

Utah's Experience with Accelerated Bridge Construction (ABC):

Presented by:

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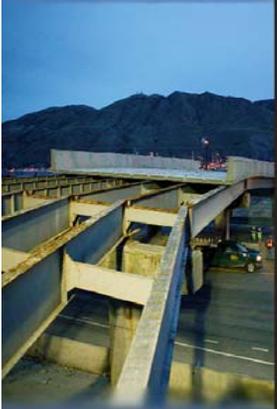
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James McMinimee, P.E.-UDOT Director, Project Development

Louis N. Triandafilou, P.E. - FHWA Resource Center

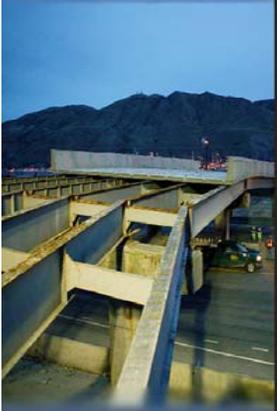
Overview

- What is ABC
- Benefits of ABC
- Elements of ABC
- Why use ABC
- UDOT ABC History
- Past Projects
- Current Projects
- Future Projects
- Lessons Learned



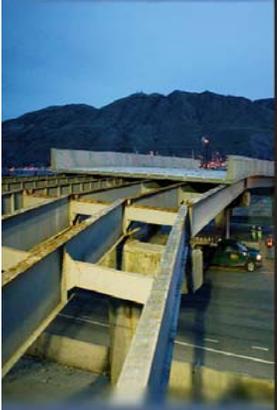
What is ABC?

- Innovative methods to decrease bridge construction time
- Build elements offsite/outside of traffic area
- Transport to site and install rapidly



Benefits of ABC

- Minimized traffic disruption
- Improved work zone safety
- Improved product quality
- Save \$\$ in regional commerce



FAMILY OF INNOVATIVE ABC ELEMENTS AND METHODS

Innovative
Accelerated
Bridge
Construction

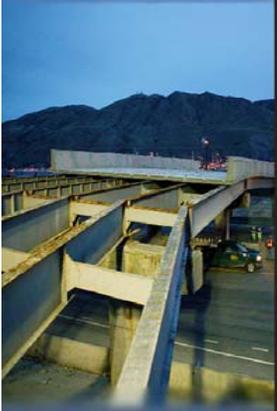
Precast
Concrete
Elements

Modular
Construction

Structure
Placement
Methods

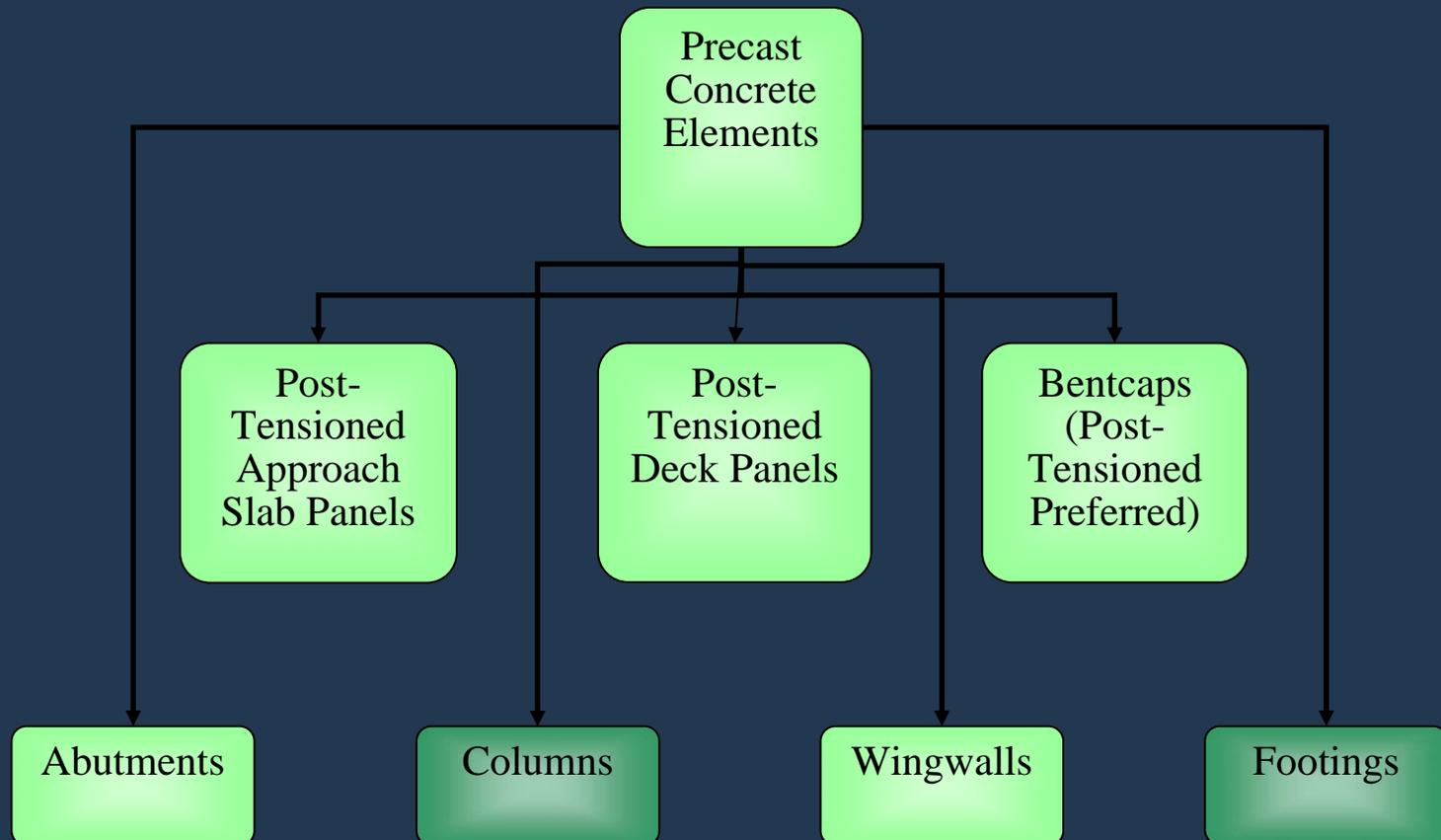
Accelerated
Geotech
Work

Fast Track
Contracting





Family of Innovative ABC Elements and Methods



FAMILY OF INNOVATIVE ABC ELEMENTS AND METHODS

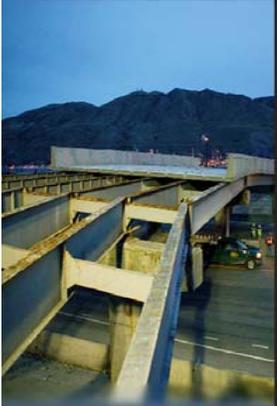
Modular
Construction

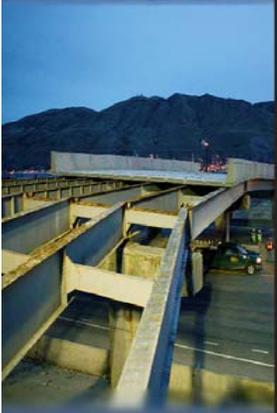
Prefabricated
Modular Steel
Bridge
Systems

