

## COMMITTEE ON MATERIALS AND PAVEMENTS

<b>Meeting (Annual or Mid-Year)</b>	<b>2019 Annual Meeting</b>
<b>Date</b>	<b>August 7, 2019</b>
<b>Scheduled Time</b>	<b>10:15 AM – 12:00 PM</b>
<b>Technical Subcommittee &amp; Name</b>	<b>TS 3C- Hardened Concrete Properties</b>
<b>Chair Name and (State)</b>	<b>Brian Egan (TN)</b>
<b>Vice Chair Name and (State)</b>	<b>Andy Babish (VA)</b>
<b>Research Liaison Name and (State)</b>	<b>John Staton (MI)</b>

### I. Introduction and Housekeeping

### II. Call to Order and Opening Remarks

Brief Summary of Activities

2019 Group 1 Release- 1) T 358, 2) T 380, 3) PP 89, 4) PP 84, Reconfirmation of 9 standards

### III. Roll Call of Voting Members (See ATTACHMENT A (Page 6) for full Membership list)

Present	Member Name	State	Present	Member Name	State
<input type="checkbox"/>	Brian Egan- Chairman	TN	<input type="checkbox"/>	Mick Syslo	NE
<input type="checkbox"/>	Andy Babish- Vice Chairman	VA	<input type="checkbox"/>	Darin Tedford	NV
<input type="checkbox"/>	Scott George	AL	<input type="checkbox"/>	Chuck Dusseault	NH
<input type="checkbox"/>	Richard Giessel	AK	<input type="checkbox"/>	Donald Streeter	NY
<input type="checkbox"/>	Jesus Sandoval-Gil	AZ	<input type="checkbox"/>	Daniel Miller	OH
<input type="checkbox"/>	Robert Lauzon	CT	<input type="checkbox"/>	Kenny Seward	OK
<input type="checkbox"/>	Wasi Khan	DC	<input type="checkbox"/>	Becca Lane	ONT
<input type="checkbox"/>	Jose Armenteros	FL	<input type="checkbox"/>	Timothy Ramirez	PA
<input type="checkbox"/>	Brian Ikehara	HI	<input type="checkbox"/>	Jose Lima	RI
<input type="checkbox"/>	Mike Santi	ID	<input type="checkbox"/>	Danny Lane	TN
<input type="checkbox"/>	Brian Pfeifer	IL	<input type="checkbox"/>	Kurt Williams	WA
<input type="checkbox"/>	Richard Barezinsky	KS	<input type="checkbox"/>	Ron Stanevich	WV
<input type="checkbox"/>	John Grieco	MA	<input type="checkbox"/>	Matt Bluman	AASHTO
<input type="checkbox"/>	John Staton	MI	<input type="checkbox"/>	Sonya Puterbaugh	AASHTO
<input type="checkbox"/>	Brett Trautman	MO	<input type="checkbox"/>		
<input type="checkbox"/>	Oak Metcalf	MT	<input type="checkbox"/>		

*Quorum Rules Met?*

Annual Meeting: Simple majority of voting members (☐y/ ☐n) | Mid-Year Meeting: Voting members present (☐y/ ☐n)

A. Review of Membership (*New members, exiting members, etc.*)

### IV. Approval of Technical Subcommittee Minutes

2018 Mid-Year Meeting – Webinar, Friday, November 16, 2018, 2:00 – 4:00 PM, ATTACHMENT B (page 12)

Motion to approve the 2018 Mid-year minutes

Motion-

2<sup>nd</sup>-

Discussion-

## V. Old Business

(Outstanding or action items from previous meeting; use Heading 1 through Heading 6 styles to get outline format.)

1. Outstanding item from 2018 Annual and Mid-year meeting- Update R 80 Table 6 and Figure 3 (Brett Trautman- MO)
  - a. Needs some clarity in some of the lines as well as a table that gives more information for when to use/not use the test to evaluate ASR
  - b. May want equations for the lines on the table – potential TS ballot item.
  - c. Last week there was an ASTM ballot to make changes to their version.
  - d. ASTM will likely make some more changes to their standard, so AASHTO may need to do a TS ballot to incorporate

### A. COMP Ballot Items (Include any ASTM changes/equivalencies, including ASTM standards' revision years.)

COMP Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action

### B. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
19-01 #1	T 22- Compressive Strength of Cylindrical Concrete Specimens	0/21 (7 no vote)	PA, WA, FL, MO, IL SEE  ATTACHMENT C (Page 35)	
19-01 #2	PP 84- Developing Performance Engineered Concrete Pavement Mixtures	0/21 (7 no vote)	NRMCA, PCA, PA, KS, FL, MO, TN, IL  SEE ATTACHMENT C	
19-01 #3	TP WWW- Standard Method of Test for Determining the Total Pore Volume in Hardened Concrete Using Vacuum Saturation	1/20 (7 no vote)	NRMCA, PCA, PA, FL, MO, TN, MI Negative comment: Irrespective of the content, starting at section 7 and carrying through the end of the document, the formatting in terms of inconsistent bulleting and possible missing content is unacceptable for publication.  SEE ATTACHMENT C	
19-01 #4	TP XXX- Standard Method of Test for Determining the Degree of Saturation of Hydraulic- Cement Concrete	1/20 ( 7 no vote)	NRMCA, PCA, PA, FL, MO, TN, MI Negative comment: Irrespective of the content, starting in section 4, the formatting in terms of inconsistent bulleting and possible missing content is unacceptable for publication.  SEE ATTACHMENT C	
19-01 #5	TP 119- Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	0/21 ( 7 no vote)	PA, MI, FL, MO, TN  SEE ATTACHMENT C	

## B. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action
19-02 #6	T 365 - Quantifying Calcium Oxychloride Formation Potential Amounts in of Cementitious Pastes Exposed to Deicing Salts	0/21 (7 no votes)	PCA, PA, KS, WA, FL, MO, IL  SEE ATTACHMENT C	

**Motion to move the following Standards to COMP ballot:**

**Motion-**

**2<sup>nd</sup>-**

**Discussion-**

## C. Reconfirmation Ballots

Reconf. Ballot #	Standard	Results (neg/affirm)	Comments/Negatives	Action

## D. Task Force Reports

Task Force #	Title	Members	Status/Update
18-01	Implementation of Changes to PP 84 (Developing Performance Engineered Concrete Pavement Mixtures), TP 119, T 365, and other PP 84 related standards	Don Streeter, Chair (NY), James Krstulovich (IL), John Staton (MI), Matt Romero (OK), Dan Miller (OH), Mike Praul (FHWA), Peter Wu (GA), Brian Hunter (NC), Brian Egan (TN) and Cecil Jones (DES)	Completed- See Attachment D (Page 56) Proposed actions as balloted in TS 3C Spring Ballot 19-01 and 19-02

## VI. New Business

- A. AASHTO re:source/CCRL/NTPEP (*Observations from assessments, as applicable.*)
- B. Presentation by Industry/Academia
  1. Larry Sutter, Michigan Tech- The current status of DOT Specification for ASR Mitigation
- C. Revisions/Work on Standards for Coming Year

The following Standards will need to be reconfirmed this year:

Standard No.	Description	Steward
R 72-16	Match Curing of Concrete Test Specimens	AL- Scott George
T 140-97 (2016)	Compressive Strength of Concrete Using Portions of Beams Broken in Flexure	AK- Richard Giessel
T 260-97 (2016)	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials	MD- Wood Hood
T 323-03 (2016)	Determining the Shear Strength at the Interface of Bonded Layers of Portland Cement Concrete	NH- Dennis Boisvert/Chuck Dusseault
T 332-07 (2016)	Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe	ONT- Becca Lane
T 334-08 (2016)	Estimating the Cracking Tendency of Concrete	OH- Dan Miller
PP 89-19	Grinding the Ends of Cylindrical Concrete Specimens	TN- Mike Doran
TP 129-18	Vibrating Kelly Ball (VKelly) Penetration in Fresh Portland Cement Concrete	OL- Brian Pfeifer/James Krstulovich

D. Review of Stewardship List –

See ATTACHMENT E (Page 60) for Stewardship List and ATTACHMENT F (Page 63) for TS 3C Standards.

*(List of subcommittee's standards flagging those requiring action; include as separate attachment.)*

E. Proposed New Standards

1.

F. NCHRP Issues

TRB Proposed Research Needs Statement (RNS), "Development of Expert System to Predict Mechanical Properties of Concrete Made with Recycled Concrete Aggregate" - TRB Committee AFN 40- Concrete Materials and Placement Techniques See ATTACHMENT G (Page 64)

G. Correspondence, Calls, Meetings [Proposed Webinar, Dr. Anol Mukhopadhyaya, Accelerated Determination of Potentially Deleterious Expansion of Concrete Cylinder Due to ASR- ATTACHMENT H](#)

H. Proposed New Task Forces *(Include list of volunteers to lead and/or join TF.)*

I. New TS Ballots

<sup>1</sup>  
VII. Open Discussion

A.

B.

VIII. Adjourn

## TS Meeting Summary

Meeting Summary		
Items Approved by the TS for Ballot <i>(Include reconfirmations.)</i>		
Standard Designation	Summary of Changes Proposed	Ballot Type
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT

Meeting Summary		
		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
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		<input type="checkbox"/> TS <input type="checkbox"/> COMP <input type="checkbox"/> CONCURRENT
New Task Forces Formed		
Task Force Name	Summary of Task	TF Member Names and (States)
Research Proposals <i>(Include number/title/states interested.)</i>		
RNS- Development of Expert System to Predict Mechanical Properties of Concrete Made with Recycled Concrete Aggregate- TRB Committee AFN 40- Concrete Materials and Placement Techniques		
Other Action Items		

## ATTACHMENT A- TS 3C HARDENED CONCRETE MEMBERSHIP LIST

FirstName	LastName	Company
Becca	Lane	Ontario Ministry Of Transportation
Brett	Trautman	Missouri Department of Transportation
Brian	Pfeifer	Illinois Department of Transportation
Brian	Ikehara	Hawaii Department of Transportation
Brian	Egan	Tennessee Department of Transportation
Charles	Babish	Virginia Department of Transportation
Chuck	Dusseault	New Hampshire Department of Transportation
Daniel	Miller	Ohio Department of Transportation
Danny	Lane	Tennessee Department of Transportation
Darin	Tedford	Nevada Department of Transportation
Donald	Streeter	New York State Department of Transportation
Jesus	Sandoval-Gil	Arizona Department of Transportation
John	Grieco	Massachusetts Department of Transportation
John	Staton	Michigan Department of Transportation
Jose	Armenteros	Florida Department of Transportation
Jose	Lima	Rhode Island Department of Transportation
Kenny	Seward	Oklahoma Department of Transportation
Kurt	Williams	Washington State Department of Transportation
Mick	Syslo	Nebraska Department of Transportation
Mike	Santi	Idaho Transportation Department
Richard	Barezinsky	Kansas Department of Transportation
Richard	Giessel	Alaska Department of Transportation and Public Facilities
Robert	Lauzon	Connecticut Department of Transportation
Ron	Stanevich	West Virginia Department of Transportation
Ross	Metcalf	Montana Department of Transportation
Scott	George, P. E.	Alabama Department of Transportation
Timothy	Ramirez	Pennsylvania Department of Transportation
Wasi	Khan	District of Columbia Department of Transportation
Anne	Holt	Ontario Ministry Of Transportation
Carole Anne	MacDonald	Ontario Ministry Of Transportation
Casey	Soneira	AASHTO
Cecil	Jones	Diversified Engineering Services, Inc.
Colin	Lobo	NRMCA
Daniel	Gettman	Alaska Department of Transportation and Public Facilities
Daniel	Tobias	Illinois Department of Transportation
Desna	Bergold	D B Consulting and Associates, LLC
Eric	Carleton, P.E.	National Precast Concrete Association
Hannah	Schell	Ontario Ministry Of Transportation
Jan	Prowell	Cement and Concrete Reference Laboratory
John	Melander	Slag Cement Association
John	Giannini	Connecticut Department of Transportation
Larry	Sutter	Michigan Technological University
Matthew	Bluman	AASHTO Re:source

Paul	Tennis	Portland Cement Association
Prasad	Rangaraju	Clemson University
Sonya	Puterbaugh	AASHTO Re:source
Steven	Ingram	Alabama Department of Transportation
Steven	Tritsch	Iowa State University
Ken	Nwankwo	Wisconsin Department of Transportation
Steven	Lenker	AASHTO Re:source
Maria	Knake	AASHTO Re:source
Harvey	DeFord	Florida Department of Transportation
William	Bailey	Virginia Department of Transportation
Sean	Parker	Oregon Department of Transportation
William	Lawrence	Utah Department of Transportation

ExternalEmailAddress	Designation	MemberType
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brian.ikehara@hawaii.gov	Member	Voting
brian.egan@tn.gov	Chair	Voting
andy.babish@vdot.virginia.gov	Vice Chair	Voting
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Sean.P.Parker@odot.state.or.us	Member	Non-Voting
BillLawrence@utah.gov	Member	None

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Jesus	Sandoval-Gil	Arizona Department of Transp jsandoval-gil@azdot.gov
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Wasi	Khan	District of Columbia Departme wasi.khan@dc.gov
Jose	Armenteros	Florida Department of Transpc jose.armenteros@dot.sta
Brian	Ikehara	Hawaii Department of Transpo brian.ikehara@hawaii.go
Mike	Santi	Idaho Transportation Departm mike.santi@itd.idaho.gov
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Mick	Syslo	Nebraska Department of Trans Mick.Syslo@nebraska.go
Darin	Tedford	Nevada Department of Transp dtedford@dot.nv.gov
Chuck	Dusseault	New Hampshire Department o chuck.dusseault@dot.nh.
Donald	Streeter	New York State Department of donald.streeter@dot.ny.}
Daniel	Miller	Ohio Department of Transport daniel.miller@dot.ohio.g
Kenny	Seward	Oklahoma Department of Tran kseward@odot.org
Becca	Lane	Ontario Ministry Of Transport: Becca.Lane@ontario.ca
Timothy	Ramirez	Pennsylvania Department of T: tramirez@pa.gov
Jose	Lima	Rhode Island Department of T: jose.lima@dot.ri.gov
Brian	Egan	Tennessee Department of Trar brian.egan@tn.gov
Danny	Lane	Tennessee Department of Trar danny.lane@tn.gov
Charles	Babish	Virginia Department of Transp andy.babish@vdot.virgini
Kurt	Williams	Washington State Department willikr@wsdot.wa.gov
Ron	Stanevich	West Virginia Department of T Ron.L.Stanevich@wv.gov

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## COMMITTEE ON MATERIALS & PAVEMENTS

2018 - 2019 Mid Year Meeting (*Webinar*)

Friday, November 16, 2018

2:00 – 4:00 PM EST

### TECHNICAL SECTION 3C Hardened Concrete

- **Introduction and Housekeeping** (*AASHTO Liaison*)
- **Call to Order and Opening Remarks**
  - A. Brief summary of activities (*Please briefly explain the goals of today's meeting and what you hope to accomplish. Get everyone up to speed and on the same page.*)

- **Roll Call**

Brian	Egan (Chair)	TN		John	Staton	MI
Charles (Andy)	Babish (Vice-Chair)	VA		Brett	Trautman	MO
Scott	George	AL		Misty	Miner	MT
Richard	Giessel	AK		Mick	Syslo	NE
Paul	Burch	AZ		Darin	Tedford	NV
Robert	Lauzon	CT		Denis	Boisvert	NH
Wasi	Khan	DC		Donald	Streeter	NY
Harvey	DeFord	FL		Daniel	Miller	OH
Brian	Ikehara	HI		Kenny	Seward	OK
Mike	Santi	ID		Becca	Lane	Ontario
Brian	Pfeifer	IL		Timothy	Ramirez	PA
Richard	Barezinsky	KS		Jose	Lima	RI
Woody	Hood	MD		Danny	Lane	TN
John	Grieco	MA		Kurt	Williams	WA
				Anne	Holt	ON
				Pamela	Marks	ON
				Patrick	Carlton	FL
				Paul	Tennis	PCA
				John	Melander	SCA

- **Approval of Technical Section Minutes**
  - A. **2018 Annual Meeting – Cincinnati, OH, Wednesday August 8, 2018, 10:15 – 12:00 AM EST, ATTACHMENT #1**
    - Motion- Florida**
    - 2<sup>nd</sup> - Kansas**
    - Discussion- No discussion**
    - The Minutes were revised to correct a last name spelling error Section V. A. (John Staton)**

- **Old Business**

A. COMP Ballot Items (Including any ASTM Changes/equivalencies)

1. Outstanding items from Annual Meeting? [Update R80 Table 6 and Figure 3- \(Brett Trautman-MO\)](#)

- Brett Trautman updated the group on the R 80 update: Needs some clarity in some of the lines as well as a table that gives more information for when to use/not use the test to evaluate ASR
- May want equations for the lines on the table – potential TS ballot item.
- Last week there was an ASTM ballot to make changes to their version.
- ASTM will likely make some more changes to their standard, so AASHTO may need to do a TS ballot to incorporate

B. TS Ballots

Rolling Ballot 1- Fall Summary

- Changes will be made to all of the following standards, as noted. Negatives have been addressed as noted.

