



Accelerated Bridge Construction

Research, Design and Practice

Florida International University
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Presented by:
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Presentation Outline



- Research
 - Accelerated Bridge Construction (ABC) initial efforts
- Design
 - Program implementation
- Practice
 - Projects

Research *Outline*



- Perform scanning tours
- Conduct pilot project
- Identify a program of projects
- Get involved nationally

Research

Scanning Tours



- Market internally and externally
- Conduct workshops
- Engage industry

Research

Pilot Project



- Obtain senior leadership involvement
- Evaluate project risks
- Define scope, schedule and budget
- Identify procurement method

Research

Program of Projects



- Prescriptive projects – gain experience
 - Design-Bid-Build
 - Construction Manager General Contractor (CMGC)
- Performance projects – innovations led by contractor
 - Design-Build

Research

Get Involved Nationally



- Coordinate with FHWA
- Participate in AASHTO Subcommittees
- Host showcase projects
- Share lessons learned and best practices



Design *Outline*



- Educate and communicate with industry
- Evaluate projects
- Implement standardization
- Improve based on lessons learned

Design

Educate and Communicate With Industry



■ ABC goals

- Relentlessly pursue reducing traffic congestion during construction
- Add value by furthering Department themes and meeting project goals
- Improve worker safety and safety to the traveling public
- Improve quality