Prefabricated
Concrete
Arch

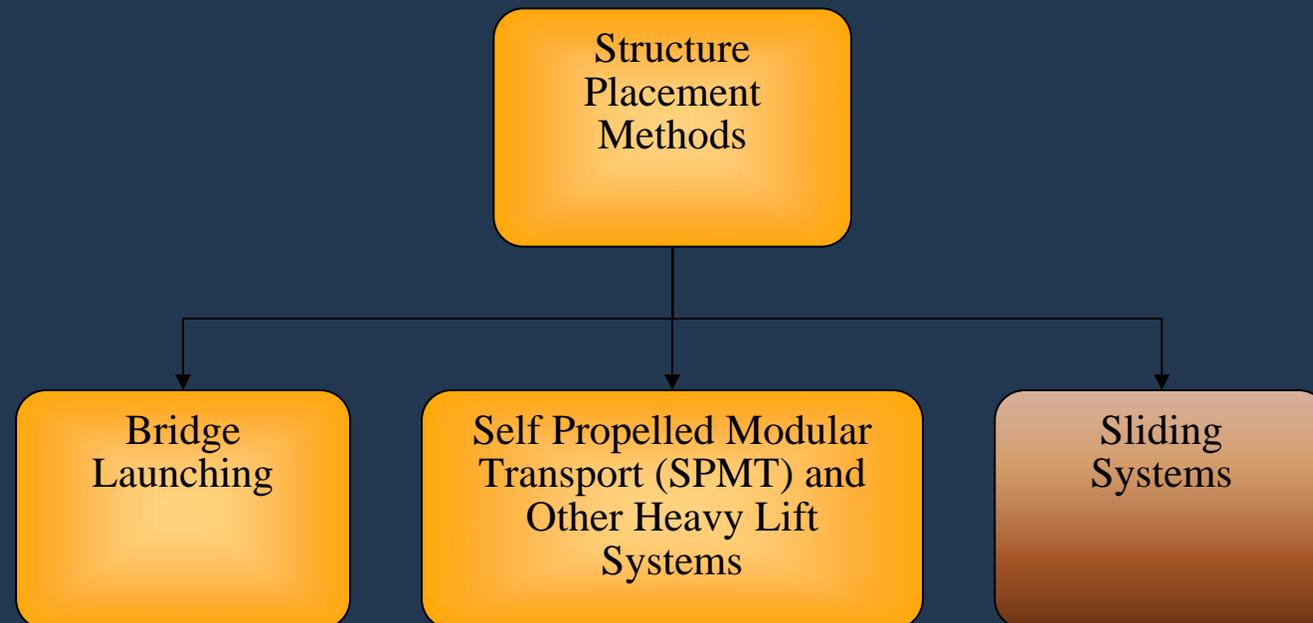
Precast
Concrete
Segmental
Superstructure

