

American Concrete Institute
ACI Committee 223
Shrinkage Compensating Concrete

Meeting Minutes
ACI Fall Convention 2017, Anaheim, California
Disneyland Hotel, Western Room
Tuesday October 17, 2017, 2:00-5:00 p.m.

Attendance

Voting Members: (7) Jason Barnes, Ben Bissonnette, Barry Foreman, Todd Hawkinson, Jerry Holland, Alma Reyes, and Ed Russell.

Associate Members: (6) Michael Collins, Barton Foreman, Harry Moss, Meysam Najimi, Juan Roberto Pombo, and Ken Vallens.

Visitors: (11) Jeff Abbuhl, Ryan Fisher, Lance Heiliger, Cameron Murray, Jim Preskenis, Michael Somero, Eduardo Tartuce, Payam Vosoughi, Orville Werner, Tom Westphale, and Jerzy Zemajtis (ACI Staff).

Voting Members Not Attending: (12) Karl Bakke (Chair), Craig Dahlgren, Rick Felder, Greg Fricks, Terry Fricks, Federico Lopez Flores, Kevin MacDonald, Chris Ramseyer (Secretary), John Rohrer, Henry G. Russell, and Larry Valentine.

In replacement of chair Karl Bakke, Ben Bissonnette called the meeting to order at 2:00 pm

1. Call to Order

2. Attendance and self-introduction of members and guests

Total of 5 voting members present at the beginning out of **18** voting members overall (2 voting members joined during the course of the meeting). Ben Bissonnette and Jason Barnes accepted to replace chair Karl Bakke and secretary Chris Ramseyer respectively.

3. Agenda

Proposed agenda Minutes motioned by Ed Russell, seconded by Barry Foreman and adopted unanimously.

4. Approval of the Minutes of Meeting Minutes from Detroit Spring meeting 2017

The meeting minutes from the Detroit meeting held on March 28, 2017 were reviewed. Minutes as presented motioned by Barry Foreman, seconded by Ed Russell, and adopted unanimously.

5. Membership Review

Item not addressed.

6. **Presentation:** Robert Pombo made a presentation entitled « *Shrinkage-Compensating Concrete in Seismic Concrete Structures - Cordillera, Argentina.* » The presentation drew significant interest, discussions and questions.

7. Ballot Resolution

The document entitled *Shrinkage Compensating Concrete Construction Optional Checklist* (addition to the Guide) was balloted from September 15 to October 15, 2017. The ballot drew negatives from two members, Federico Lopez Flores and Chris Ramseyer, although it meets both the 1/2 and 2/3 rules. The ballot would thus pass, pending resolution of these negatives. They were addressed, but since the members who cast negatives could not attend the Convention and quorum was reached very late in the meeting (quorum required 7 voting members to attend), mostly recommendations could be made. Where resolution could not be found, issues would be resolved subsequently through letter balloting.

Besides, some of the comments provided by Henry Russell and Ben Bissonnette led to recommendations for more significant changes, which are described hereafter.

a. Negatives from Federico Lopez Flores

- i. Add to the title “Optional Requirements Checklist”

Consensus recommendation

Comment initially found non-persuasive (p/Ed Russell; s/Alma Reyes; all in favor, **no quorum**), as the wording appeared strange (optional *vs.* requirement) to the members present. However, it was brought up that it is common terminology for ACI checklists. To be addressed by the primary author (Karl Bakke).

- ii. Page 1, line 3 should say “Foreword” (***note: editorial comment**)

Consensus recommendation

Editorial change proposed: “*FOREWORD TO CHECKLIST.*”

- iii. Page 2, line 36 reword 2.1 for example “(...) *on reports, given that the subgrade might have been disturbed.*” (***note: editorial comment**)

Consensus recommendation

Editorial change proposed: “(...) *as the subgrade may have been (...).*”

- iv. Page 4, line 12 add “... *five years experience each with...*”

Consensus recommendation

Emphasis to be put instead on the foreman’s experience and on finisher’s training.