Item Number:	16
Description:	COMP ballot for T358. It was discovered that the Precision statements and the reference document for the Precision statements were incorrect. This ballot revises the Precision statement and identifies the correct reference document as recommended by the Task Force. See page 4 and Attachment #3 in attached Minutes.
Decisions:	Affirmative: 36 of 51 Negative: 0 of 51 No Vote: 15 of 51
Comments:	None

Item Number:	17
Description:	COMP ballot for T380. This ballot item revises a mold size in section 4.1.1. (Reference in section 2.1 was editorially corrected by AASHTO Publications) See page 3 in attached Minutes.
Decisions:	Affirmative: 36 of 51 Negative: 0 of 51 No Vote: 15 of 51
Comments:	None

Item Number:	18
Description:	COMP ballot for PP89. This ballot makes revisions to sections 1.2, 2.1, 3.4, 4.1, 5.1, 5.2, 5.3, 6.1, 6.5, and 6.6. See page 3 in attached Minutes.
Decisions:	Affirmative: 36 of 51 Negative: 0 of 51 No Vote: 15 of 51
Comments:	South Carolina Department of Transportation (Merrill E Zwanka) <i>Section 2.1: Add R39 to the list of standards (referenced in 3.3 and 6.1).</i> <a href="#">Chair Comment: It appears that R39, currently included in PP 89-18, was mistakenly removed from the balloted standard. This was not the intent and will work with AASHTO Pubs to keep the reference to R39 in the revised PP 89-19 version.</a>

Item Number:	19- <b>COMMITTEE BALLOT</b>
Description:	Concurrent ballot for PP84. This ballot removes restrained shrinkage language, kept appendices for users applying to concrete other than pavement concrete, edited SAM criteria, and other editorial clarifications. See page 5 and Attachment #7 in attached Minutes.
Decisions:	Affirmative: 36 of 51 Negative: 0 of 51 No Vote: 15 of 51
Comments:	<p>Massachusetts Department of Transportation (Mark John Brum)- (Non-Voting member)</p> <p style="padding-left: 40px;"><i>Subsection 5.1.4 - I don't think that "or other SHA approved methods" should be included. It should be up to the SHA to modify their specifications when there is a discrepancy with T23.</i></p> <p style="padding-left: 40px;"><i>Subsection 6.4 - there are two "to" in a row.</i></p> <p>Pennsylvania Department of Transportation (Timothy L Ramirez)- (Non-voting member)</p> <p style="padding-left: 40px;"><i>Affirmative with comments:</i></p> <ol style="list-style-type: none"> <li><i>1) In Section 1.6, suggest adding a comma after the word "selected".</i></li> <li><i>2) In Section 5.1.4, suggest revising from "concrete specimens" to "concrete test specimens" for consistency with title of T 23.</i></li> <li><i>3) In Sections 6.3.1 and 6.3.2, shouldn't the word "minimum" be maintained in both these sections? Perhaps not at beginning of each sentence, but go from "design" to "minimum design".</i></li> <li><i>4) In Section 6.4, revise from "Susceptibility to to Slab" to "Susceptibility to Slab".</i></li> <li><i>5) In Section 6.4.2, suggest deleting the text "(choose one if cracking is a concern)" since only one cracking test remains in this section with the other tests now included in Appendix X1.3.</i></li> <li><i>6) In Section 6.1.5.3, revise from "Air content 4 percent" to "Air content of 4 percent".</i></li> <li><i>7) In Section 6.7, revise from "6.8.1 and 6.8.2" to "6.7.1 and 6.7.2".</i></li> <li><i>8) In Section 6.8.1, 1st sentence, revise from "with procedure" to "with the procedure".</i></li> <li><i>9) In Section 7.2.1, shouldn't the word "minimum be added here (i.e., revise from "Design compressive" to "Minimum design compressive")?</i></li> <li><i>10) In Section X1.3 and paragraph immediately above Figure X, 3rd sentence, revise from "may be used as an alternative" to "as an alternative" since beginning of sentence uses "This method allows".</i></li> <li><i>11) In Section X1.3 and paragraph immediately below Figure X, 5th line, revise from "sign of cracking" to "signs of cracking".</i></li> <li><i>12) On page PP 84-29, the Section numbering does not seem to be correct (i.e., "6. PROPORTIONING"). I know this is for adding commentary to these Sections, but I am not sure this is the best way to add the commentary. It seems repetitive or duplicative.</i></li> </ol>



	<p>Missouri Department of Transportation (Brett Steven Trautman) <i>Affirmative vote with a few editorial comments:</i> 1) In Section 6.7, on Page 8, it references Sections 6.8.1 and 6.8.2. Both of these sections discuss workability instead of aggregate requirements. Believe the section should reference Sections 6.7.1 and 6.7.2 instead. 2) In Section 6.7.2, on Page 8, the second line, recommend adding the abbreviation '(ASR)' for alkali silica reactions so it would reads as follows: "...alkali silica reactions (ASR) in accordance with R 80..."</p> <p>Florida Department of Transportation (Timothy J. Ruelke) <i>This document is too difficult to review properly - it has too many revisions (different font colors), and the font size is too small. It should be cleaned up and sent back out.</i> <i>Revisions:</i> 1.4 Did not strikethrough the old 1.4 6.4 Remove duplicate "to" 6.5.1.1 Replace "and" with "with an air content corresponding to"</p> <p>Chair comment: All editorial corrections will be made before printing. FDOT provided a "WORD" version for review.</p>
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Item Number:	19- <b>TECHNICAL SECTION BALLOT</b>
Description:	Concurrent ballot for PP84. This ballot removes restrained shrinkage language, kept appendices for users applying to concrete other than pavement concrete, edited SAM criteria, and other editorial clarifications. See page 5 and Attachment #7 in attached Minutes.
Decisions:	Affirmative: 18 of 28 Negative: 1 of 28 No Vote: 9 of 28
Comments:	<p>Pennsylvania Department of Transportation (Timothy L Ramirez) <i>SAME comments as above</i></p> <p>Missouri Department of Transportation (Brett Steven Trautman) <i>SAME comments as above</i></p> <p>Florida Department of Transportation (Harvey Dale DeFord) <b>NEGATIVE VOTE</b> <i>This document is too difficult to review properly - it has too many revisions (different font colors), and the font size is too small. Please correct and resubmit.</i> <i>Revisions:</i>  1.4 Did not strikethrough the old 1.4 6.4 Remove duplicate "to" 6.5.1.1 Replace "and" with "with an air content corresponding to"</p>

Chair Comment- Florida Negative was withdrawn November 2, 2018

C. Reconfirmation Ballots

Item Number	Test Method	Decision	Comments
1	T 024M/T 024-15, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	Affirmative with question: 1) In Section 1.1, 1st line, is the "(1)" intended for the user to refer to "Note 1"? If so, consider revising from "(1)" to "(Note 1)" for better clarity.  Chair comment: T24 was revised in 2015, prior to that Section 1.1 stated: This method covers obtaining, preparing, and testing (1) cores drilled from concrete for length or compressive or splitting tensile strength determinations; and (2) beams sawed from concrete for flexural strength determinations. ASTM C42, has no numbers (1) or (2). Resolution: Remove (1) to be consistent with C 42 (Editorial Change)
2	T 148-15, Measuring Length of Drilled Concrete Cores	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
3	T 178-15, Portland-Cement Content of Hardened Hydraulic-Cement Concrete	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
4	T 198-15, Splitting Tensile Strength of Cylindrical Concrete Specimens	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
5	T 277-15, Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
6	T 336-15, Coefficient of Thermal Expansion of Hydraulic Cement Concrete	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
7	T 356-15, Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
8	T 357-15, Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure	Affirmative: 24 of 29 Negative: 0 of 29 No Vote: 5 of 29	
9	TP 119-15, Electrical Resistivity of a	Affirmative: 24 of 29	



Concrete Cylinder Tested in a Uniaxial Resistance Test	Negative: 0 of 29 No Vote: 5 of 29
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D. Task Force Reports- Don Streeter (NY)- TF 01 (Implementation of Changes to PP 84 (Developing Performance Engineered Concrete Pavement Mixtures), TP 119, T 365, and other PP 84 related standards

- The goal was to look at PP 84 (12 test methods as part of this test method). Had an initial meeting with DOT's only to review the goal, are the test methods relevant to mix design, QA, or are they more research oriented?
- Jason Weiss (Oregon State Univ.) had a webinar with TF to explain and show the various proposed test methods associated with Freeze-Thaw and Salt Damage (Section 6.5 of PP 84)
- They will have another webinar/meeting to talk about some of the other test procedures (Transport Properties/Section 6.6) and have a follow up to lay the groundwork to determine what's logical moving forward with this.

E. Mid-year meeting Open Discussion Follow-up

*T22: Has there been any discussion about harmonizing with C39 about types of cylinder breaks? Chair is not aware of any harmonization efforts in this area. The Chair asked the steward (FL DOT) to look into this issue and report back to the committee at the mid-year meeting. No one is aware of any reason NOT to harmonize with the ASTM standard. Colin Lobo made the suggestion to look at the tolerance on the age of testing between T22 and C39.*

- Florida is reviewing this right now and they are looking at differences. Changes would need to be vetted through the TS then go to COMP ballot for rolling ballot 1. Florida will have this ready for TS ballot in the spring for discussion in Baltimore.

• **New Business**

A. Research Proposals

NCHRP RFP 18-19, posted 11/2/18- closes 12/18/18-

"Rating Concrete Water Permeability Based on Resistivity Measurements"

"Electrical resistivity measurements (AASHTO T 358, Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration and ASTM C 1760, Standard Test Method for Bulk Electrical Conductivity of Hardened Concrete) have the potential of providing performance-based evaluation of concrete. Although the data from these methods are easy to obtain, they may not relate to concrete water permeability. *It is suggested that a formation factor that incorporates the ratio of the resistivity ( $\rho$ ) of the bulk concrete to the resistivity ( $\rho_0$ ) of the pore solution or other approaches could be used to provide a better assessment of fluid transport properties.* There is a need to consider using such approaches for rating concrete permeability based on resistivity measurements and providing an expedited means for assessing concrete water permeability to facilitate the evaluation of concrete durability"

(Chair comment: "Should include TP 119 as well"

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4577>

B. AASHTO Re:source/CCRL - Observations from Assessments?

C. NCHRP Issues

D. Correspondence, calls, meetings

1- Cameron Minney, Materials Investigation Engineer, Michigan DOT, E-mail question regarding T 259- " We were wondering if there was a reason AASHTO used the mix that is specified (658 lbs of cement with a w/c of 0.5 and air content of 6 +/- 1%)? Do you know what kind of differences we could expect with our mix (564 lbs of cement with a 0.45 w/c and air content of 5.5 – 8.5%)?"

Partial Response- “Unfortunately, I do not know the historical reasoning why the mixture specified in T 259 for treatments is as it is (i.e. 658 LB/CY cement, 0.50 w/c, and 6±1 % air content). Interestingly, I found the T 259- 80 (1990) version (attached) and that version had the same requirements (section 2.3). I can only speculate that when T 259 was developed in 1978 that there was research using those parameters currently specified.” SEE ATTACHMENT #2

- If anyone knows why this is the way it is, please feel free to reach out to Brian.
  - E. Presentation by Industry/Academia
  - F. Revisions/Work on Standards for Coming Year SEE ATTACHMENT #4 and ATTACHMENT #3
- These were sent earlier than usual to give more time for the stewards to review and see if changes need to be made. The chair went over the list of stewards and standards needing to be reviewed. If you’re a steward, please take the time to review and get back to the chair.
  - G. Proposed New Standards
    - 1. Permission forms for drawings/photos
- There may be a new test method for the “Box Test” (currently Appendix X3 in PP84) in TS 3b. Similar to the “V-kelly Test (TP 129)”, the Appendix will need to be removed/reserved. Also, should the V-Kelly be moved to TS 3B since it a fresh concrete test and 3B will take over the “Box Test”? Both are in PP 84 Section 6.8 for Workability.
  - H. Proposed New Task Forces  
(Include list of volunteers to lead and/or join TF)
  - I. New TS Ballots?
- There may be need for a Spring TS ballot for R80 and/or T22, but the TS will be updated as the ASTM standards are revised and become available.
  - J. Technical Subcommittee membership
- If your membership in this technical subcommittee has changed, please contact the Chair and cc Casey Soneira ([csoneira@aaashto.org](mailto:csoneira@aaashto.org)). This would include changes such as being added, removed, or having your voting status changed.
- **Open Discussion**  
REMINDER- As Stewards, please review and compare your assigned standards to the equivalent ASTM standard to determine if changes are needed- SEE ATTACHMENT #3

Chair comment: I was asked after the meeting, “What does a steward do?” There is not a specific definition in the AASHTO Guide, but in section 1.2.4.2. “The TS chair may organize the TS into task groups or task forces to work on a particular standard or group of standards or assign responsibility for maintenance of a standard to individual TS members or COMP member departments (States) (i.e. assign stewards of standards).” Therefore I believe the Stewards responsibility is 1) monitor the ASTM equivalent, if there is one, and determine if the AASHTO standard should be changed to harmonize with the ASTM standard, and 2) review the standards during reconfirmation and a) confirm that it is still “current” and good as is, or b) propose changes to of standards if necessary to make it current, or c) propose the standard to be deleted if obsolete and no longer used by Agencies.

- **Adjourn**



## COMMITTEE ON MATERIALS & PAVEMENTS

2018 Annual Meeting – Cincinnati, OH

Wednesday August 8, 2018

10:15 – 12:00 AM EST

### TECHNICAL SUBCOMMITTEE 3C

#### Hardened Concrete

#### I. Call to Order and Opening Remarks Meeting called to order by the Chair at 10:14 am.

##### A. Brief summary of activities

##### 2018 Group 1 release

- 2 new standards published:
  - TP 109-18 – Vibrating Kelly Ball (VKelly) Penetration in Fresh Portland Cement Concrete)
  - PP 89-18 – Grinding the Ends of Cylindrical Concrete Specimens
- 4 revised standards published: T 23, T 97, PP 84, and T 359
- 2 provisional standards moved to full Standards:
  - TP 109, now T 379 – Nonlinear Impact Resonance Acoustic Spectroscopy (NIRAS) for Concrete Specimens with Damage from the Alkali-Silica Reaction (ASR)
  - TP 110 now T 380 – Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures Miniature Concrete Prism Test, MCPT)

#### II. Roll Call

Membership (Attachment #1)

Voting Members:

Member states present: TN, VA, AL, AZ, CT, DC, FL, ID, IL, KS, MD, MI, MO, MT, ME, NV, NH, NY, OH, OK, ON, PA, WA

As a reminder, there are some new guidelines in the AASHTO Information Guidelines about how to become a friend of a committee.

Brian	Egan (Chair)	TN
Charles (Andy)	Babish (Vice-Chair)	VA
Scott	George	AL
Richard	Giessel	AK
Paul	Burch	AZ
Robert	Lauzon	CT
Wasi	Khan	DC
Harvey	DeFord	FL
Brian	Ikehara	HI
Mike	Santi	ID
Brian	Pfeifer	IL
Richard	Barezinsky	KS

John	Staton	MI
Brett	Trautman	MO
Ross (Oak)	Metcalfe	MT
Mick	Syslo	NE
Darin	Tedford	NV
Denis	Boisvert	NH
Donald	Streeter	NY
Daniel	Miller	OH
Kenny	Seward	OK
Becca	Lane	Ontario
Timothy	Ramirez	PA
Jose	Lima	RI

AMERICAN ASSOCIATION  
OF STATE HIGHWAY AND  
TRANSPORTATION OFFICIALS

**AASHTO**

Woody	Hood	MD	Danny	Lane	TN
John	Grieco	MA	Kurt	Williams	WA

### III. Approval of Technical Subcommittee Minutes

Meeting date: Midyear Webinar November 14, 2017 (Attachment #2)

Motion: MO

Second: NY

No discussion.

No opposed.

### IV. Old Business

#### A. COMP Ballot Items

1. **Item No. 11** – Dual Ring Test Using Inner Concrete Ring (Fall 2016 Ballot)- 3 Negative votes persuasive, yet to receive revisions from original author.

*Since there has been no activity on this standard for over a year, it will be shelved until there is interest again. Vice Chair to follow-up with Author (Jason Weiss, Oregon State University).*

*There has been no activity on this for over two years, so the Chair will sunset this.*

2. **Item No. 13** – Make PP 65 a Full Standard (Now R-80)- some edits to Table 6 and Figure 3 are not in the printed version and are still needed. TF 16-01 – to report on significant digits.

*Different zones (1, 2, and 3) in Figure 3 were not published and separation lines in Table 6 – editorial change.*

*Editorial edits (Identifying Zones 1, 2, and 3 in Figure 3 and adding lines the table 6) were made (by Brett Trautman) to make the tables easier to understand. Brett Trautman (MO) is the steward for this standard.*

*ASTM C1778 update (AASHTO R 80):*

- Looking at clarifying Fig. 1
- Working on correcting terminology for alkali content and alkali loading; making changes to the structure classification tables and clarify categories for risk
- They are not changing their significant digits

3. After Fall 2017 Rolling ballot, several editorial revisions were corrected prior to printing and several “non-editorial” items included in the May TS 3C ballot.

#### B. TS Ballots

- TS 3C 2018 Spring Ballot
- 3 Items were balloted, ALL passed TS ballot

See Attachments #9, #10 and #11



Item #	Description	Results	Comments
1	T 358, It was discovered that the Precision statements and the reference document for the Precision statements were incorrect. This TS ballot revises the Precision statement and identifies the correct reference document. See V. New Business, D. Correspondence on pages 7 and 8 of the Minutes.	Affirmative: 22 of 28 Negative: 0 of 28 No Vote: 6 of 28	
2	T 380 This ballot item revises a reference in Section 2.1 and revises a mold size in section 4.1.1. See V. New Business, B. AASHTO re:source/CCRL on page 7 of Minutes.	Affirmative: 22 of 28 Negative: 0 of 28 No Vote: 6 of 28	
3	PP 89 This TS ballot makes revisions to sections 1.2, 2.1, 3.4, 4.1, 5.1, 5.2, 5.3, 6.1, 6.5, and 6.6. Revisions are in response to comments made on Rolling Ballot #1 in the fall 2017. See Item #21 of minutes page 6 of 8.	Affirmative: 22 of 28 Negative: 0 of 28 No Vote: 6 of 28	PA Affirmative with comment: 1) The proposed revisions have not been added to the published version of PP 85-18. It is recommended to add these proposed revisions to the most current version of PP 85 before going to a SOM ballot; otherwise, there may be a lot of editorial comments.