Precast
Concrete Box
Culvert
System



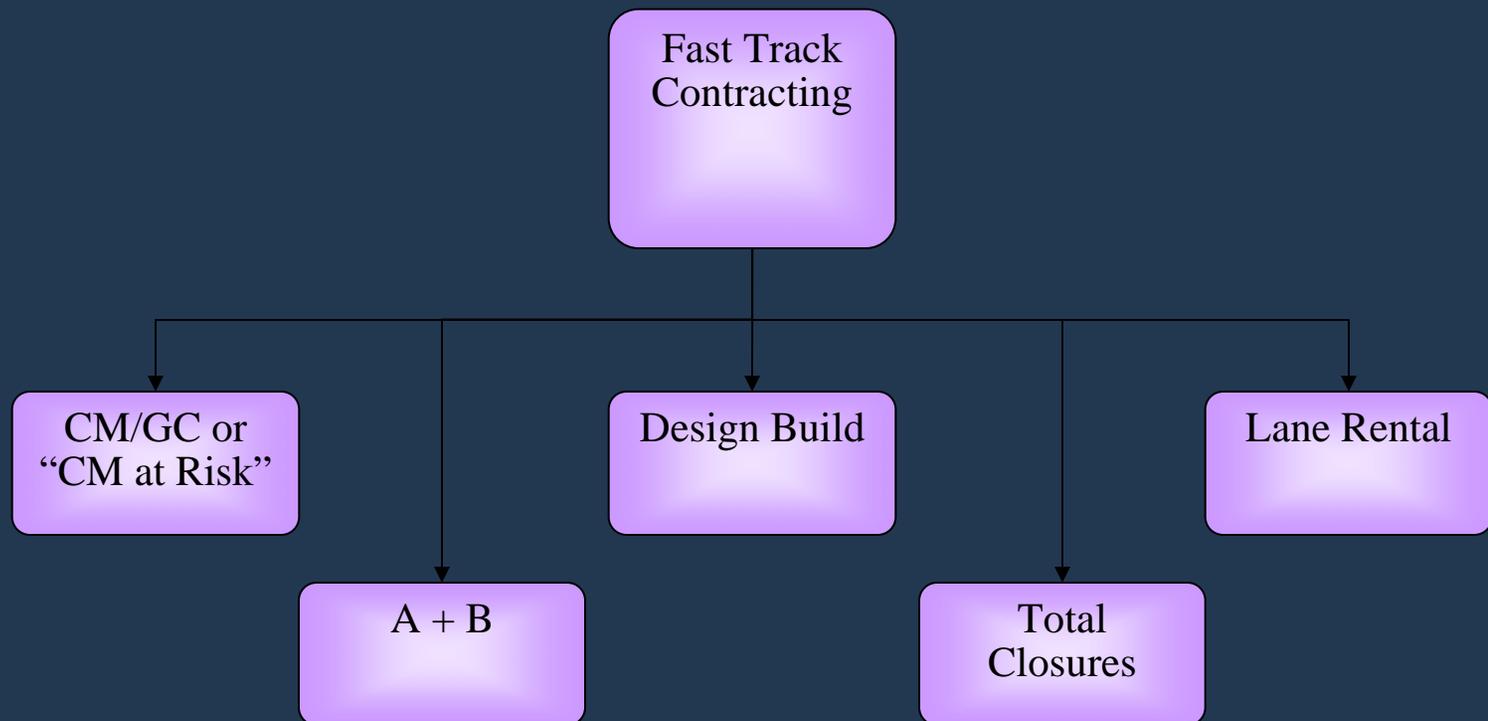


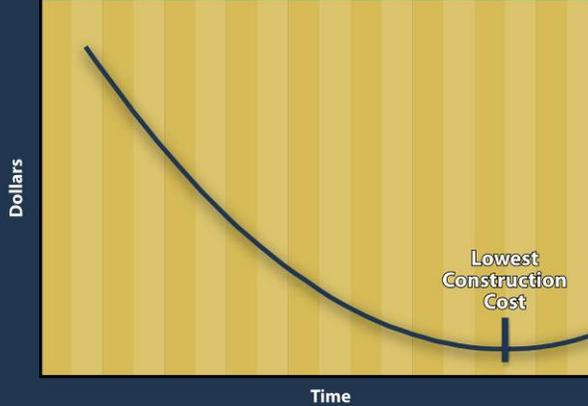
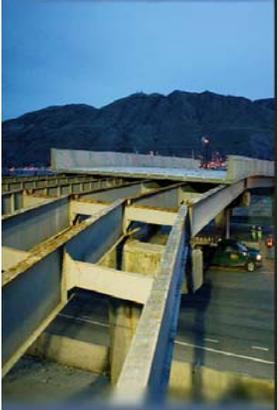
Family of Innovative ABC Elements and Methods





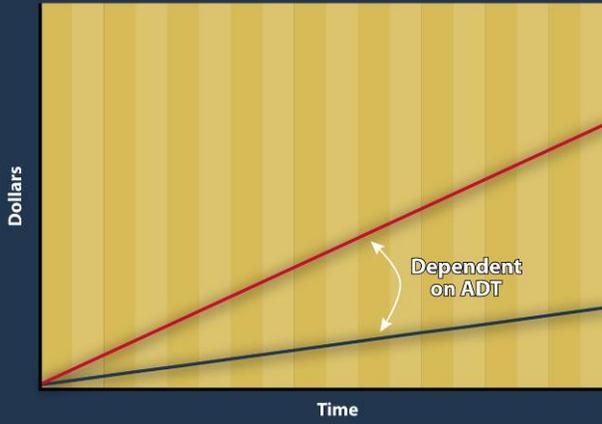
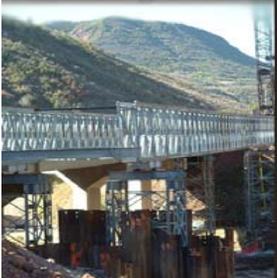
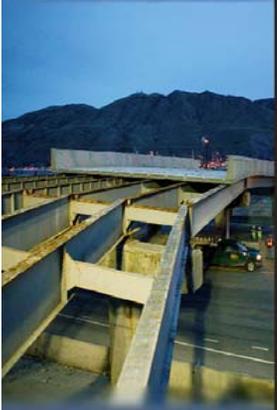
Family of Innovative ABC Elements and Methods





Traditional Business Model

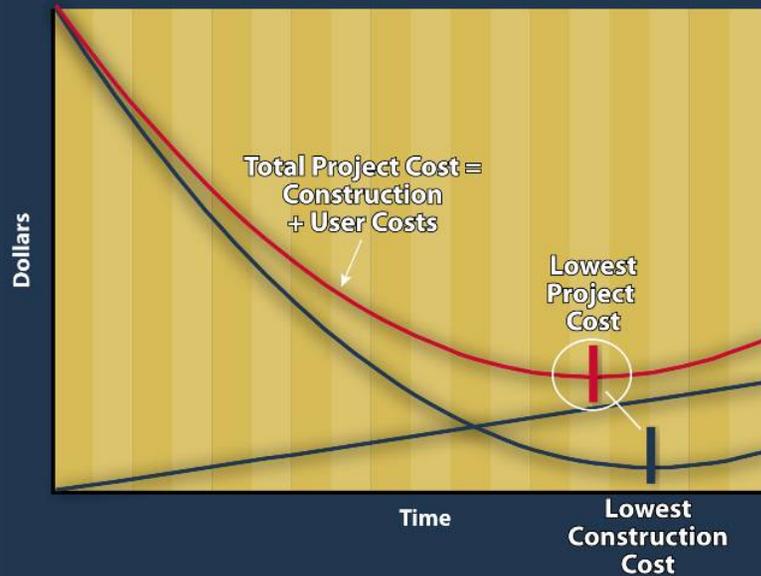
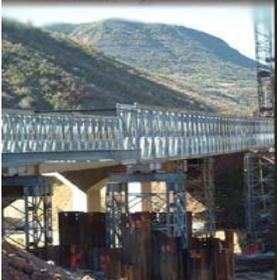
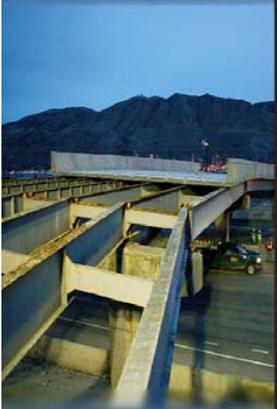
- Good business model for agency
- Existing interstate was constructed
- Competition determines the lowest cost
- Contractors select time and method
- Cost of regional impacts ignored



