

Minutes

Taken by Sarah Witt

ACI Sub-Committee 440F
FRP Strengthening/Repair

ACI Spring Convention –Tampa, Florida

April 5, 2011

10:00 AM to 12:00 PM

Ballroom 1 – Westin Hotel

440-F Members (27):

Lee, Michael (Chair)
Shield, Carol (Vice-Chair)
Gold, Will (Vice-Chair)
Witt, Sarah (Co-Chair)
Bakis, Chuck
Bisby, Luke
Blaszak, Gregg
Bradburry, Timothy
Busel, John

Ekenel, Mahmut
El-Hacha, Raafat
Fallis, Garth
Galati, Nestore
Garner, Andre
Green, Mark
Gremel, Doug
Harries, Kent
Lopez, Maria

McClaskey, Charlie
Myers, John
Orton, Sarah
Porter, Max
Prota, Andrea
Rasheed, Hayder
Rizkalla, Sami
Silva, Pedro
Thomas, Jay

440-Main Members* and Visitors (30):

Atadero, Rebecca
Brancaccio, Antonio
Casadei, Paolo
Chen, Jian-Fei
Deschamps, Dominique
De Casoy Basalo,
Francisco
El-Domiatty, Khaled
El Menoufy, Adham
Elwood, Ken
Fisher, Jon

Gibson, Robert
He, Ruih
Hernan, Santa Maria
Huaco, Guillermo
Kim, Insung
Kim, Yungon
Masmoudi, Radhouane
Mehdi, Taher
Naguib, Wassim
Noel, Martin
Okeil, Ayman

Sim, Jongsung
Slade, Robert
Smith, Scott
Sneed, Lesley
Stratman, Brian
Wesevich, Jim
Wisotzkey, Sean
Zatar, Wael
Zeiler, Bernie

Administrative

1. Chair Michael Lee called the meeting to order at 10:14. Attendees made self-introductions.
2. Agenda: Myers moved to approve the agenda. Bradberry seconded the motion. The motion passed by voice vote.
3. Minutes: Two editorial changes were made to the minutes. Busel moved to approve the Minutes as edited from the Spring 2010 Meeting in Chicago. Myers seconded the motion. The motion passed by voice vote.
4. Meeting Announcements:
 - a) Fourth International Conference on Durability and Sustainability of Fiber Reinforced Polymers (FRP) Composites for Construction and Rehabilitation, CDCC 2011, July 20-22, 2011, Quebec City, QC, Canada. Bakis mentioned that this is a very interesting conference due to its format of one session running the whole time.
 - b) Joint ACI 440 – 446 Technical Session and SP. Spring 2012 ACI Convention. “Fracture of FRP Composites”. 14 abstracts have been accepted (2 pending). Next deadline is June 15, 2011 for full papers. Reviewers are needed.
 - c) CICE Rome 13 – 15 June 2012. 20 June 2011 Abstract submission, 31 October 2011 Paper submission, 31 January 2012 Early bird registration.
 - c) IIFC Conference 2-4 February 2012 APFIS
 - d) ACMBS VI – Advanced Composite Materials in Bridges and Structures 22-25 May 2012, Kingston, Ontario, Canada. Deadline for 300 word abstract is 31 May 2011.
 - e) Rasheed announced that ACI Committee 441 is interested in doing a joint session at the Fall 2012 Convention in Toronto – Topic is Fire Performance of Columns.

Old Business

5. Task Group Reports
 - a) ACI 562 – Report from Fallis. Full Code went to TAC and comments have gone back to the committee. Plan is to address comments by end of June. Document will

then go back to TAC for July meeting. The code is performance based. There are references to FRP/440 in the commentary. Shield will have a chance to review the document. It will come to the committee chairs for review also.

b) ACI 370 – Report from El-Domiatty . See text from PowerPoint presentation at end of minutes. 370 will ballot document first and then it will come to 440 – Shield to review the rules.

c) Mechanically Fastened FRP – Report from Bakis. Brown and Bank wrote a state of the art paper for FRPRCS 10. Lee announced that the committee is open to adding a short section to the 400F document if the TG wants to submit something for review.

d) Confined Columns Modulus – Bisby will take over this task group and start moving it ahead.

e) Deflections – Report by Rasheed. Data has been collected and is being analyzed. This will be sent out for review this summer.

f) Task group for cementitious matrix – Shield opened the discussion saying there is no polymer and it doesn't belong in this committee. Another concern is that there has to be many suppliers. If there are systems that have polymers, this would be considered new business.

g) Glass transition Temperature – Report by Witt. The task group had a short meeting on Sunday night. The group is working on test parameters and will then move forward with determining the proper “x” value for acceptable service temperatures.

