

# Sub B Meeting Minutes

Unapproved



Spring 2016

**Committee:** ACI 318B - Anchorage & Reinforcement

**Date:** Monday 18 April & Tuesday 19 April 2016

**Time:** 2:00 – 5:00 pm (Monday) & 8:00 am – 12:30 pm (Tuesday)

**Location:** Wisconsin Center, Milwaukee, WI

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<b>Members Present</b>	Neal Anderson (Chairman) (M,T)	Jim Jirsa (M,T)
	Lisa Feldman (Secretary) (M,T)	Ray Lui (M,T)
	Tess Ahlborn (M,T)	Don Meinheit (WJE) (M,T)
	Dean Browning (M,T)	Jack Moehle ( <i>Ex Officio</i> ) (M,T)
	Ron Cook (M,T)	Mike Mota (M,T)
	Dave Darwin (M,T)	Conrad Paulson (M,T)
	Rolf Eligehausen ( <i>Consulting</i> )	John Silva (M,T)
	Damon Fick (M,T)	Loring Wyllie (M,T)
	Cathy French (M,T)	Greg Zeisler ( <i>ACI Staff</i> ) (M,T)
	Werner Fuchs (M,T)	
	<b>Members Not Present</b>	Bahram Shahrooz

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<b>Visitors:</b>	Abdallah Alhmood (CVM Prof.) (T)	Matthew Huslig (Consult. Eng. Group) (M)
	Jay Amin (SRNS) (T)	Mungil Kim (Incheon Nat. Univ.) (M)
	Joerg Asmus (Eligehausen & Asmus) (T)	Amy Kolczak (IL Tool Works) (M)
	Min Seo Bae (Incheon Nat. Univ.) (M)	LeRoy Lutz
	Larry Campbell (CMC Rebar) (T)	Adolfo Matamoros (UT – San Antonio) (T)
	Sung Chul Chun (Incheon Nat. Univ.) (M,T)	Jamieson Matthews (Auburn U.) (M)
	Lou Colarusso (Pentair) (M)	George Miljus (Nucor) (M)
	Todd Deason (Auburn U.) (M)	Giovanni Muciaccia (Poli. Di Milano) (T)
	Jay Dorst (CEL Consulting) (T)	Dan Mullins (Martin/Martin) (T)
	Silvia Dyer (Strongtie) (M)	Somayeh Nassiri (Wash. State Univ.) (M)
	Rolf Eligehausen (U. of Stuttgart) (M)	Erik Nissen (Nucor) (M)
	Oliver Ernst (fischerwerke GmbH) (M,T)	Rebecca Nysten (Auburn U.) (M)
	Anthony Felder (CRSI) (T)	Dan Reider (Pentair) (T)
	Pete Fosnough (Harris Rebar) (M,T)	Jacob Selzer (CMC) (M)
	Larry Gartley (HILTI Corp.) (T)	Howard Silverman (ICC-ES) (M)
	Augusta Gaertner (Insteel Wire) (T)	Hye Jung Sim (Incheon Nat. Univ.) (M)
	Cory Hill (LRFD) (M)	Jürgen Stork (A Würth KG) (T)
	Andra Hörmann-Gast (ICC-ES) (M,T)	Michael Ugalde (Pentair) (T)
	Ian Houston (Nelson Stud) (T)	Edgar Zuniga (DYWIDAG Systems) (M)

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M – Monday, April 18, 2016

T – Tuesday, April 19, 2016

1. The meeting was called to order by Chair Anderson at 2:18 pm.

2. Members provided self-introductions around the table. Visitors to the meeting also provided self-introductions.
3. **Approval of Minutes of Tuesday 10 November 2015 meeting in Denver, CO**

The minutes of the November 10 meeting in Denver were reviewed. There was a motion by Ahlborn and seconded by French to accept the minutes as distributed. The motion passed.
4. **Report on ACI318 Steering Committee Meeting (Anderson)**

Highlights of the steering committee meeting included:

  - ACI Staff will review a means of better indexing the Code.
  - Various subcommittee reports were presented.
    - Sub A: mix design information was removed from the previous code edition but likely needs to be re-introduced.
    - Sub E: Hot Topic Session (Sunday) highlighted different methods/equations by which shear could be evaluated. Many audience members requested simplified shear provisions in the code.
  - Reviewed New Business items from the last code cycle.
5. **Review of Chapter 17 Reorganization – CB 200 & 201 (French)**
  - Results of the two ballots and proposed changes were discussed. Attachment 2 includes an itemized list of the comments as discussed.
6. **Review of Chapter 26 Ballot – CB800A & 800B (Browning)**
  - Browning provided an overall summary of the ballot comments. Attachment 3 includes an itemized list of the comments as discussed.
  - A ballot of a clean, revised Chapter 26 will be issued shortly after this meeting.
7. **Review of Shallow Anchor Bolt Ballot – CB202**
  - This item was discussed briefly. A note in the code rather than a separate table will be included. This item will be re-balloted shortly after this meeting.
8. **Review of ASTM A1094 Standard Ballot – CB100**
  - Negative by Meinheit was discussed. Ballot will be tabled due to ongoing Canadian research expected to produce results within a year.
9. **Review of Deformed Wire Ballot – CB600**
  - Deformed wire U-stirrups are not covered in this code section. Some revisions to the wording of this provision were made (i.e. 'plain' was struck from the wording). Wylie withdrew his negative.
10. **Review of ASTM A615 Ductility Ballot – CB802 (Paulson)**
  - This ballot item received several comments and negatives. Paulson provided a preface, discussing the motivation for the changes as provided on the original ballot item. Given the background, suggestions were offered from committee members.
  - A clean ballot on this item will be issued following this meeting.
11. **Proposed Code Changes for Hooked and Headed Bars – Upcoming Ballot (Darwin)**
  - Darwin presented on research at KU related to anchorage of high-strength hooked and headed bars. Key points:

- Proposed design equation for hooked and headed bars have been developed that are in parallel based upon an extensive experimental investigation.
- Limits: 16,000 psi concrete compressive strength and 120 ksi yield strength for the reinforcement.
- Background on the experimental investigation and the subsequent analysis and development of the proposed code changes were presented.
- Headed bars provide a higher anchorage force than hooked bars for the same embedment length.
- ACI currently does not accurately capture the anchorage strength of hooked and headed bars. Anchor strength is over-estimated and doesn't account for loss of strength for closely spaced bars.
- Factors for confining steel and bar location factor as proposed for inclusion were presented.

## **12. ACI 308 Recommendations for Allowing the Use of Development Length in Place of ACI 318 Appendix D Methodology**

- An informal discussion, outside of this meeting will be conducted.

## **13. Upcoming Ballots**

- **Discussion of Issue**
  - Noted in items as presented above.
- **Looking for some direction from the committee per a Minnesota DOT inquiry**
  - Not specifically discussed at the meeting.

## **14. Shear Lugs – Upcoming Ballots (Cook)**

- A model that fits previous test data has been developed. A final version will be presented in a few weeks. Matches with provisions already in the code for base plates. Will be adapted into code language and will add about three pages to the code.

## **15. Screw Anchors – Upcoming Ballots**

- Not specifically discussed at the meeting.

## **16. Proposed Update to Shear Provisions**

- Refer to Item 4.

## **17. Other New Business**

- Silva presented on the development length of post-installed bars. Group effect is not checked when development length is calculated. Anchors stud welded to plates do not need to be inspected and are likely designed for  $I_d$ . Concrete breakout will govern with a capacity significantly lower than the yield strength of the bars. Similar performance has been observed for cast-in-place and post-installed bars. Systems can now be qualified for this type of use based on research that has been conducted. This situation will allow nominal, but not actual, yielding of the reinforcement.
- Line items for use in balloting was briefly presented. Sub-committee members were instructed to establish tables and put the line numbers in a column to the left grouped such that a single line number was used for each provision/thought/etc. as is deemed appropriate. It will simplify the compilation of ballots.

**18. Next Meeting – Fall ACI Convention 2016 - Philadelphia**

*Respectfully Submitted,*



Lisa R. Feldman, Ph.D., P.Eng.  
Associate Professor - University of Saskatchewan  
ACI 318B Committee Secretary

Approved by the Chair

NSA

Attachments:

- 1) Sign-in Sheets
- 2) Review of Chapter 17 Ballot – CB200 & 201
- 3) Review of Chapter 26 Ballot – CB800A & 800B