Design

Evaluate Projects

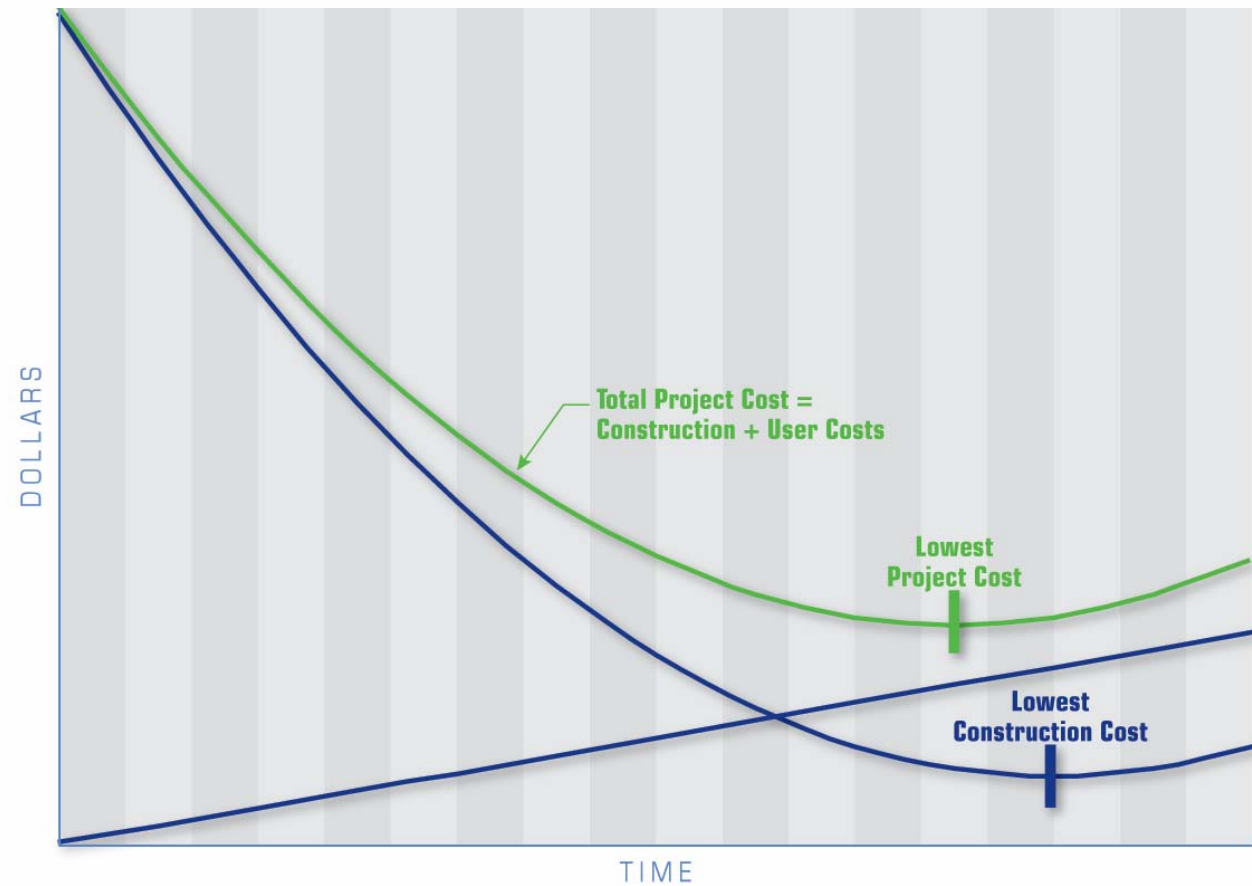


- Scope
- Schedule
- Budget
- Quality
- Risk
- Communications
- Procurement

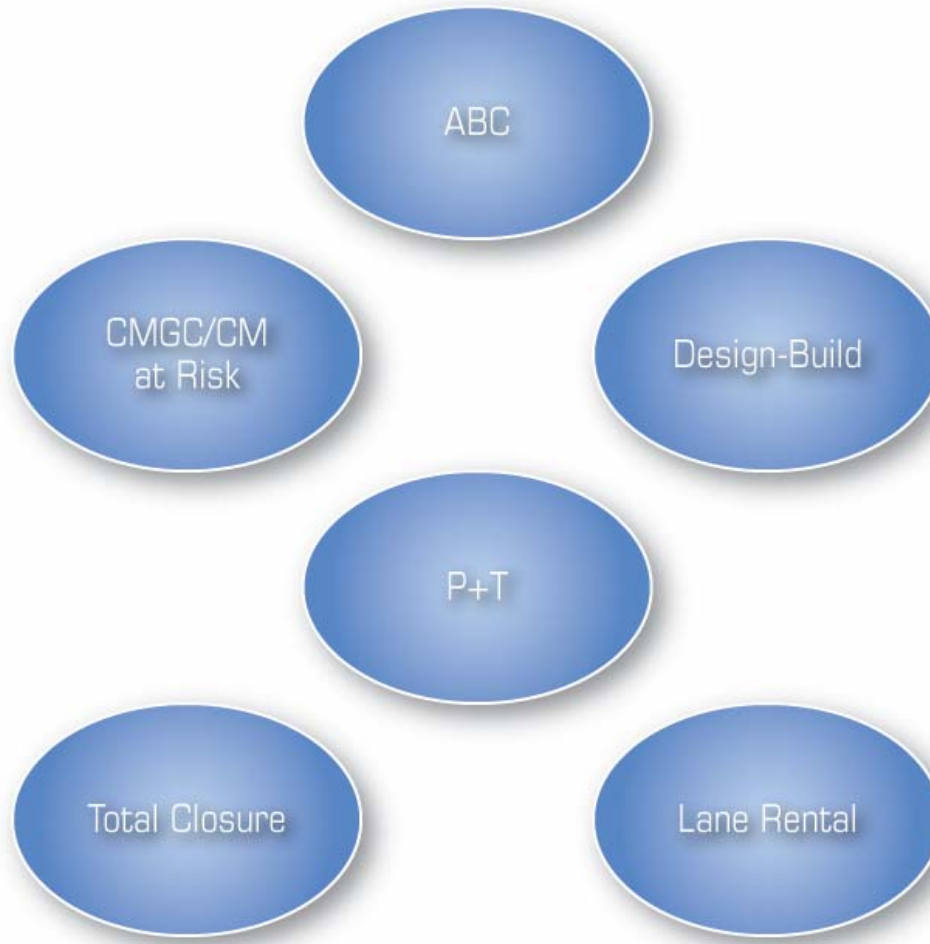
Design *Evaluate Projects*



Total Project Cost



Design *Evaluate Projects*



Design

Evaluate Projects



- Advantages of ABC
 - Reduced on-site construction time
 - Minimized traffic disruption – *months to days*
 - Reduced environmental impact
 - Improved work zone & worker safety
 - Provides positive cost-benefit ratios when user costs are considered
 - Improved product quality – *controlled environment, cure times, easier access, etc.*

Design

Implement Standardization




- Develop guidelines for ABC project inclusion
- Develop typical details and manuals
- Include user costs in analysis
- Encourage innovation
- Provide training and obtain feedback

Design

Implement Standardization



Utah Department of Transportation 4501 South 2700 West Salt Lake City, UT 84114		Project: Hypothetical Bridge Project
		By: MPC Checked: BLB
		Date: 8/30/2010 8/30/2010
		Sheet No. 1 of 3
ABC Rating Procedure		June 2010
Enter values for each aspect of the project. Attach applicable supporting data.		
Average Daily Traffic Combined on and under Enter 5 for Interstate Highways	<input type="text" value="5"/>	<ul style="list-style-type: none"> 0 No traffic impacts 1 Less than 5000 2 5000 to 10000 3 10000 to 15000 4 15000 to 20000 5 More than 20000
Delay/Detour Time	<input type="text" value="2"/>	<ul style="list-style-type: none"> 0 No delays 1 Less than 5 minutes 2 5-10 minutes 3 10-15 minutes 4 15-20 minutes 5 More than 20 minutes
Bridge Classification	<input type="text" value="1"/>	<ul style="list-style-type: none"> 1 Normal Bridge 3 Essential Bridge 5 Critical Bridge
User Costs	<input type="text" value="4"/>	<ul style="list-style-type: none"> 0 No user costs 1 Less than \$10,000 2 \$10,000 to \$50,000 3 \$50,000 to \$75,000 4 \$75,000 to \$100,000 5 More than \$100,000
Economy of Scale (total number of spans)	<input type="text" value="2"/>	<ul style="list-style-type: none"> 0 1 span 1 2 to 3 spans 2 4 to 5 spans 3 More than 5 spans
Use of Typical Details	<input type="text" value="1"/>	<ul style="list-style-type: none"> 1 Complex geometry or unfavorable site conditions 3 Some complexity, but favorable site conditions 5 Simple geometry and favorable site conditions
Safety	<input type="text" value="5"/>	<ul style="list-style-type: none"> 1 Short duration impact with simple MOT scheme 2 Short duration impact with multiple traffic shifts 3 Normal duration impact with multiple traffic shifts 4 Extended duration impact with multiple traffic shifts 5 Extended duration impact with complex MOT scheme
Railroad Impacts	<input type="text" value="0"/>	<ul style="list-style-type: none"> 0 No railroad or minor railroad spur 3 One mainline railroad track 5 Multiple mainline railroad tracks

