MODERN CONSTRUCTION TECHNIQUES & TECHNOLOGY

PRESENTED BY
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Presentation Topics

eCONSTRUCTION-3D Modeling

SAFETY-Autonomous TMA Technology

Accelerated Bridge Construction
ECONSTRUCTION

• UTILIZE TECHNOLOGY

• OWNER BENEFITS

• CONTRACTOR BENEFITS
CURRENT PRACTICE
• INEFFICIENT TECHNOLOGY USAGE
• DESIGNER TAKES 3D & MAKES 2D
• CONTRACTOR 2D INTO 3D
OWNER GAINS

REDUCTION IN SHEET PRODUCTION & DUPLICATION OF WORK

GREATER ACCURACY AND EFFICIENCY
OWNER GAINS CONT.

UDOT SR-20 PASSING LANES MLD

FIELD STAFF USING ECONSTRUCTION & 3D TECHNOLOGIES
CONTRACTOR GAINS

NO MORE REVERSE ENGINEERING  GREATER ACCURACY/LESS RISK  NO STAKES!

US-20 Thornton Interchange - Idaho
E-CONSTRUCTION

• IMPROVE ADMIN AND INSPECTION

• 3D DATA – MORE EFFICIENT/ACCURATE

• INTELLIGENT MODEL DATA FOR CONSTR.

• CHECK GRADES REALTIME

• REALTIME GEO-LOCATION FEATURE IDENTIFICATION

• VIEW 3D FOR CLASH DETECTION
Colorado DOT
Royal TRUCK & EQUIPMENT INC.
KRATOS UNMANNED SYSTEMS DIVISION

Autonomous Impact Protection Vehicle
Autonomous Truck-Mounted Attenuator (ATMA)

How the ATMA Works | System & Components

Safety Advantage:
Remove our employees out of harms way
Autonomous Truck-Mounted Attenuator (ATMA)
How the ATMA Works | System & Components | Follow Vehicle

- Can be operated manually with little adjustment
- Take seconds to convert
Autonomous Truck-Mounted Attenuator (ATMA)

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Other Features:
• External E-stop buttons through out
• Real time 360 viewing camera w/in-cab monitor
• “Black Box” recording system
• Rear radar speed feedback sign
• Mini message board messaging system
• Remote shut off and restart prevention
• Lead vehicle remote manual control
Autonomous Truck-Mounted Attenuator (ATMA)
CDOT Deployment | Challenges / System Limitation

- Varying follow gap
- Traffic lights
- Overpasses/Tunnels
- Turn signal activation
- Front Radar around corners
- Lead Vehicle Awareness
Autonomous Truck-Mounted Attenuator (ATMA)
Proposal For use | Possibilities

- Traffic control
- Materials Testing/Survey
- Striping
- Shoulder Applications: Sweeping, etc

Each operation will have its own specific set challenges that may require system configuration.
ACCELERATED BRIDGE CONSTRUCTION (ABC)

• ABC uses innovative planning, design, materials, and construction methods in a safe and cost-effective manner to reduce construction time that occurs when building, replacing or rehabilitating bridges.
• ABC improves
  • Safety for public and agency/contractor personnel
  • Material Quality and product durability

• ABC reduces
  • Traffic impacts
  • Onsite construction time
  • Weather related delays

• ABC can minimize
  • Environmental impacts
  • Alignment impacts
  • Utility relocations and right-of-way take
COMMON ABC TECHNIQUE:

- PREFABRICATED BRIDGE ELEMENTS AND SYSTEMS (PBES) – DEF.: STRUCTURAL COMPONENTS BUILT OFFSITE TO REDUCE THE ONSITE TIME AND IMPACT TIME TYPICAL OF CONVENTIONAL CONSTRUCTION
  - Foundations, Piers
  - Beams and Girders
  - Stay-in-Place Deck Forming
  - Full-Depth Deck Panels
  - Modular Superstructure Systems
  - Abutments
  - Wing and Retaining Walls
## ABC ADVANTAGES VS. DISADVANTAGES OF PBES

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tr>
<td>Reduced Road User Impacts</td>
<td>Increased construction costs (10-30%)</td>
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<td>Improved Worker and Motorist Safety</td>
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<td>Expedited Project Planning Process</td>
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<td>Improved Quality</td>
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<tr>
<td>Improved Constructability</td>
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<td>Reduced Cost to Society</td>
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Project Background:
NE 8th St., Bellevue, WA (Pop. 140,000)
- 20,000 Veh/Day
- Few I-405 Crossings
VIDEO – NE 8TH STREET, BELLEVUE WA.

- COURTESY OF HDR ENGINEERING, ATKINSON CONST., & WSDOT
Modern Construction

eCONSTRUCTION-3D Modeling

SAFETY-Autonomous TMA Technology

Accelerated Bridge Construction
Good, bad or indifferent, if you are not investing in new technology, you are going to be left behind.

Philip Green