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## **ACI 562 – Evaluation, Repair and Rehabilitation of Concrete Buildings**

**ACI Spring Convention – Chicago, IL**

**Sheraton Chicago Tower**

**Sunday, March 21, 2010**

**11:30 am - 5:00 pm**

### **MINUTES**

#### **1. Call to Order**

Chair Larry Kahn called the meeting to order at 11:30 am. The proposed agenda for the meeting was displayed and reviewed.

#### **2. Absences**

No apologies for absence were received.

#### **3. Attendance**

The following members and visitors signed the attendance sheet.

#### **Committee Members**

Larry Kahn (Chair)  
Pete Barlow  
Randy Beard  
Eric Edelson  
Paul Gaudette  
Chuck Larosche  
Tony Murray  
Jay Paul  
Halil Sezen  
Gustavo Tumialan

Keith Kesner (Secretary)  
Mike Bartlett  
Gregg Cohen  
Peter Emmons  
Fred Goodwin  
Marjorie Lynch  
Tony Nanni  
Pete Popovic  
Gus Sirakis

Tarek Alkhrdaji  
Cas Bognacki  
Kevin Conroy  
Garth Fallis  
Venkatesh Kodur  
Tracy Marcotte  
Kelly Page  
Randy Poston  
Gene Stevens

#### **Visitors**

Jacques Bertrand  
Frank Genoese  
Vlad Ivanov

Michael Breetz  
Amanda Greenfield  
Claude Jaycox

Chris Darnell  
Augusto Holmberg  
Steve Jaycox

Danielle Kleinhans  
Tom Nehil  
Roberto Nunez  
Tom Rewerts  
George Taylor

Kevin Krawiec  
Justin Norvell  
Francis Omoregie  
Stephen Schmitt  
David Tepke

Mike Leongson  
Andrzej Nowak  
Matt Reiter  
Matt Sherman

#### **4. Approval of Previous Meeting Minutes**

The minutes from the previous committee meeting in New Orleans were reviewed. The minutes were approved and will be posted to the committee website.

#### **5. Approval of Agenda**

The agenda for the meeting was reviewed and approved without changes.

#### **6. Saturday Meetings**

Chair Kahn asked for comments on how the Saturday subcommittee were working. Most committee members felt that the meetings were valuable to allow for review of documents. Rick Edelson asked that the Sub – D meeting be extended to last for four hours. Chair Kahn agreed to this request. Several members asked for a time for the subcommittee chairs to coordinate activities. The time set aside for 562-CO (coordination with other ACI committees) which was scheduled for 8:00 am on Sunday morning was suggested as a time for sub-committee chair coordination.

#### **7. Formal Subcommittees**

Chair Kahn announced that TAC has approved formal subcommittees for ACI 562. This means that there are no more associate members of the committee. Accordingly the current associate committee members will be dismissed and the active current associate committee members will be appointed as members of the subcommittees.

The new formal subcommittees will have official committee chairs, and official subcommittee members. The subcommittees will also have to satisfy the balance requirements with respect to having a balance between producers and users on the committee.

The reappointment process will be completed soon after the Chicago meeting.

#### **8. Voting by Provisions**

Chair Kahn indicated that in subsequent ballots on previously balloted Chapters, the committee will vote provision by provision, and not on the chapters as a whole. Voting by provision will allow for the committee members to focus only on changes to the document and eliminate provisions that have no consensus. Voting in this manner will be necessary for the committee to maintain its completion schedule.

## 9. Committee Schedule

Kahn reviewed the committee schedule (shown below) to remind the members of the time line for completion of the code. A full version of the code needs to be submitted to TAC for review at the Fall 2010 meeting. The TAC submission was moved up by one meeting because the Summer 2012 TAC meeting will be dedicated to the revised ACI 318 code. The change in submission is also needed to allow for the code to be presented in 2013 to the International Code Council (ICC) for inclusion in the 2015 International Existing Building Code (IEBC).

Years	1		2		3		4		5		6		7
Task	Nov-06	Apr-07	Nov-07	Apr-08	Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Nov-11	Apr-12	Nov-12
Finalize outline, assign tasks	*												
Refine topics, write code		*	*	*									
chapter group ballots				*									
responds to chapter vote negatives					*								
ballot completed draft						*							
Respond to all negatives							*						
Draft sent to TAC								*					
Respond to TAC comments									*				
New item ballots,									*				
send final document to TAC									*				
Repond to TAC comments										*			
Release for public comment											*		
Response to public comment complete												*	
Repair Code Ed. 1 is published												**	
New committee cycle begins													X

Based upon the limited amount of time available, we need to limit the revisions on the Chapters and finalize. The current code may not have all of the concepts, but it represents a stake in the ground establishing the repair code.

To prepare code draft for TAC submission, an editorial review meeting will be held over the summer in Atlanta. Volunteers are needed for the editorial committee meeting. People that are interested in participating in the editorial committee should contact Larry Kahn.

To finalize the Chapters additional ballots will be required. The committee consensus was to stagger the ballots as much as possible and avoid consecutive ballots.

At the next full committee meeting in Pittsburgh, much of the committee effort will be spent reviewing the TAC comments.

## 10. Chapter 4 Status – Keith Kesner

Subcommittee A held a meeting on Saturday to discuss revisions to the Chapter 4 based upon the TAC review comments. The major changes involved rewriting sections of the Code to provide requirements to engineers, rather than requirements for Owners or Contractors. The other significant changes involved moving some sections on Owner requirements into Chapter 1. This change will allow for construction responsibilities to be better defined in the Code.