**Motion to move T 358, T 380, and PP89 to full COMP ballot:**

**Motion: OK**

**Second: MO**

**No discussion.**

**No opposed.**

**C. Task Force Reports**

- TF 16-01:** PP 65/R 80 significant digits and notes/equations for Figure 3 (FHWA – Ahlstrom, PA – Horwhat [retired], MO – Trautman)

Lines was drawn, and then equations were determined based on those lines... is there any significance to having the equations since they are based on a line that no one is totally sure how the line was drawn?



Brett will get in touch with the ASTM subcommittee and see if they have any interest in adding the equations.

2. **TF 17-01:** T358 Resolve P&B statement (TN – Egan, NY – Streeter, FL – Ruelke, Clemson University – Mike Jackson, FHWA – Jussara Tanesi) [\(Attachment #3\)](#)

It was brought the subcommittee's attention that the precision and bias statements are referencing something completely different than surface resistivity.

The TF decided to go with the original numbers from the original report.

## V. New Business

### A. Research Proposals (John Staton, MI, Research Liaison)

1. Quick turnaround RPS
2. Full NCHRP RPS-
  - FY 2019 Funded of interest to the TS 3C
    - Project 10-103, Problem D-11, *Benchmarking Accelerated Laboratory Tests for ASR to Field Performance: Consideration of Cement and Alkali Contents and Influence of SCMs*  
   Andy Naranjo (TX) is on the panel
    - Project 10-104, Problem D-13, *Evaluating Use of Unconventional Fly Ash Sources in Highway Concrete*

No research proposals submitted.

### ASR Mitigation

The Chairs of 3a and 3c might team up together and send out a survey to the two groups and figure out what people are doing when/if they run into ASR.

Larry Sutter (Michigan Tech) suggested that we need to get a really good feel for what states are doing with ASR, and whether or not they're using R80. If states aren't using/following R80, why? If there are issues with R80, we should figure out what they are, and how to address the problems and improve the standard so people are actually using it.

M85 is going to full committee ballot and the changes in M85 will put a little more emphasis on R80.

### B. AASHTO Technical Service Programs Items **None.**

### C. NCHRP Issues [\(see attachment\)](#)

### D. Correspondence, calls, meetings **None.**

### E. Presentation by Industry/Academia

1. *National Implementation Activities and Performance Engineered Mixtures (PEM) Pooled Fund Update* by Mike Praul (Senior Concrete Engineer, FHWA) [\(Attachment #6\)](#)
2. *PEM (PP 84) Updates and Affiliated Standards* by Cecil Jones (Diversified Engineering Services) [\(Attachment #7\)](#)



Motion to move PP 84 to a concurrent ballot:

Motion: NE

Second: NY

No discussion.

No opposed.

Summary of proposed changes outlined in the referenced attached presentation are;

- removal of restrained shrinkage language, put in appendix for users applying to concrete other pavement concrete
- edited SAM criteria
- editorial clarifications

3. Accelerated Determination of Potentially Deleterious Expansion of Concrete Cylinders Due to ASR by Anol Mukhopadhyay (Texas A&M/TTI) (Attachment #8)

#### F. Proposed New Standards

#### G. Proposed New Task Forces

- Jason Weiss proposed changes, Task Force TF 18-01 (Implementation of Changes to PP 84 (Developing Performance Engineered Concrete Pavement Mixtures), TP 119, T 365, and other PP 84 related standards)
- changes to TP 119, Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test (up for reconfirmation) and T 365, Quantifying Calcium Oxychloride Amounts in Cement Pastes Exposed to Deicing Salts (Attachment #4)

Jason Weiss agreed to hold a webinar for TS and TF members to learn more about the proposed changes to TP 119 and T 365. A webinar will be scheduled in late summer or fall.

Don Streeter (NY) volunteers to be the lead of the Task Force Group.

Other volunteers include: James Krstulovich (IL), John Staton (MI), Matt Romero (OK), Dan Miller (OH), Mike Praul (FHWA), Peter Wu (GA), Brian Hunter (NC) and Cecil Jones (DES).

#### H. Standards Requiring Reconfirmation

- T 024M/T 024-15, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- T 148-15, Measuring Length of Drilled Concrete Cores
- T 178-15, Portland-Cement Content of Hardened Hydraulic-Cement Concrete
- T 198-15, Splitting Tensile Strength of Cylindrical Concrete Specimens
- T 277-15, Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
- T 336-15, Coefficient of Thermal Expansion of Hydraulic Cement Concrete
- T 356-15, Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter
- T 357-15, Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure



- TP 119-15, Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test – NY has already learned that not preparing the specimens correctly lead to some strange numbers, so preparation should be clarified. Will either be reconfirmed as is or revised with changes as recommended by TF 18-01.

I. COMP Ballot Items (including any ASTM changes/equivalencies/harmonization)

- Will submit the three (3) TS 3C spring ballot items to COMP
- PP 84 (concurrent)

J. Technical Subcommittee 3C – Standard Stewards – (Attachment #5)

Since Stewards have not come forward voluntarily, Chair has decided to assign standards to the voting members of TS3c. See Attachment #5A.

VI. Open Discussion

**T22:** Has there been any discussion about harmonizing with C39 about types of cylinder breaks? Chair is not aware of any harmonization efforts in this area. The Chair asked the steward (FL DOT) to look into this issue and report back to the committee at the mid-year meeting. No one is aware of any reason NOT to harmonize with the ASTM standard. Colin Lobo made the suggestion to look at the tolerance on the age of testing between T22 and C39.

VII. Adjourn at 11:56 pm.

Motion: NY

Second: VA

No discussion.

No opposed.



**Brian Egan**

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**From:** Brian Egan  
**Sent:** Friday, September 14, 2018 2:59 PM  
**To:** 'MinneyC1@michigan.gov'  
**Cc:** Malusky Katheryn; 'John Malusky'; Babish, Andy P.E. (VDOT); Danny Lane; 'Staton, John F. (MDOT)'  
**Subject:** RE: AASHTO T 259 Mixes  
**Attachments:** T 259 1990.pdf

Hi Cameron and All,

Unfortunately, I do not know the historical reasoning why the mixture specified in T 259 for treatments is as it is (i.e. 658 LB/CY cement, 0.50 w/c, and 6±1 % air content). Interestingly, I found the T 259- 80 (1990) version (attached) and that version had the same requirements (section 2.3). I can only speculate that when T 259 was developed in 1978 that there was research using those parameters currently specified.

I also cannot tell you what the differences would be with the mix requirements that MDOT is using compared to the T 259 results. I would assume the lower w/c ratio would provide "better" results/less chloride penetration, but I don't know if the reduction in cement content by 1 bag/94 LB of cement would have an opposite effect equaling the reduced w/c ration. (As a side note, TDOT also tests with 564 LB/CY of cement and w/c 0.45.)

I did some "Google" searching but did not find any good, related information or research projects on this subject. I did find the following however that has some useful information within; Synthesis of Highway Practice 209- Sealers For Portland Cement Concrete Highway Facilities [http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp\\_syn\\_209.pdf](http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_syn_209.pdf).

Sorry I could offer any other insights, but I am interested in any information that you may find on this subject or any research that you may do to collect data/information.

Brian



**Brian K. Egan, P.E.** | Director  
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[tn.gov/tdot](http://tn.gov/tdot)

---

**From:** John Malusky [mailto:jmalusky@ashtoresource.org]  
**Sent:** Tuesday, September 11, 2018 1:45 PM  
**To:** Brian Egan; Babish, Andy P.E. (VDOT)  
**Cc:** Malusky Katheryn  
**Subject:** FW: AASHTO T 259 Mixes

**\*\*\* This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. \*\*\***

Brian and Andy,

Good afternoon. I hope the two of you are doing well. Katheryn forwarded along this comment/question from Cameron. Unfortunately, I'm not very familiar with this test method and I was wondering if you could reach out and provide some guidance.

Thank you!

Best regards,

*John J. Malusky*

Program Manager, Proficiency Sample Program



Email: [jmalusky@ashtoresource.org](mailto:jmalusky@ashtoresource.org)

Direct: 240-436-4825

Main: 240-436-4900

Website: [www.ashtoresource.org](http://www.ashtoresource.org)

AASHTO re:source (formerly AMRL)

4441 Buckeystown Pike

Suite A

Frederick, MD 21704

**From:** Minney, Cameron (MDOT) [<mailto:MinneyC1@michigan.gov>]

**Sent:** Tuesday, September 11, 2018 12:46 PM

**To:** Malusky Katheryn <[KMalusky@ashto.org](mailto:KMalusky@ashto.org)>

**Subject:** AASHTO T 259 Mixes

Dear Katheryn Malusky,

This is Cameron Minney with the Michigan DOT. I received your contact information from Bob Cullen, and I believe he let you know that I was going to contact you about the mix that was used for this T 259.

I am the manager for the Qualified Products List for penetrating water repellents, and we are referencing this test method for acceptance. Right now, we are specifying a mix that is a closer representation to what Michigan mixes look like, but we were wondering if this would impact the test. Because if this, we were wondering if there was a reason AASHTO used the mix that is specified (658 lbs of cement with a w/c of 0.5 and air content of 6 +/- 1%)? Do you know what kind of differences we could expect with our mix (564 lbs of cement with a 0.45 w/c and air content of 5.5 – 8.5%)?

We based our acceptance criteria off of product data sheets that probably used the mix that is specified in the test method. Would you find that our requirement of less than 0.55 chloride content ratio of sealed/unsealed at ½ inch a reasonable limit with our mix difference in consideration?

Thank you very much for your time, assistance, and expertise in helping me with this situation,

Cameron Minney

Materials Investigation Engineer

(517) 322-5695

Michigan Department of Transportation

8885 Ricks Road, Lansing, MI 48909

*Standard Method of Test  
for*

## Resistance of Concrete to Chloride Ion Penetration

AASHTO DESIGNATION: T 259-80 (1990)

### 1. SCOPE

**1.1** This method covers the determination of the resistance of concrete specimens to the penetration of chloride ion. It is intended for use in determining the effects of variations in the properties of concrete on the resistance of the concrete to chloride ion penetration. Variations in the concrete may include, but are not limited to, changes in the cement type and content, water-cement ratio, aggregate type and proportions, admixtures, treatments, curing and consolidation. This test method is not intended to provide a quantitative measure of the length of service that may be expected from a specific type of concrete.

### 2. TEST SPECIMENS

**2.1** The specimens for use in this test shall be slabs made and cured in accordance with the applicable requirements of AASHTO T 126, "Making and Curing Concrete Test Specimens in the Laboratory."

**NOTE 1**—This method contemplates the use of a minimum of four specimens for each evaluation with each slab not less than 3 inches (76 mm) thick and 12 inches (305 mm) square.

**2.2** For this test the specimens shall be removed from moist curing at 14 days of age unless earlier removal is recommended by the manufacturer of a special concrete. The specimens shall then be stored until 28 days of age in a drying room of the type specified by AASHTO T 160, Length Change of Cement Mortar and Concrete.

**2.3** When the test method is used to evaluate concrete treatments, the slabs shall be fabricated from concrete having a cement factor of 658 lbs (229 kg) per cubic yard (0.76 m<sup>3</sup>), a water-cement ratio

by weight of 0.5, and an air content of 6 ± 1 percent.

The concrete treatment shall be applied at 21 days of age and in accordance with the manufacturer's recommendations for field usage.

**NOTE 2**—If field application of a sealer by spraying is recommended, the sealer should be applied to the specimens by spraying rather than brushing.

**2.4** When a special overlay material is to be evaluated, the concrete slab shall be cast 2 inches (51 mm) thick using the mix design specified under Section 2.3 and then the special overlay material shall be placed 1 inch (25 mm) thick, unless specified otherwise, according to the manufacturer's recommendations.

### 3. PROCEDURE

**3.1** Immediately after the specified drying period stipulated in Section 2.2 (i.e. 29th day of specimen age), 0.125 ± 0.625 in. (3.2 ± 1.6 mm) of the slab surface shall be abraded using grinding or sand-blasting techniques if the concrete or treatment are to be subjected to the wearing effect of vehicular traffic. No water shall be used in the abrading process. If the concrete or treatment is to be used on surfaces not subject to wear from vehicular traffic then the abrading step shall be omitted.

**3.2** Place approximately 0.75 in. (19 mm) high by 0.5 in. (13 mm) wide dams around the top edge of all slabs except one, which will then become the control slab. In lieu of this, a dam meeting these dimension requirements may be cast as an integral part of the slab. However, such previously cast dams shall not interfere with the abrasion of the surface as specified under Section 3.1.

**3.3** All slabs shall then be returned to

the drying room as specified under Section 2.2 for an additional 13 days (i.e. until 42 days of age).

**NOTE 3**—The degree of saturation of the specimens at the time of ponding will affect chloride ingress. In general, water saturated concrete will absorb significantly less chloride during the 90 days of ponding than a drier but similar material. Thus, for proper definition of chloride ingress by this method, the requirements in Sections 2.2 and 3.1 through 3.3 (for a total of 28 days of air drying prior to ponding) must be followed.

**3.4** The slabs with dams shall be subjected to continuous ponding with 3-percent sodium chloride solution to a depth of approximately 0.5 in. (13 mm) for 90 days. Glass plates shall be placed over the ponded solutions to retard evaporation of the solution. Placement of the glass plates shall not be done in such a manner that the surface of the slab is sealed from the surrounding atmosphere. Additional solution shall be added if necessary to maintain the 0.5 in. (13 mm) depth. All slabs shall then be returned to the drying room as specified under Section 2.2.

**3.5** After 90 days of exposure the solution shall be removed from the slabs. The slabs shall be allowed to dry and then the surfaces shall be wire brushed until all salt crystal buildup is completely removed.

**3.6** Samples for chloride ion analysis shall then be taken from all slabs in accordance with the procedure described in AASHTO T 260. These samples shall be obtained from each slab at each of the following depths unless otherwise directed by the specifying agency:

0.0625 in. (1.6 mm) to 0.5 in. (13 mm)  
0.5 in. (13 mm) to 1.0 in. (25 mm)

The chloride content of each sample shall be determined in accordance with the instructions in AASHTO T 260.

## Attachment #3

**Technical Section 3C- Hardened Concrete Properties- Standard Stewards**

Designation	Title	Steward	DOT/Affiliate	Phone/e-mail
<del>R 39-17</del>	<del>Making and Curing Concrete- Test Specimens in the Laboratory</del>	Moved to TS 3B- Summer 2017		
R 72-16	Match Curing of Concrete Test Specimens	Scott George	Alabama DOT	georges@dot.state.al.us
R 80-17	Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction	Brett Trautman	Missouri DOT	573-751-1036 Brett.Trautman@modot.mo.gov
R 81-17	Static Segregation of Hardened Self-Consolidating Concrete (SCC) Cylinders	James Krstulovich	Illinois DOT	217-524-7269 James.Krstulovich@Illinois.gov
T 22-17	Compressive Strength of Cylindrical Concrete Specimens	Tim Ruelke	Florida DOT	<a href="mailto:Timothy.Ruelke@dot.state.fl.us">Timothy.Ruelke@dot.state.fl.us</a>
<del>T 23-17</del>	<del>Making and Curing Concrete- Test Specimens in the Field</del>	Moved to TS 3B- Summer 2017		
T 24M/T 24- 15	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	Timothy Ramirez	Pennsylvania DOT	<a href="mailto:tramirez@pa.gov">tramirez@pa.gov</a>
T 97-17	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)	Tim Ruelke	Florida DOT	Timothy.Ruelke@dot.state.fl.us
T 140-97 (2016)	Compressive Strength of Concrete Using Portions of Beams Broken in Flexure	Richard Giessel	Alaska DOT	richard.giessel@alaska.gov
T 148-15	Measuring Length of Drilled Concrete Cores	Mick Syslo	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a>
T 160-17	Length Change of Hardened Hydraulic Cement Mortar and Concrete	Dan Miller	Ohio DOT	<a href="mailto:daniel.miller@dot.ohio.gov">daniel.miller@dot.ohio.gov</a>
T 161-17	Resistance of Concrete to Rapid Freezing and Thawing	John Staton	Michigan DOT	<a href="mailto:statonj@michigan.gov">statonj@michigan.gov</a>
T 177-17	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	Paul Burch	Arizona DOT	pburch@azdot.gov
T 178-15	Portland-Cement Content of Hardened Hydraulic-Cement Concrete	Robert Lauzon	Connecticut DOT	robert.lauzon@ct.gov
T 198-15	Splitting Tensile Strength of Cylindrical Concrete Specimens	Wasi Khan	District of Columbia DOT	wasi.khan@dc.gov
T 231-17	Capping Cylindrical Concrete Specimens	Mike Santi	Idaho DOT	mike.santi@itd.idaho.gov
T 259-02 (2017)	Resistance of Concrete to Chloride Ion Penetration	Richard Barezinsky	Kansas DOT	rick.barezinsky@ks.gov
T 260-97 (2016)	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials	Woody Hood	Maryland DOT	whood@sha.state.md.us

