

## **ACEC/Maine DOT Bridge Design Subcommittee**

### **MEETING MINUTES**

**18 March 2014**

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<b>Attendees:</b>		<b>Location:</b> MaineDOT Room 227 A/B
Mike Wight	MaineDOT	
Marie Malloy	MaineDOT	
Wayne Frankhauser	MaineDOT	
Laura Krusinski	MaineDOT	
Leanne Timberlake	MaineDOT	<b>Time:</b> 10:00AM – 11:30AM
Chris Snow	GZA	
Jason Gallant	CMA Engineers	
Craig Weaver	Kleinfelder	
Steve Hodgdon	VHB	
Keith Donington	Parsons Brinckerhoff	<b>Notes Taken By:</b> Steve Hodgdon

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This was the first quarter ACEC/MaineDOT Bridge Design Subcommittee meeting.

#### **➤ Information from MaineDOT**

- David Sherlock has retired from MaineDOT.
- The Bridge Program has been reviewing the 2007 Report, “Keeping Our Bridges Safe”. They are in the process of updating this report as they look back to what has been accomplished and what is needed to do next. Questions to be answered include:
  - Is the Department keeping on pace with its bridges?
  - Are findings/results supportive of past and current funding?
- Roland Cote has retired from MaineDOT. Bill Doukas is back part-time for a year or so helping the Department in his absence. Joel V. is also assigned to the fabrication team to assist as well as Dennis Dubois.
- Section 7 environmental compliance continues to affect project delivery. Not only salmon habitat a significant issue but bat habitat restrictions will likely be a significant issue as well. There are a lot of uncertainties from regulators and the Department. The permitting process is extremely slow.
  - Mike Wight indicated that Eric Ham of the Environmental Office is the lead on working with the resource agencies on a programmatic

type agreement to improve work flow by developing certain standards and protocols for culverts.

- Marie noted that the Contract Procurement Office (CPO) needs to have overhead rates from all consultants that are current. This should be checked regularly by each consultant.
- Marie noted that the DBE forms have been updated. Please be sure to use the revised form (it has a check-box for “prime” on it).
- Marie stated that there are many invoices coming in that do not have sufficient back-up. Invoices must include copies of timesheets, mileage, rentals, gas for rentals, etc.
- The CPO group is still shorthanded. There are two (2) position openings: One in the Multimodal Program and one in the Environmental Office.
- Leanne provided a brief overview of the Load Rating Program:
  - There are nine (9) current contracts out with consultants.
  - An RFP for 2015 bridge ratings is expected to be issued late spring/early summer. Size of the rating contracts will be dependent on budget available.
  - The Load Rating Guide is supposed to be updated with guidelines on analyzing some non-composite bridges as partially composite. Some consultants have been asked to provide rating analyses using 75% composite behavior if the non-composite analyses for certain bridge configurations do not provide sufficient capacity.
  - If bridges are not rating for legal loads (Rating Factor less than 1.0), more advanced analyses are employed that take advantage of reinforcing in the deck and some composite behavior.
  - There are limits on bond strength between girder flanges and the deck in non-composite bridges. The Department is hopeful on issuing a policy later this year.
  - The Department is working with UMaine on several bridges scheduled for instrumentation and analysis this summer regarding composite behavior of non-composite bridges. The testing includes some concrete beam structures also.
- Laura provided some information on recent research projects:

- Reports 14-01 and 14-02 titled: Development and Evaluation of Pile "High Strain Dynamic Test Database" to Improve Driven Capacity Estimates, Phase 1 and 2 respectively are uploaded at the Department website at: <http://www.maine.gov/mdot/tr/reports/bridgeresearch.htm>. A 1 hour talk to geotechnical engineers will be scheduled. Topics will include considerations of extra shoe area and recommendations on bearing values on bedrock other than the Canadian Geotechnical Society method. Recommendations will also focus on Meyerhof method considerations instead of Nordlund method. How this research will be implemented is uncertain since some methods are not consistent with the AASHTO LRFD Specifications but FHWA is encouraging States to look at opportunities to develop site-specific practices.
- There is another project based on CPT testing. There is an extension on this project to process the data.
- Laura also provided information on the FRP Piling Implementation and Testing conducted by UMaine. Flexural tests are ongoing and axial load tests have been performed on specimens. An interim report has been published on driving; however, an update is needed for the Appendix. Once report is updated, Laura will provide a link to the location for this.
  - Draft design and construction specifications are under development but MaineDOT is not ready to build a bridge yet with the FRP piling.
  - The Department is pursuing funding for another site for pile installation tests.
- The Northern Team has a new project manager, Andrew Lathe. He started in early March of this year. He is new to MaineDOT and comes from the concrete industry.
- Joel Kittredge (formerly PM in the Multimodal Program) is now a project manager for Team South in the Bridge Program.