Societal Costs

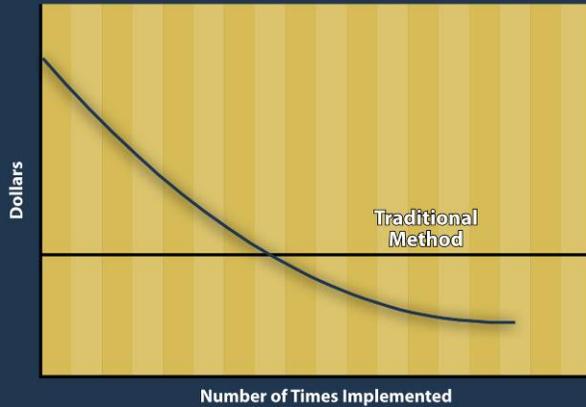
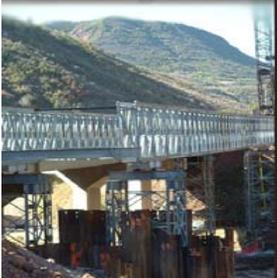
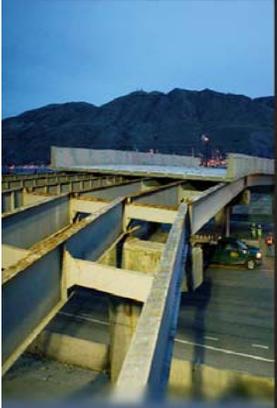
- Linear relationship
- Cost depends on volume of traffic
- Longer construction duration  increase impacts to users





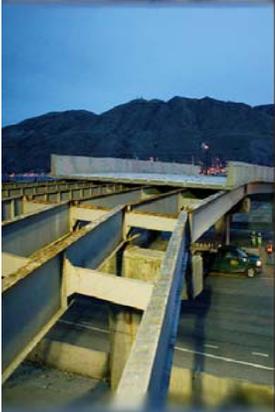
New Business Model

- Lowest construction cost → lowest project cost
- Societal costs minimized
- Political capital
- Public praise

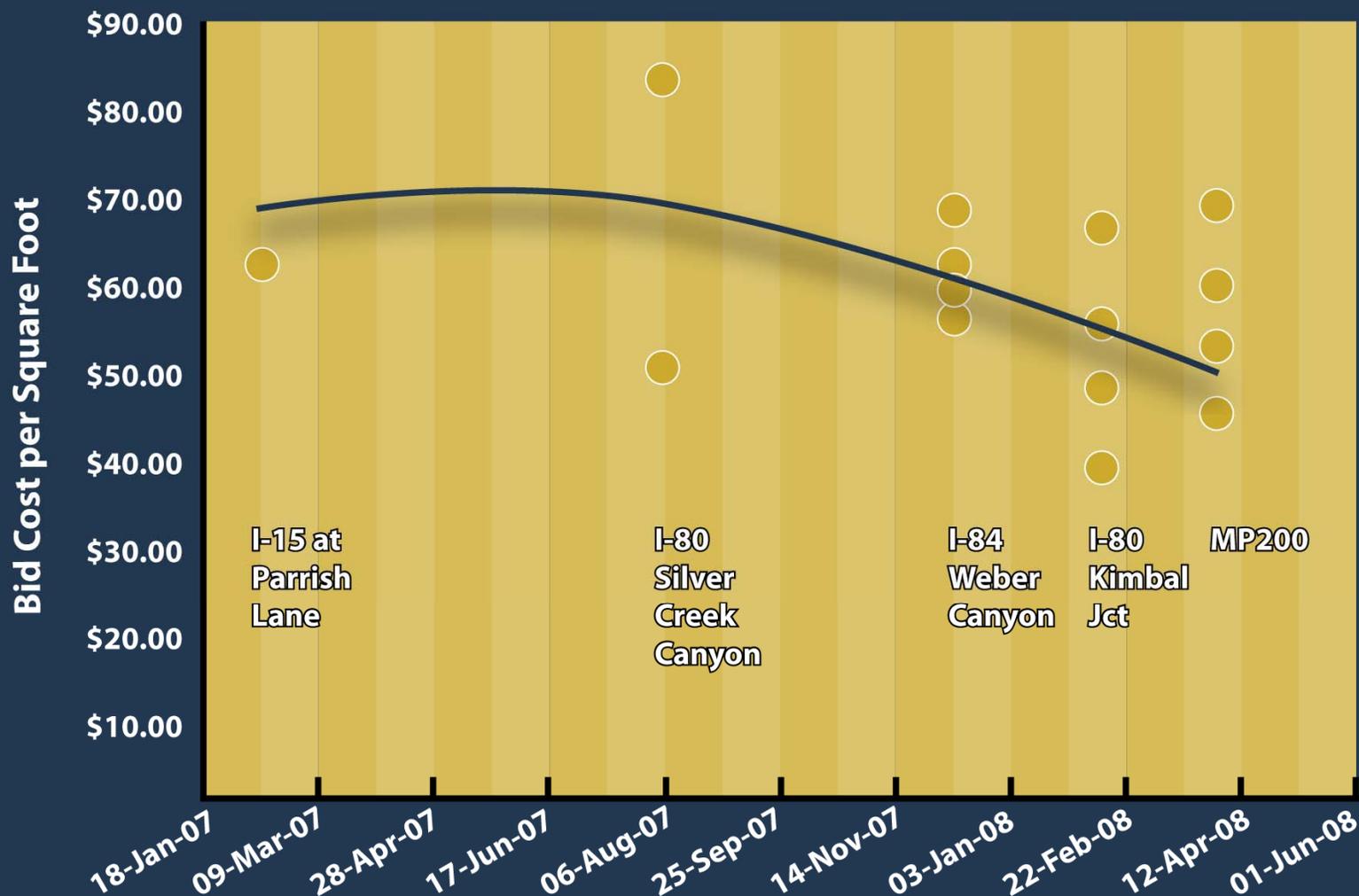


Innovative Technology

- First implementations cost more
- Potential for new methods to cost less
- Promise of time savings
- Positive cost-benefit ratios



