

**ACI COMMITTEE 437
STRENGTH EVALUATION OF EXISTING CONCRETE STRUCTURES**

**Main Committee Meeting
2011 ACI Fall Convention – Cincinnati, Ohio
17 October 2011, 10:30 am - 12:30 pm
Duke Energy Center – Room 202**

MEETING MINUTES

1. Call to Order

Chair Larosche called the meeting to order at 10:40 am.

2. Attendees Introduction

The following members and visitors were in attendance. Regrets were received from members Nestore Galati, Matt Mettemeyer, and Paul Ziehl.

Voting Members

Carl J. Larosche (Chair)
J. Gustavo Tumialan (Secretary)
Joseph A. Amon
Nicholas J. Carino
John Fraunhoffer
Ashok Kakade

Danielle D. Kleinhans
Thomas E. Nehil
Antonio Nanni
K. Nam Shiu
Jeffrey S. West

Associate Members

Robert S. Jenkins
Predrag Popovic

Ernest A. Rogalla
Eric J. Van Duyne

Visitors

A. Luke

3. Approval of Agenda

Carino moved to approve the agenda. Nehil seconded the motion. The agenda was approved unanimously by voice vote.

4. Approval of the Last Meeting Minutes

Carino asked to make the following corrections to the meeting minutes from the 2011 Spring Convention:

- Visitors list: Kerry Hall's name is repeated twice. Delete one.
- Item 7.2: Modify name of Task Group. It should be "Code Requirements and Commentary for Load Testing of Existing Concrete Structures"

Nehil moved to approve the meeting minutes with Carino's changes. West seconded the motion. The motion passed to approve the corrected minutes.

5. Announcements

Larosche asked Nanni (ACI 437 TAC liaison) to comment on the ACI process once our committee completes the Load Testing code.

Nanni said that once all the negatives are resolved and TAC's comments are addressed, the Load Testing code will be sent back to TAC. He noted that TAC may find some of our responses not persuasive and ask us to address them. He said that after ACI clears our document, it will be sent for public comment.

6. Chairman's Report

6.1 Membership

No changes in the membership

The membership stands at 21 Voting Members, 3 Consulting Members, and 31 Associate Members.

7. Old Business

7.1 **Task Group: Position Paper/New Document - Selection of Appropriate Material Properties for Strength Evaluation (Leader: Amon)**

Not discussed.

7.2 **Task Group: Code Requirements and Commentary for Load Testing of Existing Concrete Structures**

Larosche said that during this meeting will need to resolve our negatives by voice ballot so the document can be submitted to TAC.

The voting results for the Ballot are summarized below.

Affirmative	11
Affirmative with Comments	6
Negative	2
Abstentions	1
Not returned	1
TOTAL	21

- Ballot meets the 1/2 Rule
- Ballot meets the 2/3 Rule

Below is a summary of the discussions and resolution of the negative comments. The comment number corresponds to the number shown in the ballot comments form for Chapters 2 to 6.

Comment No. 1
Member: Carino Page 3, Line 21 I'm not sure why we need to use "i" and "i+1" if our procedures is based on two cycles at the same load level? Seems like we are making it more complicated than needed. What is the benefit of changing to "i" and "i+1" when this Code requires that i=1? Change our response to TAC to: "Disagree because the use of "1" and "2" is what is intended and the recommended change removes clarity."
<u>Discussion:</u> Larosche: TAC introduced "i" and "i+1". The document had "1" and "2" Nanni: Vote to find TAC's comment non persuasive
<u>Action:</u> Motion by Nanni: Find TAC's comment non persuasive and keep using "1" and "2" Motion seconded by Nehil Vote Count: Affirmative:10 Negative:0 Abstain:0 Passes 40% and 2/3 Rules Negative found persuasive

Comment No. 2
Member: Gupta Page 6, Line 12 The definition conflicts with section 4.1.3. Suggest that this be revised to " .. – load due to materials other than self-weight of the structural system that are already incorporated or will be incorporated in the future and remain in place for the service life of the structure"
<u>Discussion:</u> Nehil: The definition does not create a conflict. Fluid loads are different but for purposes of calculations can be used as construction loads. Nanni: This comment is not part of TAC's comments Larosche: Find Gupta's comment non persuasive since it is not part of TAC's comments
<u>Action:</u> No vote required Vote Count: Affirmative: -- Negative: -- Abstain: -- No vote

Comment No. 3
Member: Carino Page 10, Line 7 In this provision, a load level at the service load is stated to be optional depending on whether the LDP wants to evaluate performance at service load. Paragraph 6.2.1, however, implies that measurement of response at the service load is required in all cases. This contradiction needs to be fixed.