➤ **Designer's Meetings (Jan 8<sup>th</sup> thru March 5<sup>th</sup>)**

- See attached. Some highlights include:
  - Project pavement designs are to be completed by MaineDOT, not consultants.

- PDR Reports should not contain any load posting recommendations since this is determined by the Bridge Posting Committee. The PDR should report load rating results only.
- The BDG section on seismic design is outdated. Until the BDG is updated and published, seismic analysis and design will be on a project by project basis.
- GFRP reinforcing bid results have been relatively good. However, manufacturers have different material properties making it sometimes difficult to specify. It appears the industry is moving to three classifications to improve the specification process.

➤ **Committee Goals and Future Topics for Discussion**

- Jason circulated a copy of the 2014-2015 Committee Goals including potential technical and business practice topics for future discussion.
  - The core goals of the subcommittee are agreeable.
  - The topics related to load postings and rating approach and methodologies need input from Bridge Maintenance. The group agreed that it would be helpful to have Ben Foster at a subcommittee meeting to discuss these issues. Potentially next meeting in June?
    - Wayne will try to touch base with Ben on this possibility.
  - CADD development and updates will remain with that subcommittee as it works to gain momentum in 2014.
  - Composites in bridge design and construction are still regarded as experimental and on a project by project basis. Not likely to have a dedicated chapter in the BDG for some time.
  - Consultant RFP templates may be beneficial.
  - Code changes likely discussed on a project by project basis.

➤ **Other**

- Craig mentioned that he had heard from one of his former professors at UMaine that they have discontinued the Bridge Design Training program. Craig said that this was an excellent program and asked if some sort of ACEC sponsored short-course should be considered based on the syllabus of the UMaine program. The group was not sure if this was completely in-line with

the committee goals and objectives. More information is needed on the reasoning the course is discontinued.

- Jason Gallant of CMA Engineers is rotating off of the committee at the next meeting. Steve Hodgdon volunteered as the committee consultant chairperson – no exceptions taken.
- Tom Kendrick from MJ will be rotating onto the committee at the next meeting in June.

➤ **Next Meeting Date**

- June 3<sup>rd</sup> at 10 AM - MaineDOT Conference Room. (*Subsequently rescheduled to 1PM*)

Attachments:

Designer Meeting Minutes (Jan 8, Jan 22, Feb 19, and Mar 5)  
2014-2014 Committee Goals dated March 11, 2014

*I have attempted to summarize discussions held during this meeting as accurately as possible. If there are any items discussed herein that are misrepresented in any way, please contact me June 10th. In the absence of any corrections or clarifications, it will be understood that these minutes accurately summarize the discussions at the meeting.*

Respectfully Submitted,

Steven Hodgdon

# Designers Meeting Minutes

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*Wednesday, January 8, 2014*

*Conference Room 317 A&B*

*1:00-1:55 PM*

Attendees: Mike Wight, Brian Reeves, Denis Dubois, Rich Myers, Joel Veilleux, Roger Naous, Laura Krusinski, Joe Stilwell, Tyler Hjelm, Brian Nichols, Devan Eaton, Joel Kittredge, Josh Hasbrouck, Wayne Frankhauser, Dave Sherlock, Mark Parlin

## **1. Xypex results—Stockton Springs**

Rich Myers

A Xypex additive was used for the deck concrete in Stockton Springs to test its ability to reduce permeability and extend the life of the bridge. The bridge is a single span steel with cast-in-place concrete deck with black bar reinforcement. The abutments were cast with normal Class A concrete, the deck with Class A with Xypex added, and the sidewalk and curbs with Class LP, so all three types were present in the bridge and could be compared. In addition to MaineDOT's standard testing, UNH did other extended tests on the concrete's performance.