Design

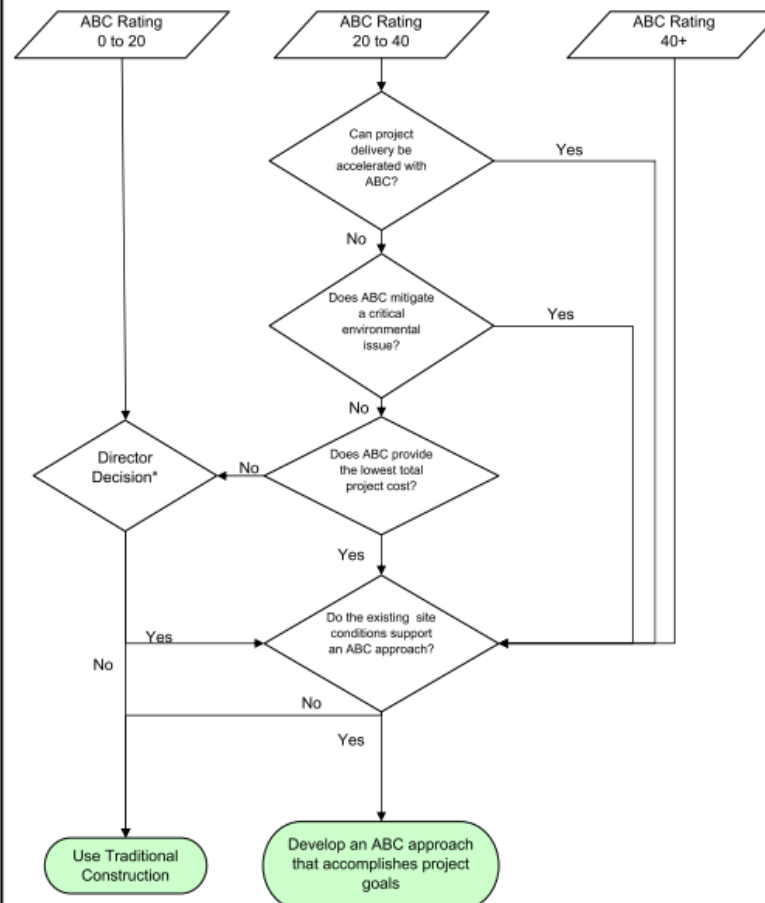
Implement Standardization



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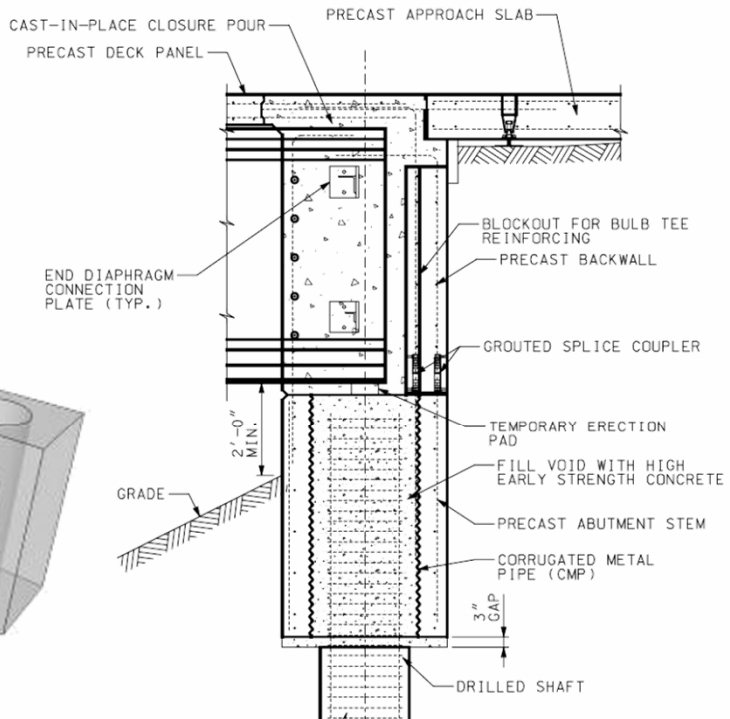
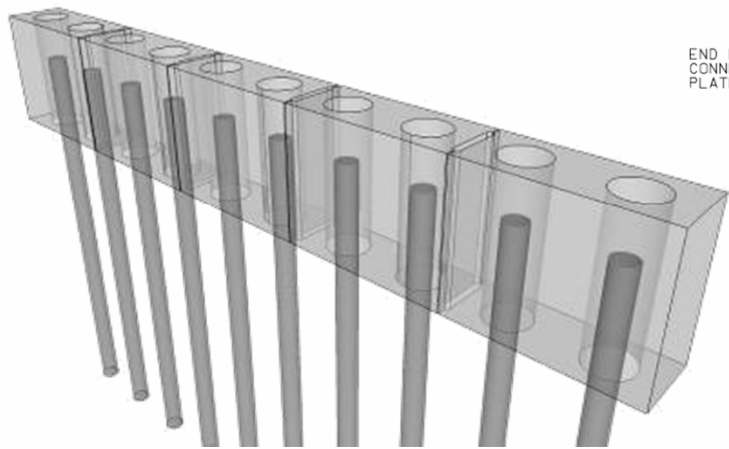
ABC Decision Flowchart June 2010