New Business

6. New Task Groups

Lee announced that Green would like to look at the width and depth of the slot for NSM and the computation of development length. He has done limited studies and feels the equations might not accurately reflect the behavior. Alkhrdaji and Nanni were involved with the original formula development but this data did not include large diameter bars. Green thinks it is worthwhile to look at the mechanism for bar development length and if bar size is a factor. Also wants to look at multiple layers of very thick pultruded plates as the current equations don't address these types of materials. Lee asked how we should move forward. Gold volunteered to work on multiple layers. Thomas volunteered (with help from Alkhrdaji) to work with Green for the NSM issues.

Smith asked to work on the task group for anchorage. There is a review paper that looks at different systems that is just being submitted. He would like to have a small section on this technology since the members of the task group have made progress. Scott wants to know if we should expand this topic. Lee discussed that this is a topic of interest and will relate to the upcoming discussion on Seismic.

7. Seismic Ballot

Michael presented the results of the ballot – the ballot passed as per the ACI rules for balloting (although its not required at the sub committee level).

Silva went over the negative votes. The first step was to go through all the AC comments and has made most of the required revisions in the chapter. There are still a few that have to be discussed by the committee.

The first negatives to address are from Prota. Prota discussed these negatives, highlighting his point that if you strengthen a single element you still have to look at the global behavior. He also pointed out that FRP is used with traditional techniques. Lee asked the committee for input, as this is an important topic. The committee viewed potential wording. It was also noted that Chapter 9 makes specific references to seismic strengthening that will have to be changed once the seismic chapter is added. Gold and Prota volunteered to look at this.

Ken Elwood, Chair of 369, stated that committee is working on a document that takes concrete frames out of ASCE 41. It will be 369R – 11. This document will be the new reference document.

There was discussion on beam-column joints. Elwood said that the reference to FEMA 369 is not appropriate as that document is for new construction. The committee decided to keep it in the document since it is just a reference. Gold and Blaszak suggested that wording is added that FRP may be used, but there is not enough design information. Silva would like to move this wording to the beginning of the document. Prota thought it should be in shear since that is where it is used. Maybe the introductory part of the shear section. Blaszak and Prota will draft something up to address this.

A new discussion started about using a 1.5 vs. 2.0 factor for confinement. Initial consensus was to revise the factor to 1.5 and add verbiage that seismic is more stringent. Then it will be new business to look at this more closely. Papers were provided as a reference for using 2.0. No more time to continue discussion.

Moving forward with 440.2 – Chair Lee announced that certain items in the seismic chapter will be balloted early this summer. Design examples and appendices will be balloted later in the summer. It is important to ballot the design examples, as they will contain commentary to help clarify the text of the document. Everything (text, design examples and appendices) will then go to main for balloting. It is anticipated that this will happen just after the Fall 2011 convention.

Adjournment

7. A motion to adjourn was made by Michael Lee and seconded by Kent Harries. Motion Passes.

End of Minutes

Blast Design Guidelines for Externally Bonded FRP Applications (ACI 440-F and ACI 370)

**ACI Spring 2011 Convention
Tampa, FL**

Agenda

Progress on Performed Tasks
Discussion on Collaboration Efforts with ACI 370

Performed Tasks

Table of Contents

Concrete and Masonry upgrades were consolidated in the document
Address out-of-plane flexural upgrades

Finalized the Design Methodology and Performance Criteria
Technical Background- Comparison of Test data to Methodology
TAC voted for a joint effort to develop the document, lead by ACI 370
Draft Document and Technical Background posted for ACI 440 and ACI 370 after
Pittsburg 2010 for review and comments.
Task force collected 28 comments from 370 and 440 members
Bill Zehrt (370 member) from DDESB joined the 370/440 task group to assist in
finalizing the document.

Next Tasks

Formalizing responses for comments to be submitted to task force members in one
month from Tampa Conference

Task forces (370 and 440) to update the document and address comments

Submit Chapters 4 through 7 for initial balloting by 370/440F within two months
from Tampa Conference -- Receiving comments for ACI Cincinnati convention

Finalizing the remaining chapters

Chapters 2 and 3 for Notations & Definitions and Constituent Materials
Example Problems (Chapter 8)
Typical Detailing Guidance