



Innovative Bridge Designs for Rapid Replacement Using ABC/PBES

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SHRP2 ABC/PBES
Subject Matter Expert



U.S. Department of Transportation
Federal Highway Administration

AMERICAN ASSOCIATION
OF STATE HIGHWAY AND
TRANSPORTATION OFFICIALS

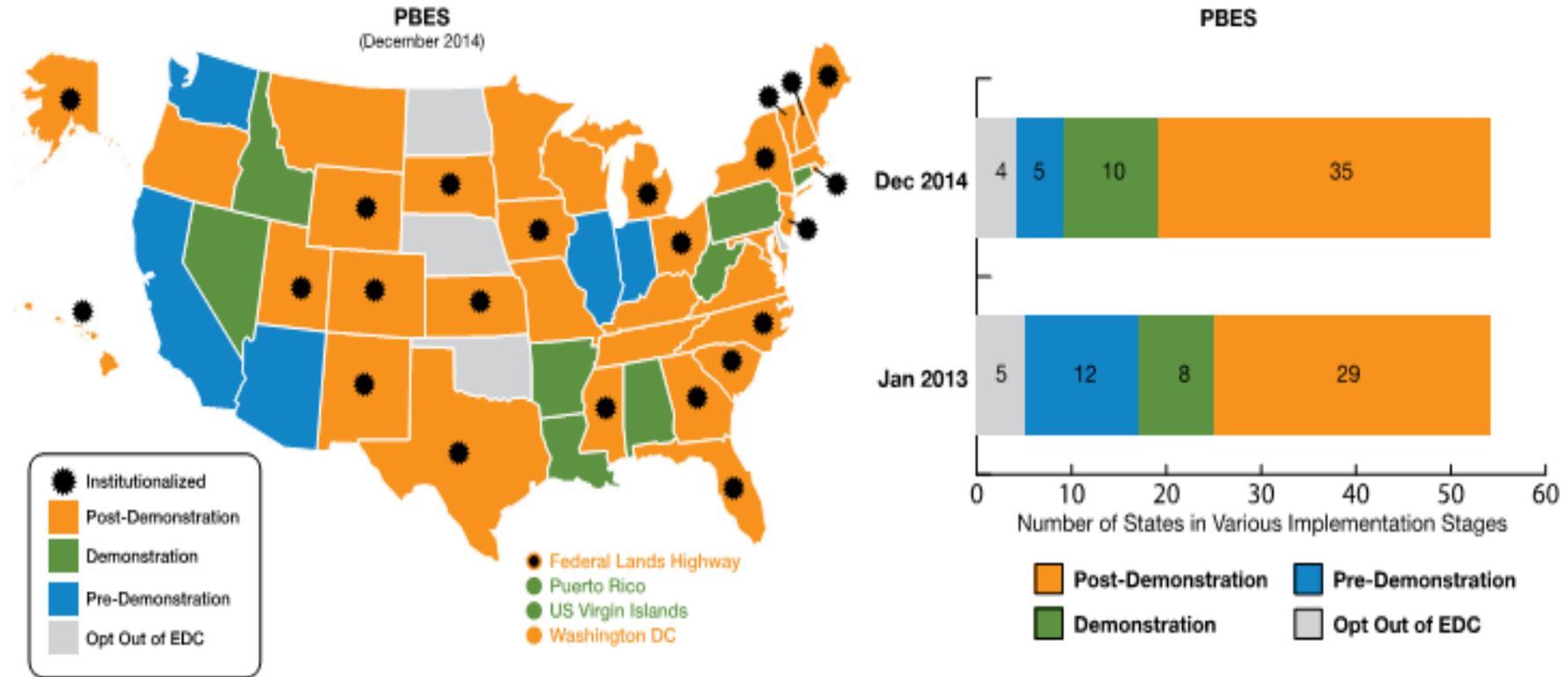
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Accelerated Bridge Construction (ABC)