* Region Director or Project Development Director to evaluate possible indirect benefits



Design *Implement Standardization*

- ABC Manual and Standard Drawings



ABUTMENT SECTION **A**
IA-1

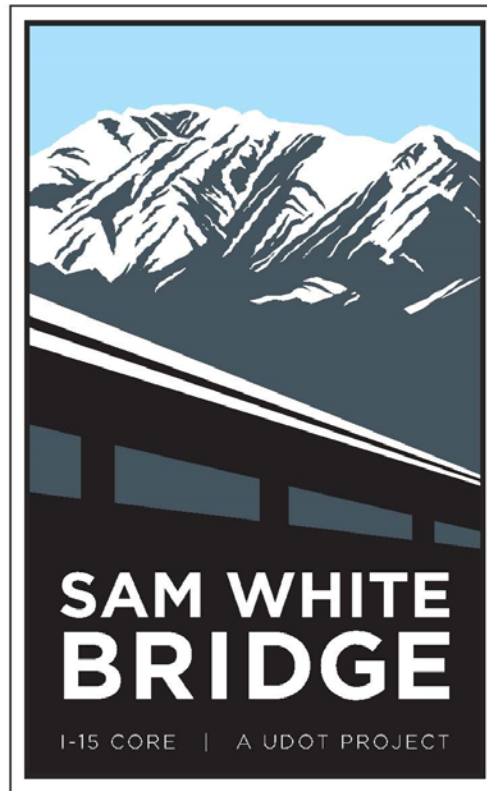
NOTE: ALL ABUTMENT REINFORCEMENT NOT SHOWN FOR CLARITY

Design *Implementation*



- Promote marketing and media plan
- Develop messaging
- Prepare visual animation

Design *Implementation*



354 Feet Long | Two Spans | One Big Night

Design

Lessons Learned



- Perform program review
- Find program deficiencies
- Repair deficiencies
- Review design decisions
- Measure design assumptions vs. reality

