

ACI 318 Sub A – General Concrete and Construction

[ACI 318 Chapters 1, 2, 3 (excluding 3.5), 4, 5, 6, and 22]

Pittsburgh Meeting

Tuesday, 26 October 2010, 1:30 PM to 6:30 PM, Westin Washington Room

DRAFT MINUTES

1. The meeting was called to order at 1:00 pm.
2. Introductions and Membership changes. Copies of the sing in sheets are **enclosed**. Kevin Folliard has resigned from the committee. Jason Weiss has been appointed a member.
3. Approval of Agenda. Approved as prepared.
4. Approval of Minutes of Chicago meeting, 23 March 2010. Approved as prepared.
5. Old Business:
 - 5.1. Review of Sub A Ballot A01-2010 (closed 13 June 2010.) Ballot results previously sent out by email with the agenda. There were five CA items on this ballot. Note that the ballot response shows resolutions of the comments and negatives on these items. The results and actions taken or necessary are shown below.

CA Item	Description	Responsible	Comments
087	Revision of definitions of all forms of lightweight concrete.	Meyer	Approve 10, Approve with comment 1, Negative 1, Abstain 0, Not returned 2 <i>Fiorato negative on 2/5 addressed as editorial change. Fiorato negative on 2/50 2/69 needs to be addressed. Meyer reported that this negative has been resolved. This item has now passed Sub A.</i>
101	Clarification of intent concerning air-entrained concrete	Hover	Approve 8, Approve with comment 3, Negative 1, Abstain 0, Not returned 2 <i>Tolles negative addressed by moving text to commentary.</i>
104	Revisions to Ch 4 durability provisions	Lobo	Approve 8, Approve with comment 8, Negative 1, Abstain 0, Not returned 2 <i>Carino negative addressed as editorial change.</i>
107	Add sustainability statement to 318	Kosmatka	Approve 6, Approve with comment 3, Negative 2, Abstain 1, Not returned 2 <i>Holland withdrew is negative. Item with minor editorial changes was approved during the meeting.</i>
109	Revise definition of	Lobo	Approve 8, Approve with comment 3, Negative 1,

	admixture		Abstain 0, Not returned 2 Tolles negative addressed by rewording.
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5.2. Review of Sub A Ballot A02-2010 (closed 21 July 2010.) Ballot results were enclosed with the agenda. There were four items on this ballot relating to the reorganization of 318. The results and actions taken or necessary are shown below.

Item	Description	Responsible	Comments
1	Proposed responses for Chapter 5	Ch 5 TG	Chapter 5 was on 318 LB 10-1 and received 74 comments. Proposed responses received 12 comments from Sub A. Comments were resolved and proposed responses were sent as an accompanying item for next 318 ballot. Proposed responses as sent for 318 ballot 10-4 are included with the ballot summary.
2	Proposed revisions to Chapter 5	Ch 5 TG	Proposed responses received 28 comments from Sub A. Comments were resolved and Chapter 5 was sent for second round of 318 balloting. The revised chapter as sent for 318 ballot 10-4 is included with the ballot summary. Chapter 5 was on 318 LB 10-4 and received 54 comments.
3	Proposed responses for Chapter 22	Chapter 22 TG	Chapter 22 was on 318 LB 10-1 and received 146 comments. Proposed responses received 59 comments from Sub A. Comments have been addressed. The proposed responses that will be sent to 318 are included with the ballot summary.
4	Proposed revisions for Chapter 22	Chapter 22 TG	Proposed revisions received 67 comments from Sub A. Because of the number of comments on the proposed revisions and because of the changes to the proposed responses, this item has been withdrawn. A revision of Chapter 22 will be prepared and submitted for another Sub A ballot.

5.3. Review of Sub A Ballot A03-2010 (closed 13 October 2010.) Ballot results were enclosed with the agenda. There were two items on this ballot relating to the reorganization of 318. The results and actions taken or necessary are shown below.