Xypex is a powder admixture added to the concrete mix at the batch plant. The amount used is not high enough to require a new mix design. The concrete was a stickier mix than normal Class A, making it more difficult to finish. The compressive strength, shrinkage, and chloride ponding test results for the concrete with Xypex added were comparable to the standard Class A mix. The 56 day permeability results were lower with the Xypex, but not as much as with Class LP.

The aggregates used were known to be high in ASR so UNH also tested expansion for a concrete mix without slag, a standard mix with slag, and a standard slag mix with Xypex added. They found that the coarse aggregate was not affected by the Xypex and expansion in the fine aggregate with Xypex at 14 days was slightly higher than without, but within MaineDOT's specifications. Testing at 28 days is not currently required by MaineDOT, but UNH found that 28 day fine aggregate expansion with Xypex was enough higher to potentially be an issue if specifications were revised.

The cost for the Class A with Xypex added is probably comparable with Class LP, so based on the permeability and chloride ponding results, the designers did not believe the Xypex mix is an improvement over Class LP.

**2. Bridge rating results in PDRs**

Wayne Frankhauser

In some cases when a new rating has been calculated as part of the PDR process, the PDR has included a statement of what the bridge must be posted at. Since the Bridge Posting Committee determines load postings and considers other factors in their evaluation, PDRs should report rating results but not make a formal declaration of what the posting should be.