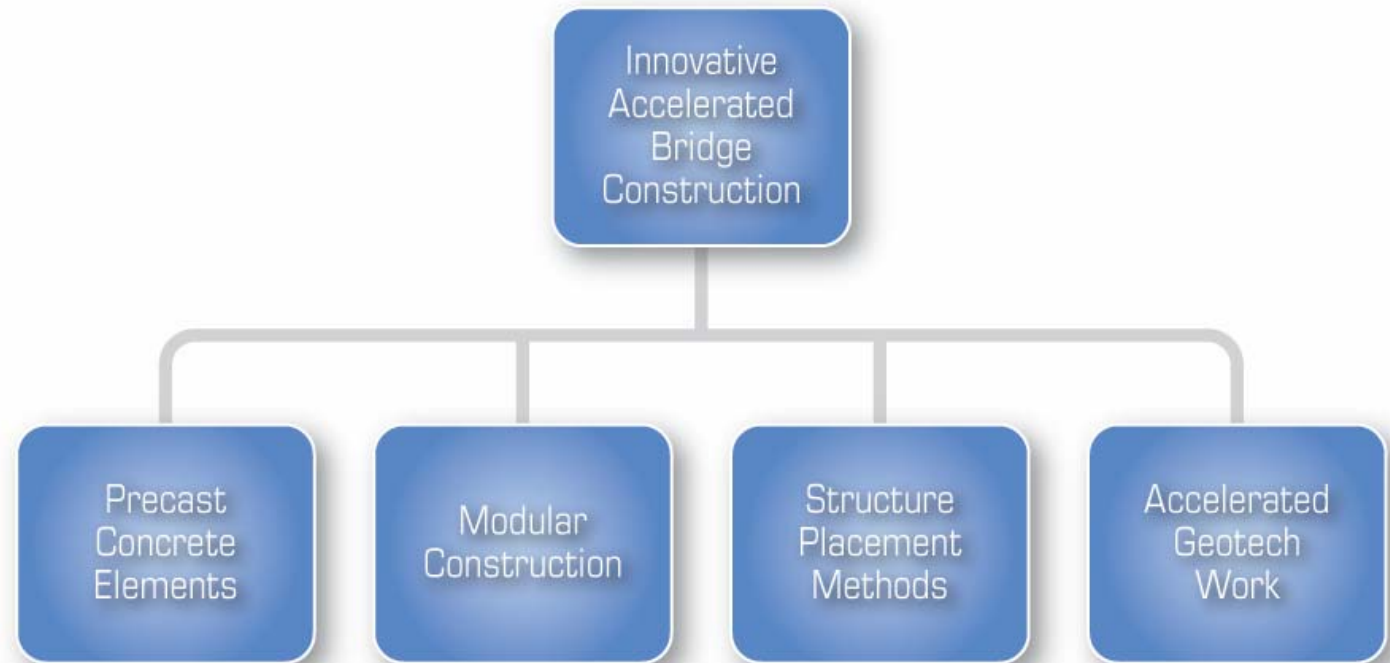
Practice *Outline*



- Innovative elements and methods
- Timeline and history
- Project highlights
- Upcoming projects
- Program evaluation

Practice

Innovative Elements and Methods



Practice

Innovative Elements and Methods

Precast Concrete Elements; I-80; Wanship Bridge





Practice

Innovative Elements and Methods

Modular Construction; I-215 over 3670 South



Practice

Innovative Elements and Methods



Structure Placement Methods



Practice

Innovative Elements and Methods

Accelerated Geotechnical; Geofoam Embankment



Practice

Timeline and History



Practice

Timeline and History



ABC Method / Element

Bridge Launch	2
Self Propelled Modular Transporters (SPMT)	23
Slide-in	5
Heavy Lift Cranes	2
Half Depth Precast Deck Panels	63
Full Depth Precast Deck Panels	31
Precast Voided Slabs	3
Approach Slab Panels	15
Precast Sleeper Slabs	14
Precast Abutments	6
Precast Bent Caps	3
Precast Columns	1
Prefabricated Pedestrian Bridge	5
Precast Box Culvert	44

