

Minutes of ACI-ASCE Committee 352 Meeting
Joints and Connections in Monolithic Concrete Structures
ACI Spring 2014 Convention
Sunday, October 26, 2014; 12:30 pm – 3:30 pm
Meeting Room “Piscataway”, Washington Hilton, Washington, D.C.

ATTENDANCE

Members Present: (15)

Burcu Burak, Jim Cagley, Min Yuan Cheng, Damon Fick, Catherine French, Mary Beth Hueste, Thomas Kang, Mike Kreger, Jim LaFave, Remy Lequesne, Gustavo Parra, Bahram Shahrooz, Myoungsu (James) Shin, Jim Wight, Loring Wyllie

Members Excused: (13)

Sergio Alcocer, John Bonacci, Marvin Criswell, Jeff Dragovich, Luis Garcia, Shyh-Jiann Hwang, Ted Krauthammer, Hung-Jen (Harry) Lee, Roberto Leon, Jack Moehle, Ian Robertson, M. Saiid Saiidi, Jorge Segura

Members Absent: (5)

Kara Hartleib, Douglas Lee, Dawn Lehman, Voula Pantazopoulou, John Wallace

Consulting Members Present: (0)

Associate Members Present: (3)

Daniel Reider, Sung Chul Chun, Ben Deaton

Visitors: (6)

Attila Beres, JoAnn Browning (TAC), Jim Olson, Wael Zatar

1. Call to Order and Introductions

Committee 352 Chair Mary Beth Hueste called the meeting to order at approximately 12:40 pm after distributing copies of the meeting agenda. All individuals in the meeting room then introduced themselves.

2. Membership Updates (M. Hueste)

- Remy Lequesne – new voting member
- Cheng-Ming Lin, Nilanjan Mitra – moved from voting member to consulting member

3. Approval of Meeting Agenda

A motion by Jim Cagley (seconded by Loring Wyllie) was made to approve the meeting agenda, a draft of which had been previously been posted to the committee website and was also available in hard copy format at the meeting.

4. Approval of Minutes from the Spring 2014 Committee 352 Meeting in Reno, NV.

A motion by Bahram Shahrooz (seconded by Jim Cagley) was made to approve the Spring 2014 meeting minutes (from the convention held in Reno, NV), which had previously been posted to the committee website and also available in hard copy format at the meeting. No additional discussion was requested and the motion was approved by acclamation.

5. Results of Ballot 1 for Slab-Column Connection Example 5 - Interior Type 2 Connection to supplement ACI 352.1R-11 (M.-Y. Cheng)

The 1st ballot for slab-column connection Example 5 – Corner Type 1 Connection started on July 17, 2014 and closed August 18, 2014. The ballot passed with 12 affirmative votes, 9 affirmative votes with comment, and 3 negative votes. Min-Yuan Cheng presented a summary of the ballot comments to the committee. A complete list of comments and responses is included as Appendix A to these meeting minutes.

- Bonacci negative – page 2, line 15: Min-Yuan Cheng clarified that the example problem is currently checking both Sections 5.2.1.2 and 7.2 of 352.1R-11. Committee members agreed to revise the problem description to state M_{ub1} and M_{ub2} are from the design lateral displacement and to add a comment stating the lateral drift check is from the requirement of Section 5.2.1.2 (e).
- Bonacci negative – page 6, line 2: Committee members agreed to remove joint tie as suggested.
- Fick comment – page 1, lines 3, 10: Damon inquired about consistency between examples. Chair Hueste suggested following the earlier example where formatting was approved by committee members.
- Hueste comment – page 4, line 9: Mary Beth suggested that clarifying Section 6.1.5(b) for consistency with Section 5.2.1.2 should be considered new business.
- Kang negative – page 3, line 6: Thomas recommended using a smaller value of d , measured to the lower layer of top reinforcement for calculating moment strength. Refer to discussion on Kang comment, page 6, line 2 below for related discussion.
- Kang negative – page 5, line 8: Committee members agreed that column strip lines should be revised to appear closer to scale.
- Kang comment – page 6, line 2: Value of slab depth, d , used for calculation of moment strength was revisited. Committee members present discussed and decided based on common industry practice and for consistency with shear strength calculations that the average d should be used in the example. Text will be added to all examples stating, “Average d is used for consistency with shear calculations”.