<u>Discussion:</u>	
Nehil:	Chapter 4 paragraph 4.2.4 provides the correct sense, that is the committee wishes the service load step to be optional. Modify paragraph 6.2.1 to read “If serviceability is a criterion in the evaluation of the structure, then deflections, crack spacing, ...”
Carino:	Satisfied with the Task Group’s response
<u>Action:</u>	
Motion by Nehil: Find Carino’s negative persuasive Motion seconded by West	
Vote Count:	Affirmative:10 Negative:0 Abstain:0 Passes 40% and 2/3 Rules
Negative found persuasive	

Comment No. 4	
Member: Gupta Page 10, Line 7 Revise “1.0DD+1.0(Lp or S or R)...” to “1.0 Dw+1.0Ds+1.0(Lp or S or R)...”to be consistent with other equations in the section	
<u>Discussion:</u>	
Nehil:	This comment brings up an issue that is more than editorial. We incorporated a new load case that it is not considered by ASCE 7. ASCE 7 does not have full live load plus full snow load. When defining the service load condition, we should be consistent with ASCE 7 ASD load combinations. Change 4.2.4 to read “If serviceability is a criterion in the evaluation of the structure, a test load level equivalent to the Allowable Stress Design load combination as defined in ASCE 7 for the loading condition under investigation shall be included in the loading cycles so that the behavior of the structure at service load level can be evaluated.
Frauenhoffer:	Even though it is not considered by ASCE 7, this load combination may be of interest for some engineers.
Nehil:	It is wrong as written. Replace text with “full service load”
West:	Let the LDP to set service load and acceptance criteria
Larosche:	This item is for new business
<u>Action:</u>	
No vote required	
Vote Count:	Affirmative:-- Negative:-- Abstain:-- Passes 40% and 2/3 Rules
No vote	

Comment No. 5	
Member: Carino Page 16, Line 5	

I think “at least 24 hours” is confusing. Would 36 h satisfy “at least 24 h”? The intent is that the reading has to be taken no later than 24 h after unloading. Revise to “no later than 24 h after removal of the load.”

The figure shows 24 to 25 h, and this has to be changed to 24 h if we are revising the provision to a maximum limit. The previous procedure was to make the measurement at 24 h and we decided to give a tolerance.

Discussion:

Nanni: 24 hours plus one hour makes sense. The reading should not be taken later than 24 hours.

Action:

Motion by Nanni: Find Carino’s negative persuasive. Add “no later”, and fix graph to align with text.

Motion seconded by West

Vote Count: Affirmative:10 Negative:0 Abstain:1 Passes 40% and 2/3 Rules

Negative found persuasive

Comment No. 6

Member: Carino
Page 16, Line 11

This is inconsistent with R1.2.3 where it says that the Building Official may dictate the method of loading. Here the LDP is the only person making the decision. Should we say something like, “Unless otherwise required by the Building Official, load shall be applied...”
The correct word is “practicable.”

Discussion:

Larosche: Non-persuasive. This section is not concerned with method of load application. Rather, it is concerned with loading protocol.

West: Part concerning to Building Official was removed from the commentary

Nanni: Find Carino persuasive because the language that he has objected has been removed.

Carino: Withdraw negative.

Action:

No vote required

Vote Count: Affirmative:-- Negative:-- Abstain:--

No vote

Comment No. 7

Member: Gupta

Page 17, Line 2

Last sentence is confusing and not enforceable, suggest revising it to “Deflection measurement devices shall have a resolution of better than 1/100 of the expected deflection.”

Discussion:

Larosche: Persuasive. The text will be revised accordingly.
<u>Action:</u>
Motion by Nanni: Find Carino’s negative persuasive Motion seconded by Amon
Vote Count: Affirmative:11 Negative:0 Abstain:0 Passes 40% and 2/3 Rules
Negative found persuasive

Comment No. 8
Member: Carino
Page 17, Line 3
For new business, the Commentary should be say something about the safety differences between a cyclic load test using hydraulic actuators and a monotonic load test using superimposed dead loads. The capacity of the shoring system has to be greater when the latter is used.
<u>Discussion:</u>
Larosche: This is a good discussion point for new business, therefore no action is taken.
<u>Action:</u>
No vote required
Vote Count: Affirmative:-- Negative:-- Abstain:--
No vote

Comment No. 9
Member: Carino
Page 17, Line 16
In the case of a hydraulic loading system, does the term “super imposed test loads” mean the TLM of the weight of the hardware
<u>Discussion:</u>
Larosche: Yes. No action is taken. New business.
<u>Action:</u>
No vote required
Vote Count: Affirmative:-- Negative:-- Abstain:--
No vote

Comment No. 10
Member: Carino
Page 21, Line 7
This provision is not clear. Does “shall be recorded” refer to measured deflections under

service load? If this is the case, the load test has begun. Should the words in line 9 be changed to “before continuing with the load test”?
 Also, this provision implies that a load level equal to the service load is mandatory, but in 4.2.4 it appears that loading to the service load is an option.

