Successfully Implementing Innovation
Accelerated Bridge Construction Case Studies and Lessons Learned

Thomas P. Donald, P.E.,
Director of Bridge Project Management, MassDOT
Presentation Outline

- Accelerated Bridge Program
  - Improving Bridge Health
- Innovations & Cultural Shift
- Reconstruct Bridges with Minimal Disruption to the Users
- Best Projects
Accelerated Bridge Program

- Began in August, 2008
- $3.1 billion
- Roughly 200 projects
- Primary Goal: Improve bridge condition / reduce number of SD bridges to 450 by 2016

Be efficient & innovative!!
Innovations Implemented by ABP

- Design Build
- Advance utility coordination and reimbursement
- Streamlined environmental permitting
- Incentives / Disincentives
- Modern schedule requirements – Design & Construction
- Comment Resolution Meetings
Innovations Implemented by ABP

- PBES using steel, precast concrete, aluminum, and FRP
- SPMT bridge moves
- Rapid-set concrete
- Innovation being implemented on a significant number of projects
Cultural Shift

- Establish new team
- Create new positions
- Empower staff
- Foster creativity
- Educate staff
- Feedback from construction
- Industry support and input
2010 Projects

First ABC Projects
Phillipston Heavy Lift Facts

- Route 2 over 2A in the Pioneer Valley
- ADT: 16,700
- Short detour used existing (modified ramps)
- Scheduled to be closed for 202 hours during fall foliage season
- Bridge and roads reopened in just 121 hours (81 hours ahead of schedule)
- Comprehensive outreach
- Completed under budget
- Cost avoidance of $2.5 M

Phillipston - Heavy Lift – 1st in MA
Phillipston - Heavy Lift – 1st in MA
Windsor Project Facts

- High Street Hill Road over Westfield Brook
- ADT: 100
- Needed short duration of construction to allow travel in the winter

Windsor - Precast Arch
Windsor - Precast Arch

After
Randolph Project Facts

- DCR Access Road over busy Route 24
- ADT: 100
- Needed to minimize impact to Route 24 and reduce profile of bridge to improve vertical clearance
- 248 feet long x 30 feet wide
- Made of 31 Channel Bridge Beams

Randolph - Channel Bridge
Randolph - Channel Bridge
2011 Projects

Bold moves
Wellesley - Heavy Lift Facts

• Cedar Street over Route 9 just west of the Rt I-95 interchange
• ADT: 16,700
• Short detour used existing (modified) ramps
• Scheduled to be closed for 72 hours during Independence Day weekend
• Bridge and roads reopened in just 61 hours (11 hours ahead of schedule)
• Award-winning public information campaign

Before

After

Wellesley – Heavy Lift
Wellesley Heavy Lift
Windsor Precast Arch

July 1, 10:30 PM
Demolition of old bridge superstructure is underway

July 2, 10:30 AM
Demolition of old bridge superstructure completed

July 2, 10:30 PM
Erecting pier and abutment caps

July 3, 10:30 AM
The new bridge is in place
Medford - 93 Fast 14 Project Facts

• 14 structures carrying I-93 over various roads and the Mystic River
• ADT: 200,000 in each direction
• Urgent need for emergency repairs and superstructure replacements
• Substructure repairs performed in spring
• All 14 superstructures replaced in a series of ten consecutive 55-hour work weekends in a single summer.
• No impact to weekday rush hour traffic

Medford - 93 Fast 14
Friday night, 10:00 PM – Demolition Begins

Medford -93 Fast 14
Saturday Morning, 7:00 AM – Demolition Complete

Medford -93 Fast 14
Saturday – Erection of PBU’s

Medford -93 Fast 14
Saturday Afternoon- Forming of Closure Pours

Medford - 93 Fast 14
Saturday Afternoon – Placement of Rebar

Medford -93 Fast 14
Sunday Morning – Placement of High Early Concrete

Medford -93 Fast 14
Monday Morning, 5:00 AM – Open for Traffic

Medford -93 Fast 14
Fitchburg – “Bridge-in-a-Backpack”

Fitchburg Project Facts

- Ashby West Road over the Scott Reservoir Outlet
- ADT: 500
- Monitored by MassDOT in partnership with UMass
Fitchburg – “Bridge-in-a-Backpack”
2012 Projects

Full steam ahead in a busy construction season
• Urban location in Boston
• ADT: 16,700
• Bus Route; Heavy pedestrian traffic
• Total duration of bridge closure: 3 days

Boston - River Street Heavy Lift
Boston - River Street Heavy Lift
Boston - River Street Heavy Lift
Brimfield NEXT-F Project Facts