- Kreger negative – page 1, line 2: The dimension will be revised as suggested. Jim Wight made a motion to find the vote persuasive, which was seconded by Loring Willie. The motion was approved by acclamation.
- Kreger negative – page 3, line 26: Chair Hueste suggested visiting with Mike for his suggestion on the current text in the example.
- Kreger negative – page 4, line 10: Min-Yuan Cheng stated the check in Section 6.1.5(b) has been revised to include V_u instead of V_c as suggested.
- Kreger negative – page 4, line 18: Committee members agreed that a check and comment should be made related to using twice the dead load for w_u .
- LaFave comment – page 2, line 10. Gustavo Parra suggested identifying the load combinations used to calculate V_u and V_{ug} for clarification.
- Robertson comment – page 1, line 1. M_{ub1} and M_{ub2} vectors have been switched as suggested.
- Robertson comment – page 4, line 32: Tie shown in Fig. E5.2(c) has been removed as suggested.

ACTION ITEMS:

- Damon Fick will add Section 6.1.5(b) and Section 5.2.1.2 to the list of items for review in the 352.1R update. The revised list will be posted on the Committee website.
- Chair Hueste will work with Min-Yuan Cheng to post the 2nd ballot for Example 5 to resolve the Negative Votes and Affirmative Votes with technical comments prior to the Spring convention.
- Damon Fick, Remy Lequesne, and Min-Yuan Cheng will add average d text to their examples in response to Kang comment, page 6, line 2.

6. Results of Ballot 1 for Slab-Column Connection Example 1 - Type 1 Interior Connection with Shear Capital to supplement ACI 352.1R-11 (R. Lequesne and J. Wight)

The 1st ballot for slab-column connection Example 1 – Type 1 Interior Connection with Shear Capital started on September 4, 2014 and closed October 6, 2014. The ballot passed with 14 affirmative votes, 6 affirmative votes with comment, and 2 negative votes. A complete list of comments and responses is included as Appendix B to these meeting minutes.

Before reviewing comments from Ballot 1 for Example 1, Remy Lequesne discussed three items related to the example.

- a) Small dimension of shear cap: The recommendation of 421.1R report to avoid small shear caps was discussed and data from Megally & Ghali (2002) and Wey & Durrani (1992) were presented. Committee agreed to include the recommendation with reference in the example and also to state the selected 12 in. shear cap meets ACI 13.2.6. Chair Hueste suggested considering the item as new business when the 352.1R report is updated to ACI 318-14.
- b) V_c at the boundary of shear reinforcement as pointed out by Ian Robertson's negative vote, page 10, line 21: The controlling shear strength equation at the boundary of shear reinforcement was discussed (Section 5.2.1.1). The Committee agreed to use $V_c =$

$2\sqrt{f'_c} A_c$ and refer to ACI 318 in the example. Remy suggested adding the topic to future business when 352.1R report is updated to the ACI 318-14 code.

- c) Definition of V_c in Section 6.1.5(b): Committee agreed to reference the V_c definition provided in Section 7.2 and to clarify this reference when the 352.1R report is updated to the ACI 318-14 code.

The following comments from the ballot were also discussed:

- Kreger negative – page 12, line 37: Remy Lequesne stated the V_c value used in the example will be clarified with a reference to Section 7.2.
- Kreger negative – page 8, line 29: Committee agreed that the noted calculation is redundant and Remy Lequesne will delete from the example.
- Kreger negative – page 9, line 11: Remy Lequesne agreed with the suggested calculation result and has revised the example.
- Kreger negative – page 10, line 7: Jim Wight suggested and committee members agreed that a reference, such as the ACI Notes from PCA should be included.
- Kreger negative – page 11, line 30: Remy Lequesne stated the example has been revised to include the calculation of ϵ_t to determine if the section is tension controlled.
- General format and consistency comments: Several comments were included in the ballot pointing out differences from previous examples. Chair Hueste recommended and Committee members agreed that examples should be consistent.
- Fick comment – page 4, line 7: Remy Lequesne stated the example would be revised to use shear cap term for consistency with definitions in 352.1R and ACI.
- Bonacci comment – page 8, line 20: Remy Lequesne stated that a reference to ACI 318 would be provided for calculating the required stud height.
- Kang comment – page 11, line 15: Jim Wight recommended specifying the column strip reinforcement that is required within $1.5h$ on each side of the column and include a reference to ACI 318.
- Kang comment – page 15, Figure E1.6a: Committee members discussed and recommended showing reinforcement in the drop panel that is consistent with practice.

