

ACEC/MaineDOT Bridge Design Subcommittee

MEETING MINUTES

December 10, 2024

Location

Hybrid: Virtual/DOTConfRM 317

Time

1:00 PM to 3:00 PM

Purpose of Meeting

4th Quarter 2024 Meeting

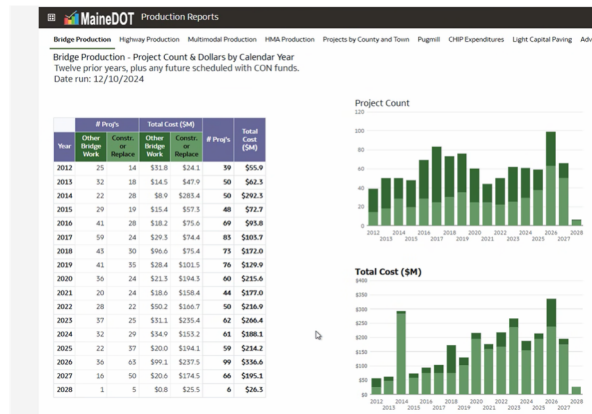
Invitees

- | | |
|-------------------------------|------------------------------------|
| ■ Garrett Gustafson, MaineDOT | □ Wayne Frankhauser, MaineDOT |
| ■ Laura Krusinski, MaineDOT | ■ John Byatt, BETA |
| ■ Ron Taylor, MaineDOT | ■ Shannon Beaumont, Fuss & O'Neill |
| ■ Richard Myers, MaineDOT | ■ Bryson Welch, Thornton Tomasetti |
| ■ Joshua Hasbrouck, MaineDOT | ■ Bryan Steinert, Haley & Aldrich |
| ■ Tim Aguilar MaineDOT | ■ Robert Blunt, VHB |
| □ Erin Binghalib, MaineDOT | |
| ■ Cindy Stafford, MaineDOT | |

AGENDA ITEMS

- Members
 - Bryson Welch, Chair
 - John Byatt, BETA Group first meeting
- Meeting Minutes Submission
 - Meeting minutes for Q3 were reviewed and have been posted to the ACEC website
- Information Dissemination by MaineDOT
 - Contracting/workload:
 - 2025-2026 Work Plan – Fairly Large
 - Spike in 2026 needed to be leveled out. (126 to 88)
 - Moved close to 30 projects from 2026 to 2027
 - New projects to be delivered in 27.
 - Total of 97 projects.
 - Only ½ funded as PE only, which only needs to be advertised in 2027.
 - Lots of projects in 2026 and 2027 only have PE money, have not progressed enough to have a construction estimate, and will need to shifted to 2028.
 - Totals don't include large projects (10 mil+)
 - Bangor-Brewer I-395 Design Build Bundle – 2026
 - i. Team North

- USDOT BIP (Bridge Investment Program) – Sydney to Waterville Bundle



2025

55 Projects
 35 Replacements
 \$208M (note: total cost including engineering and ROW)

*Doesn't include Sidney – Waterville Design Build Bundle, 6 bridges over I-95

Larger:
 Cumberland – Tuttle
 Yarmouth – Exit 15
 Dover-Foxcroft – Dover
 Hogan Road

2026

88 Projects
 55 Replacements
 \$314.7M (note: total cost including engineering and ROW)

*Doesn't include Bangor – Brewer I-395 Design Build Bundle, 6 bridges, some being replaced and some rehabilitated, including a rehabilitation of the Veterans Remembrance Bridge over the Penobscot River.

Larger:
 Augusta – Augusta Memorial (rehab.)
 Buxton – West Buxton (rehab.)
 Drew PLT – Mattawamkeag
 Palmyra – Route 100 over I-95 (exit 157)

2027

Forecasting about 97 projects to be advertised
 \$247.2 M (note: total cost including engineering and ROW)

Larger:
 Orono – Forest Ave over I-95
 Macwahoc PLT – Molunkus

*Lose clarity on size and scope on some projects in 2027 and beyond

GCA Schedule: reviewing and ranking done by middle of January

Grant update: News release from 10/31

- \$70M through the USDOT BIP (Bridge Investment Program) for the Sidney to Waterville bundle
- \$63M through the same program for the I-395 Bangor to Brewer bundle

Staffing Update (PM highlights)