T 276-17	Measuring Early-Age Compression Strength and Projecting Later-Age Strength	Oak Metcalf	Montana DOT	rmetcalfe@mt.gov
T 277-15	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	John Staton	Michigan DOT	<a href="mailto:statonj@michigan.gov">statonj@michigan.gov</a>
T 323-03 (2016)	Determining the Shear Strength at the Interface of Bonded Layers of Portland Cement Concrete	Denis Boisvert	New Hampshire DOT	Denis.Boisvert@dot.nh.gov
T 332-07 (2016)	Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe	Becca Lane	Ontario MOT	Becca.Lane@ontario.ca
T 334-08 (2016)	Estimating the Cracking Tendency of Concrete	Dan Miller	Ohio DOT	<a href="mailto:daniel.miller@dot.ohio.gov">daniel.miller@dot.ohio.gov</a>
T 336-15	Coefficient of Thermal Expansion of Hydraulic Cement Concrete	Brett Trautman	Missouri DOT	573-751-1036 <a href="mailto:Brett.Trautman@modot.mo.gov">Brett.Trautman@modot.mo.gov</a>
T 356-15	Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter	Jose Lima	Rhode Island DOT	<a href="mailto:jose.lima@dot.ri.gov">jose.lima@dot.ri.gov</a>
T 357-15	Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure	Andy Babish	Virginia DOT	<a href="mailto:andy.babish@vdot.virginia.gov">andy.babish@vdot.virginia.gov</a>
T 358-17	Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration	Darrin Tedford	Nevada DOT	(775) 888-7784 <a href="mailto:DTedford@dot.nv.gov">DTedford@dot.nv.gov</a>
T 359-16	Pavement Thickness by Magnetic Pulse Induction	Brian Egan	Tennessee DOT	<a href="mailto:Brian.Egan@tn.gov">Brian.Egan@tn.gov</a>
T 363-17	Evaluating Stress Development and Cracking Potential due to Restrained Volume Change Using a Dual Ring Test	Darrin Tedford	Nevada DOT	(775) 888-7784 <a href="mailto:DTedford@dot.nv.gov">DTedford@dot.nv.gov</a>
T 364-17	Determination of Composite Activation Energy of Aggregates due to Alkali-Silica Reaction (Chemical Method)	Kurt Williams	Washington DOT	<a href="mailto:willikr@wsdot.wa.gov">willikr@wsdot.wa.gov</a>
T 365-17	Quantifying Calcium Oxychloride Amounts in Cement Pastes Exposed to Deicing Salts	Matt Romero Kenny Seward	Oklahoma DOT	<a href="mailto:kseward@odot.org">kseward@odot.org</a>
T 379- 18	Nonlinear Impact Resonance Acoustic Spectroscopy (NIRAS) for Concrete Specimens with Damage from Alkali-Silica Reaction (ASR)	John Grieco	Massachusetts DOT	<a href="mailto:John.Grieco@dot.state.ma.us">John.Grieco@dot.state.ma.us</a>
T 380-18	Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures (Miniature Concrete Prism Test, MCPT)	Mick Syslo Wally Heyen	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a> <a href="mailto:wally.heyen@nebraska.gov">wally.heyen@nebraska.gov</a>

PP 54-06- (2015) Now R 72-17	Match-Curing of Concrete- Test Specimens			
PP 58-12- (2015) Now R 81-17	Static Segregation of- Hardened Self-Consolidating- Concrete (SCC) Cylinders			
PP 65-11- (2016) Now R 80-17	Determining the Reactivity of- Concrete Aggregates and- Selecting Appropriate- Measures for Preventing- Deleterious Expansion in New Concrete Construction			
TP 109-14- (2016) — Now T 379	Nonlinear Impact Resonance- Acoustic Spectroscopy- (NIRAS) for Concrete- Specimens with Damage from Alkali-Silica Reaction (ASR)			
TP 110-14- (2016) — Now T 380	Potential Alkali Reactivity of- Aggregates and Effectiveness- of ASR Mitigation Measures- (Miniature Concrete Prism- Test, MCPT)	Mick Syslo Wally Heyen	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a> <a href="mailto:wally.heyen@nebraska.gov">wally.heyen@nebraska.gov</a>
TP 119-15	Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	Donald Streeter	New York DOT	<a href="mailto:donald.streeter@dot.ny.gov">donald.streeter@dot.ny.gov</a>
PP 84- 17	Performance Engineered Concrete Pavement Mixtures	Donald Streeter	New York DOT	<a href="mailto:donald.streeter@dot.ny.gov">donald.streeter@dot.ny.gov</a>
PP 89-18 (New 2018)	Standard Practice for Grinding the Ends of Cylindrical Concrete Specimens	Michael Doran Brian Egan	Tennessee DOT	<a href="mailto:michael.doran@tn.gov">michael.doran@tn.gov</a>
TP 129-18 (New 2018)	Standard Method of Test for Vibrating Kelly Ball (VKelly) Penetrati Grinding the Ends of Cylindrical Concrete Specimens in Fresh Portland Cement Concrete	Brian Pfeifer James Krstulovich	Illinois DOT	Brian.Pfeifer@Illinois.gov 217-524-7269 <a href="mailto:James.Krstulovich@Illinois.gov">James.Krstulovich@Illinois.gov</a>



TS 3c			
Designation No.	Title	ASTM Equiv.	Planning Needed
R 072-16	Match Curing of Concrete Test Specimens		Begin Review
R 080-17	Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction		No
R 081-17	Static Segregation of Hardened Self-Consolidating Concrete (SCC) Cylinders		No
T 022-17	Compressive Strength of Cylindrical Concrete Specimens	C39/C39M-16	No
T 024M/T 024-15 (2019)	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	C42/C42M-13	No
T 097-18	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)	C78/C78M-16	No
T 140-97 (2016)	Compressive Strength of Concrete Using Portions of Beams Broken in Flexure		Begin Review
T 148-15 (2019)	Measuring Length of Drilled Concrete Cores	C174/C174M-13	No
T 160-17	Length Change of Hardened Hydraulic Cement Mortar and Concrete	C157/C157M-14	No
T 161-17	Resistance of Concrete to Rapid Freezing and Thawing	C666/C666M-15	No
T 177-17	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	C293-16	No
T 178-15 (2019)	Portland-Cement Content of Hardened Hydraulic-Cement Concrete	C1084-10	No
T 198-15 (2019)	Splitting Tensile Strength of Cylindrical Concrete Specimens	C496/C496M-11	No
T 231-17	Capping Cylindrical Concrete Specimens	C617-15	No
T 259-02 (2017)	Resistance of Concrete to Chloride Ion Penetration		No
T 260-97 (2016)	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials		Begin Review
T 276-17	Measuring Early-Age Compression Strength and Projecting Later-Age Strength	C918-13	No
T 277-15 (2019)	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	C1202-12	No
T 323-03 (2016)	Determining the Shear Strength at the Interface of Bonded Layers of Portland Cement Concrete		Begin Review
T 332-07 (2016)	Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe		Begin Review
T 334-08 (2016)	Estimating the Cracking Tendency of Concrete		Begin Review
T 336-15 (2019)	Coefficient of Thermal Expansion of Hydraulic Cement Concrete		No
T 356-15 (2019)	Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter		No



## TS 3c

Designation No.	Title	ASTM Equiv.	Planning Needed
T 357-15 (2019)	Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure		No
T 358-19	Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration		No
T 359M/T 359-18	Pavement Thickness by Magnetic Pulse Induction		No
T 363-17	Evaluating Stress Development and Cracking Potential due to Restrained Volume Change Using a Dual Ring Test		No
T 364-17	Determination of Composite Activation Energy of Aggregates due to Alkali–Silica Reaction (Chemical Method)		No
T 365-17	Quantifying Calcium Oxychloride Amounts in Cement Pastes Exposed to Deicing Salts		No
T 379-18	Nonlinear Impact Resonance Acoustic Spectroscopy (NIRAS) for Concrete Specimens with Damage from Alkali-Silica Reaction (ASR)		No
T 380-19	Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures (Miniature Concrete Prism Test, MCPT)		No

## TS 3c

Designation No.	Title	Pub Yr. 1	Planning Needed
PP 084-19	Developing Performance Engineered Concrete Pavement Mixtures	2017	No
PP 089-19	Grinding the Ends of Cylindrical Concrete Specimens	2018	Start Revise or 2-Yr. Reconfirm Review
TP 119-15 (2019)	Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	2015	Start Revise or 2-Yr. Reconfirm Review
TP 129-18	Vibrating Kelly Ball (VKelly) Penetration in Fresh Portland Cement Concrete	2018	Start Revise or 2-Yr. Reconfirm Review

## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

### TS 3C- Hardened Concrete Properties

#### Spring Ballot 19-01 and 19-02 Comments

Ballot Item #1	STATE	COMMENT	ACTION
T 22- Compressive Strength of Cylindrical Concrete Specimens	PA	<p>1) On the standard's cover page and on page T 22-1, it is suggested to revise the standard's designation from "T 22" to "T 22M/T 22" due to the text in Section 1.2 stating that the SI units and the inch-pound units are to be regarded separately as the standard and also due to the nature of the revisions in Section 8.1 and 8.3.1. to include separate equations for SI units and inch-pound units.</p> <p>2) In Section 5.1.2.2, with the deletion of "Note 2" in Section 4.2, the Notes should be renumbered in sequential order. In Section 5.1.2.2, revise from "Note 3" to "Note 2" and renumber all Notes after this.</p> <p>3) In Section 5.2, at end of 1st line, revise from "Note 4" to "Note 3" if all Notes are renumbered per comment 2) above.</p> <p>4) In Section 5.2.1.1, 2nd line, revise from "Note 5" to "Note 4" if all Notes are renumbered per comment 2) above.</p> <p>5) In Section 5.2.1.1, 7th line, suggest revising from "19mm" to "19 mm".</p> <p>6) In Section 5.2.1.1, 6th and 7th lines, and for the statement "One vertical center hole up to 19mm (0.75 in.) in diameter is permissible", is this center hole permissible in the bottom bearing block, the spacers, or both? It is not very clear here as currently written.</p> <p>7) In Section 5.3.1, 3rd line, revise from "Note 10" to "Note 9" if all Notes are renumbered per comment 2) above.</p> <p>8) In Section 6.1, 2nd line, revise from "Note 11" to "Note 10" if all Notes are renumbered per comment 2) above.</p> <p>9) In Section 7.3, Table 2, please reconsider not deleting the row for "56 days". With Supplementary Cementitious Materials (SCMs) being used and resulting in slower strength gain, Pennsylvania has started to perform compressive strength testing at 56 days when concrete mixes with SCMs do not make the specified design strength at 28 days. Most concrete mixes with SCMs continue to gain strength beyond the 28 days and the 56 day test age is a convenient test age to test specimens beyond 28 days rather than 90 days.</p> <p>10) In Section 7.4.1, 3rd line, revise from "Note 12" to "Note 11" if all Notes are renumbered per comment 2) above.</p> <p>11) In Section 7.4.2, 4th line, revise from "Note 13" to "Note 12" if all Notes are renumbered per comment 2) above.</p> <p>12) In Section 7.5.1, 2nd line, revise from "Note 14" to "Note 13" if all Notes are renumbered per comment 2) above.</p> <p>13) In Section 8.2, 3rd line, revise from "Note 15" to "Note 14" if all Notes are renumbered per comment 2) above.</p> <p>14) In Section 10.1.3, 5th line, revise from "Note 16" to "Note 15" if all Notes are renumbered per comment 2) above.</p> <p>-----</p> <p>I have a problem with the change made to T 22, Sect. 9.1.6, in 2017. This new Sect. 9.1.6 requires that when the average of two or more companion cylinders tested at the same age is reported, the average of the compressive strength is to be calculated using the unrounded individual compressive strength values of the companion cylinders, instead of the compressive strength values of the individual cylinders rounded to the nearest 10 psi. The average compressive strength value is then to be reported to the nearest 10 psi.</p> <p>I want to know the reasoning that led to this requirement. Based on examination of the test results of a large number of 4 in. diameter cylinder pairs (122) and a large number of 6 in. diameter cylinder pairs (261) submitted to the PennDOT Laboratory Testing Section (LTS) for testing in calendar years</p>	

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		<p>2014 and 2015, the difference between the average compressive strength for individual cylinder strengths calculated to the nearest psi and the average compressive strength for the same individual cylinder strengths calculated to the nearest 10 psi, is at most 10 psi; sometimes the difference is 10 psi higher and sometimes the difference is 10 psi lower. See the worksheets in the Excel spreadsheet I have attached to this response. In my opinion, if a difference of 10 psi in the average compressive strength of a pair of cylinders between the two calculation methods is the break point between a compressive strength failing or passing result, then the concrete producer needs to increase the cementitious content of the concrete mix. They should not depend on a change in the calculation of the average value of a set of companion cylinders to make the difference between a passing and a failing compressive strength result.</p>	
	WA	It appears the notes numbering is incorrect due to the omission of 5.4 of C39 as mentioned above. The draft ballot does not contain a note 2.	
	FL	FL attachment provided	
	MO	<p>1) Since removing the requirement that laboratory technicians meet ASTM C1077 requirements (previously in Section 4.2), is there a need to still reference ASTM C1077 in Section 2.2?</p> <p>2) On Page 3, under Section 5.1.2.2, Note 3 needs to be re-numbered to Note 2. This is because Note 2 was removed from Page 2 under Section 4.2. All subsequent notes will also need to be changed (see Pages 4, 5, 6, 8, 9, and 12).</p> <p>3) In Section 5.2, the second line on Page 4, need to reference Note 3 instead of Note 4. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>4) In Section 5.2.1.1, the second line on Page 4, need to reference Note 4 instead of Note 5. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>5) In Section 5.3.1, the third line on Page 6, need to reference Note 9 instead of Note 10. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>6) In Section 6.1, the second line on Page 6, need to reference Note 10 instead of Note 11. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>7) In Table 2 on Page 7, we recommend leaving the requirement for 56 days. A 56-day testing age is utilized for research purposes. It may also be used when replacing a significant amount of cement with supplementary cementitious materials such as fly ash and slag.</p> <p>8) In Section 7.4.1, the third line on Page 8, need to reference Note 11 instead of Note 12. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>9) In Section 7.4.2, the fourth line on Page 8, need to reference Note 12 instead of Note 13. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>10) In Section 7.5.1, the second line on Page 8, need to reference Note 13 instead of Note 14. This is because Note 2 was removed from Page 2 under Section 4.2.</p> <p>11) In Section 10.1.3, the fifth line on Page 12, need to reference Note 15 instead of Note 16. This is because Note 2 was removed from Page 2 under Section 4.2.</p>	
	IL	Section 2.2, consider deleting last item, R0030, since it is not a standard	

## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

Ballot Item #2	STATE	COMMENT	ACTION
PP 84- Developing Performance Engineered Concrete Pavement Mixtures	NRMCA	<p>General – There was an agreement that the subsections “Prescriptive” and “Performance” would be removed with only alternative “Options” listed under each property. This doesn’t seem to have been accomplished.</p> <p>General – Provisional standards should be avoided in specifications until these are approved as full standards. Efforts should be made to standardize methods as separate standards. An important aspect of standard test methods is the development of precision statements that provide the user with an understanding of the variability associated with the test – especially if the method is being used for acceptance / rejection. Some of the proposed methods are not ready for prime time by this condition.</p> <p>There is lack of consistency between the revised PP84 and the guidance document (the latter does not seem to have been revised to be consistent)</p> <p>4.1.1 Mineral fillers (in 4.1.7) should be listed under 4.1.1 recognizing its part of the aggregate system.</p> <p>5.1.3 Sampling concrete can be for fresh concrete and possibly other hardened concrete tests and may not be limited to strength test specimens</p> <p>5.1.4 Making and curing specimens does not fit under a section on Sampling. Address this in section on strength testing.</p> <p>6 Title is incorrect as it is broader in that it sets requirements – suggest “Requirements for Concrete Mixtures”</p> <p>6.2 Generally material certifications from suppliers are provided – not laboratory test data since the contractor/concrete producer do not test for specification compliance of materials. Samples of materials are not provided in a submittal – delete this part.</p> <p>6.3.1 Flexural strength is not common as an acceptance test for SHAs. It may be documented as a pre-qualification test for the proposed mixture and acceptance is more commonly based on compressive strength tests. Does the proposed mixture need be just higher than 600 psi or does it need to have some “overdesign”? This should be clarified.</p> <p>Note 1 – there are no acceptance criteria for flexural strength defined in section 7.</p> <p>6.3.2 Does the proposed mixture need be just higher than 4000 psi or does it need to have some “overdesign”? This should be clarified. Typically, a higher strength (4500 psi?) is specified for concrete exposed to freezing and thawing.</p> <p>Note 2 – there are no acceptance criteria in Section 7 other than the results should exceed the minimum.</p> <p>6.4 The selection of options should be stated here for all of Section 6.4 – it should not be one of the options under 6.4.1 AND one option under 6.4.2. Isn’t that the intent? See Table 2. If one goes through this section carefully there are 7 options (3 in 6.4.2.2) that can be specified.</p> <p>6.4.1.2 This test is a performance measure of the concrete mixture. It should be an option listed under 6.4.2. The guidance document is not consistent with this revision and should be revised.</p> <p>With pavement mixtures, the use of 4 x 4 prisms may be needed for larger aggregate size. Would a different length change criteria be needed for larger specimens?</p> <p>6.4.2 The options under this section should be stated in 6.4. See Table 2</p> <p>6.4.2.1.1 Is this requirement reasonable for pavements? Is there data that shows it can be achieved – no cracking for 180 days in T 334 seems extremely conservative – if the note says so, a different criteria should be stated for pavements.</p> <p>6.4.2.1.2 Until there is more confidence developed with using the dual ring test this option should be removed. No labs are set up to do this test. There is no precision statement for it and thereby the variability of results of the same</p>	