Number of Bridges

Practice *Project Highlights*

800 North over I-15; Precast Deck Panels; CMGC



Practice *Project Highlights*

Riverdale Road over I-84 ; Lego Bridge; CMGC



Practice *Project Highlights*

4500 South over I-215; SPMT; CMGC



Practice

Project Highlights

I-80; Lambs Canyon Bridge; SPMT; Design-Build



Practice *Project Highlights*

I-80; State Street to 1300 East; SPMT; CMGC



Practice

Project Highlights

I-70; Eagle Canyon Bridge; Precast Deck Panels; CMGC



Practice

Project Highlights

SR-66 Over Weber River; Slide-in; Design-Bid-Build



UTDOT
udot.utah.gov

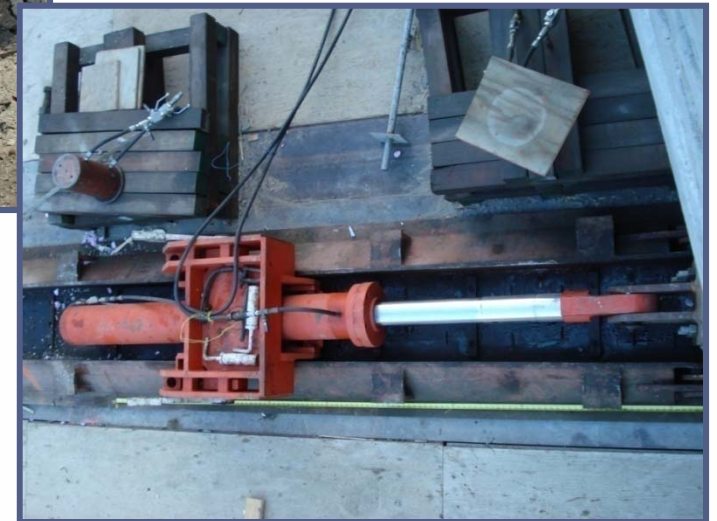


Practice

Project Highlights



I-80; Two Bridges Near Echo Junction; Slide-in; Design-Build



Practice

Project Highlights

I-80 over 2300 East; Slide-in; Design-Build



Practice

Project Highlights

South Layton Interchange; Launch; Design-Build



Practice

Project Highlights

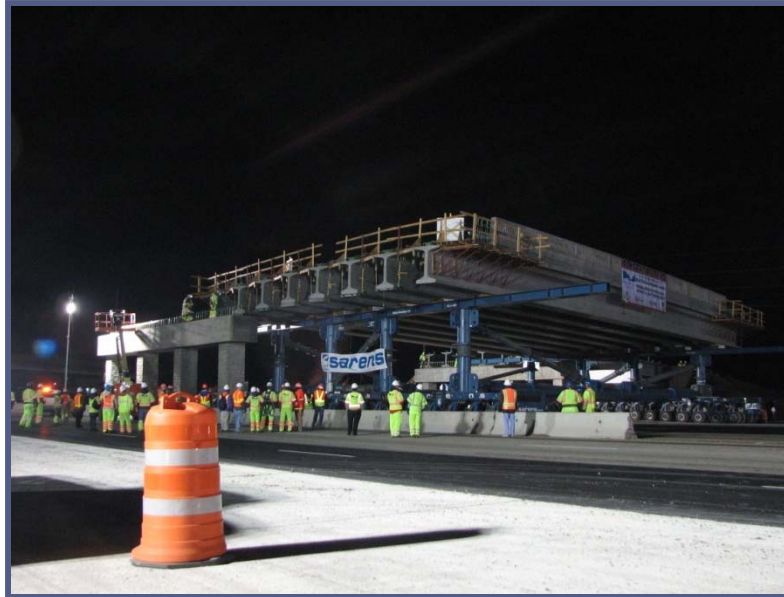
U.S. 89 over I-15; SPMT; Design-Build



Practice

Project Highlights

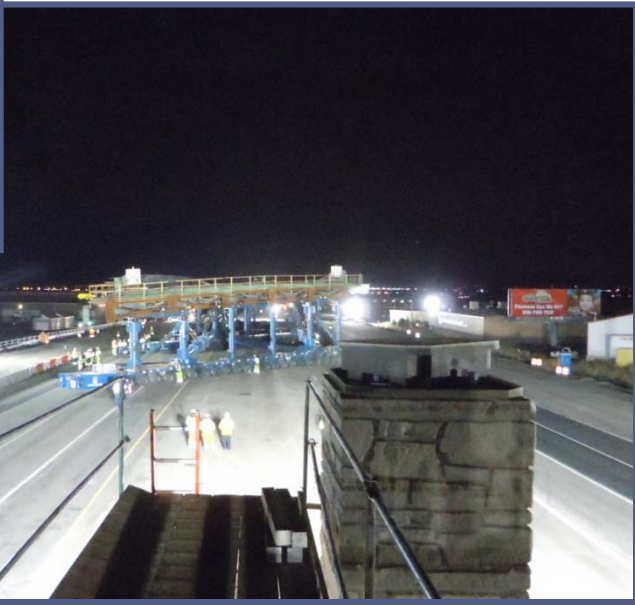
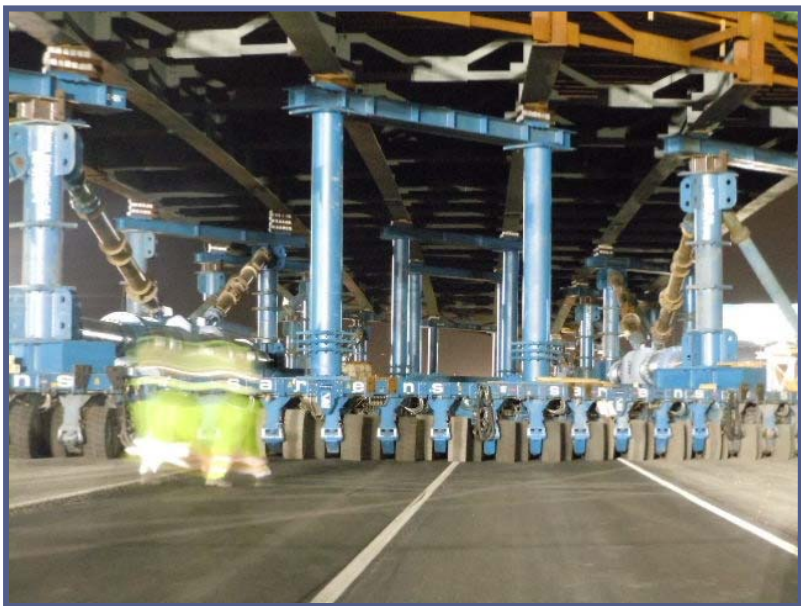
I-15 CORE Proctor Lane over I-15; SPMT; Design-Build



