Accelerated Bridge Construction

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Conventional Bridge Construction

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Precast Arches and Culvert Liners

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Accelerated Construction

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How Did We Get Started with Accelerated Bridge Construction in Vermont?

- We realized that we had many bridges that were structurally deficient and even more that were functionally obsolete, and we were falling further behind
- Significant increase in funding allocated to the bridge program
  - 2009 American Recovery and Reinvestment Act
- New construction techniques and material availability
- Tropical Storm Irene

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Structures Reorganization

- In the post-Irene aftermath, VTrans structures section was reorganized in 2012 to streamline project delivery
  - Project Initiation and Innovation Team (PIIT)
  - Accelerated Bridge Program (ABP)
  - Legislative Buy-In

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Project Initiation & Innovation Team (Scoping)

- All bridge projects start here
- Alternatives for project type and magnitude are compared, including costs
- Hard look at maintenance of traffic for detour opportunities
  - Without reasonable detours, accelerated projects much less likely
- Large investment in early public outreach and consensus building
- Some projects are just not suited for closures, i.e. long detours

Accelerated Bridge Program (ABP)

- ABP was created to accelerate the design and replacement of structures, as well as promote innovative solutions
- 24 month goal from project definition to procurement (traditionally 4-5 years)
- Aggressive project schedules
  - Short term road closures (48 hours up to 45 days)
- Promote safety for workers and traveling public
- Reduce impacts to:
  - Environmental Resources, Utilities, Right-of-Way
- Reduce design and construction costs

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Incentives for Accelerated Construction

- Vermont Act 153 of 2012 – Incentives to Towns on Town projects to allow bridge/road closure during portions of the work
  - Reduces local share of project
- Bypass mitigation grants
  - Provides grants to Towns on State projects for wear and tear on local roads during State project closures
- Concerted public outreach and information campaign gets the word out to citizens and businesses in advance of closures
- Incentive/Disincentive program for contractors

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Rochester, VT: Replacement of 4 Bridges

- Rochester VT73: Bridges 13, 15, 16, and 19
- All four bridges were developed simultaneously for a coordinated replacement during a single construction season
  - Single VTrans Project Manager, single Design Consultant, and single Contractor
  - Intended to minimize disruptions to the traveling public, private properties, commerce, and residents
  - Closures ranged from 56 hours to 2 weeks
- Challenges
  - Substandard widths and restrictive ROW
  - Long detour routes

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Rochester, VT

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Stowe, VT: Bridge 2 on VT108

- Bridge located in historic downtown village
- Year round tourist destination
  - Bridge closure during Vermont's short "mud season" after ski season but before Memorial Day (6 weeks)
- Incentive/ Disincentives written into contract
- Precast substructure on piles, precast approach slabs, steel girders, and cast-in-place deck
- Weekly meetings with contractor, designers, resident Engineers, town officials, business owners and residents
  - Helped alleviate any potential issues and project schedule on time

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Hartford, VT: Interstate 91 Lateral Slide Project

- Features:
  - First CMGC = Construction Manager/General Contractor Project
  - Replacing two 3-span bridges on the interstate with two single span bridges
  - New superstructures constructed adjacent to existing bridges on temporary supports
  - Substructures for new bridges constructed under existing structure while maintaining traffic on bridge
  - Lateral slide technology to install new bridges during two, 60 hour closure periods in August and September of 2015

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Success of ABC in VT

- Great success with ABC over the past 4 years
  - Have greatly reduced our structurally deficient structures with the help of ABC
- Positive public feedback
  - Short term closures have been preferred to summer long/ phased construction periods
  - Reduced impacts to environment, residents, business owners, and traveling public
- Overall costs reductions
  - ROW acquisition
  - Flaggers and Uniformed Traffic Officers
  - ABC materials and products

Lessons Learned Thus Far

- Poorly signed detours resulting in issues for travelers unfamiliar with area
- New construction techniques
  - Often steep learning curve for engineers, contractors, and inspectors
  - Need to account for additional shop drawing submittals and lifting calculations
- Precast Elements
  - Issues with quality control
  - Limited availability
  - Minimal fabricators and increasing costs

Lessons Learned Thus Far

- Rapid communication on a short-term closure can present problems
  - PM and engineers often unavailable to answer immediate questions and decisions that arise
  - Consider poor cell service in rural project locations
- CIP Concrete/ Grout
  - Need to account for curing times (closure pours, curbs, sidewalks, etc.)
- Guardrail/ approach rail often overlooked
  - Can be hard fit up with precast elements

Future ABC Goals and Objectives

- Continue to minimize project development and construction costs
- Provide better training on new technologies and materials being used in ABC
- Utilize alternative contracting methods
  - Contractor Self Performance
  - Design Build, CM/GC
- Improvement of project plans and details
  - Standardization and consistency from project to project
  - Better written Special Provisions

Future ABC Goals and Objectives

- Require a dry fit-up of precast elements at plant before accepting in field
  - Improve quality control
- Improve upon public outreach
  - Develop website with real time information on performance and construction updates

Questions?

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