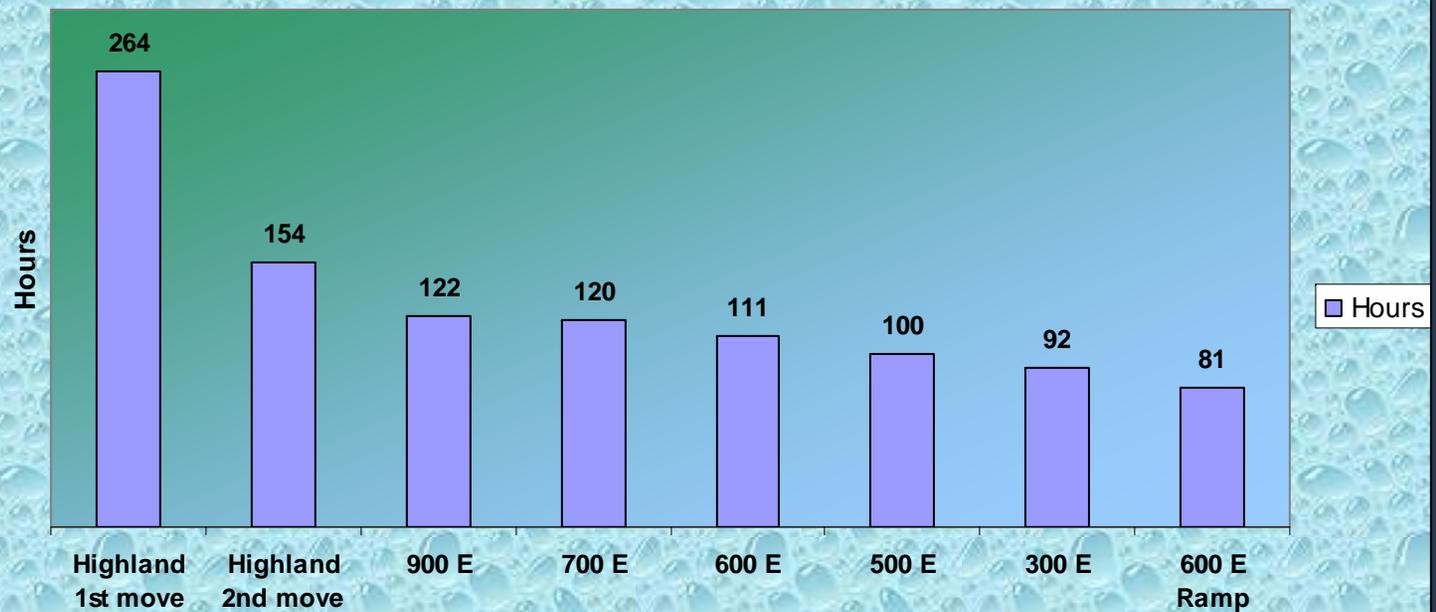
Utah Precast Deck Panel Projects



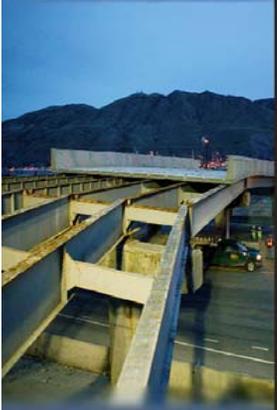
I-80 Bridge Moves

Elapsed time for each move

Total Move Time



Includes preparation of site, moving bridge from 1300 East to specific location, skidding, and setting bridge.

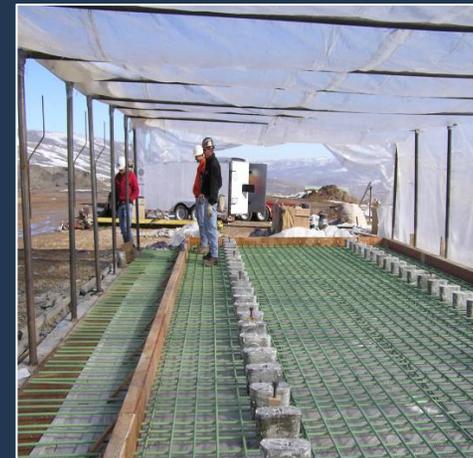
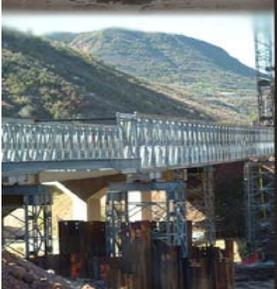
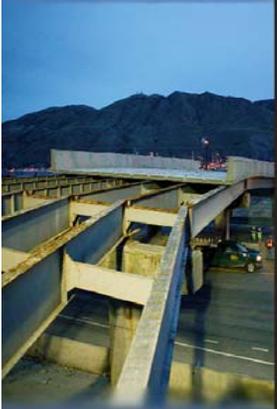


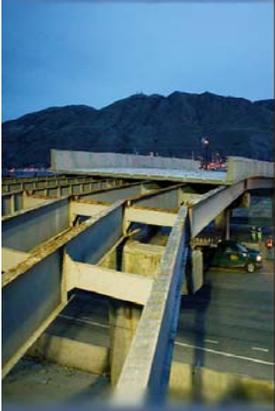
UDOT ABC History

- UDOT has 17 projects, including 80 bridges total, completed or under construction that utilized ABC
 - **Self Propelled Modular Transports:** 4 projects/13 Bridges
 - Half Thickness Precast Deck Panels: 2 Projects/47 Bridges
 - **Full Depth Precast Deck Panels:** 8 Projects/11 Bridges
 - Precast abutments: 1 Project/2 Bridges
 - Precast bent caps: 1 Project/2 Bridges
 - Precast voided slabs: 1 Project/2 Bridges
 - Segmental Bridges: 1 Project/1 Bridge
 - Heavy Lift Cranes: 1 Project/1 Bridge

Rapid Deck at Wanship over I-80

- Deck replacements using precast deck panels





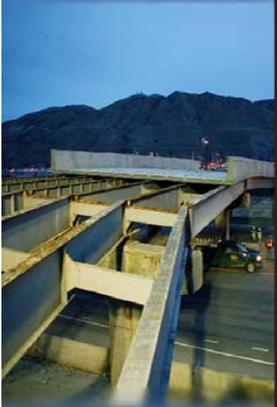
Rapid Deck at Wanship over I-80

Construction Year:	2004
Total Construction Cost:	\$366,073
ABC Construction Cost:	\$10,000*
Facility User Cost Per Day:	\$4,000
Estimated Days Saved:	90
User Savings:	\$360,000
Cost Benefit Ratio:	36

* Project cost does not take into account for traffic control cost savings from traditional to ABC