Discussion:

Carino: Withdraw negative based on Comment No.3

Action:

No vote required

Vote Count: Affirmative:-- Negative:-- Abstain:--

No vote

Comment No. 11

Member: Carino

Page 22, Line 4

Need mandatory language. Also it should be made clear that we are checking the deviation from linearity during the test. Revise as follows: “If at any time during the test the deviation from linearity exceeds 0.25, the tested element has failed the load test and the load test shall be stopped.”

Discussion:

Larosche: Find negative persuasive

Nanni: If the deviation from linearity is greater than 0.25, the LDP should determine if the text can continue. Table for rebaloting.

Action:

Table for rebaloting

Vote Count: Affirmative:-- Negative:-- Abstain:-- Passes 40% and 2/3 Rules

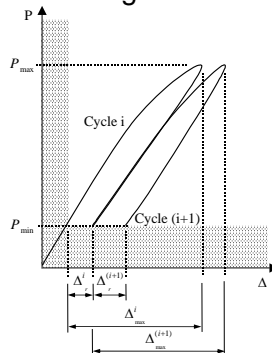
Reballot

Comment No. 12

Member: Galati

Page 23, Line 6-8

The figure shall be replaced with the following:



Discussion:

Larosche: Negative withdrawn by Galati
<u>Action:</u>
No vote required
Vote Count: Affirmative:-- Negative:-- Abstain:--
No vote

Comment No. 13
Member: Carino
Page 23, Line 11
Same comment as for line 4 on page 22. Revise as follows: "If at any time during the test the permanency ratio exceeds 0.5, the tested element has failed the load test and the load test shall be stopped." If the permanency ratio were found to be 0.54, this would be acceptable because 0.54 rounds off to 0.5. If we want the limit to be 0.5 we should write is as 0.50.
<u>Discussion:</u>
Nanni: Add language to Section 6.3.2.1 to indicate that LDP shall consider the structural response before stopping the test, Do not stop unless there are safety concerns.
<u>Action:</u>
Table for reballoting
Vote Count: Affirmative:-- Negative:-- Abstain:--
Reballot

Comment No. 14
Member: Gupta
Page 23, Line 12
Change "should" to "shall" not enforceable on the code side.
<u>Discussion:</u>
Larosche: Comment addressed by Comment No. 13
<u>Action:</u>
No vote required
Vote Count: Affirmative:-- Negative:-- Abstain:--
No vote

Comment No. 15
Member: Carino
Page 27, Line 8
"recommendation" is the wrong word when referring to a Code provision. Also we would

expect fine cracks under service loads. Revise as follows: “This provision requires the licensed design professional conducting the load test to evaluate the cracking observed during the load test because the occurrence of wide cracks or excessive growth of cracks under service loads may be an indication of structural deficiencies.”

Discussion:

Larosche: Persuasive. Amend as written

Action:

Motion by Nanni: Find Carino’s negative persuasive and amend as written
Motion seconded by Amon

Vote Count: Affirmative:10 Negative:1 Abstain:0 Passes 40% and 2/3 Rules

Negative found persuasive

Comment No. 16

Member: Carino

Page 27, Line 11

As written, there is implication that “transmitted” and “resisted” are two separate actions. Shear forces can’t be transmitted without resistance. We also don’t need to use “combined”, which TAC found to be pesky. Revise as follows: “Shear forces across a shear crack and are resisted by a mechanism that includes the effects of the transverse reinforcement crossing the crack, if present, aggregate interlock, and dowel action of the longitudinal reinforcement crossing the crack.”

Discussion:

Larosche: Persuasive. Amend as written

Action:

Motion by Nanni: Find Carino’s negative persuasive and amend as written
Motion seconded by Nam

Vote Count: Affirmative:11 Negative:0 Abstain:0 Passes 40% and 2/3 Rules

Negative found persuasive

Action: Remaining negative comments to be solved in web meetings. Larosche to coordinate with ACI

8. Liaison Member’s Reports

8.1 ACI Committees

228 – No report	364 – No report	369 – No report
348 – No report	423 – No report	440 – No report
408 – No report	546 – No report	562 – No report

444 – No report

9. New Business

None.

10. Open Discussion

None.

11. Adjourn

Chair Larosche adjourned the meeting at 12:30 pm.

Respectfully submitted,

Gustavo Tumialan
Secretary, ACI Committee 437
/attachments