ACTION ITEMS:

- Damon Fick will add the shear cap size and ACI 13.2.6 to the list of items for review in the 352.1R update.
- Damon Fick will add the controlling shear strength equation at the boundary of shear reinforcement and the clarification of the definition of V_c to the list of items for review in the 352.1R update. The revised list will be posted on the Committee website.
- Chair Hueste will work with Remy Lequesne and Jim Wight to post the 2nd ballot for Example 1 to resolve the Negative Votes and Affirmative Votes with technical comments prior to the Spring convention.

7. Committee review of ACI 421.YR (D. Fick)

Damon Fick shared a summary of the feedback that Committee 352 members provided for the ACI 421.YR report that is currently being reviewed by TAC. The overlapping areas with 352.1R, technical inconsistencies, and missing references to 352.1R-11 were discussed. Committee members agreed with Cathy French's suggestion to continue working with TAC as the review process continues.

8. Updates on slab-column connection design examples in progress to supplement ACI 352.1R-11

- Example 1: Type 1, RC, Interior Connection (R. Lequesne and J. Wight):
Remy Lequesne reported to committee members the response summary from ballot 1 and revised example would be complete by the committee meeting in Kansas City.
- Example 2: Type 1, RC, Edge Connection (D. Fick and M.-Y. Cheng):
Damon Fick reported that all negative ballots and editorial technical comments had been resolved and that only minor editorial revisions would be necessary for consistency with the other examples.
- Example 3: Type 1, RC, Corner Connection (M.-Y. Cheng):
Min Yuan Cheng stated that revisions from the 2nd ballot would be complete in about one month.
- Example 4: Type 1, RC, Interior Connection (R. Lequesne):
Remy Lequesne informed committee members that Jeff Dragovich volunteered to work on the example with one of his colleagues that has experience with the 352.1R report.
- Example 5: Type 2, RC, Interior Connection (M.-Y. Cheng and T. Kang):
Min Yuan will begin incorporating changes and suggestions from the earlier committee discussion related to the 1st ballot for Example 5.
- Example 6: Type 2, RC, Edge Connection (J. Dragovich):
Mary Beth noted that Jeff had a meeting conflict, but indicated that he is collaborating with a colleague to develop Example 6.
- Example 7: Type 2, PT, Interior Connection (T. Kang):
Thomas Kang reported that progress on Example 7 would be made until early next year.
- Example 8: Type 1, PT, Corner Connection (D. Fick):
Damon Fick had no progress to report and would double check if the original Example #8 was a corner or edge condition.

9. Formation of task group or subcommittee to update ACI 352.1R-11 (M. Hueste and D. Fick)

Chair Hueste discussed the idea of forming formal task groups or subcommittees to continue making progress related to the updated beam-column connection report, slab-column connection examples, and 352.1R report update to ACI 318-14. Mary Beth shared the definitions and procedures of task groups and subcommittees according to the Technical Activities Committee (TAC) Manual and pointed out that task groups consist of a chair and voting members of the committee, and are typically formed for shorter-term tasks. Committee members agreed that objectives of the task groups would fall into the shorter-term category.

Damon Fick showed the current list of sections in the current 352.1R-11 report that have been identified as needing clarification or revision as a result of working the examples. He mentioned it would be a good starting point for the slab-column task group when updating the report to ACI 318-14.

Jim Cagley volunteered for the slab-column task group. Gustavo Parra and Burcu Burak volunteered for the beam-column task group. A Monday afternoon time slot was briefly discussed as a meeting time for the next convention. Mary Beth will arrange a meeting time at the next convention and will share times and locations with all committee members.