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		<p>concrete in different labs, or repeated tests on the same mixture, is uncertain. There is limited information provided in the guidance document. This is not listed in Table 2.</p> <p>6.4.2.2 This option should be removed until there is more confidence in the process. There is no discussion on this method in the guidance document. It states three criteria for probability of cracking – 5, 20 or 50 percent. Table 2 lists 3 levels of length change at 91 days. Presumably one probability or length change at 91 days should be selected – it seems like 5% or 360 <math>\mu\epsilon</math> would be most likely selected – but a contractor would have no idea on how to start developing a mixture to comply with this option. This would be considerably more restrictive than 6.4.1.2</p> <p>The note provides a reference for a paper for one type of calculation and says other models can be used – this is too general. This requirement needs better evaluation and detailed procedure before its included as an option. Section reference to this requirement in Table 2 is incorrect.</p> <p>6.5.1.1 Air content should be stated as a single value based on aggregate size with an acceptance tolerance of <math>\pm 1.5\%</math>. A mixture with 1 ½ inch aggregate needs a lower air content than one with ¾ in aggregate)</p> <p>6.5.1.2 It seems like based on more evaluation of TP 118, a SAM value of 0.20 is too restrictive and should be increased to 0.25 and section 7.1.2 for acceptance criteria adjusted accordingly</p> <p>6.5.2.1 Considerable detail is needed for this evaluation Why is the primary equation in a Note? It should be in the body of the standard. TP WWW and TP XXX does not tell one how to get the saturation at the inflection point, SNick. Presumably this is determined by ASTM C1585? Obtaining this value for the equation is unclear. Is t in years? It is not clear. It should be included in the variable list and defined. In the equation is <math>v_t</math> same as <math>v_{30}</math>? where does one find DOSCritical? Should it be 0.85 (possibly expressed as a percent?). Why does it say that it can be initially be assumed to be...? What other value can it alternatively be? The equation defining S2 is unclear – what is <math>v_s</math>? Is it supposed to be <math>v_t</math>? A numerical example on this whole section in the guidance document, including FAPP from measured resistivity or RCPT would help.</p> <p>6.5.4 Make this a primary property (6.6) with options to separate it from 6.5 (while its still freeze-thaw – this should be its own set of alternative options). For this section to be apply - How does a contractor know at time of construction what deicers will be used?</p> <p>6.5.3.1 “SCM” is too generalized and there needs to be some differentiation between them – fly ash used at 30% will cause constructability problems (set time etc); slag cement should be fine. Do they consume/dilute CH to the same degree to be protective? This was revised to min 30% - this is stated in Table 2 which is inconsistent with this section.</p> <p>6.5.4.1 The availability of this method for contractors or general commercial labs is very limited, making option essentially not useable. Even research institutions in universities and other locations have difficulty with this test method. Until there is broader availability and more confidence with this method, this option should not be included.</p> <p>6.6.1.1 If the w/cm requirements between different exposures is varied, the strength requirements should also be appropriately varied (0.50 and 4000 psi; 0.45 and 4500 psi) – strength tends to be the method to verify achieving the required w/cm.</p> <p>6.6.1.2 This is a measured performance property and should be an option under 6.6.2</p> <p>6.6.2.1 It is questioned why this is important for plain jointed concrete</p>	
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		<p>pavement if there is no reinforcement that would be subject to corrosion where depth of penetration of chloride ions would be important. There are no clear requirements stated in this section for depth of chloride penetration. There is no easy way to know the “chloride ion exposure” for any location.</p> <p>The table says 25mm at 30 years. The process of arriving at that from the measured FAPP should be clearly defined and until such time, this should not be retained as an option. The Note that suggests a research reference is not useful in a specification.</p> <p>6.7.2 There should be a prohibition on using aggregates that are determined to be susceptible to ACR</p> <p>6.9 If the requirements are stated as alternative options, then why are the mixture qualification requirements including items that may not be part of those options. This is now forcing the performance of several tests that may not be selected as options in Section 6. It is not likely that a contractor will measure Cal Oxy (T 365) and dual ring (T #^#) tests because there are no commercial labs equipped to do these. Its unsure what level of matrix saturation (TP WWW and TP XXX) will be considered acceptable. Also most states do not specify the coefficient of thermal expansion (T 336) and this is also difficult to find someone to do this reliably.</p> <p>If the flexural strength is not specified, why should this be measured and a correlation with compressive established?</p> <p>Table 2 There are several inconsistencies between Section 6 and Table 2 – requirements, section references, etc.</p> <p>6.9 This section should be moved to follow 6.10 that summarizes the specification requirements. Ideally it should include all the required and alternative data for mixture pre-qualification as listed in Table 3.</p> <p>Flexural strength – only if required by the agency – change “calibration” to “correlation”. We are not calibrating the mixture – only establishing a relationship to support the design assumption.</p> <p>6.10 Table 3 should be revised if some of the suggestions earlier are accepted. The alternative choices should be clear and more than one of the choices should not be selected.</p> <p>7.3 If F factor is an option, why is this included as a basis for acceptance. It should be an option only when it is a selected option in Section 6.</p>	
	PCA	<p>PCA Attachment provided</p> <ul style="list-style-type: none"> <li>- 2.1- revised title for T 365</li> <li>- 6.4.1.1- Suggest making clear that mineral fillers such as those meeting C1797 are considered fine aggregates, rather than part of the binder phases. (REF: volume of aggregate, <i>including mineral fillers</i>, ...)</li> <li>- 6.4.1.2- Presumably this is in laboratory air? Should a relative humidity and temperature range be specified? (REF: 21 days of drying)</li> <li>- 6.5.1.3- Should this sentence be moved to 6.1 or 6.2? All of Section 6 deals with mixture qualification and 7 deals with field acceptance. Should the title of Section 6 be changed to something like “Mixture qualification” for clarity? (REF: last sentence)</li> <li>- 6.5.2.1- This is not a complete sentence; (REF: 1<sup>st</sup> sentence)</li> <li>- 6.5.2.1- Should this be part of the main text? Notes in standards are typically not mandatory. This is a practice, so perhaps that distinction is not relevant, but it would appear that if invoking 6.5.2, the equations in Note 6 should apply. (REF: Note 6)</li> <li>- Note 6- t is time in this equation, but are the units years? Perhaps t should be included in the list of variables. (REF: equation shown)</li> <li>- Note 6- The o is subscripted (REF: (po ) )</li> <li>- 6.5.4.1- Might be worthwhile to be consistent in units with Table 2 which lists 0.15 g CaOXY/g cementitious paste. (REF: 15 g CaOXY/100 g cementitious paste )</li> </ul>	

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		<ul style="list-style-type: none"> <li>- Note 7- Editorial: subscript on the o (REF: (po) )</li> <li>- Note 8- Subscript o (REF: (po) )</li> <li>- Table 1- Section 6.3 requires strength with limits at 28 days; is the 90-day values intended to be additional testing? (REF: T 22)</li> <li>- Table 1- I think what is intended here is not a "rate" but the strengths achieved at 90 days, but the referenced test methods. I think of a rate as the strength gain/time, which changes over time. If it is intend to require measurements at various ages, perhaps those should be explicitly specified (some subset of 1, 3, 7, 14, 28, 56, 90 d?). (REF: Rate of compressive strength)</li> <li>- Table 2- Suggest changing Mixture Proportioning to Mixture Qualification, or perhaps even Mixture Proportion Qualification (REF: Table title)</li> <li>-Table 2- Consider moving the Selection details column to be the second or third column. I think that is a primary column for the table as it details the options intended for the various tests for the various properties. (REF: Selection Details column)</li> </ul>	
	PA	<p>Affirmative with comments:</p> <ol style="list-style-type: none"> <li>1) In Section 6.4, revise from "Susceptibility Shrinkage" to "Susceptibility to Shrinkage".</li> <li>2) In Section 6.4.1, at end, the text "(choose one if drying shrinkage, warping or cracking is a concern)" is somewhat confusing as this same text is also contained in Section 6.4.2. There are the options of Section 6.4.1 (Prescriptive Specification) and Section 6.4.2 (Performance Specification) and then there are further options within Section 6.4.1 (i.e., Sections 6.4.1.1 and 6.4.1.2) and Section 6.4.2 (i.e., Sections 6.4.2.1.1 and 6.4.2.1.2). So, when the text indicates to "choose one" in multiple locations, is the intent to chose one from each section [i.e., one each from 6.4.1 (Prescriptive Specification) and 6.4.2 (Performance Specification)]? Or, is the intent to choose one from all the options (i.e., one of the Prescriptive Specifications or one of the Performance Specifications from the options of 6.4.1.1, 6.4.1.2, 6.4.2.1.1, 6.4.2.1.2, and 6.4.2.2)? More clarity is needed here.</li> <li>3) In Sections 6.4.1, 6.4.2, and 6.4.2.1, add something after "choose one" to perhaps help the clarity issue raised in comment 2) above (i.e., choose one what? Specification? Or, one way to determine Susceptibility to Cracking?).</li> <li>4) In Section 6.4.2.1.1, 1st line, revise from "assessed using AASHTO T 334" to "estimated according to T 334".</li> <li>5) In Section 6.4.2.1.2, 1st line, revise from "assessed using AASHTO T 363" to "evaluated according to T 363".</li> <li>6) In Section 6.4.2.1.2, 4th line, revise from "and RH of 50 ± 2 percent RH for 7 days" to "and a relative humidity of 50 ± 2 percent for 7 days". "RH" is not defined anywhere.</li> <li>7) In Section 6.4.2.2, should the paragraph starting with "The shrinkage cracking of the mixture..." be formatted as subsection 6.4.2.2.1? Compare with Sections 6.4.2.1 and 6.4.2.1.1.</li> <li>8) In Section 6.4.2.2, 2nd paragraph, 1st line, revise from "estimating" to "estimated" and, in 2nd line, revise from "determined using T 160" to "determined according to T 160".</li> <li>9) In Section 6.5.1.2, revise from "percent using T 152" to "percent determine according to T 152".</li> <li>10) In Section 6.5.1.3, 1st line, revise from "or greater and a SAM number less than or equal to 0.20 using TP 118" to "or greater determined according to T 152, T 196, or TP 118 and a SAM number less than or equal to 0.20 determined according to TP 118".</li> <li>11) In Section 6.5.2.1, 1st sentence, this sentence is incomplete. Perhaps the word "that" should be deleted? Or, something else.</li> <li>12) In Section 6.5.2.1, 3rd line, revise from "determined by TP 119" to "determined according to TP 119".</li> <li>13) In Section 6.5.2.1, "where" statements, it is suggested to include "S(t)" in</li> </ol>	



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		<p>the where statements to define that term.</p> <p>14) In Section 6.5.2.1, "where" statement, add "=" between each equation parameter and its definition"</p> <p>15) In Section 6.5.2.1, "where" statement for "SNick", in 2nd line, revise from "Determined using TP WWW" to "Determine according to TP WWW" and in last line, revise from "week using AASHTO TP 119-AA" to "week according to TP 119".</p> <p>16) In Section 6.5.2.1, "where" statement for Phi, last line, revise from "This value may be increased when deicing salt is used to 1.3" to "This value may be increased to 1.3 when deicing salt is used" for better readability.</p> <p>17) In Section 6.5.2.1, in first paragraph below the "where" statements, 2nd line, revise from "the resistivity obtained using AASHTO TP 119" to "the resistivity determined according to TP 119" and, in the 2nd and 3rd lines, revise from "(alternatively AASHTO T 358" to "(alternatively determined according to T 358".</p> <p>18) In Section 6.5.2.1, last paragraph, it is suggested to move the equation for "F<sub>app</sub>" to a new line, to number the equation, and then to add "where" statements below the equation for definition of each of the equation terms.</p> <p>19) In Section 6.6.1.2, 2nd line, revise from "the resistivity obtained using AASTHO TP 119-AA" to "the resistivity determined according to TP 119" and, in the 3rd line, revise from "(alternatively AASHTO T 358-AA" to "(alternatively determined according to T 358".</p> <p>20) In Section 6.6.1.2, Note 7, is Note 7 needed? This is same and already defined in Section 6.5.2.1.</p> <p>21) In Section 6.6.1.2.2, revise from "thawing and deicer application" to "thawing or deicer application" to match similar text in Section 6.6.1.1.2.</p> <p>22) In Section 6.6.2.1, 2nd line, revise from "the resistivity obtained using AASTHO TP 119-AA" to "the resistivity determined according to TP 119" and, in 3rd line, revise from "(alternatively AASTHO T 358-AA" to "(alternatively determined according to T 358".</p> <p>23) In Section 6.6.2.1, Note 8, is Note 8 needed? This is same and already defined in Section 6.5.2.1 last paragraph. At a minimum, consider deleting Note 8 and referring to the previous "Note 7".</p> <p>24) In Section 6.8.1, 1st and 2nd lines, revise from "concrete mixture using the box test in accordance with the procedure described in AASHTO TP ZZZ" to "concrete mixture according to TP ZZZ (box test)".</p> <p>25) In Table 2, row for Section 6.8.1, revise from "AASHTO TP ZZZ" to "TP ZZZ".</p> <p>-----</p> <p>PP 84 Guidance Document –</p> <p>a. First sentence of Sect. 3.1 – change ‘product’ to ‘produce’;</p> <p>b. Section 4.3, second line after equation 2 – remove ‘assuming’ from inside the parentheses;</p> <p>c. Section 5.2, “Alkali-Aggregate Reactivity” – in the third paragraph after the two bullet points naming the AASHTO and ASTM versions of the rapid mortar bar test, the fourth line should reference ‘mortar bars’ NOT ‘mortar beams’.</p>	
	KS	6.4.2.2. change estimating to estimated	
	FL	Attachment	
	MO	<p>Balloted Specification Change</p> <p>1) On Page 8, Note 6, we recommend that the values 't' and 's' used in the equations be listed and defined to prevent possible confusion.</p>	

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	TN	In section 6.4.2.2 change estimating to estimated. In section 6.5.2.1 the apparent formation factor is defined section 6.5.2.1 then it is again defined in section 6.6.1.2 the question being does it need to be defined in both sections.	
	IL	Notes 7 and 8 are the same; can Note 8 be deleted?	
Ballot Item #3	STATE	COMMENT	ACTION
TP WWW- Standard Method of Test for Determining the Total Pore Volume in Hardened Concrete Using Vacuum Saturation	NRMCA	The standard does not provide details on obtaining some of the saturation level requirements in PP84	
	PCA	<p>Would the reference to “a towel” in 8.3 might be better as “a damp towel.” I think the idea is to remove free surface moisture, but to keep the surface damp. This may not be significant in this method, but this standard may be referenced in other standards where this may be significant.</p> <p>Also in 8.3, I think the reference to Note 5 actually be to Note 7.</p> <p>In 8.1, the original mass is required to be determined, but it is not referenced elsewhere in the standard. Should it be deleted from this standard, or added to the reporting requirements for use elsewhere?</p> <p>In Section 9, two references to Section 7 should likely be to Section 8.</p> <p>It would appear that 9.2 and 10.1.4 requires calculation and reporting of the percentage of mass increase due to saturation. Suggest this be added to scope and summary of test methods to help users find this test method. (This assumes that the subcommittee wants to keep the standards for Items 3 and 4 of this ballot separate.)</p> <p>In Section 9, there are two equations listed as 1.</p> <p>In Note 7, I think the word “is” should be added before “exposed.”</p>	
	PA	<p>Affirmative with comments:</p> <p>1) In Section 2.1, add "R 39, Making and Curing Concrete Test Specimens in the Laboratory". AASHTO standards should reference other AASHTO standards and not the equivalent ASTM standard.</p> <p>2) In Section 2.1, add "T 23, Making and Curing Concrete Test Specimens in the Field".</p> <p>3) In Section 2.1, add "T 24M/T 24, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete".</p> <p>4) In Section 2.1, add "T 277, Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration".</p>	