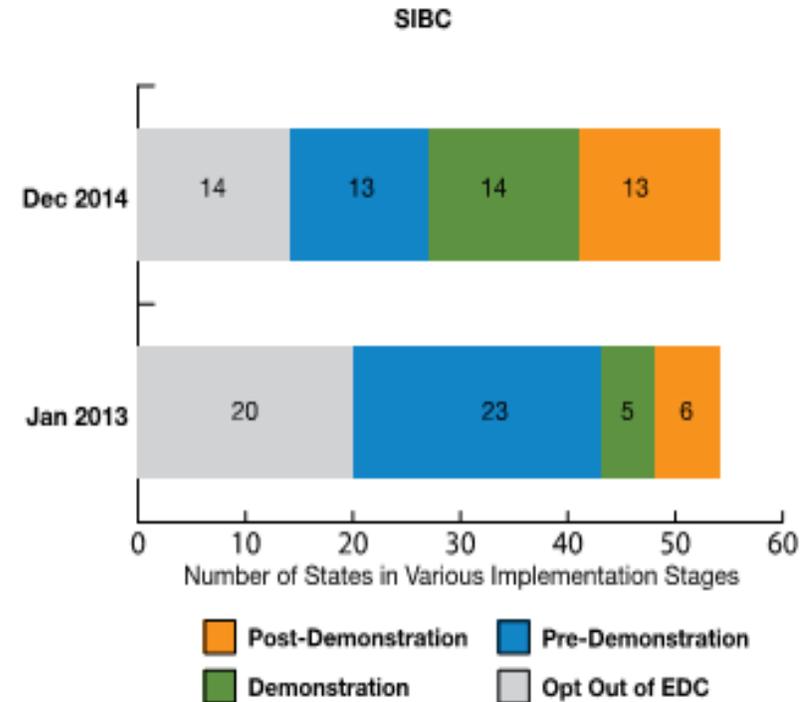
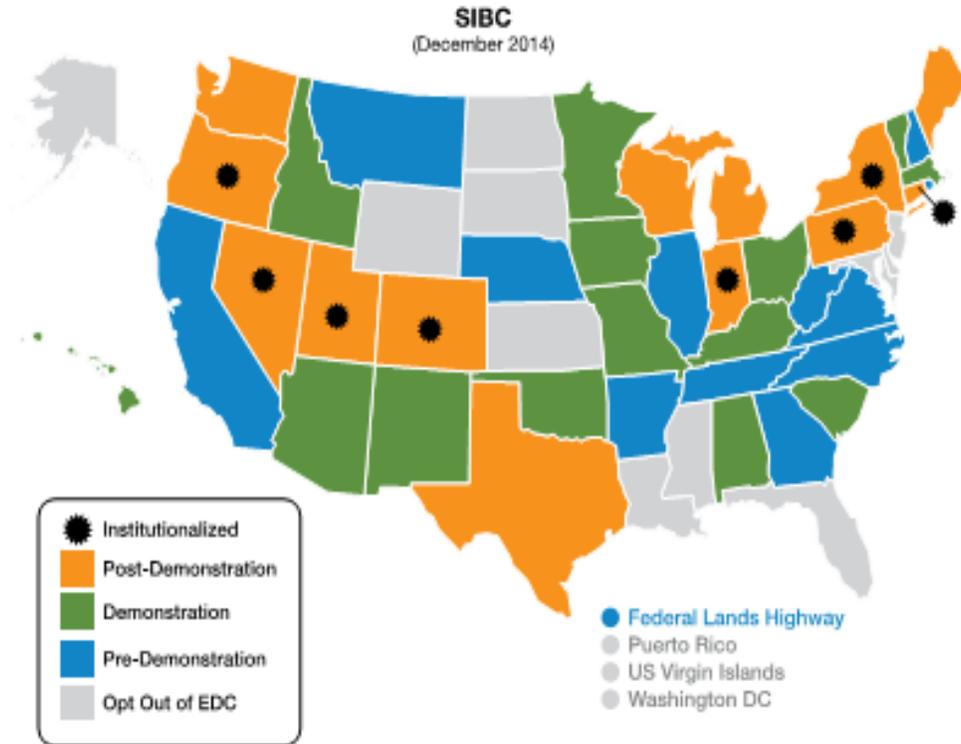
ABC – refers to technologies, contract mechanisms, design templates, and rapid-time savings in bridge construction

- Reduces construction time and minimizes traffic impacts
- Decreases safety risks by minimizing contractor exposure to traffic
- Increases local contractor involvement through standardized approaches
- Reduces environmental impacts
- Saves money and time