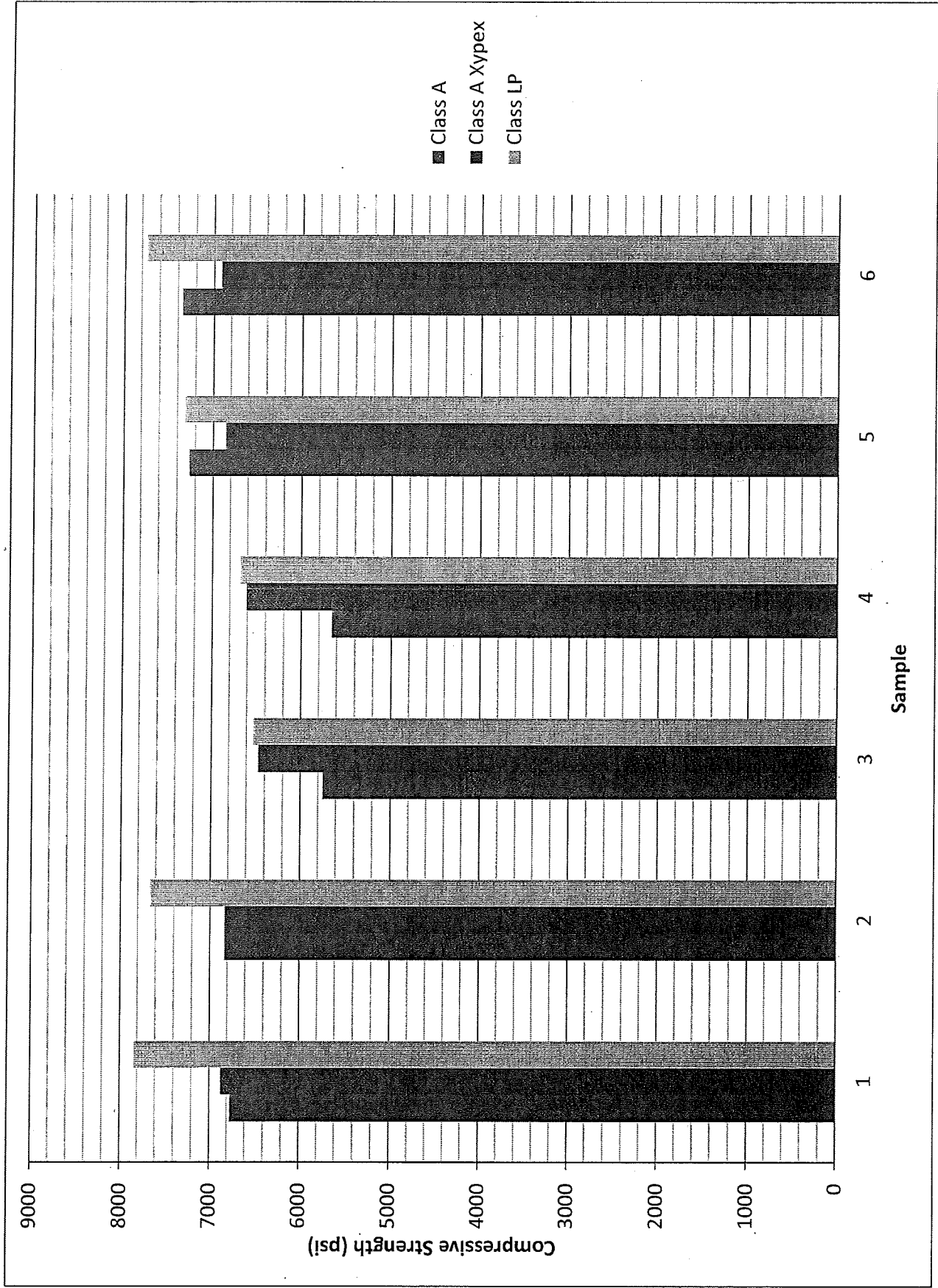
**3. DARWin ME**

Devan Eaton

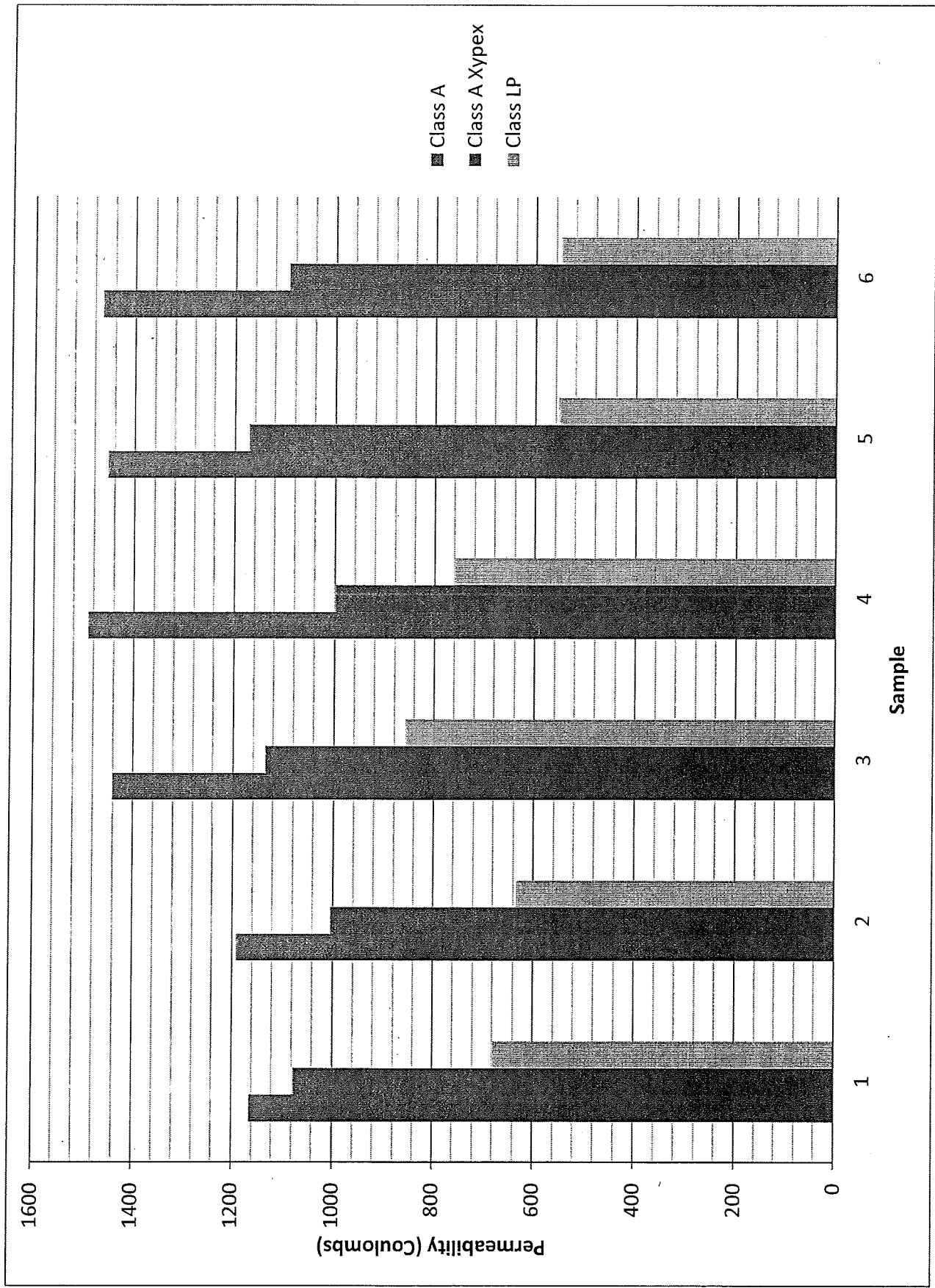
The old DARWin 3.1 program gave inaccurate results for high traffic loadings. There is a new version available that does more complex analysis and will give more accurate results. As part of the new program, the department will be building libraries of aggregate and testing data so the results will improve over time as the amount of data available increases.