ACTION ITEMS:

- Chair Hueste will form two task groups and request meeting times during the convention in Kansas City.

10. Formation of subcommittee ACI 318-J “Joints and Connections” (G. Parra-Montesinos)

Gustavo Parra provided background and an overview of new subcommittee 318-J (Joints and Connections) formed for the current code cycle. Primary responsibilities will be related to beam-column and slab-column content, which will be located in Chapter 15 of ACI 318-14. The possibility also exists for the subcommittee to be involved with related seismic design issues and shear, coordinating with subcommittees H and E. Both long-term and shorter-term commitments are planned. Gustavo mentioned that recommendations for the supplement to ACI 318-14 would need to be finalized shortly after the Fall 2015 meeting. Gustavo encouraged all Committee 352 members to attend and participate in 318-J activities.

11. Task group updates to revise and update ACI 352R-02:

- TG1: Overall Technical and Editorial Review and General Updates (J. LaFave*, M. Hueste*, J. Bonacci, D. Fick, T. Kang, V. Pantazopoulou):

Mary Beth proposed balloting the first round of revisions for the first few chapters to get initial committee input.

- TG2A: Headed reinforcement applications in beam-column joints & connections (T.

Kang*, H. Lee, M. Shin)

Thomas Kang informed committee members of new headed bar requirement in ACI 318-14. Thomas has visited with Jack Moehle to clarify the requirements for Type I connections. Thomas also discussed interest in knee-joints and stated several revisions were in process.

- TG2B: Effective joint area/strength reduction factors for beam-column joints for shear resistance (S.-J. Hwang*, J. LaFave*, H.-J. Lee, B. Burak, M. Shin)

Jim Lafave reminded committee members of the results that he and S-J. Hwang presented at the 2013 Structures Congress. Jim also shared some thoughts related to how these results could be incorporated into the updated ACI 352R-02. Jim suggested presenting some of their proposed revisions at the committee meeting in Kansas City. Chair Hueste suggested a similar type of presentation could be made by TG2A in the near future.

- TG2C: High-strength materials in beam-column connections (M.-Y. Cheng on behalf of H.-J. Lee* and S.-J. Hwang).

M-Y Cheng shared information with committee members on current tests being done by Hung-Jen (Harry) Lee on precast beam-column connections. Mary Beth noted these results may not be finalized in time for the 352.1R-02 revision, but Committee members would be interested in seeing the results in the near future.

- TG2D: Fiber-reinforced beam-column connections (G. Parra-Montesinos*)

No update.

- TG3: Updates and addition to the examples (placeholder -- to be determined)

No update.

[* indicates task group leader(s)]

ACTION ITEMS:

- Chair Hueste suggested that the task groups focus on developing specific changes or additions to the beam-column connection report that can be balloted in the near future.

12. Technical sessions and educational activities (M. Hueste)

- Mary Beth reminded committee members of the dates and times for the three upcoming special sessions honoring James Wight at the convention.
- Future technical sessions that Committee 352 could sponsor were briefly discussed. A future ASCE Structures Congress was mentioned as a possible opportunity.

13. Other business / presentations / new business (please notify M. Hueste in advance of any items in these categories)

- Jim Cagley asked committee members for their thoughts on the ACI 318 requirements for shearhead reinforcement. Jim's experience was that they were rarely used and wanted to know if members thought design requirements should remain in the code. Thomas Kang referred to his recent research and was familiar with their use in the Atlanta area.

14. Schedule for the next committee meeting

The next Committee 352 meeting will return to the regular 2:00-5:00 pm time slot on Sunday for the 2014 Spring Convention in Kansas City.

15. Adjournment

A motion by Jim Cagley (seconded by Loring Wylie) was made to adjourn the regular meeting. No additional discussion was requested and the motion was approved by acclamation. The regular meeting was adjourned at approximately 3:05pm.

Respectfully submitted,

Damon R. Fick
Secretary, ACI-ASCE Committee 352

Mary Beth D. Hueste
Chair, ACI-ASCE Committee 352