



MassDOT's ACCELERATED BRIDGE PROGRAM and 93FAST14 Project



Thomas P. Donald, P.E.
Director of Bridge Project Management
Massachusetts Department of Transportation

ABC-UTC (www.abc-utc.flu.edu) In-Depth Web Training

MassDOT's ACCELERATED BRIDGE PROGRAM




- Enacted August 4, 2008
- Addresses long-overdue infrastructure needs
- 4,676 bridges, many were near end of design life
- 543 SD bridges (8/08)

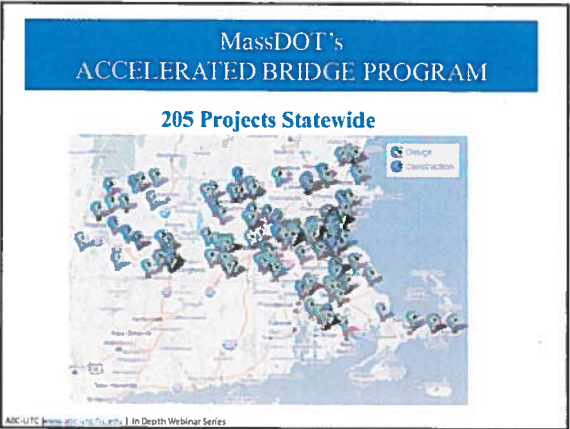
ABC-UTC (www.abc-utc.flu.edu) In-Depth Webinar Series

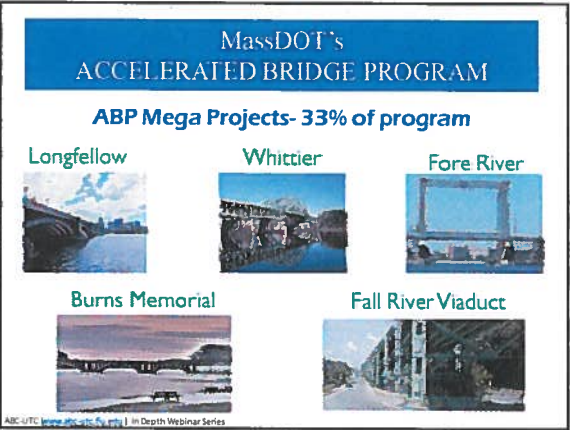
MassDOT's ACCELERATED BRIDGE PROGRAM

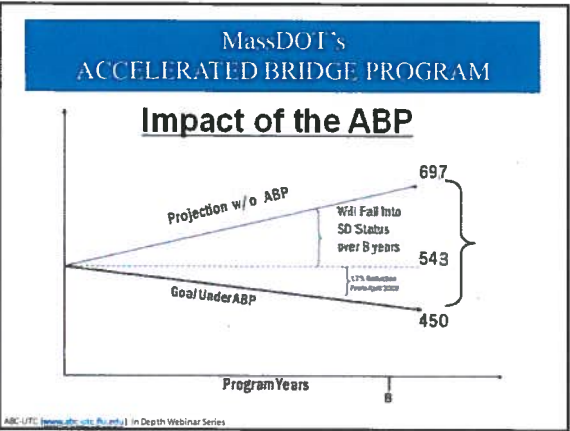
Authorization
 Chapter 233 of the Acts of 2008 (August 2008)
 Program must be complete by 2016
 Funds available total \$2,984,000,000



ABC-UTC (www.abc-utc.flu.edu) In-Depth Webinar Series





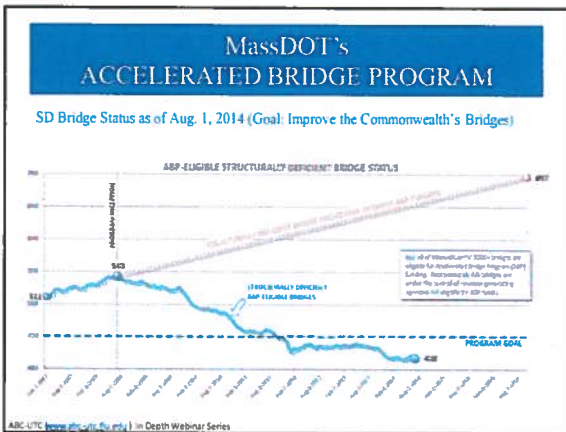


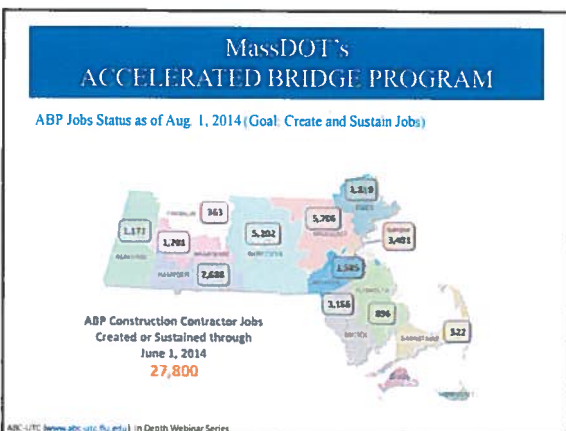
MassDOT's ACCELERATED BRIDGE PROGRAM

ABP Goals

- Improve Commonwealth's Bridges
- Create and Sustain Jobs
- Save \$ by Completing Projects Sooner
- Be Innovative and Efficient
- Provide Access and Opportunity for All
- Be Transparent and Accountable

