

COMMITTEE ON MATERIALS and PAVEMENTS

Mid-Year Webinar Meeting Minutes

Tuesday January 30, 2018

1:00 PM – 3:00 PM CST

**TECHNICAL SECTION 1C
 AGGREGATES**

I. Call to Order and Opening Remarks

- Chair: Scott Seiter
- Vice Chair: vacant

II. Roll Call/Roster

- Attendees: send an email to signify attendance

Voting Members

Name	State	Present
Scott Seiter (Chair)	Oklahoma	X
(V-Chair)		
Steven Ingram	Alabama	X
Michael San Angelo	Alaska	
Paul Burch	Arizona	X
Michael Benson	Arkansas	X
Robert Lauzon	Connecticut	
Wasi Khan	District of Columbia	
John Shoucair	Florida	X
Peter Wu	Georgia	
Mike Santi	Idaho	
Jim Trepanier	Illinois	
Rick Barezinshy	Kansas	
Rick Bradbury	Maine	X
Sejal Barot	Maryland	
John Staton	Michigan	
Curt Turgeon	Minnesota	
Mick Syslo	Nebraska	
Darin Tedford	Nevada	X
Donald Streeter	New York	X
Mickey Cronin	Ohio	X
Greg Stellmach	Oregon	
Mark Felag	Rhode Island	
Michael Doran	Tennessee	X
Darren Hazlett	Texas	
Andy Babish	Virginia	X
Paul Farley	West Virginia	

Becca Lane	Ontario	
Magdy Beshara	Saskatchewan	

Non-voting Members, Friends, Liaisons

Name	Affiliation	Present
David Savage (friend)	CMEC	
Robin Graves (friend)	Vulcan	
Jan Prowell (friend)	CCRL	
Desna Bergold (friend)	D B Consulting	
Cecil Jones (friend)	Diversified Engr.	X
James Willis (friend)	NAPA	
Dick Reaves (friend)	Troxler	
Christopher Abadie (friend)	Pine Bluff Sand & Gr.	
Georgene Geary	GGfGA Engr.	X
Tim Aschenbrener (ex Officio)	FHWA	
Evan Rothblatt (liaison)	AASHTO	
John Malusky (liaison)	AASHTO re-source	X
Matthew Bluman (liaison)	AASHTO re-source	X
Amanda Moser (member)	AASHTO re-source	
Greg Uherek (member)	AASHTO re-source	
Steven Lenker (member)	AASHTO re-source	
Maria Knake (member)	AASHTO re-source	
Jasmine Gilmore (other)	AASHTO re-source	
Pete Holter (other)	AASHTO re-source	
John Giannini	Connecticut	
Woody Hood	Maryland	
Sean Parker	Oregon	
Anne Holt	Ontario	
Carole Ann MacDonald	Ontario	

III. Approval of Technical Section Minutes

- Wednesday August 9, 2017 meeting – **Motion to approve: FL, Second: AL**

IV. Old Business

- 2017 SOM Ballot 11/8/17 – 1/5/18 - Results:

Item Number:	5 – This was the second go for T2.
Description:	COMP ballot item to revise T 2 as a standard practice in AASHTO format, R-XX. This ballot includes revisions to address comments from previous technical section ballots.
Decisions:	Yes: 47, No: 1, No Vote: 4
Negative vote with comments:	
Kentucky Transportation Cabinet (Allen H Myers) (allen.myers@ky.gov)	We agree with Maine regarding Section 5.7.2 that a minimum of three equal increments should be required rather than "repeat as necessary." We prefer wording similar to that in

