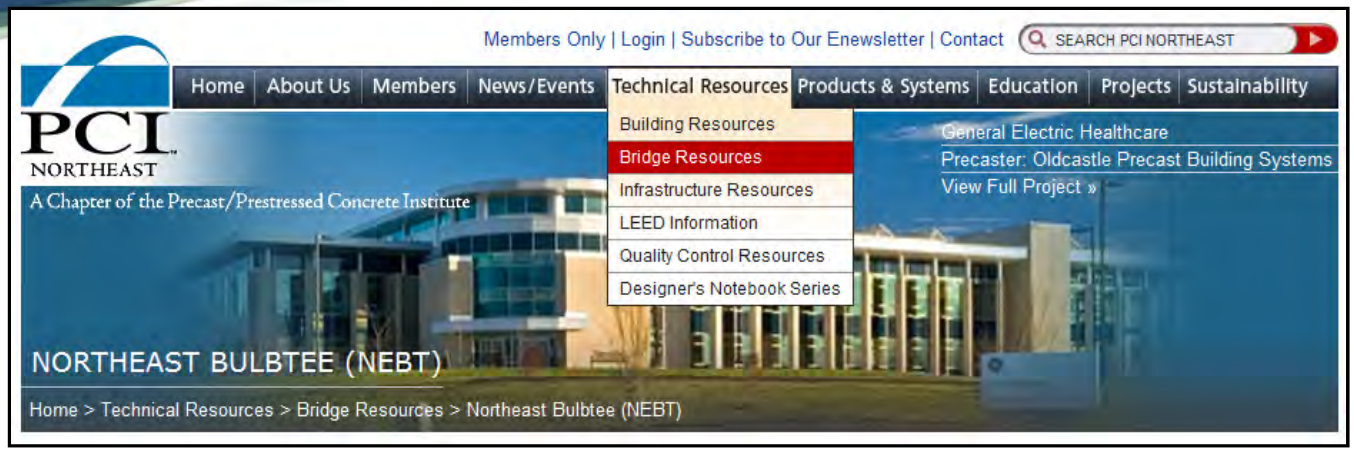
Webinar Training - Industry

- 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

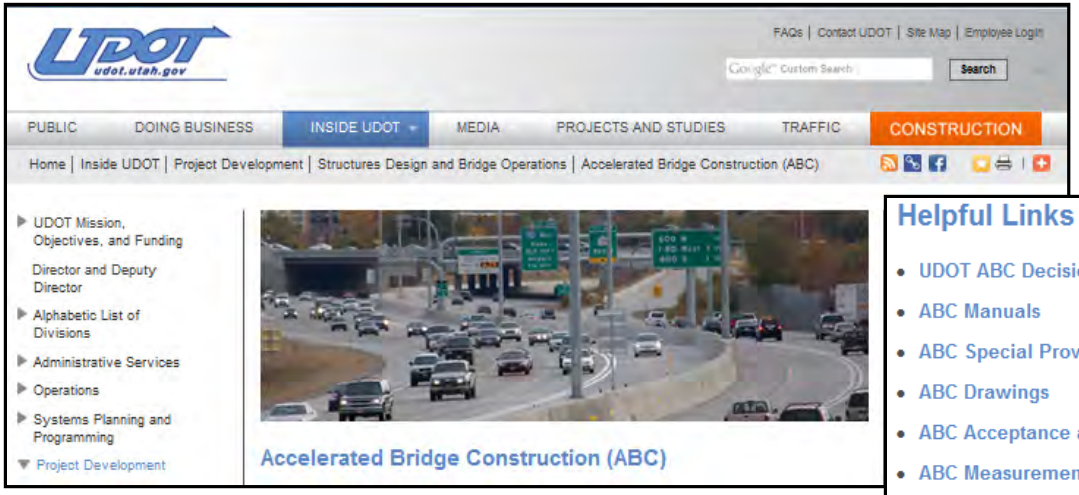


www.fhwa.dot.gov/everydaycounts/technology/bridges/pbeswebinartraining

Other Websites



www.pcine.org/



www.udot.utah.gov/

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

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:

-

-

-

-

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

ABC UTC

FIU FLORIDA INTERNATIONAL UNIVERSITY

IOWA STATE UNIVERSITY

University of Nevada, Reno

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

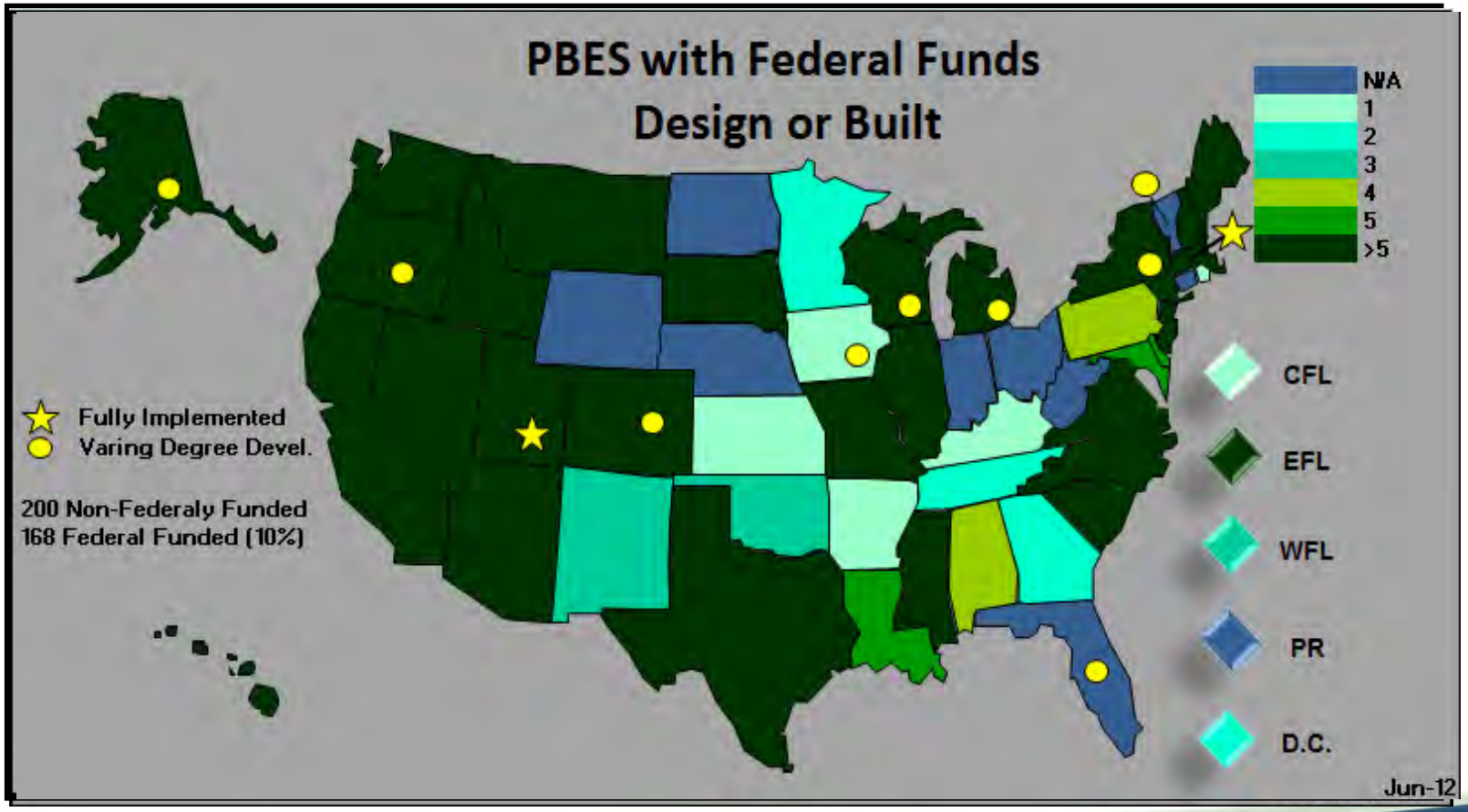
Lee Marsh, PE

www.abc.fiu.edu

National Perspective

What has been done?

850 bridge projects



Paradigm Shift
old practices

PBES:

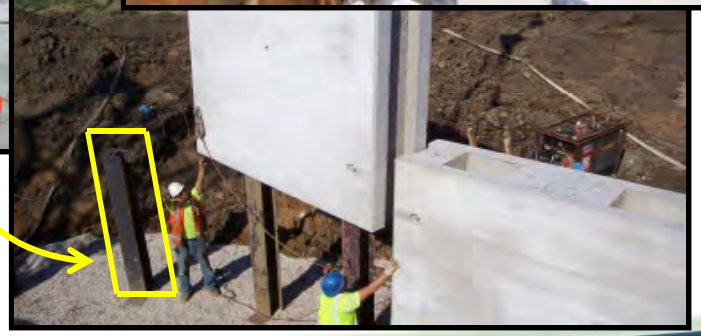
Pile Lagging

PBES:

Grouted Couplers

PBES:

Pile Pockets



Abutments

Drive the piles
Weld the temporary supports

Erect the modules on Piles

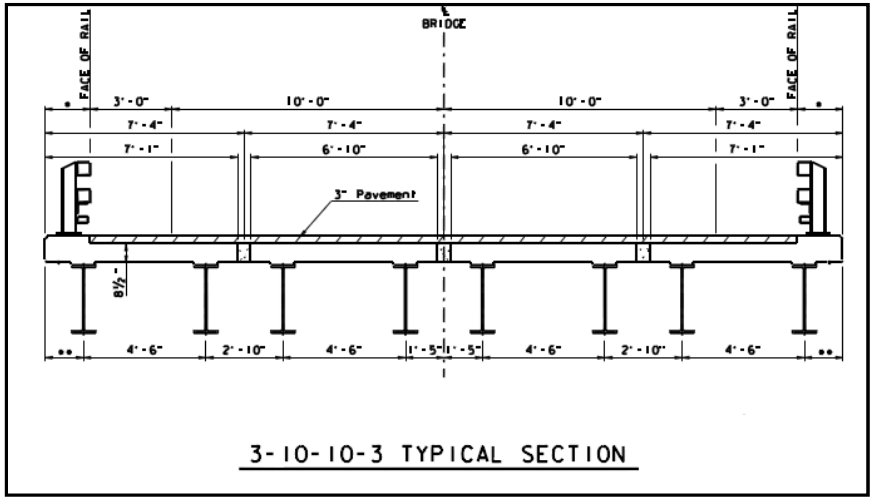
Abutments

Form the vertical joint – shear key

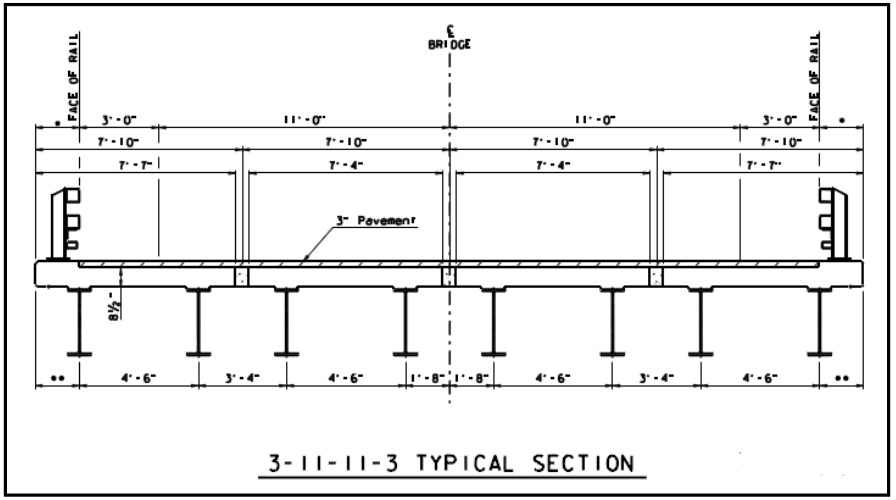
Grout the shear keys and pile block outs