Full Superstructure I-215 East over 3760 South

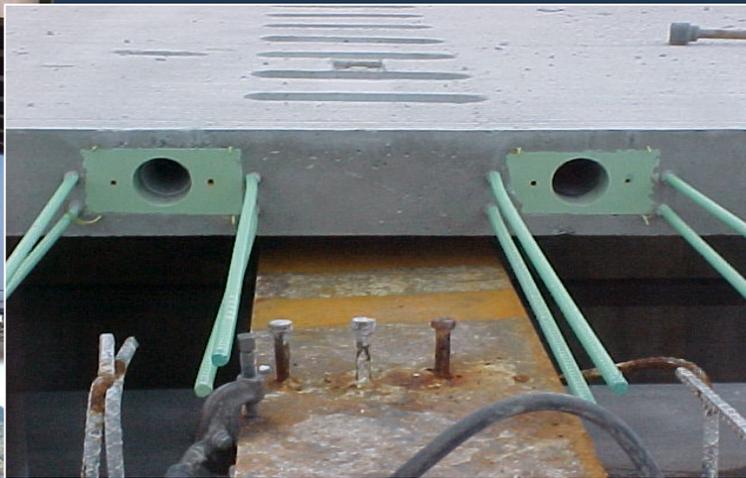
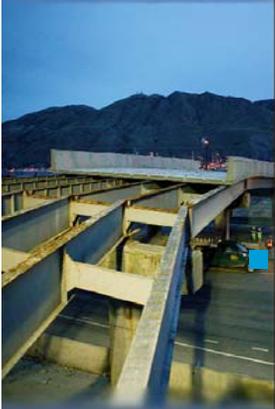
- Full superstructure replacement deck precast on steel girders
- Lifted into place by cranes

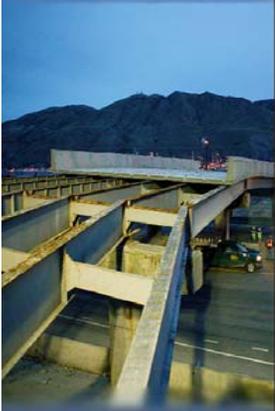


Completed Project

I-215 over 3900 South

- Deck replacement with precast deck panels



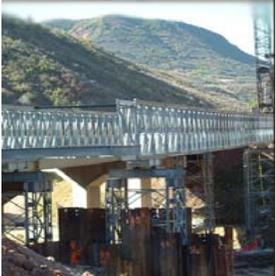
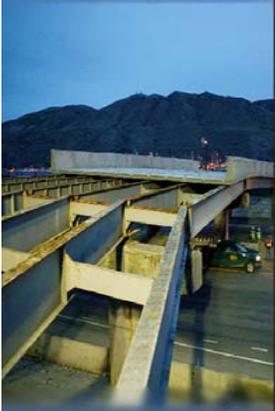


Full Superstructure I-215 East over 3760 South

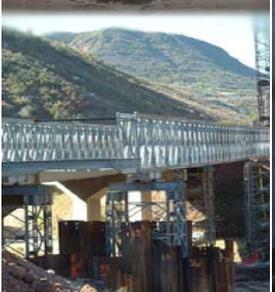
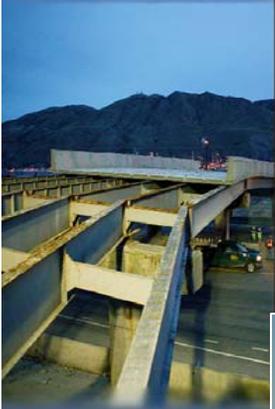
Construction Year:	2004
Total Construction Cost:	\$2,690,965
ABC Construction Cost:	\$600,000*
Facility User Cost Per Day:	\$34,000
Estimated Days Saved:	30
User Savings:	\$1,020,000
Cost Benefit Ratio:	2

* Project cost does not take into account for traffic control cost savings from traditional to ABC

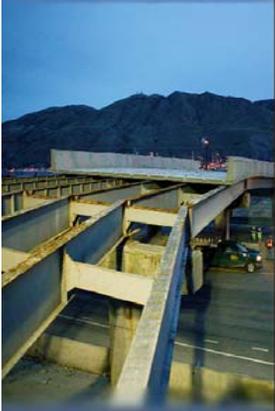
4500 South Bridge Replacement Project



4500 SOUTH OVER I-215



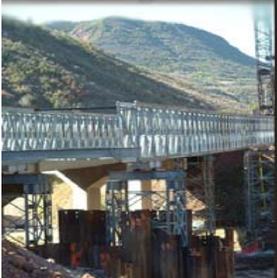
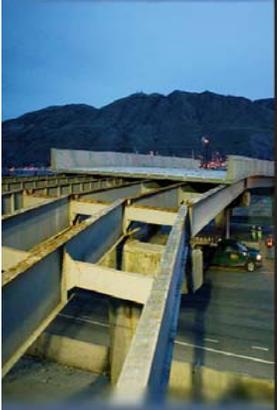
DECK PRECAST ON STEEL
GIRDERS
MOVED INTO PLACE WITH
SPMT



4500 South over I-215

Construction Year:	2007
Total Construction Cost:	\$7,700,000
ABC Construction Cost:	\$900,000*
Facility User Cost Per Day:	\$35,500
Estimated Days Saved:	120
User Savings:	\$4,260,000
Cost Benefit Ratio:	5

* Project cost does not take into account for traffic control cost savings from traditional to ABC

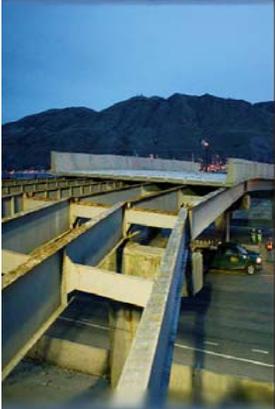


2008 UDOT Projects

- I-84 Bridge Deck Replacements
- US-6 Railroad Crossing
- I-80 State Street to 1300 East Bridge Replacements
- I-80 East and Lambs Canyon Bridge Replacement
- I-215 3300 South Bridge Replacement

I-84; US-89 to SR-167 Weber Canyon

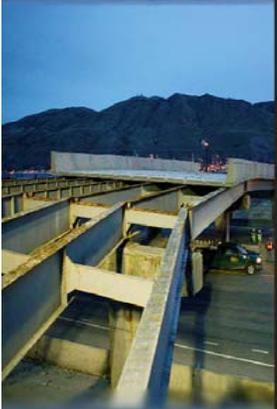
- Replace deck with precast deck panel on existing steel girders
- Overhead power lines limiting crane size and access
- Reverse curves make fitting panels complex
- Railroad under structure limits access for work
- Weber River crossing increases complexity



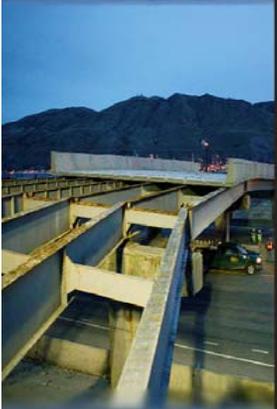
I-80 State Street to 1300 East



- Replacement of six structures along I-80
- Moved to location using SPMTs
- Moved over final location using skid shoes
- Lowered to final location using climbing jacks