- Julie Brask was promoted to Senior PM
- Trevor Gleason was promoted to PM1
- Andy Lathe left Bridge Program

BDG

- Still go over final edits to chapters 1-3

- General Consulting Agreement (GCA) Schedule

- Reviewing RFQs now through April.
- Interviews February and March
- Interviews anticipated for:
 - Firms on the border of getting a GCA
 - Firms with no GCA contract within the last 3 years
 - New firms to MaineDOT
- Federal Grants & Federal Funding Updates
 - Three bundles with AOP grant.
 - Still finalizing grant agreements for those.
 - Projects are either executed or close to being executed.
- MaineDOT Staffing Update
 - Andrew Lathe – Left Senior PM position in Bridge to go to Planning.
 - Julie Brask – Senior PM for Team South
 - Filled Devan Eaton's vacant position.
 - Trevor Gleason Promoted
 - Filled Julie's position.
 - Interviewing for Andy's Senior PM position
 - Decision will be made after the holidays.
 - Chad Lewis is no longer at the MaineDOT,
 - Erin Bingham is the new director of the Contract Procurement Office.
- Standards Update (BDG, PDR/PIC, CADD, Notes)
 - BDG update
 - Chapters 1 – 3
 - Chapters 1 and 2 are complete and completing final approval of tracked changes for Chapter 3 now.
 - Mostly just need to accept tracked changes.
 - Likely completed in January.
 - Hoping that it will go to ACEC at the same time as Federal Highway.
 - Potentially throwing it out to a single contact person at each current Bridge GCA firm, and ACEC Bridge Subcommittee will consolidate the comments.
 - Laura explained the review process for Chapter 5 Geotechnical (review already completed)
 - Included FHWA
 - Handpicked Bridge and Geotechnical GCA consultants they worked with the most.

- Each company sent files back with comments.
 - As a group, went through them and those that needed to be addressed were discussed at designer's meetings to determine how to address them.
- OpenRoads update
 - Back and forth on standards – getting formats to merge.
 - ROW – Issues with linestyles not showing up or not looking like it's supposed to.
 - Big task for Bridge Team to make sure things look correctly.
 - MaineDOT has a grant to move forward to complete digital delivery of projects by 2030. Not sure whether its everything (OpenRoads and OpenBridge)
 - No single point person for bridge plans in ORD.
- Summary of Designer Meetings
 - Meeting 1: Cell Bridge System – Fort Miller Precast (NY)– Full Depth Deck Panel System (Proprietary)
 - Puts deck in compression without post-tensioning and extensive closure pours.
 - End panels first, then jack to push panels together, then grouted.
 - Shear key joint between panels only.
 - i. Epoxy applied on the interface of shear key.
 - Example Project – I-89 Bridge Deck Removal and Replacement in VT with 60-hour closure
 - It's not something the Consultant would design
 - Alternate design by the Contractor.
 - Or company would need to be a subconsultant involved in a design (particularly for multiple span bridges).
 - Potential changes load rating.
 - Meeting 2: Vector Corrosion Technologies
 - Various GPR and Corrosion for Concrete
- Geotechnical Update (Laura K.)
 - N/A
- Contracts Update by Erin Binghalib
 - Currently processing prequals.
 - 86 Proposals submitted.
 - Important to use templates.

- Maine PE Expiration dates are required in the GCA.
 - 60% of proposals kicked back for not having this.
- Lots of turnover in Contracts for the last few years. Finally up-to-date on invoices.
- Discussion Topics
 - Cost Estimating
 - MaineDOT
 - 4 to 5 projects to be advertised on 12/13 and 3 advertising tomorrow.
 - Keep in mind potential tariffs (post election) could throw prices totally out of whack.
 - Engineers' Estimates have generally been high lately. Prices have moderated a little bit.
 - Stone materials are expensive and hard to get – per Cianbro (Aggregate, Gravels, etc.)
 - Steel prices have leveled off.
 - Lumber is easier and cheaper.
 - Other States
 - NHDOT iPD Web – access to unit prices, regressions, etc.
 - Plan sets and bid tabs available online for all projects.
 - VTrans iPD program for delivered estimates electronically and downloading information for quantity summary sheets.
 - Individual logins required to sign off on estimates (doers and checkers)
 - Maine expressed an interest in touching base with VTrans counterparts to discuss their program.
 - MassDOT Construction Project Estimator
 - Limited by lump sum bridge item.
 - i. Difficult to gain access to bridge item unit prices unless provided by MassDOT PM.
 - Integral wearing surfaces on (continuous) bridges
 - Discuss at future meeting.
 - Reuse existing abutments and scour protection (geotechnical portion)
 - Discuss at future meeting.
- Additional Topics Raised in Meeting
 - Refresh Memo for Plan Development
- Suggestions for Future Discussion Topics
 - Concrete quality (shrinkage cracks)

