






Performance of ABC Bridges in Utah

Carmen Swanwick, SE
UDOT Chief Structural Engineer
cswanwick@utah.gov
http://tinyurl.com/UDOTLL

udot.utah.gov

Project specific lessons learned

Hoytsville Rd. over I-80 (Wanship)

- Deck replacement
- Prefabricated precast concrete deck panels with closure pours
- Limitation of operations

Hoytsville Rd. over I-80 (Wanship)

Areas for improvement

- Design
  - Lifting leveling devices
  - Demolition
  - Closure pours
- Construction
  - Limitations of operations
  - Manpower requirements


OVERSIZED LOAD

I-215 over 3760 South

- Bridge replacement
- Prefabricated superstructure
- Post-tensioned transversely
- Cast-in-place substructure
- Built beneath existing bridge

I-215 over 3760 South

Areas for improvement

- Design
  - Match cast
  - Two girder sections
  - Post-tensioned transversely
- Construction
  - Crane capacity
  - Keyed connection
  - Staging area
  - Specifications/communication
  - On-site inspection

I-215 over 3900 South

- Deck replacement
- Prefabricated precast concrete deck panels
- Post-tensioned longitudinally
- Grouted key joint connection

I-215 over 3900 South

Areas for improvement

- Design
  - Leveling sequence
  - Demolition
- Construction
  - Blockout material
  - Shear stud removal
  - Shear stud placement