Paradigm Shift
future strategies

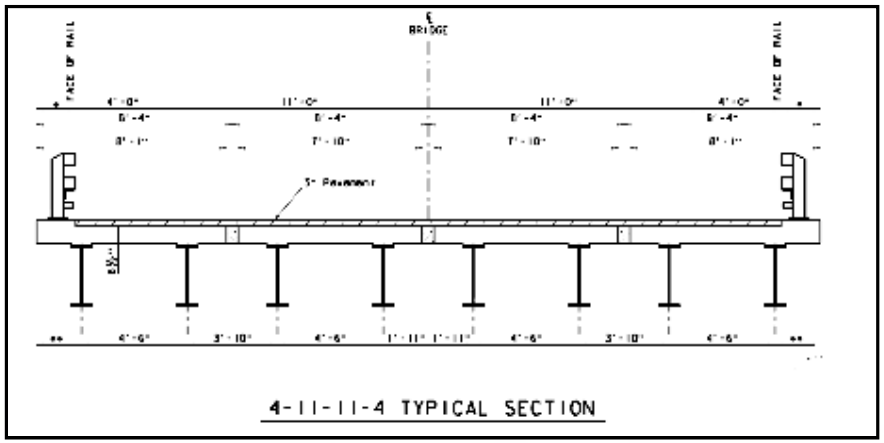
Paradigm Shift – standards



3-10-10-3 TYPICAL SECTION

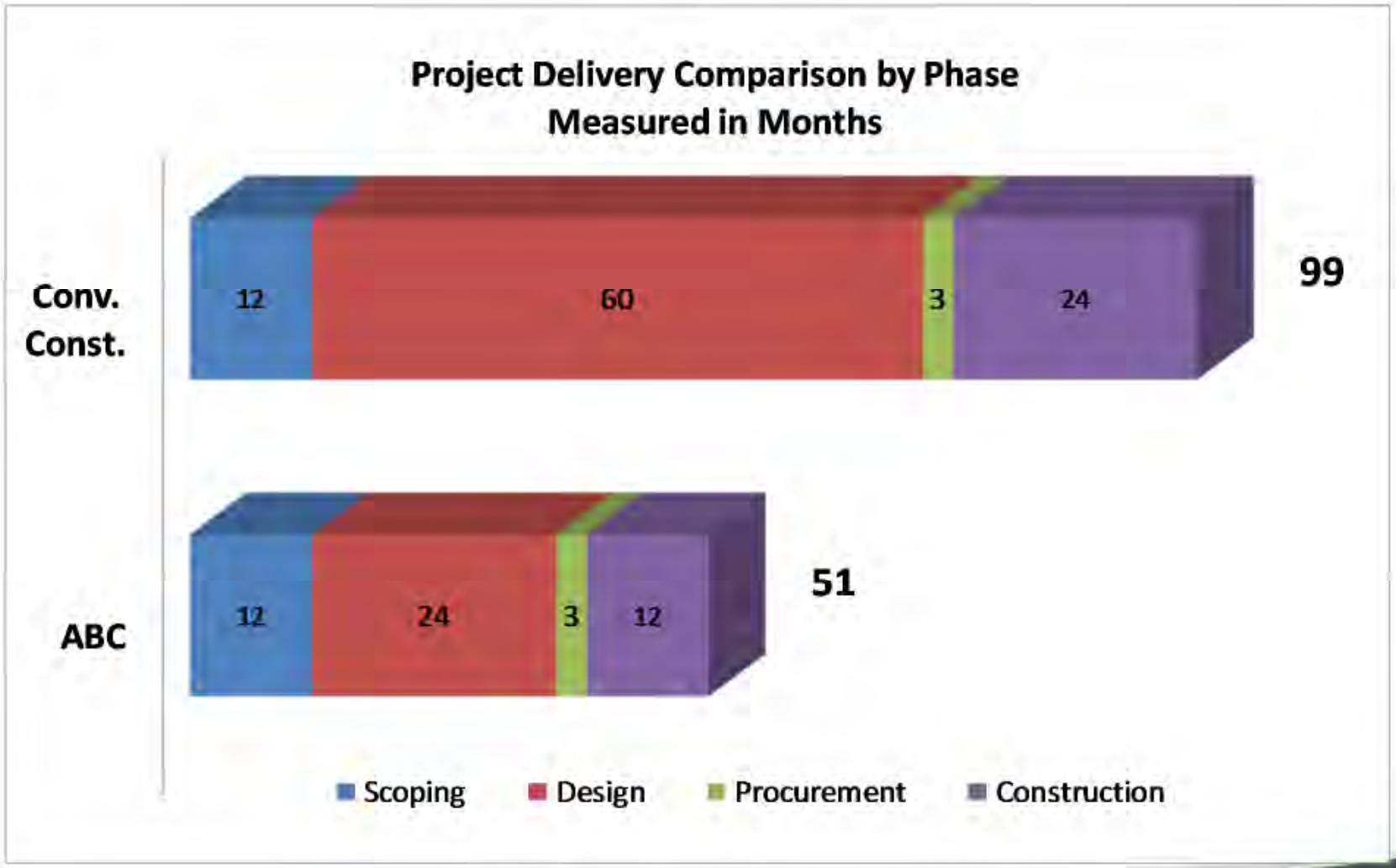


3-11-11-3 TYPICAL SECTION



4-11-11-4 TYPICAL SECTION

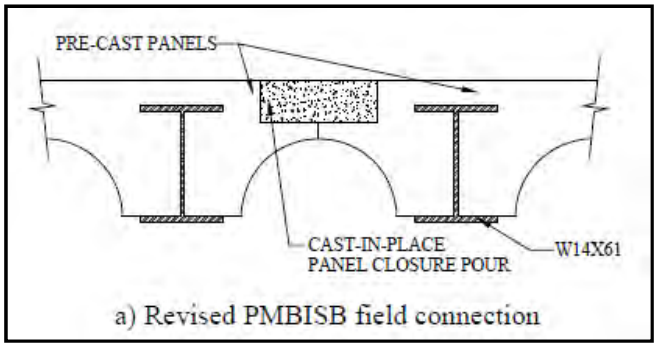
Other Reasons for PBES