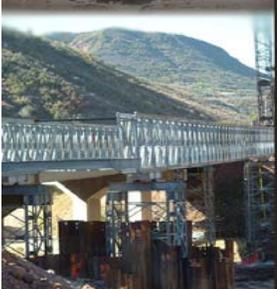
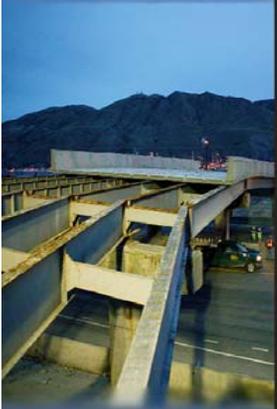


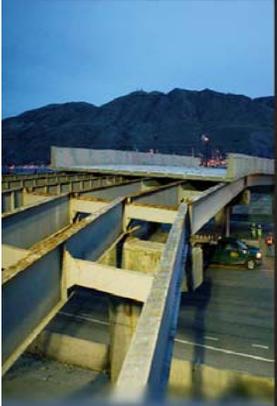
I-80 State Street to 1300 East



CM/GC CONTRACT FOR \$103 MILLION
(ENGINEERING ESTIMATE +\$97M)

I-80 State Street to 1300 East

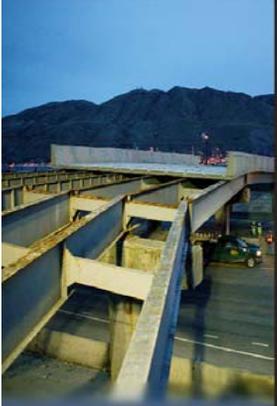




I-80 State Street to 1300 East



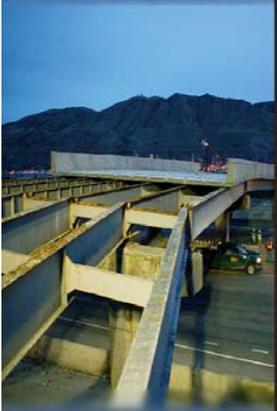
I-80 State Street to 1300 East

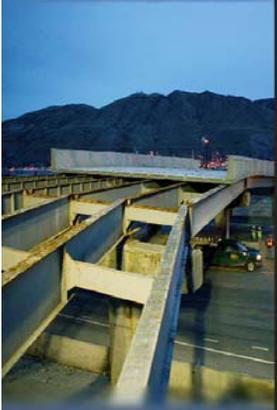


I-80 Lambs Canyon (Between SLC and Park City)



I-80 Lambs Canyon

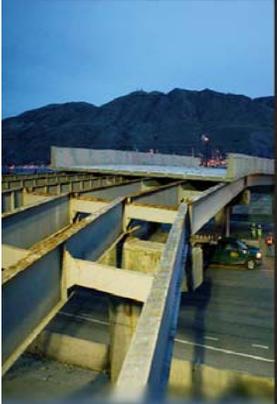




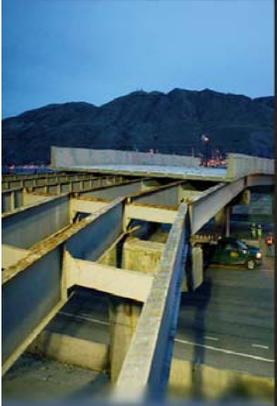
I-80 Lamb's Canyon, I-80

- 4 Separate Interstate Highway Bridges
- 2 Weekends in less than 24 hours
- No traffic frontage alternative
- Design/Build for \$9 million, with \$640k incentives (Engineering Estimate +\$7M)