Baker

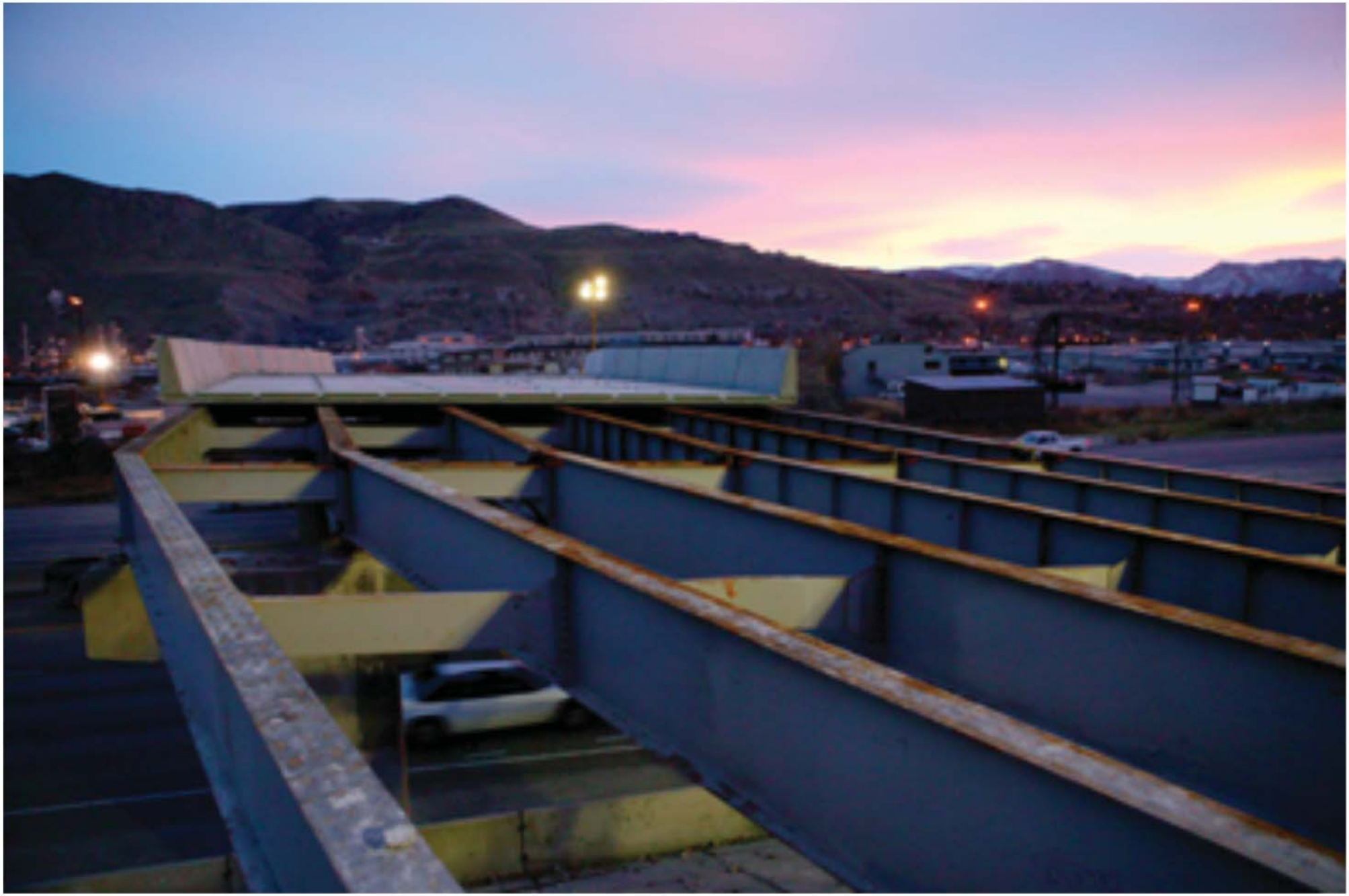
4500 South over I-215

- Bridge replacement
- SPMT bridge placement

4500 South over I-215

Areas for improvement

- Contracting Process
  - Define roles and responsibilities clearly
  - Provide adequate design time
  - Develop a method for improving construction cost estimates
- Design
  - Define the design direction up front
  - Plan for more design time (temporary works)
  - Coordinate with the contractors early
- Construction
  - Schedule adequate time for construction activities
  - Develop a more detailed plan for construction activities
  - Develop a checklist for items to evaluate during construction



800 North over I-15

- Deck replacement
- Prefabricated precast concrete deck panels with integral parapets
- Grouted key joint connection

800 North over I-15

Areas for improvement

- Contracting Process
  - Define roles and responsibilities clearly
  - Provide adequate design time
  - Develop a method for improving construction cost estimates
- Design
  - Lifting leveling devices
  - Demolition
  - Closure pours
- Construction
  - Limitations of operations
  - Manpower requirements

Program perspective

Goals of the investigation

1. Document the performance of past ABC details
2. Determine causes of substandard performance
3. Estimate the remaining life-span of the details studied
4. Estimate future maintenance needs for each bridge
5. Determine if modifications to current ABC practice is required
6. Determine if programmatic changes to UDOT procedures are required

Reports

Performance of ABC Projects in Utah [May]

2009

Performance of ABC Projects in Utah [Jun]

2010

Performance of ABC Projects in Utah [Sep]

2011

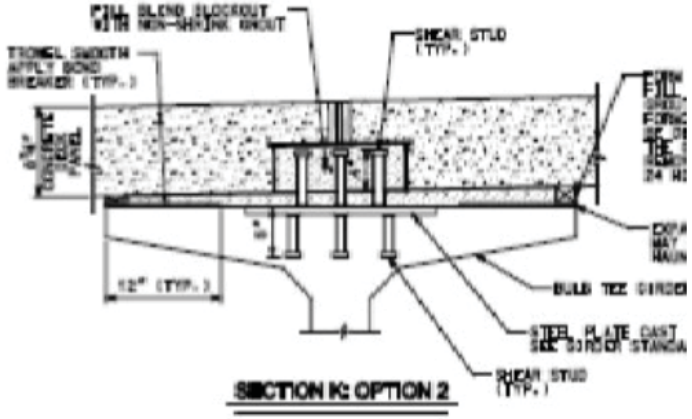
2012

Performance of ABC Projects in Utah [Oct]