	<p>Section 5.6.3.</p> <p>This standard practice needs a definition for nominal-maximum size.</p> <p>Also require the material size in Section 6.2.4.</p> <p>Scott spoke to Kentucky and they withdrew their negative. Michael Black indicated they are using a state method now, so their concerns are no more. He stressed the reasoning for preferring a minimum of 3 increments over the 'repeat as necessary'. Georgene indicated that asphalt sampling has added similar wording (Georgene will forward along that wording). This will be pushed through as is, then the issue can be added the next go around. This will be published as an R standard.</p>
Affirmative votes with comments:	
Oregon Department of Transportation (Greg Frank Stellmach)	Editorial - AASHTO standard M323 should be called out in Section 2.1 (Typo). The title is correct but the number is incorrect.
Virginia Department of Transportation (Charles A. Babish) (andy.babish@vdot.virginia.gov)	This is an aggregate sampling procedure. In Sections 3.1 and 5.1, should specification language ("shall") be used? Agree otherwise.
Illinois Department of Transportation (Brian Pfeifer) (brian.pfeifer@illinois.gov)	2.1, Should be M 323 (not 232) 5.7.2, recommend separation medium such as metal plate, to prevent contamination from underlying material
Wisconsin Department of Transportation (Barry C Paye) (barry.paye@dot.wi.gov)	Page 15, Section 5.3.1 - Do we want to remove all the material from the belt, or a representative sample? There could be a wet pile, leaving some fines on the belt constantly during operation. Removal of all the fines would result in a non-representative sample. Page 16, Section 5.7.1 - consider revising to say "...before compacting and watering." Watering for compaction can impact the gradation by washing away needed fines.
Item Number:	6 – This was a major rewrite by WAQTC
Description:	COMP ballot item to revise T 113, Lightweight Particles in Aggregate. This is a ballot item submitted by WAQTC updating the standard with significant revisions to sections 6, 7, 8. Other revisions include removing section 5.1.2 and the reference to the kerosene heavy liquid.
Decisions:	Yes: 47, No: 1, No Vote: 4
Negative vote with comments:	
Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	<p>✎• Section 3. indicates two specific gravity ranges, 2.0 and 2.40, but does not include any direction in the method as to how to formulate the heavy liquids necessary for the separation.</p> <p>✎• Section 5. needs to include a target specific gravity concentration for the solutions or additional information concerning the required concentration. The specific gravity</p>

	<p>of the liquid needs to be determined initially. Section 4.6 includes a hydrometer or glassware and balance capable of measuring the specific gravity but it is assumed in the method that the analyst understands how to determine the specific gravity with these items.</p> <ul style="list-style-type: none"> ✎• Fine aggregate sample size is confusing. Section 6.1 indicates that a minimum 200 g sample passing the No. 4 should be obtained but in Section 6.3.2. that sample is screened over a No.50 which can reduce the sample size used for the lightweight determination significantly. ✎• Section 6.2. includes the requirements of drying the test sample to constant mass, but lacks details. While constant mass is an understandable term for many it may not be for some. Recommend that the Section be changed to include cooling and weighing steps. ✎• Changing the timing in Section 6.2. to allow for drying times beyond 20 minutes is recommended. Inclusion of "at least an additional 20 minutes" would allow for some flexibility yet still maintain the intent. ✎• Section 6.3.2. appears to indicate use of a mechanical shaker only while AASHTO T 27 allows either. Allowance should be made for both. ✎• Determination of the mass of the fine aggregate sample (W_2) in Section 6.3.3 to a lower decimal place than 0.1 g would allow for a more precise determination, while practically maintains that the mass of the coarse aggregate sample should be left as indicated. ✎• Allowing for a fine aggregate sample to be brought to SSD condition by the steps formally indicated in 9.0.0 should still be permitted. The steps in T 84 are designed for a much larger sample volume than required in this test and are not practical for this size of sample. Why is it even necessary to bring these materials to SSD condition for this test? ✎• Introduction of the heavy liquid solution into the aggregate sample should also be allowed in Section 7.1.1. and 7.2.1 not just the sample to the liquid. ✎• Abbreviation for seconds should be "s" in Section 7.1.2. and 7.2.2or recommend spell out the word. ✎• Section 7.1.3. requires the material to sit undisturbed for 1 to 2 minutes. This step should allow for the use of longer standing times in case of issues with settling. ✎• Section 7.1.6 references drying the lightweight particles to constant mass but does not define what is considered constant mass. Note that the mass (W_1) is only recorded to the nearest 0.1 g. ✎• For Class fine aggregate in AASHTO M 6, a maximum of 0.25% coal and lignite determined by this method is required. It would seem appropriate that the lightweight particles mass (W_1) would be recorded to at least 0.01 g and possibly even more decimal places.
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	<p>• The sieve stated in Section 7.2.5 is incorrect and should be a 300-µm (No.50). Maintaining the specific gravity of the heavy liquid at all times during the test is impractical but the only source of dilution in the method would be from the water included for SSD. If this is what is causing the heavy liquid to be out of tolerance more than ±0.01 it would not be possible to keep it in. Recommend removal of this requirement.</p> <p>Arkansas has agreed to withdraw its negative. It's not a common method for them. WAQTC wishes to work with Arkansas to continue addressing these comments.</p>
Affirmative votes with comments:	
Kentucky Transportation Cabinet (Allen H Myers) (allen.myers@ky.gov)	In the first sentence of Section 6.1, the reference to AASHTO T 2 will need to be modified if T 2 is changed to be a standard practice.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 will need to be updated to the new standard that we are voting on this year.
Illinois Department of Transportation (Brian Pfeifer) (brian.pfeifer@illinois.gov)	6.4.3, recommend "Determine and record the cumulative mass of the material retained on the 4.75 (No. 4) and larger sieves..."
Missouri Department of Transportation (Brett Steven Trautman) (brett.trautman@modot.mo.gov)	<p>Affirmative vote with the following comment:</p> <p>Sections 6.3.2 and 6.4.2 both mention using a mechanical shaker to screen the material prior to testing. Strongly recommend adding a note that would allow hand shaking to be used in-place of mechanical shaking. We believe hand shaking would work just as well as mechanical shaking and both options should be allowed.</p> <p>Brett asked if this will be considered. WAQTC will contact Brett to work on this comment as well.</p>
Tennessee Department of Transportation (Brian K. Egan) (Brian.Egan@tn.gov)	Item #5 is proposing to be converted T2 to a R-XX. References will need to be revised also.
Wisconsin Department of Transportation (Barry C Paye) (barry.paye@dot.wi.gov)	Do we want to specify a drying temperature, or a maximum?
Item Number:	7 – Moving provisional to full standard
Description:	COMP ballot item to adopt TP 81 as a full standard, Determining Aggregate Shape Properties by Means of Digital Image Analysis.
Decisions:	Yes: 48, No: 0, No Vote: 4
Affirmative votes with comments:	

Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	It would be helpful if the particle intermediate dimension was defined. The terminology section in TP 81 and PP 64 are the same except for the addition of the gradation, % passing and % retained, are not included in TP 81. The other slight difference is the use of numbers in sentences especially in the Terminology section and whether they are expressed in numerical or alpha format.
Item Number:	8 – Moving provisional to full standard
Description:	COMP ballot item to adopt PP 64 as a full standard, Determining Aggregate Source Shape Values from Digital Image Analysis Shape Properties.
Decisions:	Yes: 48, No: 0, No Vote: 4
Affirmative votes with comments:	
Arkansas Department of Transportation (Michael C Benson) (michael.benson@ardot.gov)	There is an issue between how %R is expressed in the two different sections, 3.2.8.and 6.2. This needs to be resolved. Minimal a recommendation that the meaning of sieve x+1 should be defined. This method also has some inconsistency as to how numerical values are expressed in Section 3. Terminology with some expressed numerically while others in alpha format.

- Technical Section Reconfirmation Ballot 11/14/17 – 1/5/18 - Results

Item Number:	1
Description:	Reconfirm M6
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	This document makes references to T 2 in a few locations, In rolling ballot 3 it has been proposed to change T 2 to a Rxx. Do we need to be update this document now?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	2
Description:	Reconfirm M43
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	Should the ASTM designation in this document be updated to reflect current ASTM standard updated 2017 ?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	3
Description:	Reconfirm T11
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	

Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	Should the ASTM designation in this document be updated to reflect current ASTM standard updated 2017 ?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	4
Description:	Reconfirm T19M/T19
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C29/C29M -09 reference in this document has been updated in 2017 with changes. Do we need to update the reference in this document to reflect this update?
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	5
Description:	Reconfirm T27
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C136/C136M -06 reference in this document has been updated in 2014 with changes. Do we need to update the reference in this document to reflect this update?
Kansas Department of Transportation (Richard A Barezinsky) (rick.barezinsky@ks.gov)	10.2: Needs to include verbiage when using percent retained. e.g. The percent retained on the #200 sieve is reported to the nearest 0.1 percent when less than 90 percent is retained on the #200 sieve.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	6
Description:	Reconfirm T85
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Tennessee Department of Transportation (Michael James Doran) (michael.doran@tn.gov)	The version of ASTM C127/C127M -12 reference in this document has been updated in 2015 no changes in update identified. Do we need to update the reference in this document to reflect this update?
Illinois Department of Transportation (Jim Trepanier) (james.trepanier@illinois.gov)	In Article 6.2, if the basket was specified to be a #10 instead of #6 or finer, T 84 would not need to be run as specified in last sentence of Article 7.2.
Oregon Department of Transportation (Greg Frank)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.