Proposed revision: “Provide a foreman with at least five years experience with shrinkage-compensating concrete, or provide a qualified consultant with at least one finisher with ACI flatwork certification (or equivalent).”

(p/Ed Russell; s/Jason Barnes; all in favor, quorum reached)

- v. Page 4, line 21 (Finishing Table) Wordsmith text, especially *Weather Impact* and *Tools and Equipment* sections.

Consensus recommendation

Proposed revision:

“*Weather impact*

~~Like concrete with micro-silica, shrinkage-compensating concrete is especially sensitive to plastic shrinkage cracking.~~ When placements of shrinkage-compensating concrete are anticipated in hot and/or dry and/or windy environments, consider enclosing the work area ~~building~~, placing at night or early morning. It may be additionally necessary to spray a fog of moisture above the surface of the slab or other type of element being cast.

The use of monomolecular films ~~used~~ as evaporation retardants is ~~not~~ recommended ~~to be used~~ to minimize evaporation. Apply between finishing operations.”

Tools & Equipment

Having the right tools and equipment available for placement is important. Refer to ACI 302.1R-04, Chapter 8, Section 8.2, “Tools for spreading, consolidating, and finishing” for a comprehensive list of tools and equipment.

CAUTION: Equipment can and will break down. It is imperative that the equipment on a project be in good working order and that replacement equipment be available, should equipment failure occur.”

(p/Ed Russell; s/Alma Reyes; all in favor, no quorum)

- vi. Page 5 line 14 , “(...) daily, in compliance with (...)” (***note: editorial comment**)

Consensus recommendation

Editorial change proposed: “9.3 Evaluate expansion daily, in ~~accord~~ compliance with ASTM C878 or similar.”

b. Negatives from Chris Ramseyer

- i. Section F4. States “The Optional Requirements Checklist identifies Sections, Parts and Articles of the Guide Specification 223-17 and the actions available to the User.” As far as I can tell this is totally incorrect. I could not find a single identified Section, Part or Article of the guide specification 223-17.

Consensus recommendation

There are actually a few of them that are identified, but very little. It needs to be revised (either the text in section F4 or the identification of these sections, parts and articles in the checklist. To be revised (p/Alma Reyes; s/Ed Russell; all in favor, no quorum).

- ii. 6.0 Concrete Slab Placement: This is not always the construction type. This document seems to ignore any other type of construction other than slab on ground. If this section remains I suggest changing this sections title and content to include other types of construction, or change the title to indicate to the reader that this is only appropriate if casting slab on grade.

Consensus recommendation

Change to be made (p/Alma Reyes; s/Ed Russell; all in favor, no quorum), to be addressed by the primary author (Karl Bakke).

- iii. Section 7.4 table, in the upper right cell states:

“Be aware that shrinkage-compensating-concrete set times vary significantly by type. Most ettringite Type K, M, and S concrete set times are accelerated. All others are even faster. Hot weather accelerates them even more. Provide adequate numbers of laborers and cement finishers to keep up with the setting characteristics of the shrinkage compensating material employed.” I disagree strongly to the use of “*Most ettringite Type K, M, and S concrete set times are accelerated. All others are even faster*”, it is uncalled for. This topic is discussed more appropriately within the specification. I believe these lines should be removed from this table.

Consensus recommendation

Motion to revise the whole paragraph relating to hydration acceleration (p/Ed Russell; s/Jason Barnes; all in favor, no quorum). To be addressed by the primary author (K. Bakke).

Suggestions made by B. Bissonnette (after the meeting) in the revised document: *“Be aware that shrinkage-compensating-concrete set times can vary significantly, depending on the type of expansive system. Most ettringite Type K, M, and S concrete set times are accelerated. Some other systems may set even faster. Hot weather accelerates them even more. Provide adequate numbers of laborers and cement finishers to keep up with the setting characteristics of the shrinkage-compensating material employed.”*

- iv. Section 7.4 table, in the second cell down on the right side states:

“Like concrete with micro-silica, shrinkage compensating concrete is especially sensitive to plastic shrinkage cracking.” Once again I believe this is inappropriate. I believe this sentence should be removed.