- Review of BDG updates
- CADD Training
- Recommended Training
- Knowledge transfer on new products/materials
- Construction and maintenance lessons learned
- Collaborative review processes
- File Sharing Improvements
 - MaineDOT FTP – no longer secure.
 - MaineDOT PM should be providing a link for secure upload of project materials.
 - Consultants often use large file transfers rather than utilizing FTP.
 - Ongoing discussions within MaineDOT..

- Training:
 - Hydraulic Training – Waiting to determine who is interested internally, so we should hear soon what’s available for consultants. Virtual instructor – 4 days. Live instruction component and “Homework” the other half. Potentially February and March.
 - Load Rating Training – Ron Taylor requested a 4-day training starting either 1/6 or 1/13 from NHI. MaineDOT will let us know when there is a set day scheduled.
 - MIDAS Training – Already happened.
 - HCD Training – MaineDOT will work on a potential refresher training.

- Subcommittee Rotation for Consultants:
 - Active:

● Shannon Beaumont, Fuss & O’Neill	Q2 2023 thru Q1 2025
● Bryson Welch, Thornton Tomasetti	Q1 2024 thru Q4 2025
● Robert Blunt, VHB	Q2 2024 thru Q1 2026
● Bryan Steinert, H&A	Q2 2024 thru Q1 2026
● John Byatt, BETA Group	Q4 2024 thru Q3 2026

 - Future:

● Adam Stockin, WSP	Q2 2025 thru Q1 2027
● Sarah Williams, Stantec	Q1 2026 thru Q4 2027

- The Next Meeting is set for:
 - 3/4/25

DESIGNERS MEETING

Minutes for September 18, 2024

2:30 PM – 3:30 PM

Erin Brewer, Secretary

TOPICS

- Topic 1: Fort Miller Precast – [Accel Bridge](#) Presented by Eddie He

Contact Info

- Accel Bridge
 - Eddie He - ehe@accelbridge.com
- Fort Miller Precast – Greenwich, New York
 - John Gonyea - JGonyea@fmgroup.com
 - Josh French - JFrench@fmgroup.com

Benefits to using Accel Bridge

- Compressed deck without internal post-tensioning
- Can be used for ABC construction without needing UHPC concrete
- No rebar or post tension across the joint
- No cast-in-place joints needed

Construction

- Match Cast system
 - Panels are cast flat, no need to follow the bridge profile
 - Apply epoxy to match-cast joint, which is in between the deck segments
 - Use come-along to close the panel joints
- Shear keys with epoxy placed along the top of the girders
- Deck compression by jacking against girders
 - Jacking gap is filled with concrete
- Deck compression by external post-tensioning
 - Posttensioning bar is external to the deck panel
- Monitoring during construction
 - Panel compression
 - Girder stress
 - Stability (panel buckling)

Design

- Deck compression
 - Jacking will not increase the girder size
 - Single span girder, noncompact
 - Deck buckling under construction is not expected (and has been considered)

- Simple hold-down device can be at panel joint provided if needed (due to the bridge profile)
- Skew
 - Can go up to 30 degrees typically
- Curved bridges
 - Can be done, they have specialized reaction blocks along the girder length
- Used both concrete and steel girder types
- Have done long spans, including continuous spans
- Have done girder simple span with continuous deck (link slab)

Examples

- I-89 in Vermont
 - Deck removal and replacement within 59 hour closure-period
 - 3-span continuous
- North Hero Bridge in Vermont
 - Which has expansion joints

End of minutes

DESIGNERS MEETING, OCTOBER 2, 2024

Vector Corrosion Technologies Inc.

Case Pikor (Vector Corrosion) and Bill Horne (NDT) will be speaking about concrete reinforcing steel corrosion.