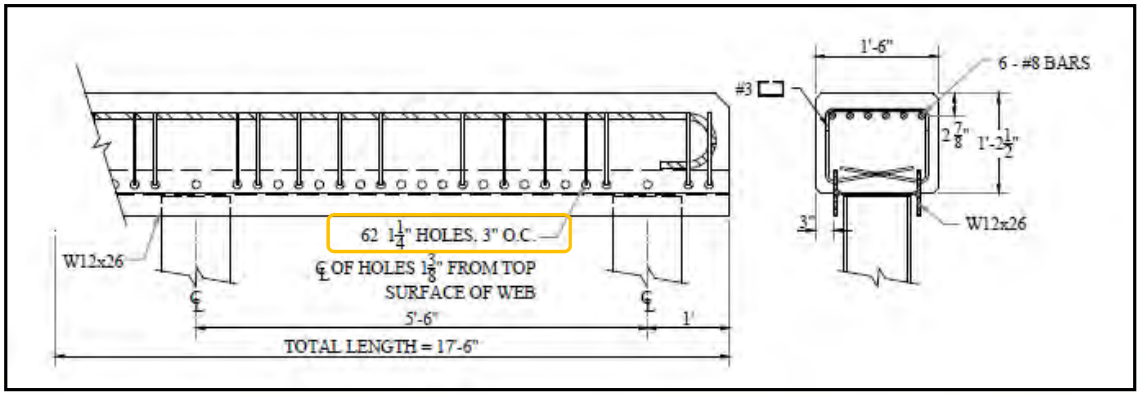
Opportunities for Improvement

Design Considerations

Opportunities for Improvement



a) Revised PMBISB field connection

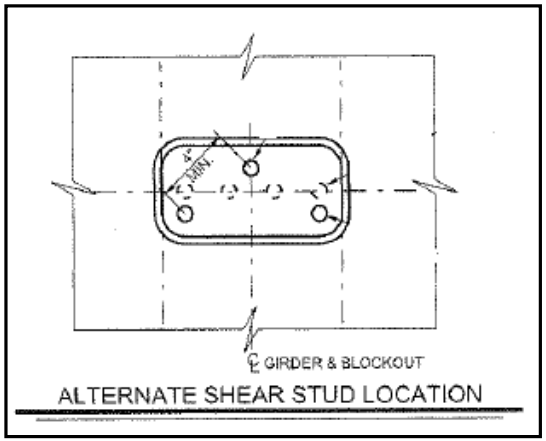


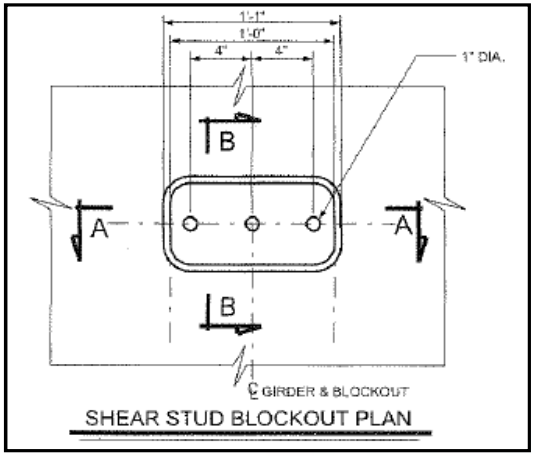
Profile: think about it

Try to get “top down”

