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:**
- 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

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

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

**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

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

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

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

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

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 Nemati 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