

MINUTES

ACI 231: Properties of Concrete at Early Ages

Monday, April 4, 2011 – 2:00 to 3:30 pm
Salon 1, Marriott Tampa Waterside Hotel, Tampa, FL

1. Welcome

Will Hansen called the meeting to order at 2:03 pm. All attendees introduced themselves. The following committee members and visitors attended this meeting:

Voting Members:

Akthem Al-Manaseer
Emmanuel Attiogbe
Joe Biernacki
Matt D'Ambrosia
Marwan Daye
Zack Grasley
Will Hansen (Chair)
Maria Juenger
Kamran Nemati
Kyle Riding
Anton Schindler (Secretary)
Jussara Tanesi
Carlos Videla
Jason Weiss
Wayne Wilson

Associate Members:

Benjamin Byard
Chul-Woo Chung
Gaurav Sant

Visitors:

Anthony Bentivegna
Seungmin Lim
George Grygar
Jason Ideker
Mike Ahert
Tengfei Tu
Andrew Mackie
Bill Wolfe
Tyler Deboodt
Wilasa Vadakam
Patricia Contreras
Abdul Akhand
Tech Chua

2. Update on Membership Status

The current membership roster was circulated. Gaurav Sant has been added as a new associate member of the committee. Will Hansen reported that the following members sent regrets and could not attend this meeting: Dale Bentz, Gert De Schutter, Daniel Cusson, and Mette Geiker.

3. Approval of Minutes from the ACI Convention in Pittsburgh, PA, October 2010

The draft minutes of the meeting in Pittsburgh, PA were reviewed and approved.

4. Status of Future Sessions Sponsored by ACI 231

Members of the committee provided updates on the following sessions:

Dallas, TX: (Spring 2012 – *The Art of Concrete*)

- Early-Age Hydration Kinetics and Temperature Effects on Concrete Durability
 - Joe Biernacki reported to the committee about this session sponsored by ACI 231 and 236.
 - Session Organizers: Joseph Biernacki, Zachary Grasley and Gaurav Sant
 - The following topics will be covered: durability, hydration kinetics and reactions, delayed ettringite formation, alkali-silica reaction, early-age temperature effects.
 - The following speakers have been contacted: Jeff Bullard – NIST, Jeff Thomas – Schlumberger, George Scherer – Princeton, Shashank Bishnoi – IIT Chennai, Anton Schindler – Auburn, Kyle Riding – Kansas State Univ., Will Hansen – U. Michigan, Christian Meyer – Columbia, Gaurav Sant – UCLA, Pietro Lura – EMPA, Karen Scrivener – EPFL, Dale Bentz – NIST, Ryan Henkensiefken – US Concrete, and Narayanan Neithalath – Clarkson University.

Toronto, Canada: (Fall 2012 – Forming Our Future)

- The Economics, Performance, and Sustainability of Internally Cured Concrete
 - Anton Schindler introduced the topic to the committee.
 - The intent is to have this topic sponsored by ACI Committees 237, 213, and 130.
 - Session Organizers: Anton Schindler, George Grygar (ACI 213), and Jason Weiss.
 - Speakers and papers on the following topics will be pursued: mixture proportioning, internal curing methods and implementation, micro-structural impacts, hydration behavior, time-dependent behavior, mechanical properties, volume change, cracking tendency, life-cycle cost analysis, impact on sustainability, durability aspects, and case studies that document the use internal curing in full-scale production applications.
 - The committee agreed to sponsor this topic and the development of a Special Publication.
 - Anton indicated that a Call for Papers would be placed in Concrete International over the summer with the intention to solicit papers and presentations on this topic.

Future Convention:

The two topics below may be combined in the same technical session depending on the response obtained.

- Early-Age Performance of SCC
 - 1. Matt D'Ambrosia updated the committee on this session
 - 2. ACI 237 will be approach to determine if they would co-sponsor this session.
- Early-Age Properties of Repair Binders
 - 1. This topic was introduced by Kyle Riding.
 - 2. ACI 546 will be approach to determine if they would co-sponsor this session.