The primary difference for most designers will be an additional comment on the traffic request form that Mechanistic Analysis is required. The traffic data will include a second page with these results. The Highway Program is switching over to using DARWin ME for all new projects this year. For Bridge projects, it will primarily be required when doing a complete reconstruction in an area with heavy traffic, so for the time being consult with Devan about what design method will be used before making a traffic request. There is no need to redo anything already requested.

As a result of this change to new software, consultants will not be allowed to do pavement designs; all designs will be done by MaineDOT. Since the process is more complex, pavement design requests need to be made in the PDR stage 1-2 weeks before the design is needed, not at the last minute.







# Designers Meeting Minutes

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*Wednesday, January 22, 2014*

*Conference Room 317 A&B*

*1:00-1:45 PM*

Attendees: Mike Wight, Devan Eaton, Tyler Hjelm, Brian Reeves, Rich Myers, Bob Bulger, Laura Krusinski, Joel Veilleux, Roger Naous, David Sherlock, Dave Sullivan, Joe Stilwell, Brian Nichols, Kate Maguire, Wayne Frankhauser, Garrett Gustafson

## **1. FRP Bridge Drains**

Michael Wight

New England Transportation Consortium (NETC) has started a project to develop standard FRP bridge drain designs, and Mike Wight is the Maine contact person. At the moment there are no specific design options, and getting five states to agree on 2-3 options will require some work, but Mike will be pushing for an option that is very similar to our usual straight drop pipe 8-10" in diameter. The objective is eventually to have 2-3 standard designs that fabricators can make ahead of time and contractors can buy 'off-the-shelf' rather than creating custom designs on a project-by-project basis.

## **2. Fill over concrete box culverts in deep fills**

Michael Wight

When there is deep fill over a box culvert, detailing it with granular borrow for the entire depth is usually unnecessary. Backfilling with native materials decreases the likelihood of there being a dip over the culvert in winter. If the soil is poor quality, it may need to be rejected as unsuitable, but since the deep fill projects are usually built embankments with granular material, this should not normally be a problem. The designers should check the soil with the geotechnical engineer and use native soils rather than granular borrow above the 18" surrounding the culvert if feasible.

## **3. Foundation design for traffic signals and light pole foundations**

Michael Wight

The previous special provision had separate pay items for above grade and below grade structures. The new one uses a single pay item. Kitty Breskin is the lead in developing foundation designs. She will develop a table of sizes for the special provision, based on the soil at the site, then the pole supplier will be responsible for calculating the bending

moment required and working with the contractor to select the correct foundation size. The foundation designs need to be requested from Kitty early in the final design process.