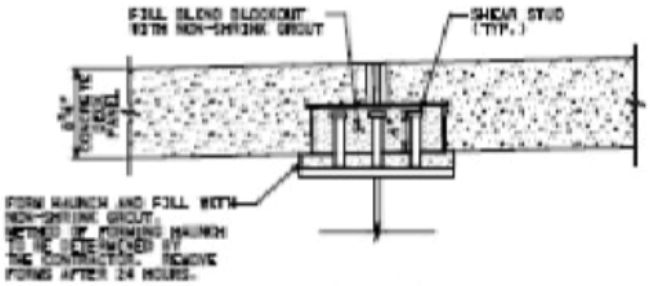
2013

Performance

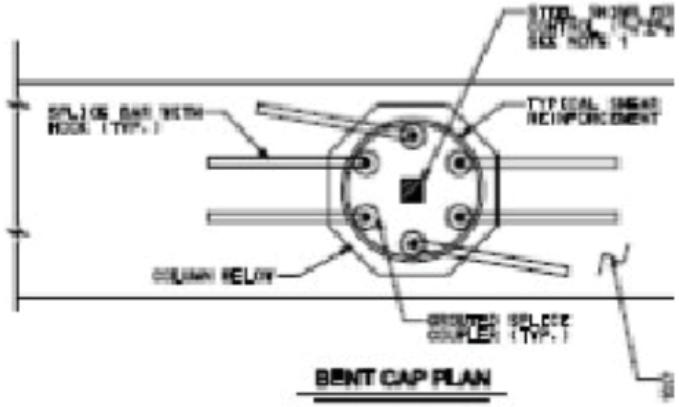
- Possible cause of problems
- Estimated life span of the detail
- Anticipated future maintenance

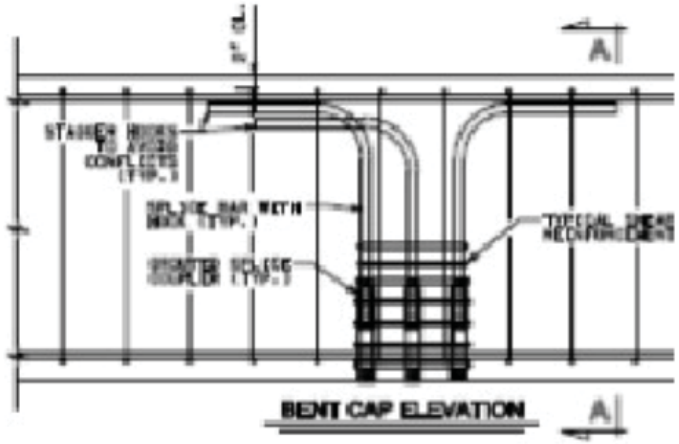


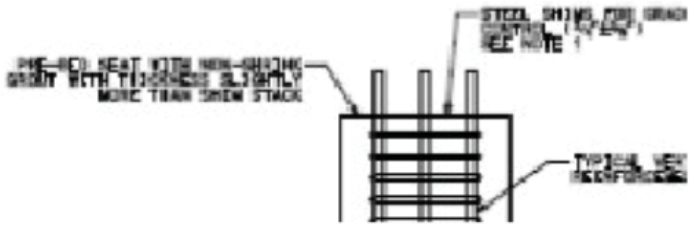
SECTION K: OPTION 2



SECTION M


BENT CAP PLAN


BENT CAP ELEVATION



Report Overview - May 2009

- 20 bridges
- Precast full depth concrete deck panels
- Precast abutment bridges
- Bridges installed with SPMT's

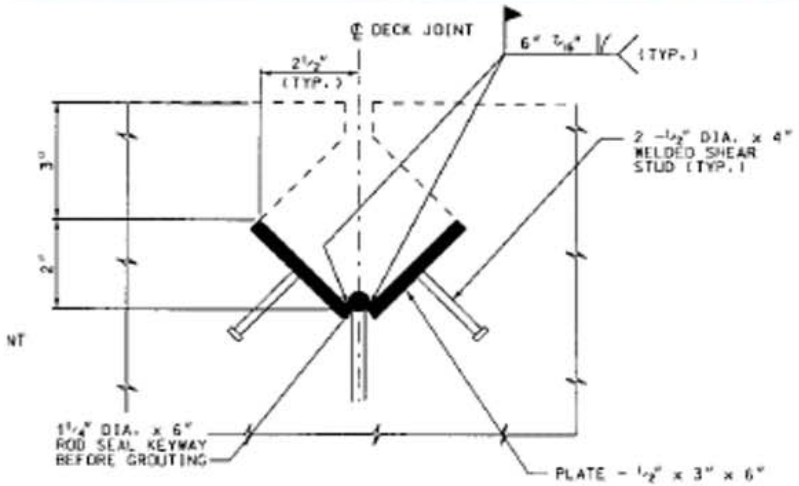
Performance of ABC Projects in Utah [May]

2009

Details

- Full depth deck panel transverse connections with welded tie plates
- Full depth deck panel transverse connections with longitudinal post-tensioning
- Full depth precast concrete deck panels shear connector pockets
- Concrete closure pours
- Precast concrete abutments with vertical thread-bar connections
- Precast concrete bents
- Self Propelled Modular Transporter (SPMT) bridge moves
- Thin bonded polymer overlay