Item	Description	Responsible	Comments
1	Proposed responses for Chapter 23	Ch 23 TG	Chapter 23 was on 318 LB 10-3 and received 107 comments.

			Proposed responses received 47 comments from Sub A. Comments are being resolved by the TG.
2	Proposed revisions to Chapter 23	Ch 23 TG	Proposed responses received 21 comments from Sub A. A revised Chapter 23 will be prepared once the comments on proposed responses have been addressed. Dean recommended that Chapter 23 not be a separate chapter. The committee agreed to move this information into Chapter 24.

5.4. Responses to TAC comments, 318 LB 10-5. The responses from the 318 LB on proposed responses to TAC comments were sent to the committee on 19 Oct. An additional copy was enclosed with the agenda. The committee will work to address the responses during this meeting.

Responses to the comments from the 318 ballot were discussed and approved. Sub A's proposed responses were accepted during the 318 meeting on Wednesday. A copy of the completed responses to TAC Comments was sent out by Basile. The Sub A portion is enclosed with these minutes. Note: TAC has accepted all of the responses from 318. The revised Code is currently being prepared for public comment.

5.5. Summary of all CA items. An updated list of all CA items as of after the Pittsburgh meeting is enclosed. Please review and continue to work on the items assigned to you. Note that we currently have 14 CA items that have been approved by Sub A.

CA 021: Tony is to report on recommendations on this item. Tony was not prepared to report. Will try to resolve this one in Tampa.

5.6. CA Items resolved since the last meeting:

CA 110, Update of ASTM standards, 318 LB 10-2, passed. Will be incorporated into 318-11.

5.7. Code reorganization.

5.7.1. Task Groups for Code Reorganization. Following are the current Task Groups. Note that I have done a little shifting around to use our resources as well as possible. Task Groups were accepted as shown below. Florian and Dean will be reassigned once Chapter 23 is merged into Chapter 24.

Chapter 5, Material Properties and Durability. Tony, CH, Fred, Doug
 Chapter 22, Concrete Materials and Quality Assurance, Nick, CH, Ken B., Eric
 Chapter 23, Formwork, Florian, CH, Dean
 Chapter 24, Contract Documents and Construction, Colin, CH, Steve, Ken H., Harry, Jason

5.7.2. Current Status:

Chapter 5: Second version of Chapter 5 was balloted on 318 LB 10-04. 54 comments were received. Waiting on recommendations from TG. Next action: Sub A ballot on proposed responses.

Chapter 22. First version of Chapter 22 was balloted on 318 LB 10-01. 146 comments were received. Responses have been prepared and approved by Sub A. Next action: Sub A ballot on proposed revisions to chapter.

Chapter 23. First version of Chapter 23 was balloted on 318 LB 10-03. 107 comments were received. Proposed responses were prepared by TG and balloted on Sub A 03-2010. 68 comments were received. TG is working on resolving comments. Next action: Sub A ballot on proposed revisions to chapter.

Chapter 24. First version of Chapter 24 was balloted on 318 LB 10-01. 438 comments were received. TG is working on resolving comments. Next action: Sub A ballot on proposed responses.

5.7.2 Process for moving forward. The following step-by-step process for working with the reorganized document was discussed and adopted.

Approach for Sub A to go Forward

1. 318 Letter Ballot
2. Comments to Sub A Task Group – Return a single set of comments ready for Sub A ballot
3. Sub A Letter Ballot on Proposed Responses

Achieve Consensus

4. Prepare revised chapter (Terry, Greg, and Staff editors)
5. Sub A Letter Ballot on Revised Chapter

Achieve Consensus

6. Return chapter to 318 for next Letter Ballot

5.8. Use of 4 x 8 inch cylinders. Rachel Detwiler sent Sub A a copy of a paper that she has prepared. Mike Bartlett has also provided comments on this paper. Colin Lobo also provided additional information on this topic. The committee agreed that we would like to see data from additional labs before making any changes to the requirement for testing three 4 x 8 in. cylinders. Harry Gleich reported that the precast industry has converted to testing only two cylinders. Colin Lobo will forward additional test data. The committee agreed to reopen this item. Steve Kosmatka and Colin Lobo were appointed to summarize current data and to prepare a new ballot item for consideration. This item is assigned CA 105. **Steve and Colin will update references in CA 105 and send for a Sub A ballot.**