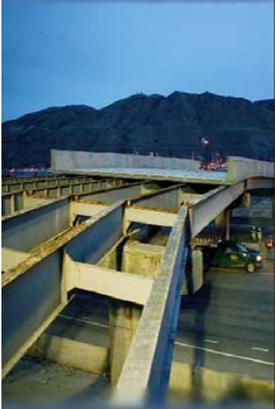
I-215 3300 South



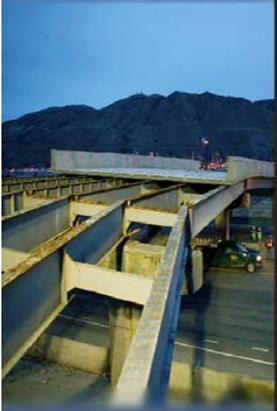
I-215 3300 South



I-215 3300 South

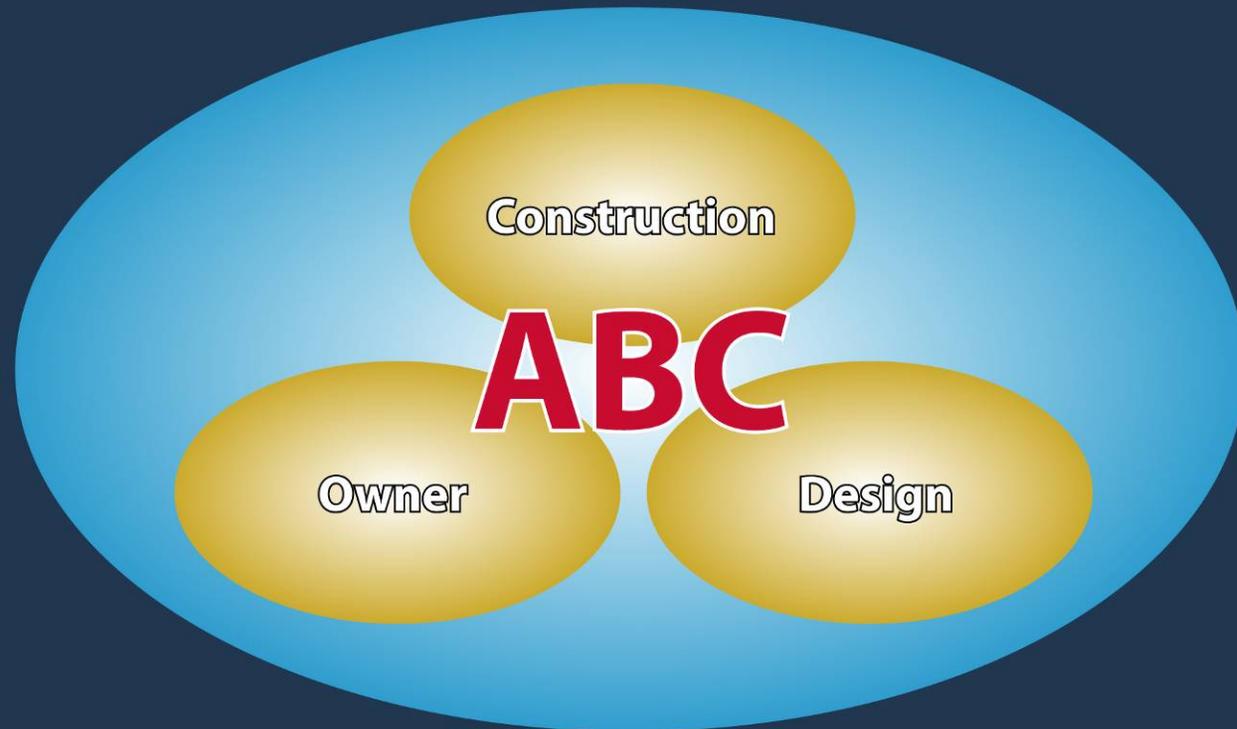


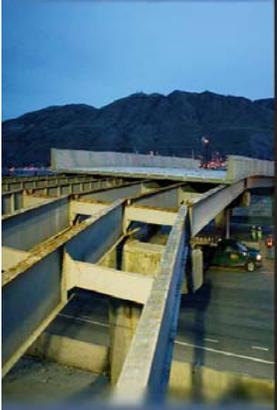
DESIGN/BUILD FOR \$4 MILLION, WITH \$500K INCENTIVES (ENGINEERING ESTIMATE \$6 MILLION)



Lessons Learned and Best Practices

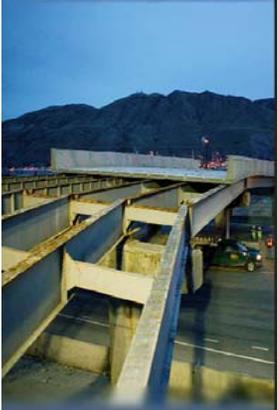
- Engage the industry





Lessons Learned and Best Practices

- Get Department Leadership Committed
- Obtain funding for demonstration projects
- Change the process
 - Start at concept level
 - Initiate within central structures design
- Use decision support tools for ABC methods
- Apply synergy of innovative contracting

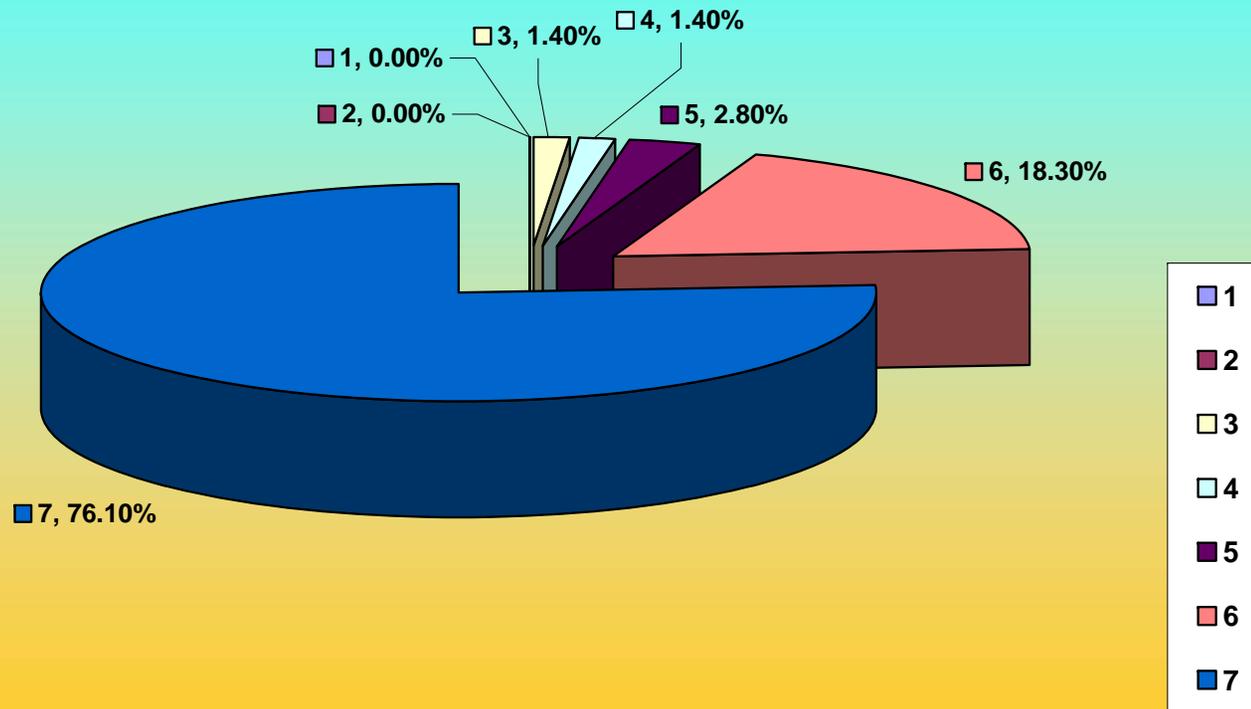


Lessons Learned and Best Practices

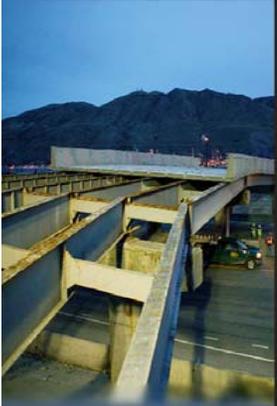
- Identify a program of projects
- Perform scanning tours
- Get involved nationally
- Implement standardization
- Educate and communicate within the industry

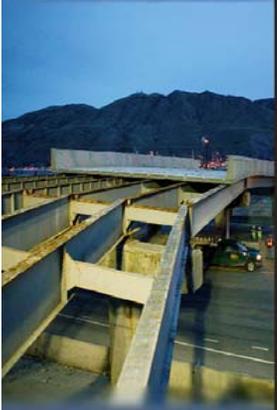
Public Opinion 4500 south

Stakeholders' OVERALL Satisfaction With Project Results (1=not satisfied, 7=very satisfied)



Thank You





QUESTIONS?