Full Depth Deck Panel Transverse Connections with Welded Tie Plates



WELD TIE DETAIL

Full Depth Deck Panel Transverse Connections with Longitudinal Post-Tensioning

Full Depth Precast Concrete Deck Panels Shear Connector Pockets

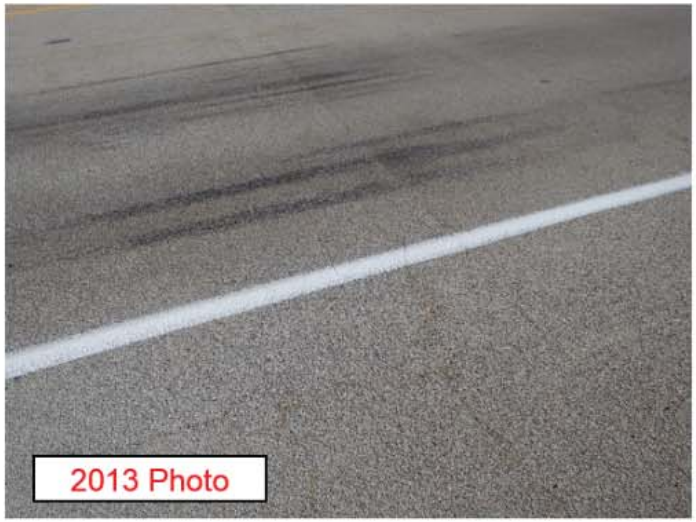
Concrete Closure Pours

Precast Concrete Abutments with Vertical Thread-bar Connections

Precast Concrete Bents

Self Propelled Modular Transporter (SPMT) Bridge Moves

Thin Bonded Polymer Overlay



Reports

Performance of ABC Projects in Utah [May]

2009

Performance of ABC Projects in Utah [Jun]

2010

Performance of ABC Projects in Utah [Sep]

2011

2012

Performance of ABC Projects in Utah [Oct]

2013

Report Overview - June 2010

- 34 bridges
- Precast full depth concrete deck panels
- Precast abutment bridges
- Bridges installed with SPMT's
- Lateral slide-in technologies

Performance of ABC Projects in Utah [Jun]

2010

Details

- Full depth deck panel transverse connections with welded tie plates
- Full depth deck panel transverse connections with longitudinal post-tensioning
- Full depth precast concrete deck panels shear connector pockets
- Concrete closure pours
- Precast concrete abutments with vertical thread-bar connections
- Precast concrete bents
- Self Propelled Modular Transporter (SPMT) bridge moves
- Thin bonded polymer overlay
- Precast concrete approach slab connection to deck
- Lateral slide-in bridge moves

Precast Concrete Approach Slab Connection to Deck

Lateral Slide-in Bridge Moves

Reports

Performance of ABC Projects in Utah [May]

2009

Performance of ABC Projects in Utah [Jun]

2010

Performance of ABC Projects in Utah [Sep]

2011

2012

Performance of ABC Projects in Utah [Oct]

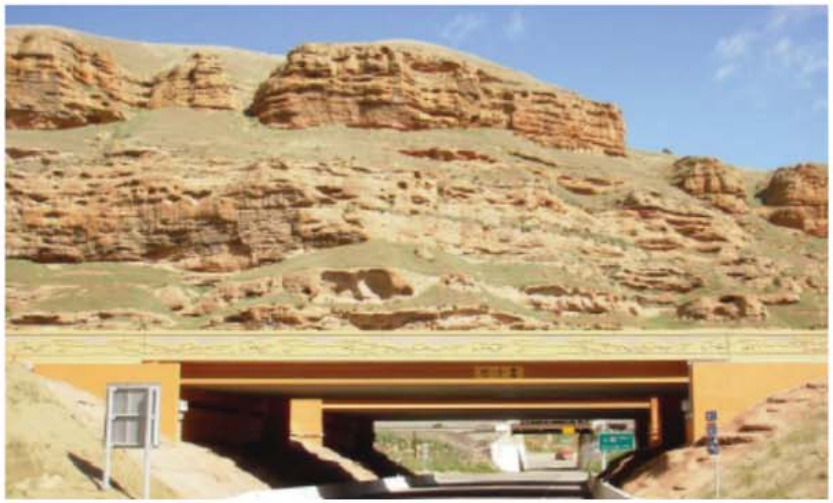
2013

Report Overview - September 2011

- 48 bridges
- Precast full depth concrete deck panels
- Precast abutment bridges
- Bridges installed with SPMT's
- Lateral slide-in technologies
- Longitudinal launch