**Attachment 2: Review of Chapter 17 Ballot – CB200 & 201**

- Item 8 remains outstanding as Fuchs was not at the meeting to discuss and/or withdraw his negative.
- Item 10: Wylie withdrew his negative. Based upon the response provided by the subcommittee.
- Item 17: Was deemed persuasive. New wording has been suggested by the task group and was accepted by Wylie and so withdrew his negative. Chapter is to be kept self-contained given that other groups (e.g. AASHTO) will be referencing it and that it is not entirely parallel to other chapters in the Code.
- Item 26: Wylie deemed to be non-persuasive as the committee was directed to provide editorial consistency.
- Item 28: Negative was found to be persuasive. Text was modified as per Wylie's comment. Wylie agreed with the change and so withdrew his negative.
- Item 30: Deemed non-persuasive as the phrase was made into a separate provision rather than being deleted as suspected by Lui. Lui agreed to withdraw his negative.
- Item 32: Deemed to be persuasive, and comment accepted as provided. Wylie withdrew his negative.
- Item 36: Text changed to "Anchors shall satisfy edge distances" to satisfy Wylie's negative. The negative was withdrawn at the meeting.
- Item 37: Lui withdrew his negative based on the change provided.
- Item 37: Withdrawn by Wylie based on changes made.
- Item 42: Is no longer necessary based upon changes made to address other comments.
- Item 44: Deemed to be non-persuasive. Wylie withdrew his negative based upon the reasoning provided.
- Item 45: Identified as new business by the subcommittee.
- Item 46: Non-persuasive as it was done to maintain editorial consistency. Wylie withdrew his negative.
- Item 47: Discussed whether the phi factors be moved to Chapter 21 or maintained within Chapter 17. Phi factors were stated to be specific to anchors and so could stay within the chapter to keep it more self-contained. Moehle suggests this comment be brought to the main committee for discussion on Wednesday.
- Item 49: Item wasn't intended for anchorage reinforcement rather than supplemental reinforcement. This item will be discussed with Ahlborn at a later time.
- Item 53 & 54: Tables 17.3.3(b) and (c) were modified to address the comments provided.
- Item 55: Deemed persuasive as there is precedence for this in ACI 318-14. Wylie agreed with the change and so the negative was withdrawn.
- Item 57: Withdrawn by Wylie as change requested has been made.
- Item 62: Withdrawn by Wylie.
- Item 64: Deemed persuasive but modified (equation numbers not always provided in ACI318-14). Lui withdrew his negative.
- Item 69: Was discussed at the meeting, and Provisions 17.4.2.2 and 17.4.2.2.1 were rephrased. Wylie withdrew his negative.
- Item 79: Anderson stated that influence of cracking is appropriate terminology.
- Item 93: Silva suggested wording remain as is.
- Item 95: No change will be made.

- Item 105: Provision 17.5.1.1 was reworded to be consistent with 17.4.2.6. Commentary will be added as new business.
- Item 143: Change text to “modification factor for the influence of cracking.”
- Item 146: Related to Item 143. Put cracking in each line of the text within the table.
- Item 155: Provision 17.8 renamed “Earthquake-resistant anchor design requirements.” Anderson to decide upon the sub-headings within 17.8.
- Item 156: Tabled until Anderson discusses this with Zeisler.
- Item 159: Negative withdrawn by Feldman based on discussion.
- Item 160: See Item 155.
- Item 164: Text can be included to preserve history.
- Item 170: Agreed. Item will be changed as suggested to satisfy the negative.
- Other: Cross-references required between Chapters 17 and 26 to satisfy Wylie’s negatives.

**Attachment 3: Review of Chapter 26 Ballot – 800A & 800B**

- **800A:**
- Item 57: ACI Certification committee is working on an inspector certification (in progress for the past year). Program content is now being worked on with a pilot program planned for. The term used is ‘certified inspector.’ Wylie maintains his negative on the use of this terminology as the certification program is not yet in place.
- Item 67 (and others): Deemed persuasive and changed as requested. Negative was withdrawn by Feldman.
- Item 74: Negative withdrawn by French, based on correction that was proposed.
- Item 75: Changes made as requested
- Item 76: Wylie withdrew his negative based on corrections made to the text.
- Item 77: Text modified as suggested.
- Item 79: Text modified as suggested. Silva withdrew his negative.
- Item 80: Negative withdrawn by French based on change made to Item 79.
- Item 84: Item was discussed at length. Negative withdrawn by French based on changes made to text.
- Item 85: Discussed as it pertained to other ballot comments. Wylie withdrew his negative.
- Item 88: After a lengthy discussion, “cast-in anchors” added to item (a) and removed from Item (f).
- Item 90: Wylie withdrew his negative based on changes made to text at the meeting.
- Item 101: Comment deemed to be non-persuasive. Mota withdrew his negative.
- Item 102: Provision broken down into two sentences to satisfy Wylie. Negative withdrawn.
- Item 106: “Qualified” was deleted. Wording to be used, in accordance with 318 Steering Committee, is “certified inspector.” Deemed to be new business.
- Item 108: A plan for resolving this negative was discussed during the meeting break.
- Item 117: Description of orientation is difficult to understand. Suggest that information be added to commentary, along with a possible figure. Anderson withdrew his negative.
- Item 122: It was deemed reasonable to move some information as requested. Negative was withdrawn by French.
- Item 133: Text was changed as suggested.
- **800B:**
- Item 137: Text was changed as a result of the negative. This is considered to be new business.
- Item 139: A brief statement was added in response to the comment. Wylie withdrew his negative.
- Item 147: This item will be reviewed following the meeting.
- Item 150: This item will be reviewed following the meeting.
- Item 151: Wording was changed in the document.
- Item 157: Agreed to the modification as proposed.
- Item 160: This item will be reviewed following the meeting.
- Item 162: This item will be revised following the meeting based upon the discussion that ensued.

- Item 163: Agreed with comment. Negative was withdrawn.
- Item 164: This item will be reviewed following the meeting.