

ACI COMMITTEE 369
SEISMIC REPAIR AND REHABILITATION

ACI Spring Convention
Monday, October 17, 2011
Cincinnati, OH

C-262
2:00 – 6:00 pm

Draft Meeting Minutes

Members Present: Ken Elwood (Chairman), Sergio Breña (Secretary), Wassim Ghannoum, Wael Hassan, Ricardo Hernandez, , Insung Kim, Roberto Stark, Jeff Dragovich, José Pincheira, Jose A. Flores, Una Gilmartin, Halil Sezen, Murat Melek, Dominic Kelly, Ying Tian, Shyh-Jiann Hwang, Mario Rodriguez, John Wallace, Laura Lowes, Adolfo Matamoros, Thomas Kang.

Visitors Present: Chad Goodnight, Marko Schotanas, Derek Pham, Brian Kehoe, Ricardo Lopez, Attila Beres, Min-Yuan Cheng, Tomohisa Mukai, Leonardo Massone.

1. Welcome and Introductions

The meeting was called to order at 2:08 PM.

2. Approval of meeting agenda

Agenda was approved as presented.

Moved/Second: Ghannoum/Kelly

3. Approval of minutes from 2011 Spring meeting

Minutes were approved as presented.

Moved/Second: Dragovich/Stark

4. Special Session and Publication: *James Jirsa's Legacy in Structural Concrete: A Time to Reflect*, Spring 2012, Dallas (S. Alcocer / J. Pincheira)

Four sessions are planned for the Dallas Convention (the actual number of sessions will be confirmed after the Cincinnati convention). About 20 speakers are confirmed.

5. Session: *Post Earthquake Repairs*, co-sponsored with ACI 546, Spring 2012, Dallas (T. Kang)

A total of 12 abstracts have been received. The total number of presentations will be known after the Cincinnati convention. Three sessions were requested for a maximum of 12 presentations (4 presentations per session).

6. *Guide for Seismic Rehabilitation of Existing Concrete Frame Buildings and Commentary*

- Conversion for ASCE 41 – 13 (K. Elwood)

The document has been converted to mandatory language for submission to ASCE 41 the week of 24 October 2011. ASCE 41 with supplement 1 will be submitted along with other changes that were made when writing ACI 369R-11. Limited changes that will be brought for ASCE41 were presented.

- Database development (W. Ghannoum)

The PEER column database has been expanded and uploaded to the NEESHub site. Other databases could be potentially created. The future role of ACI 369 might be to act as curator of data prior to uploading.

- Schedule for updates and new sections (K. Elwood)

K. Elwood proposed to have a new edition of the ACI 369 rehabilitation guide for 2014. Changes to sections in which task groups have been working (e.g. material provisions, flexure and axial force) will be incorporated into the new version. A new section on walls was also proposed for addition (Chair: D. Lehmann; participants: Leonardo Massone, Una Guilmartin, Jose Flores).

7. Ballot results on change proposals for Chapters 2 and 3 (Sept-Oct 2011)

General comments about the material contained in the ballot were made. It was determined that the types of anchors included in the guide should be defined. Rather than trying to solve individual negatives, change proposals that generated several negatives were discussed to understand the motivation for the change proposal and to identify general issues that committee members found.

Action item: change proposals will be modified by task group leaders based on the discussions during the meeting and will be submitted for re-ballot. Target: mid-November

- a. Connections modifications (SEAONC Existing Buildings Committee)

General issues with each of the change proposals were discussed. These issues will be used to modify the change proposals.

- b. General provisions changes (J. Dragovich)

J. Dragovich presented resolution to comments and negatives to change proposals CH05 and CH06.

CH05 change proposal:

Moved: To find J. Mohele's argument non-persuasive on item CH05 line 15 on eliminating the comment pointing users of the document to published references to alternative methods to calculate capacity of columns under axial force and biaxial bending.

Moved/Second: Dragovich/Brena

Yes=14; No = 0; Abstain = 2

Result: Motion passes

CH06 change proposal:

It was decided to retain Eqs 3-2 and 3-3. The two equations were identified as representing two different cases related to distinct failure modes. J. Dragovich will examine the influence on use of different ACI 318 l_d equations in Eq. 3-2. He'll report back to the committee at next convention.