5.9. Performance specifications and implications for 318. Topic remains open for possible action during this code cycle.

5.10. Exposure class conflicts. A possible conflict between Classes F3 and C2 was brought up during the St. Louis meeting. Can we determine a course of action? Doug Hooton agreed to review this item and bring back a proposal for the committee. Hooton has prepared an item (CA 108 that will be balloted on the next Sub A ballot. **Hooton is to present an overall assessment of Categories C and F for discussion in Pittsburgh. Doug will present in Tampa.**

5.11. Adding alkali-silica reactivity (ASR) to the Code. Of all of the major durability issues with concrete, only ASR is not addressed in the Code. After discussion, a Task Group of Folliard, Hooton, and Fiorato was formed to review this issue and make a recommendation to the committee during the meeting in New Orleans. In Chicago, Tony reported that ASTM C09 is preparing a specification for dealing with ASR. Sub A agreed to put any action on hold until that document is completed. **It was agreed that it is still premature for Sub A to take any action here. This item will remain on the agenda until action is taken. Doug will present an update in Tampa.**

6. New Business:

6.1. Determining Lambda. Carino had the following comment on Sub A Ballot A02-09:

I have some questions about the splitting tensile strength. First, f_{ct} is defined as the average splitting tensile strength, so this is not a function of f'_c , but a function of the average compressive strength of the concrete. So it is not correct to say that f_{ct} is $6.7 \sqrt{f'_c}$. Second, I'd like an explanation of how an engineer would determine lambda for the second alternative. The code language is not clear. I think the f_{ct} in the equation should be measured average splitting tensile strength. Maybe Fred or Ken can explain to us how the equation in 8.6.1 is supposed to be used to choose lambda.

It was agreed that the Code needs cleaning up here. Fred will follow up with ACI 213 and prepare a CA item. Note that CA 111 was assigned here.

6.2. Definitions of Exposure Classes F1, F2, and F3. A Code user sent the following email to Basile:

ACI 318-08 Table 4.3.1 for each exposure class F1, F2 and F3 the maximum w/cm is 0.45 and the minimum concrete strength is 4500 psi. The commentary indicates that F1 and F2 are conditions where exposure to deicing salts is not anticipated.

ACI 201.2R-01 Section 1.4.2 Water-cement ratio. For concrete exposed to deicing salts maximum w/cm ratio is 0.45 and all other structures maximum w/cm ratio is 0.50.

Can you verify that the values in ACI 318 table 4.3.1 are what ACI 318 intended? I would think that freezing and thawing exposure going from "moderate, F1" to "severe, F2" to "very severe, F3" that the maximum w/cm ratio and minimum concrete strength would vary.

We build vertical slip formed concrete structures (grain storage type structures), ACI 313-91 required a minimum compressive strength of 3000 psi, ACI 313-97 requires a minimum compressive strength of 4000 psi and now it appears that ACI 318-08 is requiring 4500 psi concrete for exposure conditions F1 and F2. ACI 318-08 commentary indicates that F1 is for exterior walls not in direct contact with soil and F2 is for vertical members in contact with soil.

Does Sub A need to take action here? . This item was not discussed in New Orleans or in Chicago because of a lack of time. Not discussed in Pittsburgh.

