

Accelerated Bridge Construction



August 23, 2011

*An Overview of
Methods and Projects*

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Baker

What is Accelerated Bridge Construction (ABC)?

- Designing and Detailing Bridge to be Constructed and Assembled Quickly
- Short Closures
- Innovative Phasing



What is Accelerated Bridge Construction (ABC)?

- Range of Impacts
 - Minimize lane closure times with innovative phasing and accelerated construction
 - Accelerate construction of entire bridge using pre-fabricated elements
 - Extremely quick replacements over weekend or night closures using total superstructure replacement techniques

What is Accelerated Bridge Construction (ABC)?

- How to Implement
 - Prescriptive procedures
 - Performance Based Specifications
(Maintenance of Traffic (MOT) limitations)

- Pre-Cast Prefabricated Elements
- Transverse Sliding
- Jacking
- Launching
- Self-Propelled Modular Transport (SPMT)

ABC Tools



ABC Tools

Pre-Cast,
Prefabricated Elements



ABC Tools Transverse Sliding



ABC Tools Jacking



ABC Tools Launching



ABC Tools

Self-Propelled Modular Transport (SPMT)



Why Use ABC?

- User Impacts
 - Minimize personal & commercial business time stuck in traffic
 - Justified with consistent approach to looking at user costs
- Increased Safety
 - Workers not working over live traffic or closer to ground level
- Political Clout
 - Public satisfaction surveys – high approval ratings
 - Serving the Client – Public feels you are looking out for them
 - Backing from Legislature – Public willing to spend money

Project Examples

- 4500 South over I-215, Salt Lake City, Utah (2007)
- Riverdale Road over I-84, Riverdale, Utah (2008)
- Payson Deck Replacements, Payson, Utah (2009)
- I-80 Over Echo Dam Road, Utah (2009)
- I-80 Bridges over 2300 East, Salt Lake City, Utah (2009)
- I-15 South Layton Interchange, Layton, Utah (2010)
- I-15 CORE, Utah Co., Utah (2011)

4500 South over I-215 (2007) Accelerated Bridge Construction Using



4500 South over I-215 (2007)

Accelerated Bridge Construction Using SPMTs



- Bridge needed immediate replacement due to rapid deterioration of bridge supports

- New bridge was constructed adjacent to the structure

- New bridge was moved using SPMTs during one weekend closure



4500 South over I-215 (2007)

Accelerated Bridge Construction Using SPMTs



4500 South over I-215 (2007)

Accelerated Bridge Construction Using SPMTs

- Existing Bridge Spans were Removed using SPMTs



4500 South over I-215 (2007)

Accelerated Bridge Construction Using SPMTs



4500 South over I-215 (2007)

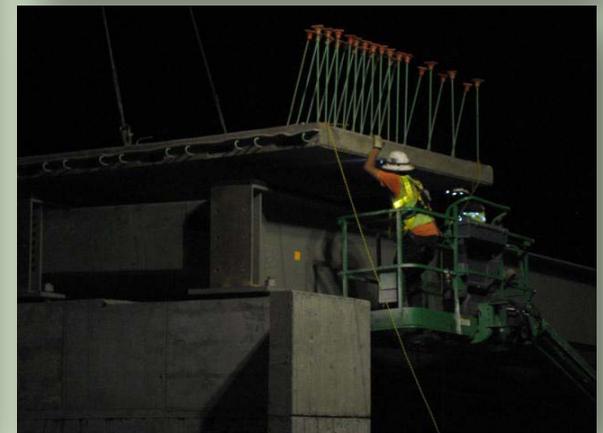
Accelerated Bridge Construction Using SPMTs

- Self-compacting Backfill used to accommodate tight work area



Riverdale Road over I-84 (2008)

Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements



Riverdale Road over I-84 (2008)

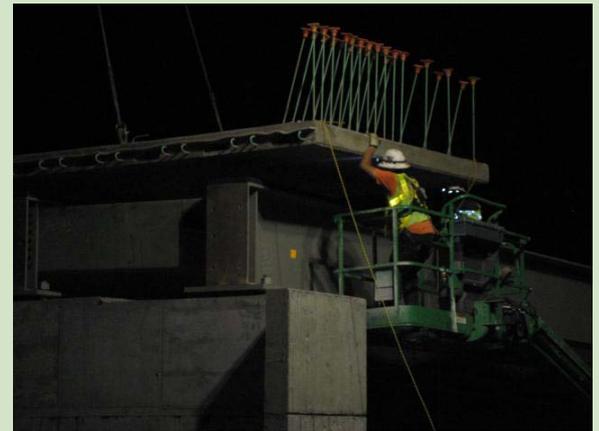
Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements



- 90% Precast Elements
- Innovative non-composite deck
- Innovative strategy for phasing

Riverdale Road over I-84 (2008)

Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements



Riverdale Road over I-84 (2008)

Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements



- Match-cast elements at on-site casting yard

Riverdale Road over I-84 (2008)

Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements



Riverdale Road over I-84 (2008)

Accelerated Bridge Construction Using Pre-Cast and Pre-Fabricated Elements

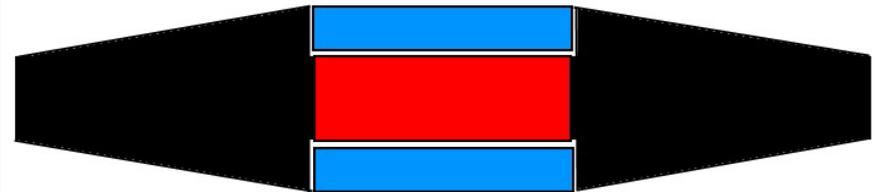
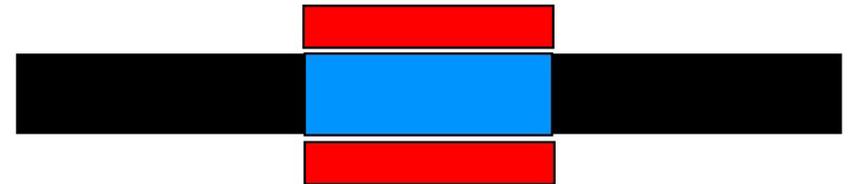


- Non-composite deck panels
- Longitudinally post-tensioned

Riverdale Road over I-84 (2008)

ABC Strategy for Phasing

- *Phase I*
Construct Outside Bridge Quarters
- *Phase II*
Move Traffic to Outside, Construct Inside 2 Quarters
- *Phase III*
Tie Phases Together and Open Entire Bridge



Payson Deck Replacements (2009)

Accelerated Bridge Construction Using Pre-Cast, Pre-Fabricated Elements



- Accelerated Phasing
- Longitudinally post-tensioned
- Pre-Demo Work

I-80 Over Echo Dam Road, Utah (2010) Accelerated Bridge Construction Using Transverse Sliding



I-80 Over Echo Dam Road, Utah (2010)

Accelerated Bridge Construction Using Transverse Sliding

- Replacement of EB & WB I-80 over Echo Rd.
- Bridges replaced using horizontal skidding of the new bridge superstructures onto new abutments constructed under existing bridges
- Substructure constructed under existing bridge while it remained in service
- Final bridge placement in 7 hours
- Overnight detour on the ramps during slide



I-80 Over Echo Dam Road, Utah (2010) Accelerated Bridge Construction Using Transverse Sliding



I-80 Over Echo Dam Road, Utah (2010)

Accelerated Bridge Construction Using Transverse Sliding



- Abutments and approach slabs on temporary supports
- Bridge slid on to new abutments and sleeper slabs

I-80 Over Echo Dam Road, Utah (2010) Accelerated Bridge Construction Using Transverse Sliding



I-80 Over Echo Dam Road, Utah (2010)

Accelerated Bridge Construction Using Transverse Sliding



- Daytime closures allowed on cross street
- Approach slabs construction with bridge

I-80 Bridges over 2300 East, Salt Lake City, Utah (2009)

Accelerated Bridge Construction Using Transverse Sliding



I-80 Bridges over 2300 East, Salt Lake City, Utah (2010)

Accelerated Bridge Construction Using Transverse Sliding



- Replacement of EB & WB I-80 Bridges
- Similar method as Echo Bridges
- Vertical Clearance challenge required bridge jacking

I-80 Bridges over 2300 East, Salt Lake City, Utah (2010)

Accelerated Bridge Construction Using Transverse Sliding



I-15 South Layton Interchange (2010) Accelerated Bridge Construction Using Jacking/Launching



I-15 South Layton Interchange (2010)

Accelerated Bridge Construction Using Jacking/Launching

- Single-point urban interchange (SPUI) over I-15
- Constructed each span on temporary steel frame supports above 12 feet of surcharge on approach embankments
- Surcharge was excavated from beneath the spans and they were lowered on to rail system
- Two temporary bents used during launch process and then removed
- Each bridge span was moved within 6-hour nighttime closures



I-15 South Layton Interchange (2010) Accelerated Bridge Construction Using Jacking/Launching



I-15 South Layton Interchange (2010)

Accelerated Bridge Construction Using Jacking/Launching



- Bridge constructed on temporary supports
- Surcharge removed underneath
- Jacked down onto slide rails

I-15 South Layton Interchange (2010) Accelerated Bridge Construction Using Jacking/Launching



I-15 South Layton Interchange (2010)

Accelerated Bridge Construction Using Jacking/Launching



- Span launched out over I-15 during night closure
- Two temporary bents used for support during launch

I-15 South Layton Interchange (2010) Accelerated Bridge Construction Using Jacking/Launching



I-15 CORE, Sam White Bridge (2011)

Accelerated Bridge Construction Using Jacking/Launching

- First two-span bridge moved in N. America
- 1 Night closure
- 4 SPMT rows





Questions?

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