

# **AGENDA**

## **ACI 231: Properties of Concrete at Early Ages**

Monday, March 19, 2012 – 2:00 to 3:30 pm  
Gaston A, Hyatt Regency Dallas, Dallas, TX

- 1. Welcome and Introductions**
- 2. Update on Membership Status**
- 3. Review and Approval of Minutes from the Meeting in Cincinnati, Oct. 2011**
- 4. Status of ACI 231 Technical Sessions**

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

- Title: Early-Age Hydration Kinetics and Temperature Effects on Concrete Durability
  - Session Organizers: Joseph Biernacki, Zachary Grasley and Gaurav Sant

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

- Note: Final session approval requests are due on Friday, March 23, 2012
- Title: The Economics, Performance, and Sustainability of Internally Cured Concrete
  - Session Organizers: Anton Schindler, George Grygar, and Jason Weiss.
  - Co-sponsored by ACI Committees 237, 213, and 130.
  - 16 papers were received and are under review. Thank you to all members of ACI 231 that have helped with the review of papers.
  - The following schedule will be followed:
    - March 26, 2012: Notify authors of review outcome
    - May 10, 2012: Final papers due
    - June 25, 2012: Finalized SP to ACI for publication
  - 3 x 2-hr technical sessions will be held in Toronto.

### **Minneapolis, MN:** *(Spring 2013 – Responsibility in Concrete)*

- Note: Preliminary session approval requests are due on March 23, 2012 and final session approval requests are due on October 26, 2012
- Title: Early-Age Properties of Repair Binders (lab, field and test methods)
  - Session Organizers: Kyle Riding

### **Suggested Topics:**

- Test methods for measuring early age properties – lab and -situ monitoring (one in morning, one in afternoon). Suggested by Wayne Wilson.
- Innovation in cooling mass concrete – Phoenix, AZ. Suggested by Anton Schindler.

### **Future Conventions:**

**Phoenix, AZ:** (Fall 2013)  
Theme: Innovation in Conservation  
Preliminary session approval requests due: Oct. 26, 2012

**Washington, DC:** (Fall 2014)  
Theme: TBD  
Preliminary session approval requests due: TBD

**Reno, NV:** (Spring 2014)  
Theme: TBD  
Preliminary session approval requests due: April 19, 2013

**Kansas City, MO:** (Spring 2015)  
Theme: TBD  
Preliminary session approval requests due: TBD

5. **Development of ACI Committee 231 Report**
  - Title: Prediction and Control of Thermal Effects at Early Ages
  - Report Outline: Refer to Attachment A
6. **New Business**
7. **Adjourn**

# Attachment A: ACI Committee 231 Report

- Title:** Prediction and Control of Thermal Effects at Early Ages
- Objectives:** Provides guidance on the prediction and control of early-age thermal effects in concrete.
- Completion:** Finalize during ACI meeting in Minneapolis, April 2013 (i.e. 18 months from meeting in Cincinnati).

## REPORT OUTLINE

Last Updated on October 17, 2011

### **Chapter 1: Introduction**

Lead authors: Anton Schindler and Will Hanson  
Complete First Draft: July 2012                      Ballot: Before meeting in Toronto, Oct. 2012

### **Chapter 2: Hydration**

Lead author: Wayne Wilson and Joe Biernacki  
Editorial committee: Dale Bentz, Anton Schindler, and Gaurav Sant  
Complete First Draft: January 2012                      Ballot: Before meeting in Dallas, March 2012

- 2.1 Hydration Kinetics
  - 2.1.1 Effect of Temperature
  - 2.1.2 Temperature Sensitivity (Activation Energy)
- 2.2 Factors Impacting Hydration
  - 2.2.1 Cement Chemistry (Including alkalinity)
  - 2.2.2 Cement Fineness
  - 2.2.3 Supplementary Cementing Materials (SCMs)
  - 2.2.4 Chemical Admixtures
  - 2.2.5 Potential Incompatibility Issues
- 2.3 Delayed Ettringite Formation (DEF)
- 2.4 Measurement Methods
- 2.5 Maturity Methods

### **Chapter 3: Thermophysical Properties**

Lead author: Miguel Azenha  
Complete First Draft: August 2012                      Ballot: Before meeting in Toronto, Oct. 2012

- 3.1 Introduction
  - Cover why thermal properties are important
- 3.2 Thermal Conductivity
- 3.3 Specific Heat
- 3.4 Coefficient of Thermal Expansion (Ben Byard offered assistance to add data for this section)

### **Chapter 4: Mechanical Properties**

Lead author: Geert De Schutter  
Complete First Draft: August 2012                      Ballot: Before meeting in Toronto, Oct. 2012

- 4.1 Strength Development
- 4.2 Stiffness Development (Ben Byard offered assistance to add data for this section)
- 4.3 Creep and Relaxation (Ben Byard and Matt D'Ambrosia offered to help add data to this section)
- 4.4 Limiting Strain or Stress Capacity

## **Chapter 5: Heat Transfer and Stress Analysis**

Lead author: Kyle Riding

Complete First Draft: Aug. 2012

Ballot: Before Toronto, Oct. 2012

- 5.1 Heat Transfer Fundamentals (Lead author: Elin Jensen and Miguel Azenha)
  - ACI 207.2R may be a good reference to cite
  - Manual methods (Schmidt method) should be mentioned
- 5.2 Software Programs
  - 5.2.1 HIPERPAV (Lead author: Kyle Riding)
  - 5.2.2 ConcreteWorks (Lead author: Kyle Riding)
  - 5.2.3 Femmasse (Lead author: Will Hansen)
  - 5.2.4 4C Temp and Stress

## **Chapter 6: In-Situ Monitoring**

Lead authors: Zach Grasley and Matt D'Ambrosia

Editorial committee: Anton Schindler and Kyle Riding

Complete First Draft: January 2012

Ballot: Before meeting in Dallas, March 2012

- 6.1 Introduction
- 6.2 Temperature and Relative Humidity
  - 6.2.1 Instrumentation Equipment
    - 6.2.1.1 Strain Sensors
    - 6.2.1.2 Thermocouples
    - 6.2.1.3 Digital Temperature Sensors and Wireless Data Collection
    - 6.2.1.4 Accuracy and Sources of Potential Error
    - 6.2.1.5 Sensor Validation
  - 6.2.2 Relative humidity
- 6.3 Strength
  - 6.3.1 Maturity Meters
  - 6.3.2 In-Place Strength Tests

## **Chapter 7: Control of Thermal Effects**

Lead author: TBA

Complete First Draft: Feb. 2013

Ballot: Before meeting in Minneapolis, Mar. 2013

- 7.1 Placement Scheduling (Authors: Jan Olek and Anton Schindler)
- 7.2 Fresh Concrete Temperature Control (Author: Maria Juenger)
- 7.3 Control of Thermal Gradients (Author: Kamran Nematy and Miguel Azenha)
  - Add Three Gorges Dam Data
  - CI articles by Ric Maggenti about the use of cooling pipes by Caltrans may be useful.
- 7.4 Mixture Modifications (Author: Maria Juenger)
  - 7.4.1 Use of SCMs (Author: Maria Juenger)
  - 7.4.2 Chemical Admixtures
  - 7.4.3 Use of Aggregates (Authors: Ben Byard and Jason Weiss)
    - 7.4.3.1 Normalweight Aggregates
    - 7.4.3.2 Lightweight Aggregates
    - 7.4.3.3 Fillers (Amal Jayapalan) [Perhaps part of 7.4.1 ?]

## **References**