Stellmach) (greg.f.stellmach@odot.state.or.us)	
Item Number:	7
Description:	Reconfirm T326
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Kansas Department of Transportation (Richard A Barezinsky) (rick.barezinsky@ks.gov)	9.2. Just a comment It is difficult to strike coarse aggregate level with the rim of the cylindrical measure. If all rock is below the rim, then a high U-value is obtained that does not represent the Uncompacted voids in the coarse aggregate. Kansas balances projections above and below the rim.
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	8
Description:	Reconfirm T335
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Oregon Department of Transportation (Greg Frank Stellmach) (greg.f.stellmach@odot.state.or.us)	Editorial - References to T2 should be updated to the new standard that is being voted on this year.
Item Number:	9
Description:	Reconfirm TP120 – 2 Year extension
Decisions:	Yes: 22, No: 0, No Vote: 5
Affirmative votes with comments:	
Florida Department of Transportation (John P Shoucair) (john.shoucair@dot.state.fl.us)	Section 5.2 calls for either a metal or plastic container. Note 2 suggests that a clear pressure chamber will allow the operator to visually determine when all the entrapped air bubbles have been removed prior to pressurizing. Section 8.3 emphasizes that the operator should make sure that all large entrapped air bubbles are removed by rocking the chamber or tapping the sides of the chamber. Some aggregates will release small air bubbles during the filling process. Recommend Deleting Note 2 Revise Section 5.2 deleting the allowance of a metal container. Rewrite first sentence of Section 5.2: A clear plastic container of sufficient volume to hold 1000 g to 4500 g of normal weight carbonate aggregate.
New York State Department of Transportation (Donald Streeter) (donald.streeter@dot.ny.gov)	Does it matter is tap water or de-aired water is used? Is a temperature correction for the volume of water needed?

- Task Force Reports
 - TF 11-01: T112 Revision (KS – Rick Barezinsky, NE, AK, AASHTO) – **no report**
 - TF 13-01: AIMS Standards, TP81 & PP64, (FL – John Shoucair, OH, AZ, TRB)
 - **John reported. Debated writing a spec for manufacturers to meet, but ended up realizing that the standard was being written for the AIMS device only. Indicated that an add-on laser has been produced to give the texture index, but this is a research only add on right now. The future can all for additional machines, but they'll have to specifically be written in to the standard with the algorithms to match.**
 - **This task force is officially closed.**
 - TF 15-01: T11 Revision (WAQTC, NJ, ME, AASHTO)
 - **Task force can be ended as goal was accomplished with adding line for mechanical washers.**
 - **This task force is officially closed.**
 - TF 15-02: T104 Revision (TN, AASHTO)
 - **The goal of this TF has been accomplished and revisions are ready to go out as TS Ballot.**
 - **Wording will be added to 4.1.1 to specify purity of the sodium or magnesium sulfate instead of relying on reagent grade.**
 - **John and Mike will compile the wording and get to Scott to get changes ready for ballot**
 - TF 15-03: Centrifuge method for LWA (LA, FL, KS, Jeff Speck)
 - **Draft provisional received from the Task Force for Tech Section Ballot**
 - TF 16-01: T27 Sieving Sufficiency (ME – Rick Bradbury, AASHTO, Gilson, FL)
 - **Waiting on technical panel to complete RFP to start research**
 - **The TF will be sunset until the project is complete, then possibly reconvene to complete revisions.**
 - TF 17-01: Friction Tester (MD –Sejal Barot, TN, LA, FL, WV, FHWA)
 - **There was a meeting last week to get things started.**

V. New Business

- Research Proposals
 - None
- AASHTO re-source Items/Issues
 - **Results of the T11 Wetting Agent Survey**
 - **Azelin Powell and John Malusky from AASHTO presented the results from the survey (presentation attached)**
- NCHRP Issues
 - None
- Correspondence, calls, meetings, presentations:
 - **Email received 1/26/18 from Garth Newman:**

AASHTO Subcommittee on Materials
 Tech Section 1c, Aggregate Materials
 Scott Seiter, Chair
 sseiter@odot.org

The WAQTC Executive Board is concerned about what will happen to many of AASHTO's 'C' standards. As we understand, AASHTO has been trying to eliminate standards that just reference a corresponding ASTM standard. The WAQTC membership believes that a number of these standards may have a large risk / cost for WAQTC member agencies if they were eliminated. The agencies would need to accept the ASTM standard or develop one.

We would like to know if the Technical Section (TS) has considered the what will become of the 'C' standards in its section, whether they will be discontinued, developed as an 'A' standard, or left as a 'C,' referencing the ASTM. This will allow the WAQTC to determine a course of action.

The 'C' standard in TS 1c is:

T 96, *Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.*

Thank you.

Garth Newman,
WAQTC QAC Chair

garth.newman@itd.idaho.gov
(208)334-8039

- Proposed New Standards -None
- Proposed New Task Forces -None
- Upcoming Technical Section Ballot Items
 - T 84 – to address numerous comments from previous ballot
 - T 85 – to address numerous comments from previous ballot
 - A few years ago there was a large study done on T84 and T85 to speed up the test and improve quality. There is ongoing work on the revisions produced from this study.
 - T 11 – from task force 15-01
 - TP xx – from task force 15-03

VI. Open Discussion

Scott discussed that he is going to be retiring at the end of February.