Consensus recommendation

Motion to remove the sentence (p/Ed Russell; s/Alma Reyes; all in favor, no quorum).

c. Comments from Henry Russell and Ben Bissonnette

- i. Page 1, line 9

ACI 223-17 cannot be referenced in a specification because it is not in mandatory language.

Consensus recommendation

Motion to change the text for: “(...) *be used as a guideline by the specifier in developing the specifications* (...)” (p/Alma Reyes; s/Ed Russell; all in favor, no quorum).

- ii. Page 1, line 22
Is there meant to be a list included?

Consensus recommendation

Motion to remove the whole article F5 (p/Ed Russell; s/Alma Reyes; all in favor, no quorum).

- iii. Page 1, line 38
“dry conditions” can mean anything. As a standard test, the curing conditions should be spelled out such as 73°F and 50% relative humidity.

Consensus recommendation

Motion to add information on the drying test conditions as follows: “(...), *but subsequently measure at 73 °F (23 °C) and 50% R.H. (or other specified controlled temperature and/or R.H. conditions) for additional 21 days to evaluate drying shrinkage; (...)*” (p/Alma Reyes; s/Ed Russell; all in favor, no quorum).

- iv. Page 2, line 4
Item to be added to the list: - Required air content.

Consensus recommendation

Motion to add the following two items: air content, setting time (p/Ed Russell; s/Alma Reyes; all in favor, no quorum).

- v. Page 2, line 19
What does test spec for water content mean?

Consensus recommendation

To be addressed by the primary author (Karl Bakke).

- vi. Page 3, line 2
Confusing information, needs to be clarified (to be revised).

Consensus recommendation

To be addressed by the primary author (Karl Bakke).

- vii. Page 3, line 25
Warning on feeding sequence of the components to avoid balls generation should be mentioned.

Consensus recommendation

Motion to add the following sentence on the risk of balling: “*Feeding sequence of the components should be addressed to avoid generation of balls.*” (p/Jerry Holland; s/Jason Barnes; all in favor, quorum reached).

- viii. Page 4, line 11
Should the finishers be ACI certified?

Consensus recommendation

Motion to revise art. 7.1 as follows: “*Provide sufficient trained workers. Provide a foreman with at least five years experience with shrinkage-compensating concrete, or provide a qualified consultant and at least one finisher with ACI concrete flatwork certification (or equivalent).*” (p/Jerry Holland; s/Barry Foreman; all in favor, quorum reached).

- ix. Page 4, line 21

Article 7.1 states finishers with more than five years experience. The second paragraph in the table states 5 years for finisher foreman and 3 years for lead finishers. Need to be consistent.

Consensus recommendation

Motion to modify the content of art. 7.1 (see the response to HR’s comment in viii) and completely remove the subsequent reference in the table (p/Alma Reyes; s/Ed Russell; all in favor, quorum reached).

8. Old Business

- a. Liaison with other ACI committees.

It is recalled by some members that a suggestion was made during the Fall meeting in Philadelphia last year to initiate communication channels between C223 and other ACI committees to increase the visibility of shrinkage-compensating concrete and better promote its use. Jason Barnes volunteered to prepare a letter. Jerry Holland accepted to review it, before sending to chair Bakke for diffusion to the various committees identified in Philadelphia (see the minutes of the meeting).

9. New Business

- a. Technical session during the ACI Fall Convention in Quebec city

Alma Reyes presented a motion for committee C223 to sponsor a technical session during the ACI Spring Convention 2019 in Quebec city. All members present were in favor (quorum reached), but most likely, it was already too late to get on the technical session schedule. Chair Bakke will find out with ACI staff.

- b. Transfer of knowledge and technology in the industry

Alma Reyes suggest that the committee should play a role in promoting the publication and dissemination of documents dealing with shrinkage-compensating concrete construction.

10. Adjournment – Looking forward to Salt-Lake City, March 24-28, 2018.

Motion to adjourn by Alma Reyes, seconded by Barry Foreman, and adopted unanimously.