- Route 19/Wales Rd. over Mill Brook
- Environmentally sensitive area
- ADT: 1,900
- Instrumented by UMass
- 2 phases to allow access to critical services
- Bridge never closed
Brimfield - NEXT-F Beams
Taunton - Holloway Street Project Facts

- Holloway Street over SR 140 NB
- ADT: 1,700 on Holloway Street
- ADT: 37,800 on Route 140
- Replaced using PBUs in a single construction season
Taunton - Holloway Street – PBU’s
Dover-Needham Project

Facts

- Willow Street over Charles River
- ADT: 4,000
- Replaced historic bridge with unique, colored stones
- Precast arch
- Faced with stones from original bridge

Dover-Needham Context-Sensitive Arch
Dover-Needham Context-Sensitive Arch
Riverside Ave. Pedestrian Bridge
Worthington Project Facts

• Route 112 (Dingle Rd.) over Kearney Brook
• **ADT: 300**
• Replaced during a 60-day closure period
• New bridge made of 8 PC footings, 6 PB abutments walls, 4 PC wing walls, 4 PC guardrail transitions, 8 PC approach slabs, and 3 PC 32F NEXT Beams
• First curved flange NEXT Beam bridge
• **Completed in 60 days**
Worthington, 100% Precast, NEXT-F
Worthington, 100% Precast, NEXT-F
After

Worthington, 100% Precast, NEXT-F
Charlemont Project Facts

• Mountain Road over Hartwell Brook
• ADT: 100
• Replaced using NEXT-Fs within a 90-day closure period

Charlemont, NEXT-F
Southwick Project Facts

- Route 202/Route 10 over Johnson Brook
- Environmentally sensitive area with endangered species
- ADT: 8017
- Precast concrete abutments, wingwalls and arch bridge structure with T-wall type retaining wall on CIP foundations
- Replaced in 3 stages
- Completed 4 months ahead of schedule

Southwick - Precast Arch
Southwick – Precast Arch
Taunton - Bay Street Project Facts

- Bridge carries Bay Street over the Mill River
- ADT 17,300
- Includes a dam, fish ladder and eel ladder
- Secant pile wall
- Replaced in a single construction season using PBUs

Taunton - Bay Street, PBU’s
Taunton - Bay Street, PBU’s
Conway Project Facts

- Bridge carries North Poland Road over the Poland Brook
- ADT: 120
- 100% prefabricated bridge elements
- Replaced in a single construction season using recycled Inverset units
Conway, Recycled Inverset Units
2013 Construction Season

Innovation goes mainstream
Chicopee Project Facts

- Bridge carries SR 116 over the Chicopee River
- ADT: 15,500
- Deck panels erected in January, 2013

Chicopee – Precast Concrete Deck Panels
Chicopee – Precast Concrete Deck Panels
Chicopee – Precast Concrete Deck Panels
Rocks Village Bridge Project Facts

- Crosses Merrimack River between Haverhill and West Newbury
- ADT: 6,500
- Unique truss structure
- Historic bridge
- FRP will allow structure to carry truck loads

Haverhill – West Newbury, Rocks Village Bridge
FRP Deck Panels
Haverhill – West Newbury, Rocks Village Bridge
FRP Deck Panels
Fairhaven Project Facts

• Bridge carries I-195 over River Ave., 2 miles east of New Bedford
• ADT: 50,000

Fairhaven – I-195, PBU’s
Fairhaven – I-195, PBU’s
TYPICAL STEEL PLATE SECTION
SCALE: 1" = 1'-0"

STEEL PLATE NOTES:
1) LOCKING CHANNELS SHALL BE SPACED AT A MAXIMUM OF 6'-0" O.C. WITH A MINIMUM OF 2 CHANNELS PER PLATE SECTION.
2) FOR ADDITIONAL INFORMATION SEE TYP. LONG. CLOSURE POUR SECTION THIS SHEET.

Fairhaven – I-195, PBU's
Easthampton - Deck Bulb Tee

- Route 10 over the Manhan River
- ADT 22,440
- Eight 1220NEBT deck girders 5 feet wide, 95 feet long, 8-inch-thick with 8-foot-wide top flange
Easthampton - Deck Bulb Tee
Easthampton - Deck Bulb Tee
Compression Data - Ductal® JS1000

Contractor: Northern Construction  CA: MassDOT
Project: Reo 10 Manhan Bridge  Location: MassDOT Northampton
Cast Date: 5-Feb-13  Flow: Static 225 mm
Lot #: 90018115  Dynamic 249 mm
Batch #: 1  Temperature: Ambient 19 °C
Batch Finish Time: na  Ductal® 20 °C
Casting Location: Northampton DOT facility

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Comments: 

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Easthampton - Deck Bulb Tee
Feedback & Questions