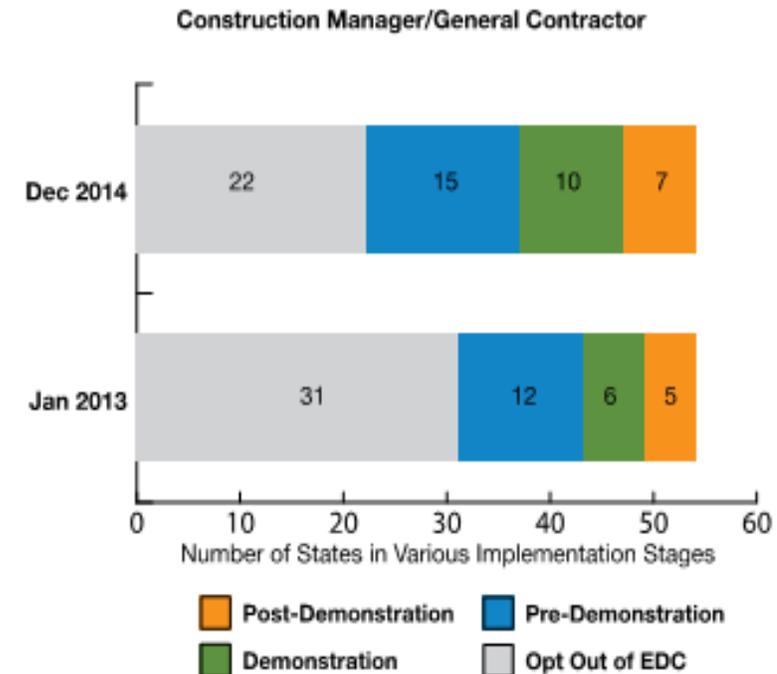
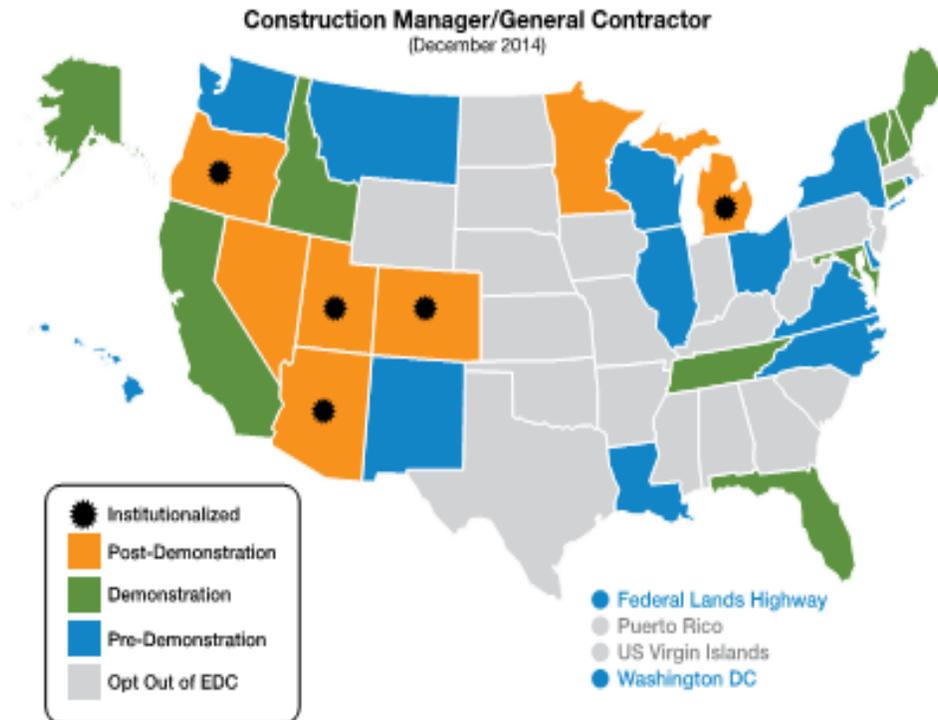
EDC-2, Prefabricated Bridge Elements and Systems