5. Committee Report: “Prediction and Control of Thermal Effects at Early Ages”

- The following objective of this document was reviewed: “This document provides guidance on the prediction and control of early-age thermal effects in concrete.”
- It was agreed to review parts of this document in sub-committees before the document is balloted by all Voting Members of ACI 231.
- The committee reviewed and discussed the progress made on each of the following chapters:
 - **Chapter 1: Introduction**
 - **Chapter 2: Hydration**
 - Lead author: Wayne Wilson
 - The committee discussed the objectives and content of this chapter. It was decided to focus on:
 - kinetics including activation energy,
 - chemistry (including alkalinity) and admixtures (including SCMs),
 - cement fineness, and
 - measurement methods.
 - Wayne Wilson will develop a draft and forward this to the chapter’s editorial committee for preliminary review. Will Hansen agreed to help Wayne develop a rough first draft.
 - The following editorial committee will review and edit the first draft of this chapter: Dale Bentz, Anton Schindler, and Gaurav Sant.
 - A draft of this chapter will be circulated to the editorial committee for review by July 30, 2011.
 - This chapter will be balloted before the next meeting in Cincinnati.
 - **Chapter 3: Thermophysical Properties**
 - The content of this chapter was not discussed at this meeting.
 - Lead author: Geert De Schutter
 - It was previously agreed that the focus of this chapter should be to give the reader an understanding of why thermal properties are important and then define these for concrete.

- **Chapter 4: Mechanical Properties**
 - The content of this chapter was not discussed at this meeting.
 - Lead author: Geert De Schutter
 - It was previously agreed that strength development should be covered in Section 4.1, creep and relaxation should be covered in Section 4.2, and that limiting strain or stress capacity issues should be covered in Section 4.3.
- **Chapter 5: Heat Transfer and Stress Analysis**
 - The content of this chapter was not discussed at this meeting.
 - Section 5.1: Heat Transfer Fundamentals
 - Lead author: Elin Jensen
 - Section 5.2: Software Programs
 - Lead author: Kyle Riding. HIPERPAV and ConcreteWorks will be covered.
 - Lead author: Will Hansen. Femmasse will be covered.
- **Chapter 6: In-Situ Monitoring**
 - Lead authors: Zach Grasley and Matt D'Ambrosia
 - Zach and Matt developed a rough first draft, which included some of the material developed by Thomas Voigt.
 - Matt emphasized that since many temperature measurement devices are commercially available, the focus of this document is more on relative humidity and strain measurement methods.
 - Akthem Al-Manaseer suggested that guidelines should be provided on where in a structure sensors should be positioned. Tech Chua indicated that ACI 207.6R will have recommendation on sensor location.
 - The following editorial committee will review and edit the first draft of this chapter: Anton Schindler and Kyle Riding.
 - A draft of this chapter will be circulated to the editorial committee for review before the next meeting in Cincinnati.
- **Chapter 7: Temperature Control Techniques**
 - Marwan Daye mentioned that in some cases large concrete mock-up elements are cast to evaluate the temperature control measures. This topic may need to be added to this chapter.
 - Section 7.1: Placement Scheduling (Authors: Jan Olek and Anton Schindler)
 - Section 7.2: Mixture Modifications (Author: Maria Juenger)
 - Section 7.3: Control of Thermal Gradients (Author: Kamran Nemati)
 - Kamran's data from the Three Gorges Dam will be added to this section.
 - CI articles by Ric Maggenti about the use of cooling pipes by Caltrans may be useful.
 - Section 7.4: Use of SCMs (Author: Maria Juenger)
 - Section 7.5: Use of Lightweight Aggregates (Author: Maria Juenger)
- **Chapter 8: References**

6. New Business

Will Hansen indicated that this is the end of his 6-year term as chair of ACI 231 and that Anton Schindler will become the new chair. On behalf of ACI 231, Anton Schindler thanked Will Hansen for his 6 years of service to the concrete industry as chair of ACI 231. The committee boisterously applauded Will Hansen for his contributions.

7. Adjourn

The meeting adjourned at 3:27 pm.