ABC-UTC www.abc-utc.org | In Depth Webinar Series






**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Culture Shift (Goal: Be Innovative and Efficient)

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



ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Innovations Implemented by ABP

- Design Build
- Advance utility coordination and reimbursement
- Streamlined environmental permitting
- Modern schedule requirements – Design & Construction
- Comment Resolution Meetings

ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Innovations Implemented by ABP

- PBES (Prefabricated Bridge Elements and Systems) using steel, precast concrete, aluminum, and FRP
- SPMT (Self Propelled Modular Transporters) bridge moves
- Rapid-Set / High Strength concrete


ABC-UTC www.abc-utc.org | In Depth Webinar Series

MassDOT's ACCELERATED BRIDGE PROGRAM

Self Propelled Modular Transporters

Phillipston Heavy Lift Facts

- Route 2 over 2A
- ADT: 18,200
- 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




ABC UTC www.abc-utc.org In Depth Webinar Series

MassDOT's ACCELERATED BRIDGE PROGRAM

Self Propelled Modular Transporters


Wellesley - Heavy Lift Facts

- Cedar Street over Route 9 just west of Rt I-95 interchange
- ADT: 17,940
- 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




ABC UTC www.abc-utc.org In Depth Webinar Series


MassDOT's ACCELERATED BRIDGE PROGRAM




Job 1, 10/10/13
Disassembly of old bridge superstructure in roadway



Job 2, 10/21/13
Re-assembly of old bridge superstructure has completed



Job 3, 10/21/13
Finalizing pier and abutment caps



Job 4, 10/28/13
The new bridge is in place


ABC UTC www.abc-utc.org In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Self Propelled Modular Transporters

Boston - River Street

- Urban location in Boston
- ADT: 11,500
- Bus Route; Heavy pedestrian traffic
- Total duration of bridge closure: 3 days




ABC-UTC www.abc-utc.org in Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Self Propelled Modular Transporters

Boston - Morton Street

- Urban location in Boston
- ADT: 23,100
- Bus Route; Heavy pedestrian traffic
- Several businesses located close to the bridge
- Total duration of bridge closure: 3 days



ABC-UTC www.abc-utc.org in Depth Webinar Series



**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Precast Concrete

Worthington - Rt. 112 over Kearney Brook

- ADT: 300
- Replaced during a 60 day closure period
- New bridge made of 8 PC footings, 6 PC 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


ABC-UTC www.abc-utc.org in Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Precast Concrete
Randolph – DCR Access Rd over Rt. 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




ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Precast Concrete
Chicopee – Rt 116 over Chicopee River

- ADT: 15,500
- Deck panels erected in January, 2013




ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Precast Concrete
Southwick – Rt 202 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



ABC-UTC www.abc-utc.org | In Depth Webinar Series



**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Folded Plate Girder

Usbridge – River Rd over Ironstone Brook

- Deck precast compositely to girders
- Precast reinforced concrete integral abutments
- 4 folded plate girders- install in 1 day
- Project completed in 13 weeks



ABC-UTC www.abc-utc.org | in Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Bridge-in-a-backpack

Fitchburg - Ashby West Rd over the Scott Reservoir Outlet

ABC-UTC www.abc-utc.org | in Depth Webinar Series



**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Fiber Reinforced Polymer (FRP) Decking

Haverhill – West Newbury, Rocks Village Bridge

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

ABC-UTC www.abc-utc.org | in Depth Webinar Series



**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Prefabricated Bridge Units (PBU's)

Taunton - Holloway Street

- ADT: 1,700 on Holloway Street
- ADT: 37,800 on Route 140
- Replaced using PBUs in a single construction season

ABC-UTC www.abc-utc.org In Depth Webinar Series



**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Prefabricated Bridge Units (PBU's)

Taunton - 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 PBU's

ABC-UTC www.abc-utc.org In Depth Webinar Series


**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Prefabricated Bridge Units (PBU's)

Revere - Revere Beach Parkway over State Road and MBTA

- ADT 14,100
- Two-span bridge with Link Slab over pier
- Maintained traffic on the bridge throughout construction
- Replaced in two - 3 day weekends using PBU's



ABC-UTC www.abc-utc.org In Depth Webinar Series


**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Prefabricated Bridge Units (PBU's)

Fairhaven – I-195 over River Ave.