**4. Temporary detour traffic control items**

Michael Wight

Traffic control items for temporary detours are paid for separately. They are not incidental to the temporary detour pay item.

**5. Seismic policy update/discussion**

Michael Wight

The seismic policy as written in the BDG is very dated. According to Laura Krusinski, the draft BDG Chapter 5 has been rewritten to allow either the AASHTO LRFD or Guide Specification for seismic design, and terminology has been updated to include the Guide specification. One of the main issues left is defining what major and critical bridges are. In the current BDG, a major bridge is defined as anything over \$10,000,000, but that number is outdated and problematic. The Guide specification will probably become the standard procedure in coming years and is more lenient for detailing requirements on non-essential bridges. The designers did not think there was a clear advantage between LRFD and Guide specifications, however, so either will be allowed as design options. BDG section 3.7 is almost completely superseded by newer specifications, but has not been revised yet. Garrett Gustafson will take the lead in revising BDG 3.7 to match AASHTO LRFD and Guide specifications.

**6. Buy America regulations for utilities**

Dave Sherlock

New regulations apply the Buy America limitations to all materials used by utilities that are part of our contract if there is federal money in the project. This applies even if the utility work is not paid for by federal money. If the utility does not want to use material that complies, then they will need to either reach a separate agreement with our contractor or do the work separately. The utility coordinators have been working on this and more information will be coming.

**7. New Designers Meeting secretary**

Starting next meeting, Joe Stilwell will be acting as the Designers Meeting secretary. Suggested topics should be submitted to him.

Special Provision  
SECTION 643  
Traffic Signals

643.021 Materials

Add Concrete                      Section 502.03  
Add Reinforcing Steel            Section 503.02

Add Section 643.041 Foundations as follows:

Foundations shall consist of cast-in-place reinforced concrete drilled shafts; one drilled shaft per mast arm or dual purpose pole. Supplier shall determine the Bending Moment, Shear Force, Torsion and Axial Load at the top of each mast arm or dual purpose pole foundation. Foundation size (diameter and length) shall depend on the Torsion and Bending Moment at the top of the foundation based on Chart 1 and 2, below. The larger of the foundation sizes shown for Torsion or Bending Moment shall be the required foundation size. Lengths are depths below lowest adjacent (proposed) grade.

**Chart 1 - Foundation Length (feet) Based on Maximum Torsion**

Torsion (foot-kips)	30" diameter	36" diameter	42" diameter
30	10'		
40	10'		
50	12'	10'	
60		11'	
70		12'	
80		13'	10'
90		14'	11'
100		14'	11'
110		15'	12'

**Chart 2 - Foundation Length (feet) Based on Maximum Bending Moment**

Bending Moment (foot-kips)	30" diameter	36" diameter	42" diameter
30	10'		
40	10'		
50	10'		
60	10'	9'	
70	11'	10'	
80		10'	
90		10'	
100		11'	10'
110		11'	10'

Reinforcing Steel shall be as shown in Standard Detail 626(03) and 626(04) for 30-inch and 36-inch foundations. Reinforcing Steel for 42-inch diameter foundations will be according to the following chart:

<b>Summary of Reinforcing Steel – 42" foundation</b>	
Quantity longitudinal bars	18
Longitudinal bar size	#8
Spiral bar size	#5
Spiral bar spacing (0-2 ft) (inches)	4
Spiral bar spacing (2 ft – L/2) (inches)	8
Spiral bar spacing (L/2 - tip) (inches)	12

Concrete for foundations shall be placed immediately after excavation to prevent water from accumulating in the excavated areas. Concrete shall be Class LP in accordance with Section 502, Structural Concrete. Drilled shaft foundation holes, except in bedrock, shall be excavated by auger method to the neat line of the outside dimensions of the footing without disturbing the soil around or below the proposed footing. Drilled shafts shall not be permanently cased, except for the top 3 feet; concrete shall be cast directly against the surrounding soil. Precast foundations will not be permitted.