Practice

Project Highlights

I-15 CORE 200 South over I-15; SPMT; Design-Build



Practice

Project Highlights

I-15 CORE Sam White Lane over I-15; SPMT; Design-Build



Practice

Upcoming Projects



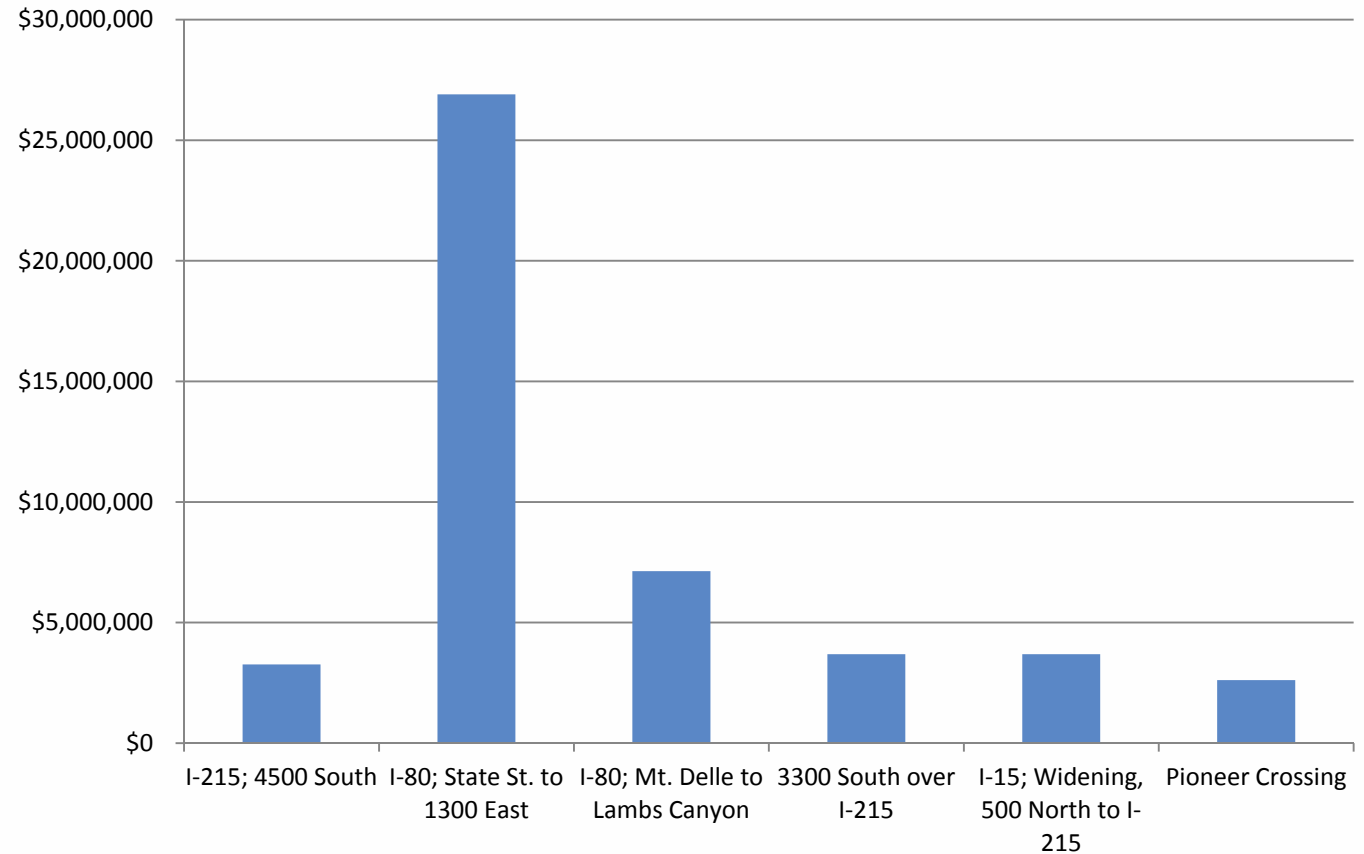
- Slide-in
 - I-80 over Weber River; Spring 2011
 - I-80 at Atkinson; Summer 2011
 - I-80 at Summit Park; Summer 2011
- Prefabricated bridge elements
 - SR-193 over UPRR and UTA; Spring 2012



Program Evaluation

Utah ABC Costs; SPMT

Valued Added (includes user cost savings)