- ADT 27,500
- Provided two lane, two-way traffic on one barrel using cross-overs during weekend work
- Replaced in two – 3 day weekends using PBUs



ABC-UTC www.abc-utc.com | In Depth Webinar Series


**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Prefabricated Bridge Units (PBU's)

Medford – I-93 "FAST14"

- 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




ABC-UTC www.abc-utc.com | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"




ABC-UTC www.abc-utc.com | In Depth Webinar Series

MassDOT's
ACCELERATED BRIDGE PROGRAM

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"

- A scheduled highway resurfacing project, started in 2008, exposed severely deteriorated bridge decks
- Old age and chloride intrusion from snow and ice control were the main contributors to degradation




ABC-UTC www.abc-utc.org | In Depth Webinar Series

MassDOT's
ACCELERATED BRIDGE PROGRAM

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"




ABC-UTC www.abc-utc.org | In Depth Webinar Series

MassDOT's
ACCELERATED BRIDGE PROGRAM

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"




ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

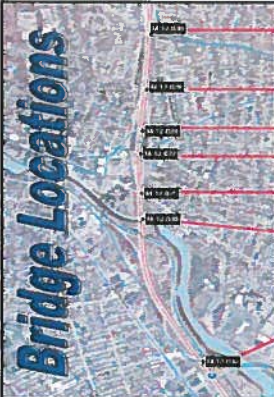
Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"

- Valley Street deck failure underscored the need for a deck replacement project for the entire corridor
- Traffic volumes preclude long term lane closures
- The decision was made "FIX THEM ALL IN THE SUMMER OF 2011"



ABC-UTC www.abc-utc.org In Depth Webinar Series



Valley Street

Webster Street

Salem Street WB

Salem Street EB

Riverside Avenue

Mystic River

Route 16

7 Bridges are spaced out within a 1.5 mile corridor



massDOT
707.276.7272

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"

- Multi stage – (possibly five)
- Minimum 4 years
- Worker safety issues
- Traffic splits
- Narrow travel lanes
- Loss of accel/decel lanes
- Concern over durability of the existing decks


ABC-UTC www.abc-utc.org In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"

- Replace 14 deteriorated bridge superstructures over 10 weekends in June, July & August
- No work on July 4th weekend
- 2 weekends of float for weather/construction issues
- Use 1 side of I-93 to provide 2 lanes of NB and SB traffic on weekends



ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Project Background

- June 21, 2010 - CME retained to study deck replacements on I-93.
- Aug. 4, 2010 - Deck failure occurs causing major traffic backup.
- Aug. 16, 2010 - CME scope revised to prepare preliminary design for replacement of 14 bridge superstructures.
- Aug. 22, 2010 - Request for Letters of Interest issued.
- Oct. 1, 2010 - Letters of Interest received.
- Oct. 4, 2010 - Request for Qualifications issued.
- Oct. 22, 2010 - Statements of Qualifications received.
- Nov. 1, 2010 - Request for Proposals issued to short-listed D-B teams.
- Dec. 22, 2010 - Technical proposals/bids received.
- Jan. 12, 2011 - Oral presentations.
- Jan. 19, 2011 - Bids opened; Best Value determined.
- Feb. 1, 2011 - Notice to Proceed issued.

ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Procurement Method: Design-Build

- Enabled construction to begin roughly 5 months after project inception
- Simultaneous Fabrication, Materials Development, Design & Construction
- Risk of design is distributed to contractor who hires consultant to complete design from 25% level. Contractor owns the design.
- Incentive/Disincentive used to push schedule and reward acceleration and penalize delays

ABC-UTC www.abc-utc.org | In Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Medford I-93 "FAST14"

Project Background


- CME Associates, Inc. (Mike Culmo) – MassDOT's designer for studies, conceptual and preliminary design, preparation of D-B procurement documents, and technical reviews during final design and construction.
- Joint Venture of J. F. White / Kiewit (Kevin Lampron) selected by MassDOT through "Best Value" Design-Build procurement method.
- Gill Engineering (Joe Gill) – lead bridge engineers for J. F. White/Kiewit.
- Team had extensive road, bridge and tunnel experience
- Team brought expertise in the following:
 - Design-Build projects
 - Accelerated Bridge Construction techniques
 - Traffic Management
 - Contingency Planning
 - Community Outreach

ABC-UTC [www.abc-utc.org](#) | In-Depth Webinar Series

**MassDOT's
ACCELERATED BRIDGE PROGRAM**

Prefabricated Bridge Elements & Systems

Medford I-93 "FAST14"



ABC-UTC [www.abc-utc.org](#) | In-Depth Webinar Series