All provisions of Section 626.034 Concrete Foundations shall apply to these drilled shaft foundations.

In areas where bedrock is encountered above the proposed bottom of the drilled shaft, the Contractor will have the option of removing rock and placing the shaft at the design depth shown above, or constructing a rock-anchored foundation system to the depth of the foundation shown. Rock-anchored foundations shall be constructed according to Standard Detail 626(06) Foundations for Traffic Signals, Highway Signing and Lighting, or as approved by the Department for drilled shafts greater than 36 inches in diameter.

Section 643.19 Basis of Payment Add the following sentence: Foundations for Mast Arm Poles and Dual Purpose Poles shall be incidental to the Pole Item and shall be full compensation for all labor, equipment and materials for the accepted complete signal foundation installation, including but not limited to foundations, excavation, excavation stabilization, backfill, replacement of subbase gravel, replacement or repair of pavement, slope regarding, and placement of loam, seed and mulch on disturbed slopes.

# Designers Meeting Minutes

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*Wednesday, February 19, 2014*

*Conference Room 317 A&B*

*1:00-2:30 PM*

**1. Use of riprap with concrete cable mats for scour projects**

Brian Reeves

5 minutes

The use of the Standard Detail 610(02) 1 foot cut was brought in to question. It was that discussed and was decided that as long as the riprap was toed in the 1 foot trench was not needed.

**2. Payment for under water riprap**

Rich Myers

10 minutes

it was suggested from the field that underwater riprap be measured by weight instead of truck measure. It was determined that giving the resident the option to use truck measure or truck weight would be best. Rich Myers is taking the lead on the potential change to the spec

**3. Fabrication Engineer intro and overview**

Bill Doukas

10 minutes

Bill Doukas is going to work 20 hours a week in Bridge as the Fabrication Engineer. His duties will be to review shop drawings and to train people review shop drawings. He will only be reviewing Bridge program drawings. Highway and Multimodel will have to review their own drawings. To help Bill, people will be delegated to review shop drawings. Additionally bill is going to work to streamline the submittal process.

# Designers Meeting Minutes

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*Wednesday, March 5, 2014*

*Conference Room 317 A&B*

*1:00-2:30 PM*

**1. Volunteers need for popsicle bridge construction**

Michael Wight

5 minutes

Brian Reeves and Garrett Gustafson are volunteering

**2. Pultrall Fiberglass Rebar**

Wayne Frankhauser

60 minutes

The presentation is located below.

..\..\Meeting Minutes\Designers Minutes\2014\Designers Meeting  
Attachments\Pultrall - Connecticut DOT Technical Presentation - USA - ENG -  
20140313.pptx

# **ACEC/Maine DOT Bridge Design Subcommittee**

## **2014-2015 Committee Goals**

**March 11, 2014**

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In accordance with the request of the Transportation Committee, the parent committee to the Bridge Design Subcommittee, the following draft plan is offered for consideration. The plan was formulated by consultant community subcommittee members (Consultants) and reviewed with MaineDOT subcommittee members (Department) at the first quarter 2014 subcommittee meeting.

### Core Goals of the Bridge Design Subcommittee:

1. Maintain quarterly subcommittee meetings.
2. Foster mutually beneficial training opportunities through FHWA or other resources.
3. Provide Consultant technical expertise for Department consideration on issues of interest.
4. Discuss and review technical and / or project development topics within the Bridge Program.
5. Disseminate Department provided information to bridge designers throughout the ACEC community and promote ACEC community feedback to the Department.

Possible technical and business practice topics for discussion over the next year:

Department overview of the load posting committee; how ratings are reviewed and acted upon.

Status of draft load rating guide and consideration of consultant review and comment?

Composite action of non-composite bridges through load testing / research findings by Consultants.

CADD plan development and updates to the 2007 manual

Integration of 3-D modeling / bridge geometry; implementation of terrestrial LIDAR / laser imaging data.

Review of Bridge Design Guide amendments as they are proposed by The Department and Consultant suggested edits

Permanent implementation of composites in bridge construction.

Project scoping and labor hour estimating process.