8. Task Groups Reports

- a. Materials (H. Sezen) – work from TG was submitted to Concrete International. Will be published in a future issue of the magazine.

- b. General Provisions (J. Dragovich)

Development length equation in ACI 369R-11 for smooth bars will be studied.

- c. Beams and Columns (W. Ghannoum)
The task group is working on developing separate modeling parameters (MP) and acceptance criteria (AC) for circular columns. Only rectangular columns are currently included in tables. The group is also working on developing consistent methods to extract information for MPs and ACs from backbone curves. A database of about 580 columns has been created so far for this work.
- d. Beam-Column Joints (L. Lowes/W. Hassan)
The group is working on evaluating shear strength equations for interior and exterior joints. New equations will include not only confinement conditions, but other influential parameters in shear strength such as axial force and yielding of frame elements prior to reaching joint shear strength. A proposed methodology to model joints where yielding of columns and/or beams occurs prior to joint failure was presented (zero length spring element between columns and beams in a centerline model).
- e. Rehabilitation Techniques (S. Breña)
No update.
- f. Slab-column connections (T. Kang)
Feedback was requested from committee on several issues that the task group is investigating (Attachment B).
Action item: Committee members are asked to look at list and provide input.

An example of modeling a flat slab will be presented during the next committee meeting.

9. New Business

None.

10. Next meeting – Dallas, Texas

Same time/day will be requested (Monday 2:00-6:00pm).

11. Adjournment

Meeting adjourned at 6:12pm

Attachment A – Proposed Agenda

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 - Conversion for ASCE 41 – 13 (K. Elwood)
 - Database development (W. Ghannoum)
 - Schedule for updates and new sections (K. Elwood)
7. Chapter 2-3 Changes Ballot (Sept-Oct 2011)
 - a. Connections modifications (SEAONC Existing Buildings Committee)
 - b. General provisions changes (J. Dragovich)
8. Task Groups Reports
 - c. Materials (H. Sezen)
 - d. General Provisions (J. Dragovich)
 - e. Beams and Columns (W. Ghannoum)
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Attachment B – Feedback Request from Task Group F: Slab-column Connections

1. Slab-column framing as gravity system in regions with high seismicity vs. primary lateral system in regions with low-to-moderate seismicity.
 - (a) If used as a gravity system, focus shall be given to (local) deformation capacity at slab-column connections. Connection stiffness and strength are less important.
 - (b) If used as a lateral system; connection strength, stiffness, and deformation capacity shall be considered. Stiffness modeling is challenging.

QUESTION:

- Should we consider both cases?

2. Review internal force characteristics of slab-column connections under lateral loading.
 - (a) Discuss the complex nature of slab-column connections: subjected to shear, flexure, and torsion. Any action cannot be measured directly in the test and thus rational assumptions must be made.
 - (b) Explain why torsion exists in the slab at the side faces of connection.

QUESTIONS:

- Would we admit the similarity of punching failures of a connection subjected to lateral loading to one under gravity loading? If so, much insight can be gained from tests of connections under gravity loads.
- Should we still consider the eccentric shear stress model which was developed not for seismic loading and has been proven to be not accurate enough?

3. Determination of plastic deformation (or plastic rotation angle) of slab-column connections:
 - (a) If the mechanism of punching failure under lateral loading is identical to that under gravity loading, plastic deformation shall be measured from the formation of the inclined crack or first yielding at the slab-column interface;
 - (b) The gravity and lateral loading tests have indicated the connection failure after yielding has occurred regardless the reinforcement ratio (if practical) is high or low;
 - (c) The gravity loading tests also indicated that the connection deformation capacity is a function of reinforcement ratio; however, the lateral loading test indicated that the connection deformation capacity is hardly affected by the reinforcement ratio.

QUESTIONS:

- What is the basis for measuring connection inelastic deformation from test data to determine “plastic deformation” or “plastic rotation angle”? This is also related to the next question:
- Given that a different modeling approach may predict first yielding or even a “general yielding” at a quite different deformation, what is the basis of measuring the deformation demand? What is the definition of “at yield” for a slab-column connection?

Key consideration for developing modeling parameters for this committee:

- What are the expectation and needs from practice?