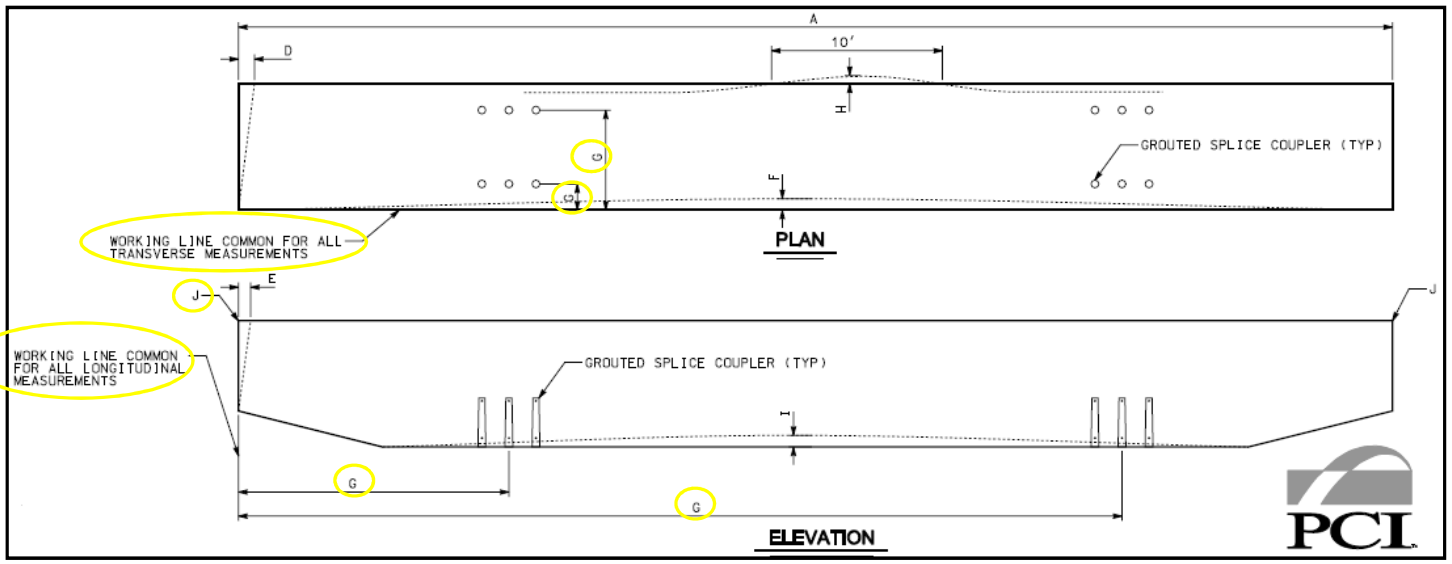
Clearances/Top Down

Detail with Tolerances in mind





Detail/Work off Common Line

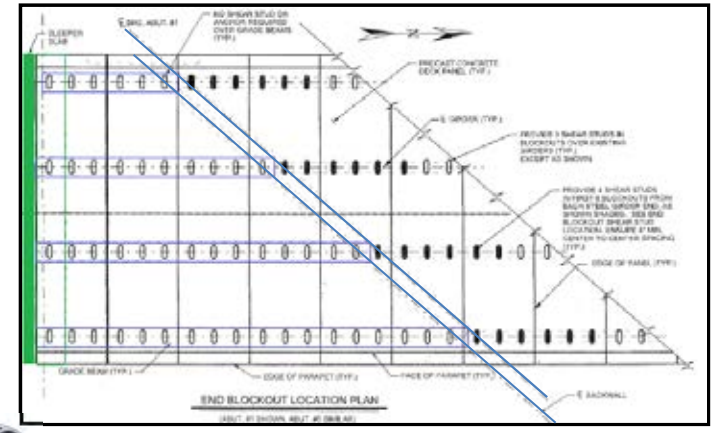


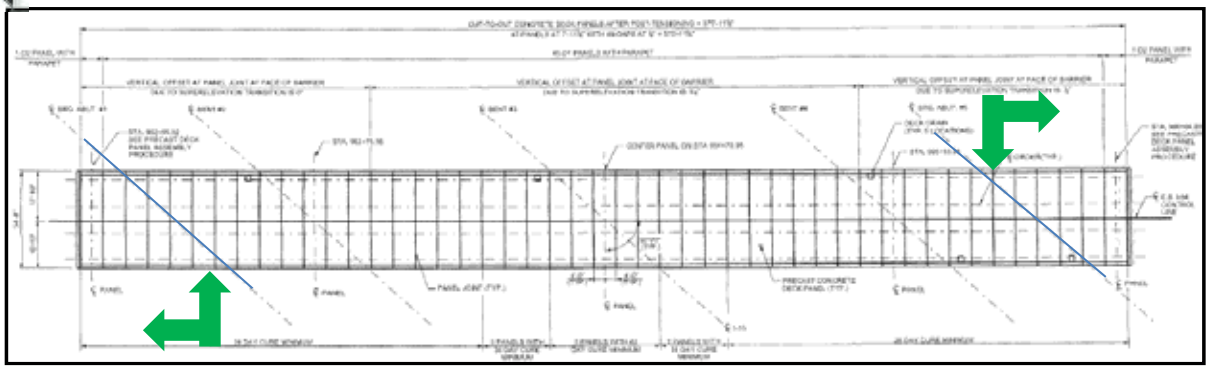
BENT CAP FABRICATION TOLERANCES

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" ± 3/8" ± 5/8"
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
I	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