Other minor changes were also made to Chapter to satisfy TAC comments.

In Section 4.4.1 there is a note for to obtain load factors to be used during temporary conditions from Chapter 5. This provision will need to be included in Chapter 5.

## **11. Chapter 6 Status – Chuck Larosche**

The ballot on the latest version of Chapter 6 generated 16 pages of comments. The major changes from the previously balloted version included the removal of the strength reduction factors (I-factors) and modifications to the procedure used to establish the strength of concrete strength based upon core test results. The procedure for evaluation of concrete strength was adapted from the Canadian Bridge Code. The use of the procedure was described by Mike Bartlett.

The committee had several comments on the proposed provisions, many dealt with the need for commentary on the equations and a procedure to identify outliers in the data. ASTM E 178 was suggested as a reference for outlier identification.

The question of the concrete core outliers was also discussed in terms of identifying if an outlier result was the result of poor sampling / testing procedures or if it represented a local area of low strength concrete. The issue will need to be discussed in the commentary.

The concept of reliability levels and their treatment in the repair code was discussed. Based upon discussion and time available to complete the code, the issue will be reviewed in a later version.

The concept of having separate load and phi (strength reduction) factors for the repair was raised by Nanni, and where should they be located in the code. Nowak and Bartlett both indicated that a lower reliability level was acceptable for existing structures or for repaired structures. The concept of reliability levels may not make this code version but can be addressed in the future. Consensus was that the strength reduction and phi-factors belong in a single chapter (Chapter 5).

Chuck Larosche discussed the use of historical material properties versus test results from original construction (if available) or from in-situ testing. Committee members had concerns about allowing a “pick and choose” approach, especially if higher results were provided by the historical properties. Larosche indicated section would be changed to require use of test results when available.

Committee by voice vote indicated that the concept of using historical material properties in analysis of existing structures was acceptable.

Section 6.4 on serviceability was discussed. Committee members were unsure of what an unserviceable structure was, and had concerns about including the section as it could cause unreasonable demands by owners. Nowak indicated the he is working on several projects related to serviceability assessment in bridges. The term serviceability is subjective. Consensus of committee was to keep section in place. Bartlett offered to help

Larosche with the evaluation clause based upon work he has done on Canadian Bridge Code.

Larosche asked for volunteers interested in working on Chapter 6 to contact him.

## **12. Chapter 7 Status – Rick Edelson**

Rick Edelson reviewed the result of the recently completed ballot. Most of the comments focused on the sections that discussed integral and composite behavior in Section 7.3. The distinction between integral and composite behavior was reviewed by Edelson.

The Chapter 7 subcommittee was planning a series of Web-Ex meetings to review the comments and revise the chapter.

## **13. Chapter 8 Status – Fred Goodwin**

Goodwin discussed the results of the recent ballot on Chapter 8 – Durability. Most of the comments dealt with the sections on service life and maintenance requirements with additional comments on the other sections. The comments will be reviewed at upcoming web meetings and a revised chapter balloted.

Several people discussed if the service life of a repair can be defined. The 318 Building code does not discuss the expected service life of a new structure. Code does not define a service life, but indicates repairs should be durable for the service life desired.

The location of Section of 8.4.3 was discussed, it is possible for this section to move into Chapter 7 in future editorial revisions

Larosche questioned the provision in Section 8.5 which indicates that deleterious materials can be encapsulated in repairs, without removal. The committee consensus was this is acceptable.

Section 8.6 on Maintenance Requirements was discussed. Committee consensus was that some code text and commentary on maintenance was desirable. Concern was voiced by Alkhrdaji that maintenance requirements should only be provided when requested by Owner. Paul had concerns about mandatory maintenance requirements and the affect they would have on smaller projects where engineers are working with limited budgets.

The provisions regarding redundant attachment of repairs in Section 8.6.3 was reviewed. Stevens did not like the provision as it creates a potential liability problem for repair designers. Sirakis believed it needed to be included as a maintenance requirement. The section may also be a design requirement and therefore belongs in Chapter 7.

#### **14. TAC Update – Tony Nanni**

The ACI 562 code was not extensively discussed at the TAC meetings. However the following items were discussed at the TAC Code Committee Meeting:

- The code should speak to an engineer
- The chapters should read as if they have a single author

The issue of load testing was discussed by TAC based upon a request by Larry Kahn. The question revolved around the potential for different committees to have different standards for load test magnitude and acceptance criteria. Specifically ACI 318 and 437 have different criteria. TAC reaffirmed that ACI Committee 437 is the lead committee of the development of load testing standards.

Nanni also discussed the ISO TC7 Document on repair, which is a four part guide / specification for evaluation and repair of concrete structures that is currently under development. Nanni felt the document was a good general guide / reference. Unfortunately, ISO limits access to documents under development. So, the only way for ACI 562 members to

#### **15. Other Items**

The ACI Webex account can be made available for subcommittee meetings. The meetings need to be coordinated by Khaled Nawlahi – ACI Staff Engineer.

#### **16. Date for Next Meeting**

Kahn indicated that the next meeting of the full committee would be held on Sunday, October 24<sup>st</sup>, 2010 in Pittsburgh, PA. Sub-committee meetings would be held on Saturday.

#### **17. Adjournment**

The meeting of the committee was adjourned at 4:45 p.m. Kahn thanked all of the committee members for their participation in the meeting and for their continued work on the development of the repair code.

Respectfully Submitted,

Keith Kesner  
Committee Secretary