TS 1C is in need of volunteers for a Chair and Vice chair, so please let Scott or Evan know of your interest.

VII. Adjourn

- Motion to adjourn: ME, second: NY

TS 1C Aggregates Mid-Year Attendance		
Last	First	State/Affiliation
Seiter	Scott	OK (Chair)
Blackburn	Lyndi	AL
Benson	Michael	AR
Wilson	Craig	AZ
Budo	Leah	CA
Shoucair	John	FL
Cole	Neoma	GA
Black	Michael	KY
Dees	Amanda	KY
Morris	Justin	LA
Welderufael	Amanuel	MD
Bradbury	Richard	ME
Trautman	Brett	MO
Lamanilao	Roberto	MS
Hammons	Caleb	MS
Morrison	Clark	NC
Wutzke	Scott	ND
Dusseault	Charles	NH
Hanczaryk	Paul	NJ
Changlin	Pan	NV
Tedford	Darin	NV
Streeter	Don	NY
Heiser	Steven	NY
Doran	Michael	TN
Babish	Andy	VA
DeVol	Joe	WA
Jones	Cecil	Diversified Eng. Services (Friend)
Geary	Georgene	GGFGA Engineering (Friend)
Prowell	Jan	CCRL (Friend)

T 11 / C 117 WASHING SURVEY

AZELIN POWELL, QUALITY ANALYST – AASHTO ACCREDITATION PROGRAM

JOHN MALUSKY, PROGRAM MANAGER – PROFICIENCY SAMPLE PROGRAM

AASHTO RE:SOURCE

RATIONALE FOR THE SURVEY

- Brought to our attention by AAP
- Suspended laboratories (5-10)
 - Multiple failures in regular rounds and extra samples (XPS) on the total % passing No. 50, 100, and 200 sieves.
 - Detailed Corrective Action Reports
 - Equipment - replaced sieves (checked), replaced shaker, checked sufficiency,
 - Training - checked procedure, calculations, etc.
 - Samples – ran multiple XPSs knowing what the results were and still getting poor results

Q1: WHAT METHOD IS MOST COMMONLY USED FOR YOUR AGF WASH?

(34 RESPONSES)

- Method A (Plain Water) : 20
- Method B (Wetting Agent) : 11
- Other : 3
 - Uses state specification or both methods

Q2: IF METHOD B, WHAT WETTING AGENT IS USED?

- Method A : 7
- Dish soap (Dawn, Joy, etc.): 19
- Sodium Hexametaphosphate : 3
- Other: 5
 - Calgon, Alconox Detergent (Sodium linear alkyl-aryl sulfonate)

Q3: WHAT TYPE OF WASH DO YOU PERFORM?

- Manual: 27
- Mechanical: 7

Q4: IF MECHANICAL, DO YOU PERFORM A COMPARISON BETWEEN MANUAL AND MECHANICAL?

- Yes (each aggregate source): 1
- Yes (only once, not varying material types): 6
- No (never compared): 5
- No (we don't mechanically wash): 22

Q5: WHEN MANUALLY WASHING, WHAT INSTRUMENT IS USED TO AGITATE THE MATERIAL?

- Hand: 9
- Metal spoon or spatula: 21
- Wooden spoon: 1
- Plastic spoon or spatula: 3

Q6: HOW LONG DO YOU MANUALLY WASH (APPROXIMATE)?

- 5 minutes or shorter and clear: 9
- 5-10 minutes and clear: 22
- 10-15 minutes and clear: 3

Q7: IF YOU MECHANICALLY WASH, HOW LONG DO YOU WASH?

- 5 minutes or shorter and clear: 4
- 5-10 minutes and clear: 7

Q8: WHAT MATERIAL IS YOUR WASHING BOWL MADE OF?

- Metal: 29
- Plastic: 4
- Glass: 1

Q9: IS THE AGGREGATE ALLOWED TO SOAK PRIOR TO WASHING?

- Yes (for both Methods A and B): 5
- Yes (Method A): 0
- Yes (Method B): 2
- No soaking : 27

Q10: IF YOU ALLOW THE MATERIAL TO SOAK, WHAT IS THE SOAK TIME?

- Various responses
 - 5 minutes
 - 10 minutes
 - Overnight
 - 12-15 hours

SUMMARY AND NEXT STEPS:

- Results of survey appear consistent
- Comparison between manual vs. mechanical washing
 - Currently, non-mandatory in AASHTO and ASTM
 - Should it be mandatory?
- Should soaking be precluded?
- Compare results between dish soap, sodium hex, and Calgon

QUESTIONS?