Performance of ABC Projects in Utah [Sep]

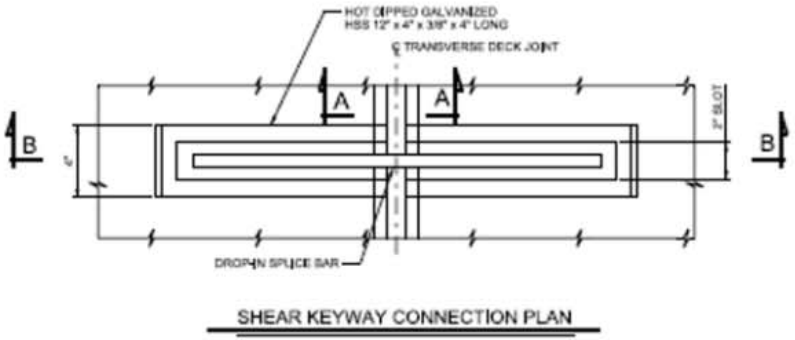
2011

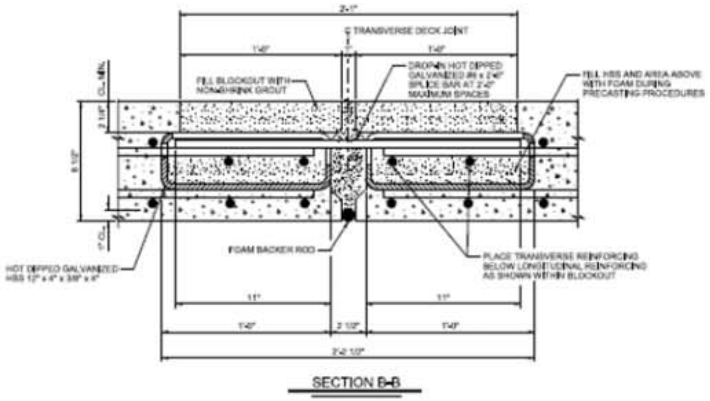


Details

- Full depth deck panel transverse connections with welded tie plates
- Full depth deck panel transverse connections with longitudinal post-tensioning
- Full depth precast concrete deck panels shear connector pockets
- Concrete closure pours
- Precast concrete abutments with vertical thread-bar connections
- Precast concrete bents
- Self Propelled Modular Transporter (SPMT) bridge moves
- Thin bonded polymer overlay
- Precast concrete approach slab connection to deck
- Lateral slide-in bridge moves
- Full depth deck panel transverse connections with dowel bar pockets
- Longitudinal launch

Full Depth Deck Panel Transverse Connections with Dowel Bar Pockets





Longitudinal Launch

Reports

Performance of ABC Projects in Utah [May]

2009

Performance of ABC Projects in Utah [Jun]

2010

Performance of ABC Projects in Utah [Sep]

2011

2012

Performance of ABC Projects in Utah [Oct]

2013

Report Overview - October 2013

- 41 bridges
- Precast full depth concrete deck panels
- Precast abutment bridges
- Bridges installed with SPMT's
- Lateral slide-in technologies
- Longitudinal launch
- Geosynthetic Reinforced Soil (GRS)

Performance of ABC Projects in Utah [Oct]

2013

Details

- Full depth deck panel transverse connections with welded tie plates
- Full depth deck panel transverse connections with longitudinal post-tensioning
- Full depth precast concrete deck panels shear connector pockets
- Concrete closure pours
- Precast concrete abutments with vertical thread-bar connections
- Precast concrete bents
- Self Propelled Modular Transporter (SPMT) bridge moves
- Thin bonded polymer overlay
- Precast concrete approach slab connection to deck
- Lateral slide-in bridge moves
- Full depth deck panel transverse connections with dowel bar pockets
- Longitudinal launch
- Geosynthetic Reinforced Soil (GRS)

Geosynthetic Reinforced Soil (GRS)

Programmatic Recommendations

- Improve review procedures for ABC projects
- Establish consistent detailing practices
- Establish design guidelines
  - Approach railing attachments
  - Thermal movement
  - Deck joint edge support
- Improve construction inspection procedures





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