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		<p>5) In Section 2.2, delete "C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field" due to adding T 23 in Section 2.1. AASHTO standards should reference other AASHTO standards, not the equivalent ASTM standard.</p> <p>6) In Section 2.2, delete "C42/C42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" due to adding T 24M/T 24 in Section 2.1.</p> <p>7) In Section 2.2, delete "C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory" due to adding R 39 in Section 2.1.</p> <p>8) In Section 2.2, delete "C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration" due to adding T 277 in Section 2.1.</p> <p>9) In Section 5.1, it is recommend to add the specific terms and definitions most important within this standard directly to Section 5 instead of referring to ASTM C125. If this recommendation is not considered, then at a minimum, in Section 2.2, add "C125, Standard Terminology Relating to Concrete and Concrete Aggregates".</p> <p>10) In Section 6.1, revise from "Complying with AASHTO M 231" to "Complying with M 231".</p> <p>11) In Section 6.5, do not italicize the text "A towel used to dry the surface of the specimen".</p> <p>12) In Section 6.6, do not italicize the text "Used to cut concrete specimens".</p> <p>13) In Section 6.7, revise from "ASTM C1202" to "T 277".</p> <p>14) In Section 6.7.2, revise from "Beaker (1000 mL or larger) or other container" to "Beaker or other container". The volume of the beaker is specified in the definition". If the text "1000 mL or larger" is to remain, it is recommended to add a Note in Section 6.7.2 which states something like "A 1000 mL or larger volume beaker has been found to be sufficient in size".</p> <p>15) In Section 6.7.2, 2nd line, revise from "The volume of beaker" to "The volume of the beaker".</p> <p>16) In Section 6.7.3, 1st line, revise from "The volume of desiccator" to "The volume of the desiccator".</p> <p>17) In Section 6.7.3, 3rd line, revise from "Desiccator shall" to "The desiccator shall".</p> <p>18) In Section 6.7.4, revise from "over range of the entire range of measured pressure" to "over the entire range of the measured pressure" for better readability.</p> <p>19) In Section 7.1, 2nd sentence, revise from "Specimens are obtained from either molded cylinder, according to Practices C31/C31M or C192/C192M or drilled cores, according to Test Method C42/C42M" to "Obtain each test specimen from a concrete cylinder, molded according to T 23 or R 39, or from a concrete core, obtained according to T 24M/T 24".</p> <p>20) In Section 7.1, 3rd line, revise from "Specimens shall be cut</p>	
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		<p>with" to "Cut specimens with" to put in active voice.</p> <p>21) In Section 7.1, 5th line, revise from "they shall be marked" to "mark the cores" to put into active voice.</p> <p>22) In Section 7.1, Note 4, Note 5, and Note 6, revise each Note's font type to be similar to the font type used for the text of Section 7.1.</p> <p>23) In Section 7.1, Note 4, 2nd and 3rd lines, revise from "(i.e., &gt; 326,000 mm<sup>3</sup>) however the thickness" to "(i.e., &gt; 326,000 mm<sup>3</sup>); however, the thickness".</p> <p>24) In Section 7.1, Note 5, 1st line, revise from "used it is best practice" to "used, it is a best practice".</p> <p>25) In Section 7.1, Note 6, 1st line, revise from "used it is best practice" to "used, it is a best practice".</p> <p>26) In Section 7.2, 2nd line, consider revising from "packed" to "packaged".</p> <p>27) In Section 8.2, 1st line, revise from "the original the mass" to "the original mass" and add a comma after the word "specimen".</p> <p>28) In Section 8.2, last line, revise from "Designate this last as the oven dry mass (A)" to "Designate this last measurement as the oven dry mass (A)".</p> <p>29) In Section 8.3, 1st line, revise from "After oven drying, place concrete specimen" to "After oven drying, place the concrete specimen".</p> <p>30) In Section 8.3, 1st line, what is the reason to reference "(See Note 5)"? Note 5 is about a best practice to use sections of the specimen that are at least 35 mm away from the top and bottom. It is unclear why Note 5 is referenced here.</p> <p>31) In Section 8.3, Note 7, 1st line, revise from "surface exposed" to "surface is exposed" and, in 2nd line, revise from "racket" to "rack".</p> <p>32) In Section 8.4, revise from "23 ± 2.0 °C" to "23 ± 2 °C".</p> <p>33) In Section 8.5, 3rd line, revise from "23+/-2°C" to "23 ± 2 °C".</p>	
	FL	Attachment	
	MO	<p>Affirmative vote with comments:</p> <p>1) In Section 6.7.4, in the first line, we recommend removing 'range of' so the sentence reads as follows:  "...nearest 5 Torr (666 Pa) over the entire range of measured pressure."</p> <p>2) In Section 7.2, the first line, we recommend changing the wording to be more inclusive. We utilize extra large zip lock plastic bags for shipping cores. We suggest the following wording:</p>	

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		<p>"...to the laboratory in sealed plastic bags to prevent moisture loss."</p> <p>This wording is very similar to AASTHO T24, Section 7.3.1.</p> <p>3) In Section 8.2, the first line, we recommend removing the word 'the' so it reads as follows: "After determining the original mass of the concrete specimen..."</p> <p>4) In Section 8.2, the tenth line, we recommend adding the word 'measurement' after the word 'last' so it reads as follows: "Designate this last measurement as the oven dry mass (A)."</p> <p>5) In Section 8.5, does a time frame need to be specified for consistency purposes?</p>	
	TN	General question would be should standard English units included in this standard? Section 10.1.3 seems to be incomplete thought.	
	MI	<b>NEGATIVE-</b> Irrespective of the content, starting at section 7 and carrying through the end of the document, the formatting in terms of inconsistent bulleting and possible missing content is unacceptable for publication.	
Ballot Item #4	STATE	COMMENT	ACTION
TP XXX- Standard Method of Test for Determining the Degree of Saturation of Hydraulic- Cement Concrete	NRMCA  PCA	<p>The standard does not provide details on obtaining some of the saturation level requirements in PP84</p> <p>Primary comment: This procedure is overwhelmingly similar to that in Item 3 (TP WWW-20), with the exception of one additional equation. I would suggest that the two proposed methods be combined, with the addition of the final equation to Item 3, and updating of the title and scope of that document.</p> <p>In Section 4, the references to references 13.2 and 13.3 I think should be 13.1 and 13.2.</p> <p>The last sentence of 8.2 refers to the oven-dry mass as mOD. However, the only place this value is used is in Eq. 1, where it is A. Should these variables be consistent?</p> <p>Also, in 8.2 a number is missing in the 4th sentence: "determine the mass to the nearest."</p> <p>Likewise moriginal in 8.1 is not used elsewhere. However, perhaps an equation should be added to calculate D in Equation</p>	

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		<p>1. I believe the common approach is to use the original mass as the basis for the percentage of mass increase, but someone may use the final mass?</p> <p>In 8.3, the “saturated surface dry” mass of the specimen is required from another method. However that phrase is not found in Item 3 (TP WWW-20) of this ballot, but I think it is called the “mass of surface-dry sample in air after vacuum, g” (B in Equation 1 of TP WWW-20).</p> <p>If this subcommittee would like to keep the methods separate, I think it would be more straightforward to copy Section 8.3 of TP WWW-20 to this document, along with the calculation for D. This appears to have been done for Section 8.2.</p> <p>An example may help illustrate the equations. I initially was concerned that the “(D-1)” term in Eq. 1 was out of place, but if D is expressed as a decimal, for example 0.10 instead of 10%, then this term becomes 0.90 instead of 9%.</p>	
	PA	<p>Affirmative with comments:</p> <p>1) In Section 2.1, revise from "T XXX" to "TP WWW" to match the temporary designation shown in COMP TS-3c 19-01 Ballot Item 3.</p> <p>2) In Section 2.1, add "R 39, Making and Curing Concrete Test Specimens in the Laboratory". AASHTO standards should reference other AASHTO standards and not the equivalent ASTM standard.</p> <p>3) In Section 2.1, add "T 23, Making and Curing Concrete Test Specimens in the Field".</p> <p>4) In Section 2.1, add "T 24M/T 24, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete".</p> <p>5) In Section 2.1, add "T 277, Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration".</p> <p>6) In Section 2.2, delete "C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field" due to adding T 23 in Section 2.1. AASHTO standards should reference other AASHTO standards, not the equivalent ASTM standard.</p> <p>7) In Section 2.2, delete "C42/C42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" due to adding T 24M/T 24 in Section 2.1.</p> <p>8) In Section 2.2, delete "C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory" due to adding R 39 in Section 2.1.</p> <p>9) In Section 2.2, delete "C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration" due to adding T 277 in Section 2.1.</p> <p>10) In Section 3.2, last line, revise from "following AASHTO T</p>	

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		<p>XXX" to "according to TP WWW".</p> <p>11) In Section 6.1, 1st line, revise from "Complying with AASHTO M 231" to "Complying with M 231".</p> <p>12) In Section 7.1, 2nd sentence, revise from "Specimens are obtained from either molded cylinder, according to Practices C31/C31M or C192/C192M or drilled cores, according to Test Method C42/C42M" to "Obtain each test specimen from a concrete cylinder, molded according to T 23 or R 39, or from a concrete core, obtained according to T 24M/T 24".</p> <p>13) In Section 7.1, 3rd line, revise from "Specimens shall be cut with" to "Cut specimens with" to put in active voice.</p> <p>14) In Section 7.1, 5th line, revise from "they shall be marked" to "mark the cores" to put into active voice.</p> <p>15) In Section 7.1, Note 1, 2nd line, revise from "(i.e., &gt; 326,000 mm<sup>3</sup>) however the thickness" to "(i.e., &gt; 326,000 mm<sup>3</sup>); however, the thickness".</p> <p>16) In Section 7.1, Note 2, 1st line, revise from "used it is best practice" to "used, it is a best practice".</p> <p>17) In Section 7.1, Note 3, 1st line, revise from "used special processing" to "used, special processing".</p> <p>18) In Section 7.2, 2nd line, consider revising from "packed" to "packaged".</p> <p>19) In Section 8.2, 1st line, revise from "the original the mass" to "the original mass" and add a comma after the word "specimen".</p> <p>20) In Section 8.2, 7th line, revise from "determine the mass to the nearest." to "determine the mass to the nearest 0.01 g."</p> <p>21) In Section 8.2, last line, revise from "Designate this last as the oven dry mass (mOD)" to "Designate this last measurement as the oven dry mass (mOD)".</p> <p>22) In Section 8.3, revise from "determined following AASHTO T XXX Total Pore Volume in Hardened Concrete Using Vacuum Saturation." to "determined according to TP WWW."</p> <p>23) In Section 9.1, Note 6, revise from "use in AASHTO T XXX" to "use in TP WWW".</p> <p>-----</p> <p>Section 9.1 – add a note that 'D' comes from TP WWW-20.</p>	
	FL		
	MO	<p>1) In Section 7.2, the first line, we recommend changing the wording to be more inclusive. We utilize extra large zip lock plastic bags for shipping cores. We suggest the following wording:</p> <p>"...to the laboratory in sealed plastic bags to prevent moisture loss."</p>	

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		<p>This wording is very similar to AASTHO T24, Section 7.3.1.</p> <p>2) In Section 7.3, the seventh line, we recommend adding the word 'measurement' after the word 'last' so it reads as follows:</p> <p>"Designate this last measurement as the conditioned mass."</p> <p>3) In Section 8.2, the tenth line, we recommend adding the word 'measurement' after the word 'last' so it reads as follows:</p> <p>"Designate this last measurement as the oven dry mass (mOD)."</p> <p>General question would be should standard English units included in this standard? Seems like there is a extra space between first paragraph of section 7.2 and note 4.</p> <p>MI <b>NEGATIVE</b>- Irrespective of the content, starting in section 4, the formatting in terms of inconsistent bulleting and possible missing content is unacceptable for publication.</p>	
Ballot Item #5	STATE	COMMENT	
TP 119- Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	PA	<p>Affirmative with comments:</p> <p>1) In Section 2.1, add "T 277, Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration". AASHTO standards should be referenced and not the equivalent ASTM standard.</p> <p>2) In Section 2.2, delete "C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration" due to adding T 277 in Section 2.1.</p> <p>3) In Section 4.4, next to last line, revise from "where a represents" to "where a represents" (i.e., italicize the letter "a").</p> <p>4) In Section 5.6, Note 3, revise from "specimens from the classification provided by ASTM C1202 and show good agreement with" to "specimens from the results determined according to T 277 and it shows good agreement with". T 277 or ASTM C1202 do not refer to "classification".</p> <p>5) In Section 6.1, Note 6, what does "Reserved" mean. If Note 6 is not needed, delete it and renumber the subsequent Notes.</p> <p>6) In the "Figure 2" caption, it states "Examples of the Geometries of Resistivity Meters: (a) - (c)", but Figure 2 includes "(a)" to "(d)". If Figure 2(d) is another example, revise from "(a) - (c)" to "(a) to (d)". If "(d)" is not an example, either delete Figure 2(d) or revise the Figure 2 caption to indicate what Figure 2(d) represents.</p> <p>7) In Section 7.2, 3rd line, revise by adding a comma after the word "minimum".</p> <p>8) In Section 7.2, Note 11, revise from "Typical sponge are 6 +/- 2 mm. These have been" to "The thickness of a typical sponge is</p>	



## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>6 ± 2 mm. Sponges have been".</p> <p>9) In Section 7.5, revise from "Calipers--" to "Calipers--".</p> <p>10) In Section 7.6, revise from "Cloth or Absorbent Paper--" to "Cloth or absorbent paper--"</p> <p>11) In Section 7.7, revise from "Non Conductive specimens support" to "Nonconductive specimen support--" and then add a purpose or use for this apparatus.</p> <p>12) In Section 7.8, revise from "Thermometer capable" to "Thermometer--Capable".</p> <p>13) In Section 7.9, revise from "Verification component--" to "Verification component--".</p> <p>14) In Section 9.2.1.1, revise from "Cores from test slabs" to "Cores obtained from concrete slabs according to T 24M/T24".</p> <p>15) In Section 9.2.1.2, revise from "diameter cast cylinders" to "diameter test specimens made and cured in the laboratory according to R 39".</p> <p>16) In Section 9.2.1.3, revise from "diameter cast cylinders" to "diameter test specimens made and cured in the laboratory according to R 39".</p> <p>17) In Section 9.2.2, consider deleting this Section in its entirety as it does not seem to be needed as cylinders could be a test specimen option under Section 9.2.1.</p> <p>18) In Section 9.2.2.1, revise from "diameter cylinders cast and cured at the field site" to "diameter test specimens made and cured in the field according to T 23".</p> <p>19) In Section 9.2.2.2, revise from "diameter cylinders cast and cured at the field site" to "diameter test specimens made and cured in the field according to T 23".</p> <p>20) In Section 9.2.3, it is suggested to delete this Section in its entirety, except for Note 15, as it seems to be already covered under Sections 9.2.1.2 and 9.2.1.3.</p> <p>21) In Section 9.2.3, Note 15, 1st line, revise from "has been used with various curing durations and curing regimens" to "has been used with test specimens made and cured with various curing durations and procedures".</p> <p>22) In Section 9.2.3, Note 15, 3rd line, revise from "obtained from specimens subjected to differing curing conditions" to "obtained from test specimens made and cured to differing curing procedures".</p> <p>23) In Section 9.2.4, revise from "When specimens are cast in the field ends of the specimens shall be finished flat (As indicated in AASHTO T22)" to "When specimens are made and cured in the field, ends of the specimen shall be a flat, even surface according to the finishing procedures of T 23." I don't think you want to reference "T 22" here as it has language regarding the ends stating "neither end of compressive test specimens shall depart from perpendicularity to the axis". If you do mean to refer to T 22, then, in Section 2.1, add "T 22,</p>	
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## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>Compressive Strength of Cylindrical Concrete Specimens". In addition, is Section 9.2.4 needed if T 23 is added as a reference to Section 9.2.2.1 and Section 9.2.2.2? In my opinion, it is not needed and Section 9.2.4 could be deleted.</p> <p>24) In Section 9.3, 2nd line, consider revising from "packed" to "packaged".</p> <p>25) In Section 10.1, revise from "Specimens shall be conditioned" to "Test specimens shall be conditioned" to link to previous Section 9.</p> <p>26) In Section 10.2.2, Note 16, revise from "this can be made" to "This solution can be made".</p> <p>27) In Section 10.3.3, revised from "weighted" to "weighed".</p> <p>28) In Section 10.4.2, what does "Task 6a" refer to? It would seem this should be revised from "saturated following the procedures described in Task 6a" to "saturated according to TP WWW". If so, then in Section 2.1, add "TP WWW, Total Pore Volume in Hardened Concrete Using Vacuum Saturation".</p> <p>29) In Section 10.4.3, Note 17, revise from "at least 2g/L" to "at least 2 g/L".</p> <p>30) In Section 10.5, Note 19, what does "Reserved" mean? If this Note 19 is not needed, then delete it and renumber the subsequent Notes.</p> <p>31) In Section 10.6, do you mean to say "making and curing test specimens" or "conditioning of test specimens" as specified in Section 10? It should be clear here by using the same appropriate terminology. For example, if this "curing" is related to making and curing the test specimens, then revise from "Alternative specimen curing regimes are allowed as approved by the sponsoring agency." to "Alternative procedures for making and curing test specimens may be specified by the agency." If this "curing" is related to the Section 10 "Conditioning", then revise from "Alternative specimen curing regimes are allowed as approved by the sponsoring agency." to "Alternative procedures for conditioning may be specified by the agency.".</p> <p>32) In Section 10.7, revise from "When using alternative curing regimes, specimens conditioning" to either "When using alternative procedures for making and curing test specimens, specimen conditioning" or "When using alternative procedures for conditioning, conditioning".</p> <p>33) In Section 11.2, Note 20, revise completely to read "A rubber mat or plastic base is a suitable nonconductive surface."</p> <p>34) In Section 11.3, revise from "Before removing specimens from conditioning environment" to "Before removing a specimen from the conditioning environment"</p> <p>35) In Section 11.3.1, 1st line, revise from "connect the two left two probe tips shall be connected to one electrode plate" to "connect the left two probe tips to one electrode plate".</p>	
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## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>36) In Section 11.3.1, Note 21, 2nd and 3rd lines, delete the text "shall be ensured" as it is not needed.</p> <p>37) In Section 11.3.1, Note 21, last line, revise from "Figure 2" to "Figure 3".</p> <p>38) In Section 11.4.2, revise from "of each of conductive" to "of each conductive".</p> <p>39) In Section 11.4.2.2, Note 22, 2nd line, revise from "on top it" to "on top of it".</p> <p>40) In Section 12.2.1, 1st line, add a comma after the word "resistivity", in 3rd line, add a comma after the word "directly", and in last line, add a comma after the word "measured".</p> <p>41) In Section 14.1.2, 2nd line, revise from "13.2 percent the same concrete material" to "13.2 percent. Therefore, results of two properly conducted tests by two different laboratories on the same concrete material".</p>	
	MI	subsection 13.1.8 is deficient and has typographical errors. Numbering of notes from Note 9 forward is incorrect. Fonts in note 15 is not correct. Other typos throughout document.	
	FL	Attachment	
	MO	<p>1) In Note 6, under Section 6.1 on Page 13, the information is being deleted and replaced with the word 'Reserved'. Not sure what is intended with the word 'Reserved'. Is the information in this note no longer needed?</p> <p>2) In Note 19, under Section 10.5 on Page 8, the information is being deleted and replaced with the word 'Reserved'. Not sure what is intended with the word 'Reserved'. Is the information in this note no longer needed?</p>	
	TN	General question would be should standard English units included in this standard? In Sections 6.5, 10.5, and 11.1, the curing(conditioning) temperature range is 69 to 77 F. Should this be made consistent with AASHTO T 23 for the moist curing temperature range of 70 to 77 F?	
Ballot Item #6	STATE	COMMENT	ACTION
T 365 - Quantifying Calcium Oxychloride Formation Potential Amounts in of Cementitious	PCA	<p>-2.2- Should this refer to E11-17?</p> <p>-5.2- Since the test method specifies the solution concentration and the solid:solution ratio, can these variables be included in this list?</p> <p>-5.5- Likely these refer to references in Section 14.1 and 14.2, but I'm not sure.</p> <p>-6.3- Or? (REF: lathe <i>and</i> mortar and pestle)</p> <p>-6.4- Should this refer to E11-17?</p>	

## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

<p>Pastes Exposed to Deicing Salts</p>	<p>-7.1- These other salts will likely change the variability and interpretation of the results. Will magnesium chloride react at the same rate and to the same extent as calcium chloride in this test regime? (REF: last sentence)</p> <p>- 7.2 Note 2- This note would appear to be mandatory rather than informational.</p> <p>Type II reagent grade water may be unduly restrictive.</p> <p>-8.1 and Note 3- For mixing uniformity, it would appear that the quantities of materials relative to the mixer would be important variables to be held constant. Likewise the water/cement ratio (or water cementitious materials ratio) should likely be kept constant, or at least within a narrow range.</p> <p>From the next step, at least 100 g sample must be cast; which may be obvious with the size of the cylinder to be filled, but some guidance such as that in Table 2 might be helpful.</p> <p>Q: Is the mass of Calcium oxychloride formed relative to the dry paste or the cement? Since it depends on the CH content formed, does the mixture composition have an impact? Consider a w/c of 0.60 vs. a w/c of 0.36. More cement in the latter, so for the same mass of paste, more CH.</p> <p>- 8.2.3- Shouldn't this be part of 8.2.1 as well? (REF: by means that will not contaminate the sample)</p> <p>- 10.2- PP 84 is the only standard I'm aware of that references this test method. It generally uses units of g/g paste, rather than g/100 g paste. It would seem that the units of g/g paste is a more appropriate format for formal documents. Equation 2 and this line (and Note 5, if keeping) can be modified for consistency. (REF: Moxy= mass in g of calcium oxychloride per 100 g of cementitious paste, g/100 g)</p> <p>- Note 5- "in the field" (REF: on field)</p> <p>Usually this type of statement is found in specifications, rather than test methods themselves. If PP 84 changes the recommended value, and this test method does not change at the same time, there could be problems with interpretation. Suggest deleting this note.</p> <p>- 11.1.5- No sure how this would be reported by a laboratory</p> <p>-11.1.7- If a limit is around 15 g/ 100 g, is the second decimal place relevant? For example, 14.41 vs. 14.42 ?</p> <p>I've seen this limit expressed (in PP 84 I think) as 0.15 g/g paste). I think in that case the 0.01 g limit is relevant, but I'm not familiar enough with the test to know. If the COV is 5% then 0.01 g in 10 or 15 g seems overly precise.</p> <p>The example in X1 also seems to point to this being too many significant digits (REF: 0.01g)</p> <p>-12.1.1- There does not appear to be any relevant information</p>	
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## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>in 13.1. Is it in one of the references? Reference 14.1 perhaps? (REF: Section 13.1)</p> <p>- Appendix – Figure 1- Y-axis label appears to have “cm” in the units, which I don’t think belongs</p> <p>-X1.1.4- In looking at Figure 1, it appears that the <math>\Delta H</math> value is more like 43 J/g? (REF: <math>\Delta H</math>) is 55.9 J/g)</p> <p>-X1.1.4- Based on the significant digits in Eq. 2 and the <math>\Delta H</math> value, this should be 30.1 g. (REF: 30.05)</p> <p>-X.1.14- I think this should be Equation 2. (REF: Equation 1)</p> <p>-X.1.1.5- This may be accurate, but is it useful? I don’t see the point of Y on the figure.</p> <p>-X.1.2.2- I’m confused by this statement. Isn’t the total mass of solution and solid used in the DSC values in Figure 1 as well? (REF: <math>2\Delta H</math> is used here as the tested material was entered as the total mass, which is equal parts by mass of cementitious powder and salt solution)</p> <p>--X.1.2.2- Figure 2 shows 28.68 J/g (REF: 28.69)</p> <p>-X2.1- Section 14.8 is a reference</p>	
	PA	<p>1) In Section 1.1, 2nd line, suggest revising from "calcium oxychloride amounts formed in cement pastes" to "calcium oxychloride of cement pastes" for consistency with change in title of standard.</p> <p>2) In Section 1.1, 3rd line, suggest revising from "magnesium chloride." to "magnesium chloride deicer salts." for better clarity.</p> <p>3) In Section 1.1, last line, revise from "in field" to "in the field".</p> <p>4) In Section 3, it is suggested to make the first paragraph (Calcium Oxychloride) Section 3.1.</p> <p>5) In Section 3, revise from "Calcium Oxychloride" to "Calcium Oxychloride" (i.e., italicized).</p> <p>6) In Section 4.1, end of third line, revise from "in field" to "in the field".</p> <p>7) In Section 4.2, 3rd line, revise from "missed" to "mixed".</p> <p>8) In Section 5.1, add a blank line between the first paragraph and the line for the equation.</p> <p>9) In Section 5.1, to the right of the equation, add the equation number as "(1)".</p> <p>10) In Section 5.3, 5th line, revise from "and therefore is useful" to "and, therefore, is useful" (i.e., add two commas; one after "and" and one after "therefore").</p> <p>11) In Section 5.4, the first sentence is incomplete. It is suggested to combine the first and second sentences to make one complete sentence.</p> <p>12) In Section 5.5, last line, revise from "Sections 13.1 and 13.2" to "Sections 14.1 and 14.2".</p> <p>13) In Section 6.9, 2nd line, revise from "ASTM E 1269" to "ASTM E1269" (i.e., delete space between the "E" and "1269").</p>	

## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>14) In Section 7.1, Note 1, revise from "Note 1" to "Note 1" (i.e., from italics to bold font).</p> <p>15) In Section 7.2, Note 2, revise from "Note 2" to "Note 2".</p> <p>16) In Section 7.3, next to last line, revise from "at any time it , discard" to "at any time, discard" (i.e., delete "it").</p> <p>17) In Section 7.3, last line, revise from "strengths can used" to "strengths can be used".</p> <p>18) In Section 7.3, Note 2, revise from "Note 2" to "Note 3" and renumber all subsequent Notes.</p> <p>19) In Section 8.1, Note 3, revise from "Note 3" to "Note 4".</p> <p>20) In Section 8.1, Note 4, revise from "Note 4" to "Note 5".</p> <p>21) In Section 9.4, add a period (".") at end of section.</p> <p>22) In Section 10.1, 1st line, revise from "formation one" to "formation, one" (i.e., add a comma after "formation").</p> <p>23) In Section 10.1, 7th line, revise from "cumulative heat curve select" to "cumulative heat curve, select" (i.e., add a comma after "curve").</p> <p>24) In Section 10.1, last line, suggest revising from "This can be illustrated in Figure 1" to "This is illustrated in Figure 1".</p> <p>25) In Section 10.2, revise from equation number "(1)" to "(2)" since a new Equation 1 ["(1)"] was added in Section 5.1.</p> <p>26) In Section 10.2, Note 5, revise from "Note 5" to "Note 6".</p> <p>27) In Section 11.1.4, is this item required to be reported? If the user is following this standard and specifically, Section 8.1, it includes a specific sample curing procedure. It would seem unnecessary to include the sample curing procedure if reporting a result as determined according to T 365.</p> <p>28) In Section 12.1.1, 2nd new line, revise from "Section 13.1" to "Section 14.1".</p> <p>29) In Section X1, Figure 2, revise the figure caption from "Illustrating of Heat" to "Illustration of Heat".</p> <p>30) In Section X1.1.4, is the Delta H of Figure 1 = "55.9"? Based on the Y-axis values and the Point X (approx. 130.3 J/g) and Point Z (approx. 172.5 J/g), the Delta H in Figure 1 appears to be approximately <math>172.5 - 130.3 = 42.3</math>.</p> <p>31) In Section X1.2.2, last line, revise from "Equation 1" to "Equation 2" due to adding a new Equation 1 in Section 5.1.</p> <p>32) In Section X2.1, 3rd line, revise from "(Section 8.1)" to "(Section 9.1)" and revise from "(Section 8.2)" to "(Section 9.2)".</p>	
	KS	<p>2.2. &amp; 6.4 Suggest dropping the "-09" on "E11-09". Current spec is year 17.</p> <p>3. Why the "="?</p>	
	WA	<p>Section 3: There appears to be an = sign in front of the word "reacts" in the sentence. Is that supposed to be there?</p>	

## ATTACHMENT C- TS 3C Spring Ballot 2019 Comments

		<p>Section 6.5: Extras space between words, shall be, in last sentence.</p> <p>Section 6.6: Appears that Micropipet is misspelled and should be: Micropipette</p> <p>Section 8.1, Note 3: Seems odd to have all caps for first part of sentence for words "Paste Can Made", those should not be capitalized. Also, Typical should be, Typically.</p>	
	FL	<p>Attachment- Sections that appear to be edited:</p> <p>5.1 added space before equation</p> <p>5.4 salt-scaling and high-slump added (-)</p> <p>6.3 lathe or mortar (changed to or)</p> <p>6.8 stainless-steel</p> <p>7.1 chloride-based</p> <p>7.3 Note 3 Renumber notes starting here</p> <p>Note 4 – remove caps</p> <p>9.1 stainless-steel</p> <p>9.2 liquid-to-solid ratio</p> <p>X2.1 – Revise to "..., and testing and interpretation are identical. However, due to the lower heterogeneity of concrete compared to mortar,..."</p>	
	MO	<p>1) The note under Section 7.3 needs to be renumbered from Note 2 to Note 3. This is because a new Note 2 was added under Section 7.2. All subsequent notes need to be renumbered:</p> <p>Under Section 8.1 Note 3 to Note 4</p> <p>Under Section 8.1 Note 4 to Note 5</p> <p>Under Section 10.2 Note 5 to Note 6</p> <p>2) It appears Section 11.1.1 is being deleted. Need to renumber all of the subsequent sections accordingly.</p>	
	IL	<p>Section 4.2, third sentence, replace "missed" with "mixed"</p> <p>Section 12.1.1, incorrect reference to Section 13.1</p>	

**ATTACHMENT D****Brian Egan**

**To:** Streeter, Donald A. (DOT)  
**Subject:** RE: Task Force Status

Egan Edits in RED below



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**From:** Streeter, Donald A. (DOT) [mailto:Donald.Streeter@dot.ny.gov]  
**Sent:** Thursday, March 21, 2019 9:49 AM  
**To:** Brian Egan  
**Subject:** RE: Task Force Status

Brian,

I had shared an update with Cecil not too long ago. End result was that I only received 1 additional response from the group after the previous / preliminary summary was provided to you back in January (1/11 email). Really, nothing changed from that response. I also received thoughts from Cecil, which I did not even look at prior to compiling the summary so as not to become biased in any way. Everyone was pretty consistent with their recommendations, including Cecil, so I doubt we would see any significant changes if I were to poll the group again. If you want me to do that I can and develop a revised summary otherwise, I think the below is what we have as our recommendation.

*Key findings:*

- *For deicer salt damage consideration*
  - *Air content and SAM are recommend for use now and all tests could be used for qualification as well as QC/QA*
  - *LTDSC is seen as only for research by most of the respondents*
- *For F/T, consensus is*
  - *Air content and SAM are recommend for use now and all tests could be used for qualification as well as QC/QA*
  - *Items for Tasks 1.6 a/b and 1.7 are suitable for qualification testing but these are ranked lower than Air and SAM and with 1.6 a/b considered more important than 1.7.*
- *Transport properties*
  - *T358 ranked 1<sup>st</sup> in this category by all and relevant for qualification as well as QC/QA*
  - *TP119 ranked 2<sup>nd</sup> in this category and generally recommend for qualification only*
  - *Tasks 1.2 a/c could be suitable for qualification use but ranked lower*

*Also note:*



- All TM's could / would be suitable for research purposes (development of them all is ultimately warranted in the long term except for some of those that may be replaced and/or determined to have a constant value for most mixtures as Jason W. has eluded to)
- Additionally, the feeling is that all TM's should be stand alone and not as part of the annex to PP84

From what I have so far, the TF would recommend, in priority order highest to lowest applicability, use of

- Air content (all methods including SAM),
- surface resistivity (T358),
- Uniaxial resistivity (TP119), **Ballot Item#5- TP 119- Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test**
- Tasks 1.6 a/b tests **Task 1.6a- Ballot Item #3- TP WWW-Standard Method of Test for Determining the Total Pore Volume in Hardened Concrete Using Vacuum Saturation and Task 1.6b- Ballot Item #4- TP XXX-Standard Method of Test for Determining the Degree of Saturation of Hydraulic-Cement Concrete**
- Task 1.5 test **Ballot Item #6- T 365 - Quantifying Calcium Oxychloride Formation Potential Amounts in of Cementitious Pastes Exposed to Deicing Salts**
- Tasks 1.7 and 1.2 a/c tests **(Task 1.7- Determining the Secondary Rate of Absorption of water by Hydraulic-Cement Concrete, Task 1.2a-Quantifying Electrical Resistivity of Cementitious Pore Solution and Task 1.2c- Determining the Temperature Correction for Resistivity Measurements using Activation Energy of Conduction**

A few comments from TF members

- Really wonder how much of a change in a mixture would occur to tweak results from some of the more lab / research oriented tests? Are we trying to refine mixtures too much considering any given batch has variability in production. How much of a change in cement content or w/c ratio has to occur before changes in these test results start to show?
- One respondent was concerned with cost of SAM to outfit their state (I personally think it's a tool for specific projects / applications and not everything, at least not yet, and a state's Materials office could handle use on a limited number of projects)

I will not be going to NCC meeting in Denver. Adam Miller from NY will be attending. FYI – I'm retiring from DOT effective 5/29. I'm hoping I can participate at the AASHTO COMP meeting as an independent attendee / TRB rep so I can at least wrap up the work I was doing on some of the different TS's. I'm also going to try to participate in future NCC meetings, again as an independent and/or TRB rep since I am the Concrete Section Chair.

Thanks – Don

Donald Streeter  
Group Director, Accelerated Delivery and Innovative Deployment -  
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**From:** Brian Egan [mailto:Brian.Egan@tn.gov]

**Sent:** Tuesday, March 19, 2019 2:10 PM

**To:** Streeter, Donald A. (DOT) <Donald.Streeter@dot.ny.gov>

**Subject:** RE: Task Force Status

*ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.*

Hi Don,

I hope all is well with you in NY. I was wondering if you had the final summary for the Task Force by chance. I'll be going to the NCC meeting in a couple of weeks and trying to get back up to speed on PP 84. Last I recall, you were not going to Denver, is that still true?

Talk to you soon.

Brian



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**From:** Streeter, Donald A. (DOT) [<mailto:Donald.Streeter@dot.ny.gov>]

**Sent:** Tuesday, February 26, 2019 10:36 AM

**To:** Cecil Jones

**Cc:** Brian Egan

**Subject:** RE: Task Force Status

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Cecil,

Been trying to catch up (seems like always chasing something or someone rather than being out in front).

I only had 1 other response from TF reps that doesn't change the original findings. I was going to summarize the TF recommendations as previously compiled and send that off to Brian Egan and consider our efforts complete unless he and/or the PEM folks needed more. Short answer is that you have the answers as best the TF could provide from my previous summary (attached). Group did recommend moving all annex / appendix out of PP84 as separate standalone TM's

Hope this works for what you need.

Thanks – Don

---

**From:** Cecil Jones [<mailto:Cecil.Jones@nc.rr.com>]  
**Sent:** Tuesday, February 26, 2019 11:13 AM  
**To:** Streeter, Donald A. (DOT) <[Donald.Streeter@dot.ny.gov](mailto:Donald.Streeter@dot.ny.gov)>  
**Subject:** Task Force Status

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Food morning Don,

We are having a team call this afternoon, and do you have an update on the status of the task force findings at this time?

We are at the point that we need to get moving on the revisions to PP 84 and any direction from the group is appreciated.