Technologies

- Ground Penetrating Radar (GPR)
 - Electromagnetic frequencies are pulsed through the concrete and bounces off the rebar.
 - The timing of the return bounce can be used to determine depths (e.g., depth of cover in a deck, depth of a wearing surface, etc.).
 - Can also help determine the quality of the rebar.
 - There is a trade-off of penetration vs resolution. The farther the pulses have to penetrate, the less clear the results will be.
 - Need to calibrate different frequencies and determine best balance of detail and penetration depth.
 - Can be used to locate features other than rebar (such as bedrock).
- Corrosion Potential Measurement
 - A test which measures how many electrons leave the rebar over the test duration.
 - This shows the cathodic resistance of the rebar.
 - Determines the potential for corrosion and identifies current or future corrosion hotspots.
- Crack Depth Assessment
 - Use a mobile surface sensor and triangulation to determine the depths of cracks non-destructively.
- Refraction Survey
 - Similar to GPR, use the refraction pattern of soundwaves to determine ground/bedrock features.
 - The test is much faster to conduct than traditional borings and gives continuous results (not discreet boring holes).
 - Not a replacement for traditional borings. It gives a decent approximation of feature depths but is not exact.
 - Was used to determine material depths for the pier foundations of the Madawaska/Edmundston Internation Bridge.
- Ultrasonic Testing
 - Multiple uses described.
 - First was finding post-tensioning ducts and any voids in post-tensioned concrete.

- Testing for pile lengths of existing bridges and identifying defects in the piles.
- Can find defects in timber construction, but this requires extra sensors, due to the variability of timber's material properties.
- System is waterproof.
- Multiple uses for concrete
 - Determine element thickness.
 - Locate honeycombing.
 - Concrete bonding (measure whether energy from the test crosses the construction joints).
- Case Studies
 - Measure freeze-thaw effects.
 - Determine rebar diameter in an existing structure (don't need to chip-and-find rebar).
 - Refraction Testing used to find deepest part of an aquifer for a well.
 - Asses ASI in marine concrete.

Science of Corrosion

- Corrosion environment in concrete
 - Corrosion is caused by a loss of energy in the steel.
 - Fabricating steel from iron or adds energy to the material. As the steel corrodes (rusts) that energy is released back into the environment.
 - This corrosion is exacerbated by a low pH environment.
 - Concrete is alkaline, a high pH environment. Natural state of concrete protects the steel from corrosion.
 - Steel expands (up to 7 times its original size) as it corrodes. This causes concrete to crack and scale.
- Corrosion Cell
 - Areas in a concrete structure where corrosion occurs.
 - In bridge decks, road salt will eventually penetrate voids in the concrete/shrinkage cracks and reach the top mat of reinforcing steel.
 - This strips any protective layer from the steel.
 - As the corrosion initiates, the top mat becomes the anode (transfers electrons to the cathode) in the corrosion cell.
 - This transfer of electrons through areas with potential differences is the cause of corrosion.
 - The addition of a sacrificial zinc anode at the edge of a concrete patch prevents the creation of a differential potential between the rebar mats, stopping corrosion.
 - The sacrificial anode is ensconced in its own cement mixture within the concrete. This mix expands less and stays contained in the spot where it was

installed. Allows for the anode to expand within the cement without affecting nearby structural concrete.

- All sacrificial anodes have an Anode Aging Factor. They lose ~50% of their electron output after 13 years.
 - The aging factor is used to determine the useful life after 13 years.
 - They have been testing ways to extend the 50% lifespan from 13 years to 25.
- Sacrificial anodes require at least 1.25” of cover.

- Sacrificial Anode Specifications
 - Current specs used by other states focus on mass of zinc in the anodes, but don’t specify required performance of the anode.
 - MassDOT has moved to a performance spec.
 - Specs also lay out required anode spacing.
 - Each anode protects a roughly 24” radius sphere, centered on the anode,
 - The anode needs electronic continuity with the rebar (brush down and clean rebar before installation).

- Galvanic Encasement
 - Used in the Gardiner Expressway instead of replacement.
 - 25+ year lifespan extension.
 - Saved 70,450 cubic yards of concrete.
 - Saved 35,225 tons of greenhouse gasses which would have been emitted during a full replacement.

- Bridge Joints
 - Surface-mounted anode.
 - Drilled into the concrete to make steel connection.
 - Use low resistivity grout.