6.3. Sulfate resistance: The following email was sent to Cathy French. Colin Lobo responded as shown.

I hope your sabbatical is going well. I had a question for you when
> you have a minute. On our wind farm projects in some parts of the
> country we are running into situations where we have severe sulfate
> exposures and it seems that I am continually at odds with local
> concrete suppliers over the interpretation of the sulfate resistance
> portions of chapter 4 of ACI 318. Is this one of your fields of
> expertise or can you recommend someone I could talk to so I can make
> sure I am doing the right thing?
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> The issue that I keep running into is that, the way I read section
> 4.3, for severe sulfate exposures, type V cement is required. Type I
> or II cement with the addition of class F fly ash can be used if the
> mixture meets the requirements of section 4.5 when tested according to

- > ASTM C1012. The problem is that the test takes 6 months or a year to run and I have yet to run into a concrete supplier who has run it on any of their mixes. The suppliers that I talk to want to offer me a test result from ASTM C452 but I have found multiple references in the

- > literature to the fact that this test is not accurate for mixes containing cement blended with pozzolans. I have continued to insist that the C1012 test be run if anything is to be substituted for the type V cement but I seem to be the only engineer that these suppliers are running into that is requiring them to do this.

Colin Lobo:

I will attempt a response. The sulfate provisions in the code are not ideal for compliance in practice.

In the footnote to table 4.3.1 "The amount of the specific source of the pozzolan or slag to be used shall not be less than the amount that has been determined by service record..."

This note permits the LDP to use customary practice on mix composition in lieu of test. It is realized the test duration is too long for mix submittals. It is unlikely that concrete suppliers will have C1012 data. It is more likely that blended cements by C595 or C1157 will have data in their certifications, but S3 requires additional SCM. In CA for instance the use of 25% fly ash in addition to a sulfate resistant cement has been considered adequate for severe sulfate conditions. I think it is accepted by CALTRANS. I am not sure of the area of your projects, but slag as an SCM might be an option too. Slag has been entering the CA market more recently and these suppliers (as with the fly ash people) might have C1012 data but it won't be with the specific cement for the project. What is important in the cement would be the C3A used in the test relative to that used on the project. If that on the project is equal to or less than that used in the test, it should be OK.

ASTM C 452 is not an appropriate test - it is an optional test to qualify Portland cements for sulfate resistance only.

You might consult with Eric Tolles who is a code official for the city of Irvine in CA (if that's where you are operating). Eric is on 318 and aware of these provisions.

Does Sub A need to take action here? . This item was not discussed in New Orleans or in Chicago because of a lack of time. Not discussed in Pittsburgh.

Note that the following new business items are listed by title only because we will probably not have time to address them. If time is available or if a topic is of interest to a member, we will address these items.

6.4. Core waiting period.

6.5. Add recycled aggregate to the Code.

- 6.6. Top bar effects in self-consolidating concrete.
- 6.7. Fix mixture proportioning flow chart in Commentary.
- 6.8. Various new work items resulting from review of Version 1 of the reorganized Code.
- 6.9. w/cm versus strength for durability.
- 6.10. Chloride ion restrictions in concrete containing aluminum embedments.
- 6.11. Request to add ASTM C 1600 Rapid hardening Hydraulic Cements to the Code.
- 6.12. Inquiry regarding appropriate strength for w/cm for durability. (Goes with 6.9.)

Note: None of these items were discussed in Pittsburgh.

7. Next Meeting/Future Schedule. The next meeting of Sub A will be at the Tampa Convention on Tuesday, 5 April 2011.

8. Adjourn

The following actions were taken during the Steering Committee meeting on Thursday:

1. The 2011 document will be a full code, not just a supplement.
2. SC approved merging Chapter 23 into Chapter 24.
3. The portion of Chapter 5 dealing with steel will become a separate chapter. Chapter 5 will be revised to reflect this change when it goes back to Sub A for the next ballot.
4. Sub G is rewriting the portion of the code dealing with grouting bonded tendons. Sub A does not have to deal with the comments on that portion of the document.
5. SC approved incorporating technical changes into the chapters as they are balloted at main. Any changes have to be identified and justified. I will take advantage of this change and work the change to eliminate the statistics into chapter 22 for the next ballot.