Thanks,  
Cecil

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919 616-5139

## ATTACHMENT E

## Technical Section 3C- Hardened Concrete Properties- Standard Stewards

Designation	Title	Steward	DOT/Affiliate	Phone/e-mail
<del>R 39-17</del>	<del>Making and Curing Concrete- Test Specimens in the Laboratory</del>	Moved to TS 3B- Summer 2017		
R 72-16	Match Curing of Concrete Test Specimens	Scott George	Alabama DOT	georges@dot.state.al.us
R 80-17	Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction	Brett Trautman	Missouri DOT	573-751-1036 Brett.Trautman@modot.mo.gov
R 81-17	Static Segregation of Hardened Self-Consolidating Concrete (SCC) Cylinders	James Krstulovich	Illinois DOT	217-524-7269 James.Krstulovich@Illinois.gov
T 22-17	Compressive Strength of Cylindrical Concrete Specimens	Tim Ruelke	Florida DOT	<a href="mailto:Timothy.Ruelke@dot.state.fl.us">Timothy.Ruelke@dot.state.fl.us</a>
<del>T 23-17</del>	<del>Making and Curing Concrete- Test Specimens in the Field</del>	Moved to TS 3B- Summer 2017		
T 24M/T 24- 15	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	Timothy Ramirez	Pennsylvania DOT	<a href="mailto:tramirez@pa.gov">tramirez@pa.gov</a>
T 97-17	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)	Tim Ruelke	Florida DOT	Timothy.Ruelke@dot.state.fl.us
T 140-97 (2016)	Compressive Strength of Concrete Using Portions of Beams Broken in Flexure	Richard Giessel	Alaska DOT	richard.giessel@alaska.gov
T 148-15	Measuring Length of Drilled Concrete Cores	Mick Syslo	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a>
T 160-17	Length Change of Hardened Hydraulic Cement Mortar and Concrete	Dan Miller	Ohio DOT	<a href="mailto:daniel.miller@dot.ohio.gov">daniel.miller@dot.ohio.gov</a>
T 161-17	Resistance of Concrete to Rapid Freezing and Thawing	John Staton	Michigan DOT	<a href="mailto:statonj@michigan.gov">statonj@michigan.gov</a>
T 177-17	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	Paul Burch	Arizona DOT	pburch@azdot.gov
T 178-15	Portland-Cement Content of Hardened Hydraulic-Cement Concrete	Robert Lauzon	Connecticut DOT	robert.lauzon@ct.gov
T 198-15	Splitting Tensile Strength of Cylindrical Concrete Specimens	Wasi Khan	District of Columbia DOT	wasi.khan@dc.gov
T 231-17	Capping Cylindrical Concrete Specimens	Mike Santi	Idaho DOT	mike.santi@itd.idaho.gov
T 259-02 (2017)	Resistance of Concrete to Chloride Ion Penetration	Richard Barezinsky	Kansas DOT	rick.barezinsky@ks.gov
T 260-97 (2016)	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials	Woody Hood	Maryland DOT	whood@sha.state.md.us

T 276-17	Measuring Early-Age Compression Strength and Projecting Later-Age Strength	Oak Metcalf	Montana DOT	rmetcalfe@mt.gov
T 277-15	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	John Staton	Michigan DOT	<a href="mailto:statonj@michigan.gov">statonj@michigan.gov</a>
T 323-03 (2016)	Determining the Shear Strength at the Interface of Bonded Layers of Portland Cement Concrete	Denis Boisvert	New Hampshire DOT	Denis.Boisvert@dot.nh.gov
T 332-07 (2016)	Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe	Becca Lane	Ontario MOT	Becca.Lane@ontario.ca
T 334-08 (2016)	Estimating the Cracking Tendency of Concrete	Dan Miller	Ohio DOT	<a href="mailto:daniel.miller@dot.ohio.gov">daniel.miller@dot.ohio.gov</a>
T 336-15	Coefficient of Thermal Expansion of Hydraulic Cement Concrete	Brett Trautman	Missouri DOT	573-751-1036 <a href="mailto:Brett.Trautman@modot.mo.gov">Brett.Trautman@modot.mo.gov</a>
T 356-15	Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter	Jose Lima	Rhode Island DOT	<a href="mailto:jose.lima@dot.ri.gov">jose.lima@dot.ri.gov</a>
T 357-15	Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure	Andy Babish	Virginia DOT	<a href="mailto:andy.babish@vdot.virginia.gov">andy.babish@vdot.virginia.gov</a>
T 358-17	Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration	Darrin Tedford	Nevada DOT	(775) 888-7784 <a href="mailto:DTedford@dot.nv.gov">DTedford@dot.nv.gov</a>
T 359-16	Pavement Thickness by Magnetic Pulse Induction	Brian Egan	Tennessee DOT	<a href="mailto:Brian.Egan@tn.gov">Brian.Egan@tn.gov</a>
T 363-17	Evaluating Stress Development and Cracking Potential due to Restrained Volume Change Using a Dual Ring Test	Darrin Tedford	Nevada DOT	(775) 888-7784 <a href="mailto:DTedford@dot.nv.gov">DTedford@dot.nv.gov</a>
T 364-17	Determination of Composite Activation Energy of Aggregates due to Alkali-Silica Reaction (Chemical Method)	Kurt Williams	Washington DOT	<a href="mailto:willikr@wsdot.wa.gov">willikr@wsdot.wa.gov</a>
T 365-17	Quantifying Calcium Oxychloride Amounts in Cement Pastes Exposed to Deicing Salts	Matt Romero Kenny Seward	Oklahoma DOT	<a href="mailto:kseward@odot.org">kseward@odot.org</a>
T 379- 18	Nonlinear Impact Resonance Acoustic Spectroscopy (NIRAS) for Concrete Specimens with Damage from Alkali-Silica Reaction (ASR)	John Grieco	Massachusetts DOT	<a href="mailto:John.Grieco@dot.state.ma.us">John.Grieco@dot.state.ma.us</a>
T 380-18	Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures (Miniature Concrete Prism Test, MCPT)	Mick Syslo Wally Heyen	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a> <a href="mailto:wally.heyen@nebraska.gov">wally.heyen@nebraska.gov</a>

PP 54-06- (2015) Now R 72-17	Match-Curing of Concrete- Test Specimens			
PP 58-12- (2015) Now R 81-17	Static Segregation of- Hardened Self-Consolidating- Concrete (SCC) Cylinders			
PP 65-11- (2016) Now R 80-17	Determining the Reactivity of- Concrete Aggregates and- Selecting Appropriate- Measures for Preventing- Deleterious Expansion in New Concrete Construction			
TP 109-14- (2016) — Now T 379	Nonlinear Impact Resonance- Acoustic Spectroscopy- (NIRAS) for Concrete- Specimens with Damage from Alkali-Silica Reaction (ASR)			
TP 110-14- (2016) — Now T 380	Potential Alkali Reactivity of- Aggregates and Effectiveness- of ASR Mitigation Measures- (Miniature Concrete Prism- Test, MCPT)	Mick Syslo Wally Heyen	Nebraska DOT	<a href="mailto:Mick.Syslo@nebraska.gov">Mick.Syslo@nebraska.gov</a> <a href="mailto:wally.heyen@nebraska.gov">wally.heyen@nebraska.gov</a>
TP 119-15	Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	Donald Streeter	New York DOT	<a href="mailto:donald.streeter@dot.ny.gov">donald.streeter@dot.ny.gov</a>
PP 84- 17	Performance Engineered Concrete Pavement Mixtures	Donald Streeter	New York DOT	<a href="mailto:donald.streeter@dot.ny.gov">donald.streeter@dot.ny.gov</a>
PP 89-19	Standard Practice for Grinding the Ends of Cylindrical Concrete Specimens	Michael Doran Brian Egan	Tennessee DOT	<a href="mailto:michael.doran@tn.gov">michael.doran@tn.gov</a>
TP 129-18 (New 2018)	Standard Method of Test for Vibrating Kelly Ball (VKelly) Penetrati Grinding the Ends of Cylindrical Concrete Specimens in Fresh Portland Cement Concrete	Brian Pfeifer James Krstulovich	Illinois DOT	Brian.Pfeifer@Illinois.gov 217-524-7269 <a href="mailto:James.Krstulovich@Illinois.gov">James.Krstulovich@Illinois.gov</a>

## ATTACHMENT F

ATTACHMENT - TS 3C Hardent Concrete

TS	Std Sort	Designation No	Title	ASTM Eq	Immediate Action Needed?	TC Notes
3c	R 072-16	R 72-16	Match Curing of Concrete Test Specimens		Revise or Reconfirm	
3c	R 080-17	R 80-17	Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction		No	
3c	R 081-17	R 81-17	Static Segregation of Hardened Self-Consolidating Concrete (SCC) Cylinders		No	
3c	T 022-17	T 22-17	Compressive Strength of Cylindrical Concrete Specimens	C39/C39M-16	No	
3c	T 024M/T 024-15 (2019)	T 24M/T 24-15 (2019)	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	C42/C42M-13	No	
3c	T 097-18	T 97-18	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)	C78/C78M-16	No	
3c	T 140-97 (2016)	T 140-97 (2016)	Compressive Strength of Concrete Using Portions of Beams Broken in Flexure		Revise or Reconfirm	
3c	T 148-15 (2019)	T 148-15 (2019)	Measuring Length of Drilled Concrete Cores	C174/C174M-13	No	
3c	T 160-17	T 160-17	Length Change of Hardened Hydraulic Cement Mortar and Concrete	C157/C157M-14	No	
3c	T 161-17	T 161-17	Resistance of Concrete to Rapid Freezing and Thawing	C666/C666M-15	No	
3c	T 177-17	T 177-17	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	C293-16	No	
3c	T 178-15 (2019)	T 178-15 (2019)	Portland-Cement Content of Hardened Hydraulic-Cement Concrete	C1084-10	No	
3c	T 198-15 (2019)	T 198-15 (2019)	Splitting Tensile Strength of Cylindrical Concrete Specimens	C496/C496M-11	No	
3c	T 231-17	T 231-17	Capping Cylindrical Concrete Specimens	C617-15	No	
3c	T 259-02 (2017)	T 259-02 (2017)	Resistance of Concrete to Chloride Ion Penetration		No	
3c	T 260-97 (2016)	T 260-97 (2016)	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials		Revise or Reconfirm	
3c	T 276-17	T 276-17	Measuring Early-Age Compression Strength and Projecting Later-Age Strength	C918-13	No	
3c	T 277-15 (2019)	T 277-15 (2019)	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	C1202-12	No	
3c	T 323-03 (2016)	T 323-03 (2016)	Determining the Shear Strength at the Interface of Bonded Layers of Portland Cement Concrete		Revise or Reconfirm	
3c	T 332-07 (2016)	T 332-07 (2016)	Determining Chloride Ions in Concrete and Concrete Materials by Specific Ion Probe		Revise or Reconfirm	
3c	T 334-08 (2016)	T 334-08 (2016)	Estimating the Cracking Tendency of Concrete		Revise or Reconfirm	
3c	T 336-15 (2019)	T 336-15 (2019)	Coefficient of Thermal Expansion of Hydraulic Cement Concrete		No	
3c	T 356-15 (2019)	T 356-15 (2019)	Determining Air Content of Hardened Portland Cement Concrete by High-Pressure Air Meter		No	
3c	T 357-15 (2019)	T 357-15 (2019)	Predicting Chloride Penetration of Hydraulic Cement Concrete by the Rapid Migration Procedure		No	
3c	T 358-19	T 358-19	Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration		No	
3c	T 359M/T 359-18	T 359M/T 359-18	Pavement Thickness by Magnetic Pulse Induction		No	
3c	T 363-17	T 363-17	Evaluating Stress Development and Cracking Potential due to Restrained Volume Change Using a Dual Ring Test		No	
3c	T 364-17	T 364-17	Determination of Composite Activation Energy of Aggregates due to Alkali-Silica Reaction (Chemical Method)		No	
3c	T 365-17	T 365-17	Quantifying Calcium Oxychloride Amounts in Cement Pastes Exposed to Deicing Salts		No	
3c	T 379-18	T 379-18	Nonlinear Impact Resonance Acoustic Spectroscopy (NIRAS) for Concrete Specimens with Damage from Alkali-Silica Reaction (ASR)		No	
3c	T 380-19	T 380-19	Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures (Miniature Concrete Prism Test, MCPT)		No	
TS	Std Sort	Designation No	Title	Prov Yr 1	Immediate Action Needed?	TC Notes
3c	PP 084-19	PP 84-19	Developing Performance Engineered Concrete Pavement Mixtures	2017	No	
3c	PP 089-19	PP 89-19	Grinding the Ends of Cylindrical Concrete Specimens	2018	Revise or 2-Yr. Reconfirm	
3c	TP 119-15 (2019)	TP 119-15 (2019)	Electrical Resistivity of a Concrete Cylinder Tested in a Uniaxial Resistance Test	2015	No	
3c	TP 129-18	TP 129-18	Vibrating Kelly Ball (VKelly) Penetration in Fresh Portland Cement Concrete	2018	Revise or 2-Yr. Reconfirm	

## ATTACHMENT G

### DRAFT

#### Research Needs Statement

#### **Development of Expert System to Predict Mechanical Properties of Concrete Made with Recycled Concrete Aggregate**

**Description:** The availability of user friendly guidelines for use of waste streams in construction industry will promote further recycling of construction and demolition waste. This can lead to increased acceptance and implementation of recycled concrete aggregate (RCA) in concrete construction. The performance of the concrete is highly dependent on the properties and content of RCA. The heterogeneous nature of RCA stemming from the adhered residual mortar, origin of the waste concrete source, recycling process, level of chemical contamination, etc. can lead to wide range of performance when RCA is incorporated. The degree of heterogeneity of RCA can be reflected in key physical properties, including variability in specific gravity (2.0-2.5), water absorption (2%-8%), and Los Angeles abrasion mass loss (20%-50%) (FHWA 2008). Such variability of RCA characteristics can impact engineering properties, e.g. compressive strength, modulus of elasticity, splitting tensile strength, etc. that can decrease by 0-40% (NCHRP 2013).

Proper strategies enabling the prediction of the performance of concrete based on key characteristics of RCA are required to enhance the reliability of using RCA in transportation infrastructure applications. The present research proposal seeks to use artificial intelligence for development of guidelines to predict the performance of concrete made with RCA.

**Objective:** The main objectives of the research are to:

1. Develop a smart system using artificial intelligence techniques (e.g. artificial neural networks) to predict the key mechanical properties of concrete incorporating RCA.
2. Validate the developed system using additional datasets obtained from laboratory investigation.
3. Develop guidelines for selection of RCA to produce reliable concrete with RCA in transportation infrastructure.

**Benefits:** The project will develop guidelines to predict concrete performance based on RCA characteristics. The research program targets concrete used in pavement applications as well as structural concrete that is of great interest to owner agencies and engineers considering the design and use of sustainable concrete for infrastructure applications.

**Tasks:** The proposed research is expected to include the following tasks:

1. Develop a comprehensive database of key properties of concrete incorporating fine and coarse RCA. This will include an extensive review of published materials and the preparation of several concrete mixtures using different RCA materials procured from a variety of sources across the country. The properties of the RCA materials that are of special interest are:



- a. physical properties of RCA, including water absorption, specific gravity, Los Angeles abrasion resistance, micro Duval, and deleterious materials content;
  - b. raw materials and mixture design of concrete where RCA is employed (binder type and content, *w/cm*, RCA replacement level, properties of virgin aggregate); and
  - c. concrete performance, including mechanical properties and durability.
2. Employ artificial neural networks and statistical data analysis techniques to analyze the database.
3. Develop models to predict compressive strength, splitting tensile strength, flexural strength, and modulus of elasticity of concrete made with RCA.
4. Validate models by testing concrete with different RCA materials used at replacement levels of 0, 20%, 35%, 50%, 70%, and 100% of coarse RCA.
5. Repeat Task 4 for concrete made with 0, 10%, 20%, and 30% fine RCA and concrete containing both fine and coarse RCA.
6. Proposed recommendations and guidelines for the evaluation of key RCA materials and prediction of mechanical properties of concrete made with such recycled materials.

**Sponsoring Committee:** TRB AFN 40, Concrete Materials and Placement Techniques

**Funding:** \$300,000 - \$400,000

**Research Period:** 24 - 36 months

**Research Priority:** High

**Date Proposed:** 01/04/2018

**Index Terms:** Portland cement concrete, recycled concrete aggregate, sustainability, construction and demolition waste, artificial intelligent, neural network modeling, statistical analysis, concrete mechanical properties.

**Cosponsoring Committees:**

**Subjects:** Highways Construction Design

**Accelerated Determination of Potentially Deleterious Expansion of Concrete Cylinder Due to Alkali-Silica Reaction (Accelerated Concrete Cylinder Test, ACCT)**

Dr. Anol Mukhopadhyay, TTI, Texas A&M University

1. A detailed presentation covering the following
  - a. Current status of ASR testing – limitations, industry demands (rapid and reliable ASR test methods and a performance-based approach for formulating ASR resistant mixes)
  - b. Review of accelerated concrete cylinder test (ACCT)
    - i. The detailed test procedure along with providing updates on (A) specific parameter optimization (e.g., specimen dimension, volume of specimen / soak solution volume and testing period etc.) and (B) expansion limits for characterizing aggregate reactivity in ACCT method
    - ii. Understanding the advantages of the ACCT method – (A) Rapid (~ 45 days to determine aggregate reactivity and ~ 75 days to test job concrete mixes), (B) steps taken to improve reliability - no aggregate crushing, no alkali boosting, no alkali leaching (soak solution chemistry = pore solution chemistry), continuous automatic measurement, elimination of errors associated with length change due to temperature change, (C) comparative assessment (ACCT vs. C1260 vs. C1293) based on testing selective aggregates, (D) differences, benefits, and challenges among ASR tests (ACCT, AMBT, CPT, MCPT)
    - iii. Updates on within the lab repeatability
    - iv. Additional information related to comparative assessment between ACCT method and limited exposure block (TxDOT) data
  - c. Developed a performance based approach for formulating case-specific ASR resistant mixes using locally available aggregates and fly ashes and other suitable supplementary cementitious materials (SCMs) – the selective results from the past TxDOT research projects and current TxDOT implementation projects (validating the ASR resistance property of the selective Texas precast mixes) will be presented - ACCT method was found to be very effective to perform job concrete mix testing and fly ash (e.g., Class F, Class C (low and high CaO), blended ashes etc.) optimization.
2. Q&A – to address the questions / queries from the committee member
3. Discussion on the required next steps before balloting