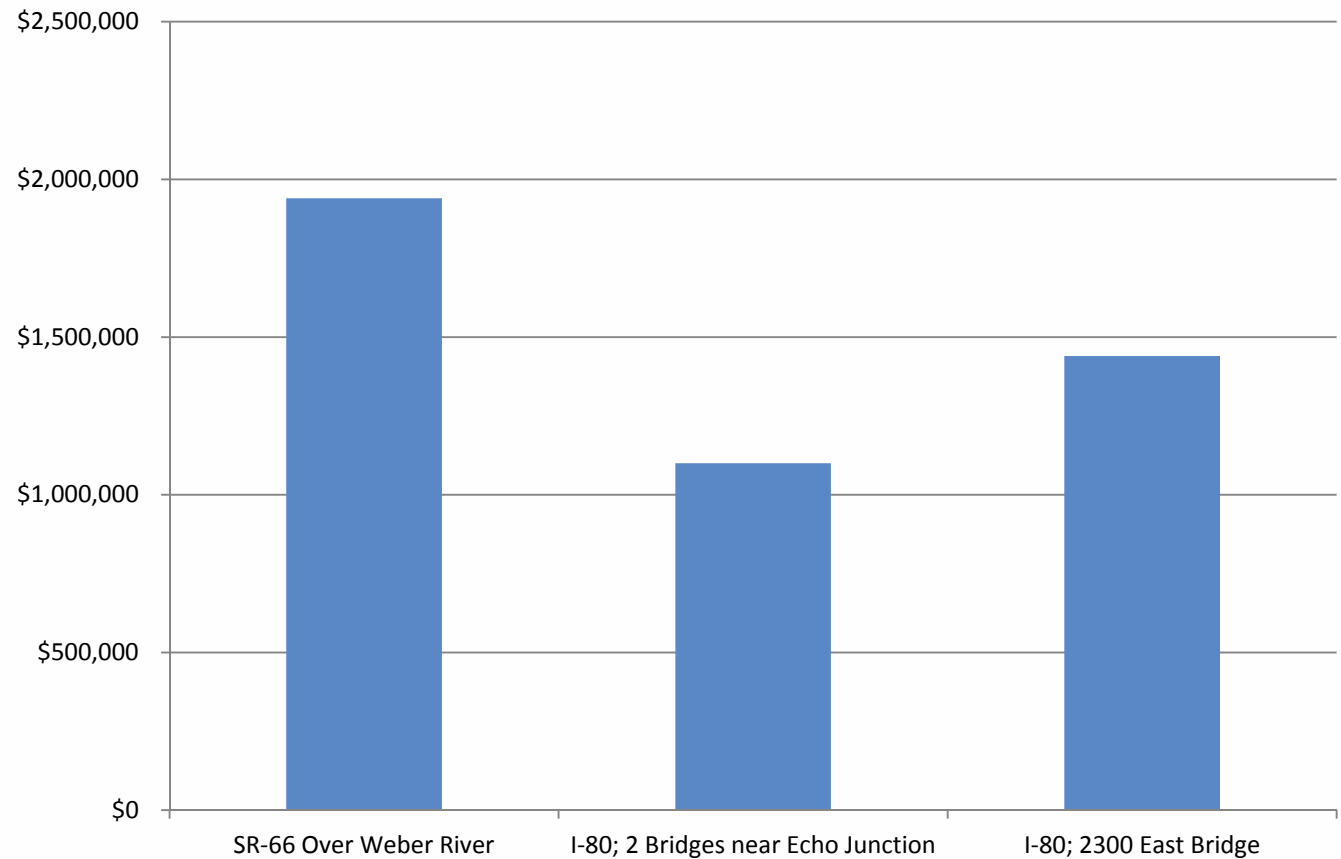


Program Evaluation

Utah ABC Costs; Slide-In



Valued Added (includes user cost savings)

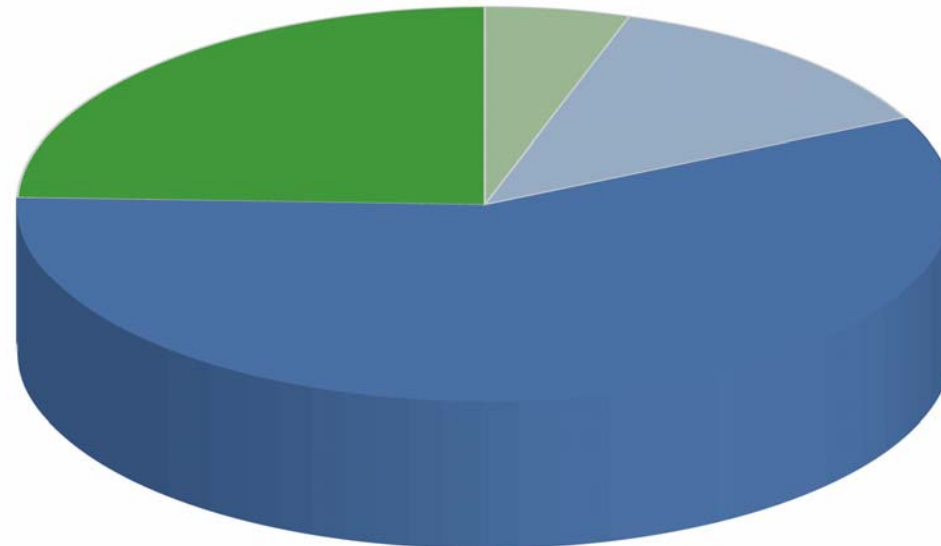


Program Evaluation

ABC Because...



- Value added to the public
- Societal costs minimized
- Public support for innovation
- Political capital



Would you say UDOT is becoming more innovative?

- 55% Probably
- 23% Definitely
- 12% Probably Not
- 5% Definitely Not

Source: 2010 Dan Jones & Associates



UDOT Website

[UDOT Structures Division](#)

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