EDC-2, Slide-in Bridge Construction

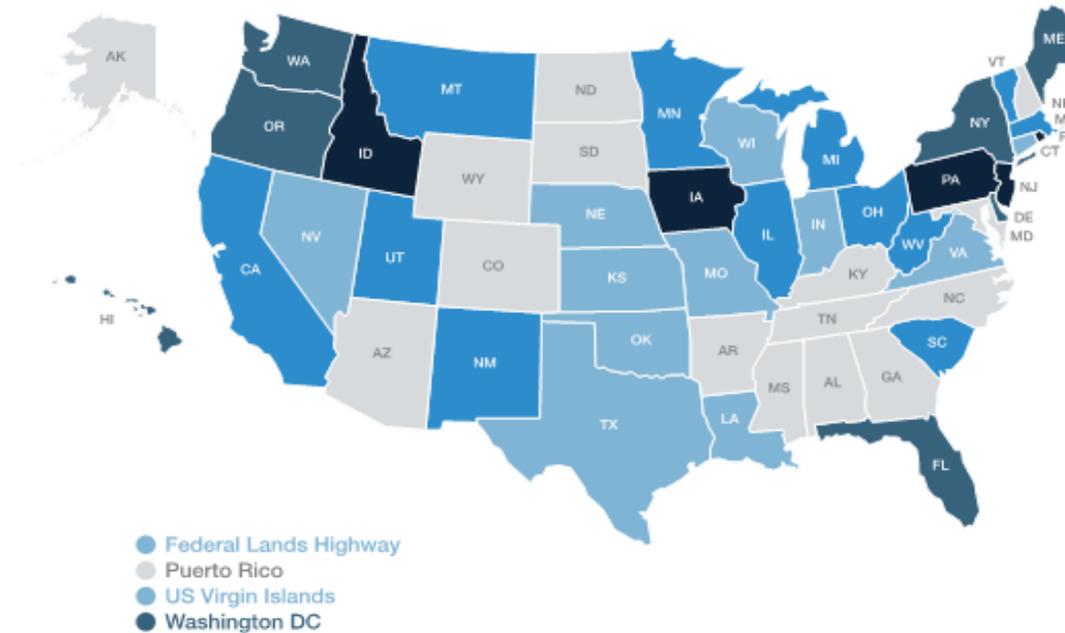


EDC-2, Construction Manager/ General Contractor

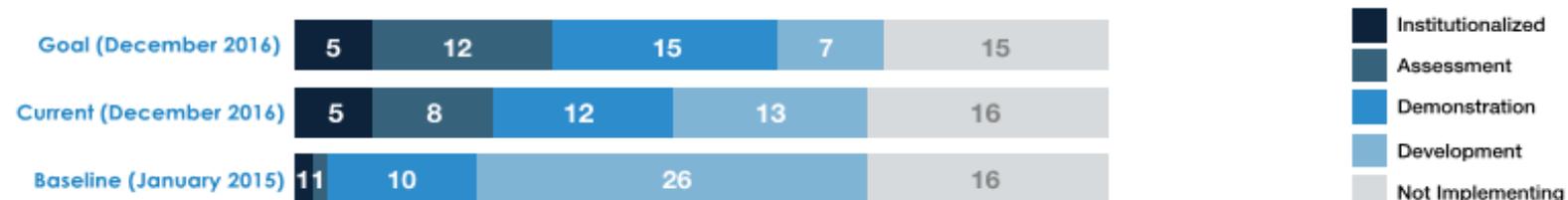


EDC-3, Ultra High Performance Connections

Current (December 2016)



Number of States in Various Implementation Stages



ABC Construction Methods

- Elements Assembled Onsite
- Slide In Bridge Construction (SIBC)
- Entire Super Structure moved in from a remote location (SPMT)
- Other methods?



Other Factors: ABC Significantly Decreases Construction Impacts

- During peak construction season:
 - ✓ 20% of highways are under construction
 - ✓ More than 3,000 work zones.
 - ✓ Active work zone in 1 out of every 100 miles
- More than 40,000 people are injured each year in crashes in work zones.
- One work zone fatality every 8 hours – 3 per day
- One work zone injury every 9 minutes – 160 per day