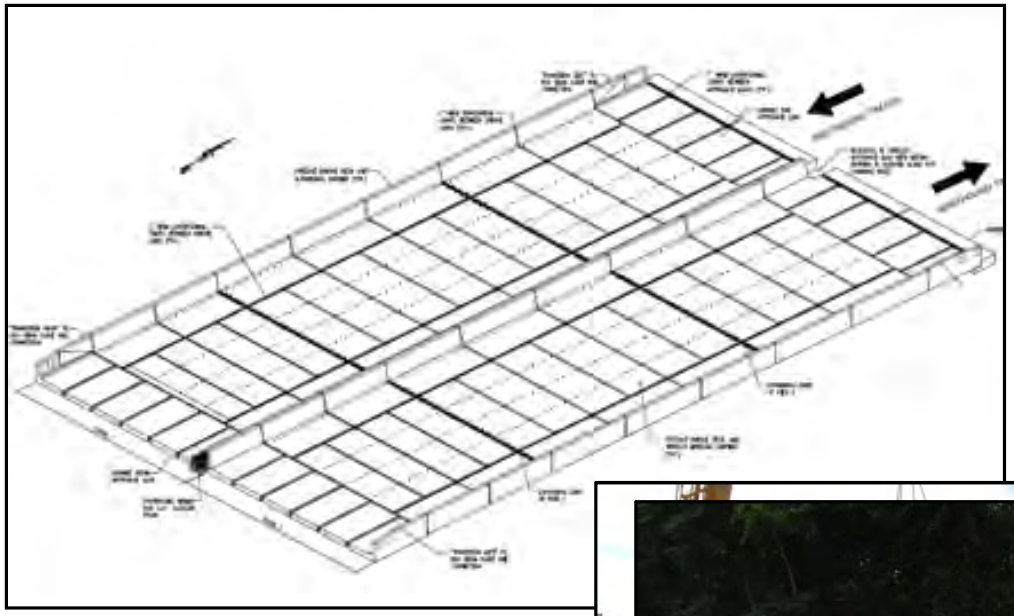
Clean Detailing/Repeatability



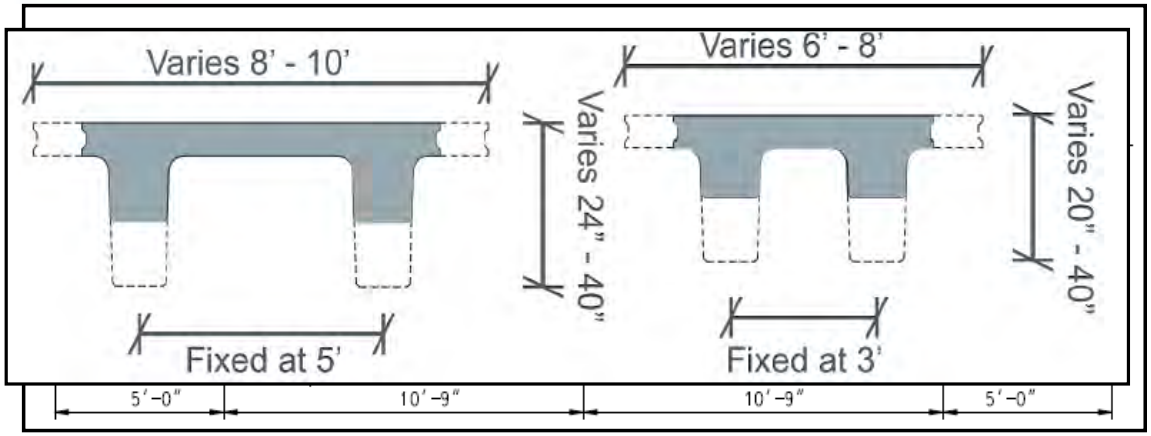


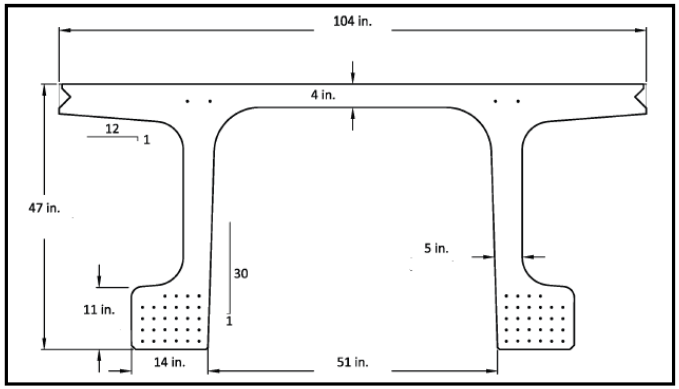

Innovation

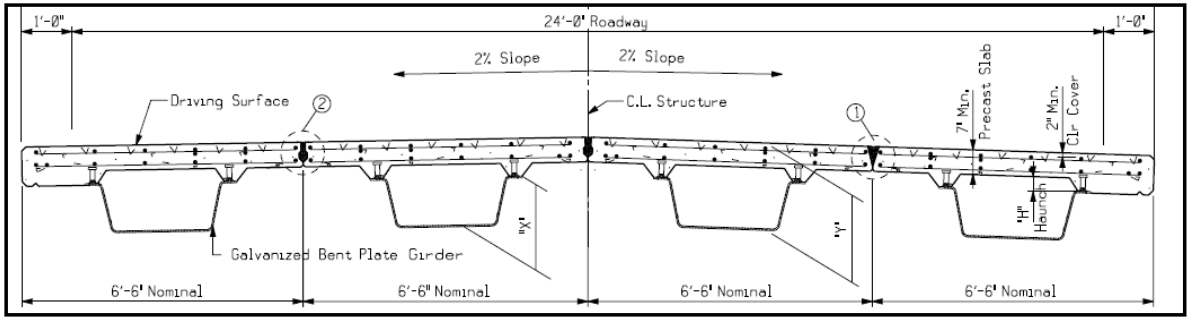
Deck Panels



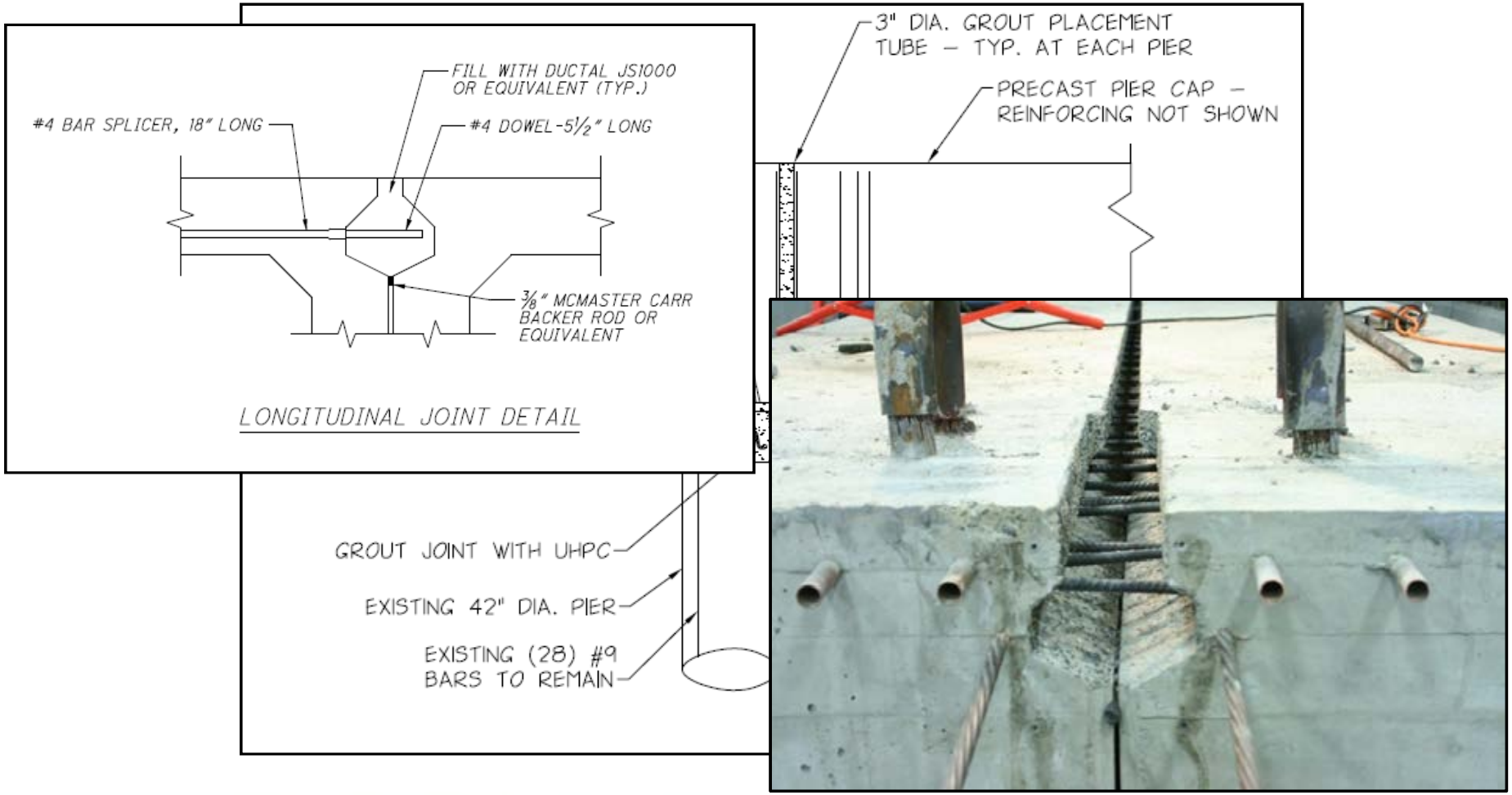
MDB Elements







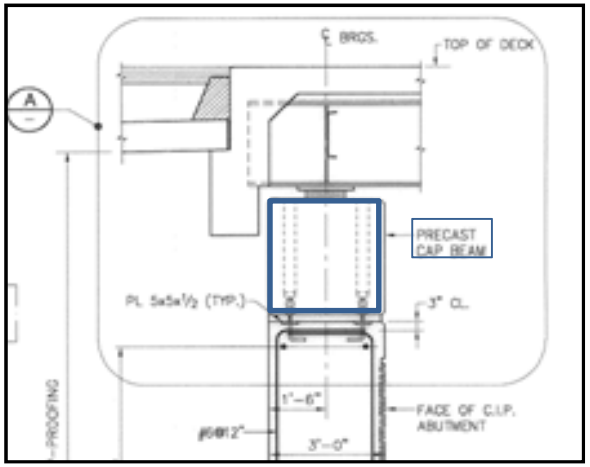
UHPC


FILL WITH DUCTAL JS1000 OR EQUIVALENT (TYP.)
#4 BAR SPLICER, 18" LONG
#4 DOWEL-5½" LONG
⅜" MCMASTER CARR BACKER ROD OR EQUIVALENT
LONGITUDINAL JOINT DETAIL
3" DIA. GROUT PLACEMENT TUBE – TYP. AT EACH PIER
PRECAST PIER CAP – REINFORCING NOT SHOWN
GROUT JOINT WITH UHPC
EXISTING 42" DIA. PIER
EXISTING (28) #9 BARS TO REMAIN

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.