When to Use ABC



Planned Replacement



Emergency Replacement

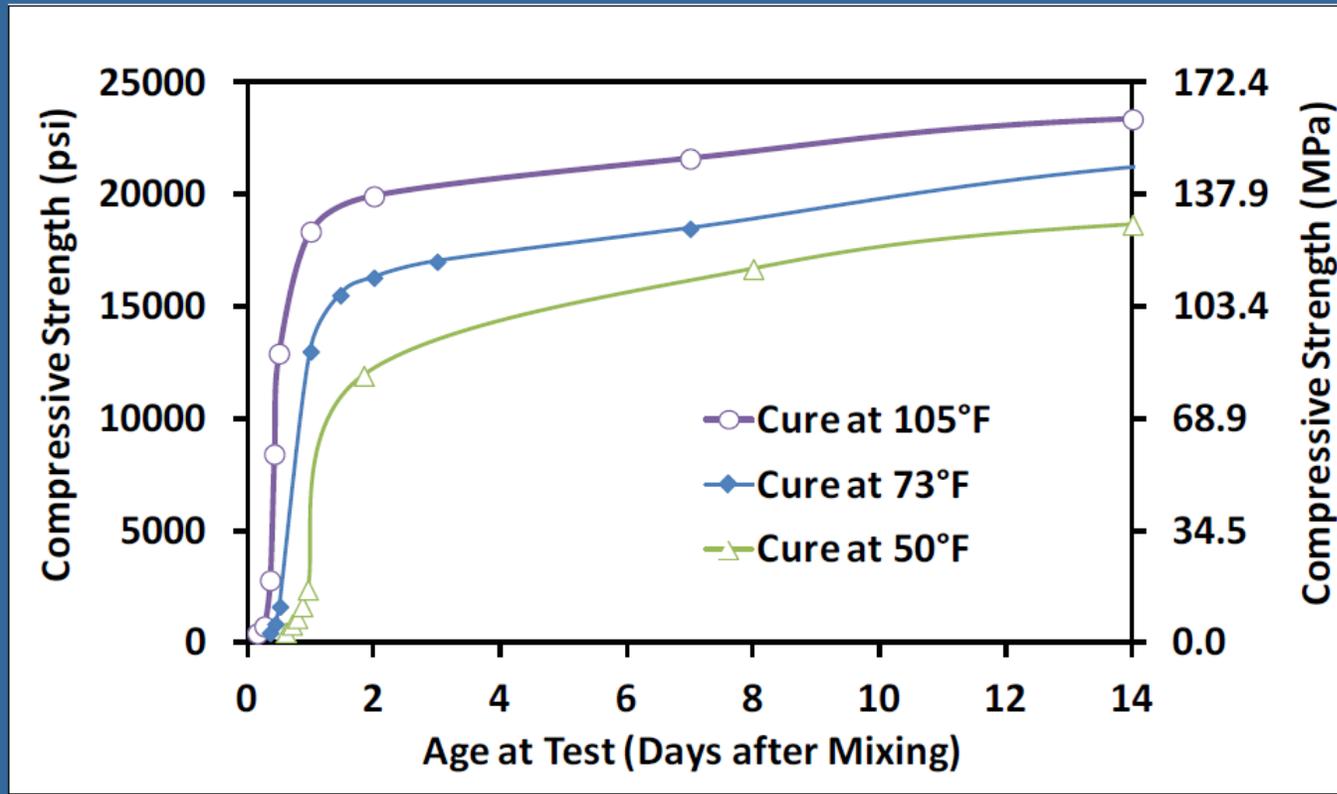
At right, I-10 spans on Lake Pontchartrain after Hurricane Katrina

How UHPC Fits into ABC

- Benefits
 - Strong joint, short lap lengths of rebar
 - Watertight
 - Chloride resistant
- Drawbacks
 - Expensive material
 - Specialty sub contractor?
 - Non-familiarity of contractor/owner

UHPC Strength Gain

Compressive Strength Gain



UHPC Mixing and Placement – NYSDOT Example



Example: Utah Bridge Farm



Utah I-80 Bridges,
State to 1300 East

Precast Piers



Gila River - Arizona



Gila River - Arizona



Gila River - Arizona



Gila River - Arizona



Seney National Wildlife Refuge, Michigan

- Federal Lands Highway applied R04 Toolkit to Seney National Wildlife Refuge PBES project
- Single lane, three-span continuous concrete box beam bridge
- Piers/abutments built with precast pile caps
- Placed a concrete overlay on top of boxes
- Concrete rails cast on to boxes before beam erection
- Prefabrication will limit impacts in an environmentally sensitive area

Seney National Wildlife Refuge, Michigan



Michigan



Seney National Wildlife Refuge, Michigan



Oregon DOT ABC Project



- Applying precast prestressed deck panels with UHPC joints
- US 30 Burnt River (UPRR) 2012

Oregon DOT ABC Project



US 30 Burnt River
(UPRR)

California R04 Project



Fort Goff Creek
Bridge



Nevada PBES/ABC Projects



B-1942 Tuscarora



Bridge Replacements

- Performance Specs
- Prefabricated Bridge Rail/Headwalls/Wingwalls
- Structure Placed in 1 Day

Nevada PBES/ABC Projects



10 Mile Summit



HD Summit



Safety Crossings

- Performance Specs
- Temporary Road Closures

Georgia ABC Project



Precast Bents
KIA Boulevard over I-85
Troup County, Georgia

Georgia DOT Precast Substructure

For More Information

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The screenshot shows the SHRP2 Solutions website homepage. The header includes the SHRP2 logo and navigation links for FHWA, AASHTO, and TRB. The main content area features a large banner with the text "Save lives. Save money. Save time." and a description of the SHRP2 program. Below the banner, there are several featured articles and sections. A red star and a red box highlight the "IMPLEMENTATION ASSISTANCE" article, which is titled "Announcing Round 4 recipients and Round 5 products." The footer contains links for "SHRP2 Nationwide", "Talking About SHRP2", "Tools You Can Use", and "Resources".

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