1. CALL TO ORDER
The meeting was called to order by Chair Banthia.

2. PREVIOUS MINUTES
Minutes from the Vancouver meeting were approved unanimously.

3. A) ANNOUNCEMENTS
   
   • **RILEM Spring Meeting Symposium on Advances in Concrete Through Science and Engineering**, March 21 – 26, 2004, Northwestern University, Evanston, Illinois ([www.acbm.info/symposium.html](http://www.acbm.info/symposium.html)). The symposium is be divided into three main areas:
     1. **Early Age Behavior: Materials, Monitoring and Modeling** – Coordinators: J. Weiss and D. Lange,
     2. **Durability of Hydrated Cement Systems** – Coordinators: J. Marchand and M. Thomas, and
   
   Contact: Prof. J. Weiss, consci@ecn.purdue.edu.
• *Fifth International Conference on Fracture Mechanics of Concrete and Concrete Structure: FRAMCOS-5;* April 12 - 16, 2004, Vail, Colorado ([www.ust.hk/framcos5](http://www.ust.hk/framcos5)).

• *Fourth International Conference on Concrete Under Severe Conditions – Environment and Loading, CONSEC 04;* June 20 – 23, 2004, Seoul, Korea ([www.conlab.snu.ac.kr](http://www.conlab.snu.ac.kr)). Contact: Prof. B. H. Oh, civilcon@gong.snu.ac.kr.

• *Sixth RILEM Symposium on Fibre Reinforced Concrete, BEFIB 2004,* September 20 – 22, 2004, Varenna, Lake Como, Italy ([www.lecco.polimi.it/befib04.htm](http://www.lecco.polimi.it/befib04.htm)). Contact: G. Barina, giselda.barina@polimi.it.


• *Third International Conference on Engineering Materials,* August 22 - 24, 2005, Vancouver, Canada. Contact: N. Banthia, rbanthia@civil.ubc.ca.

3 B) ACI Special Publications

• SP-216 *Innovations in Fiber-Reinforced Concrete for Value* has been published in 2003. The SP is based on papers presented during the ACI Toronto Convention.

• A new SP based on three technical sessions jointly sponsored with ACI Committee 549 on *Thin Reinforced Cement Composites: Materials Technology, Manufacturing Methods and Practical Applications* (Vancouver 2003) is being assembled. Contact: A. Dubey

• A new SP based on two technical sessions on *Hybrid Fiber Reinforced Systems and High-Performance Reinforced Cementitious Composites for Increased Blast and Impact Resistance of Structures* (Vancouver 2003) is being assembled. Contact: N. Krstulovic.

3 C) ACI Technical Sessions in Boston, 2003

The following technical session was successfully completed:

• One technical session sponsored jointly with ACI Committee 343 on *Applications of Fiber-Reinforced Concrete in Highway Bridges* [Chair: Banthia and Yazdani]. It is anticipated that presented papers will be organized into a Special Publication.

4. REPORTS FROM THE MEMBERSHIP SECRETARY

Galinat reported on membership status. The voting membership is at 72 with 48 general interest, 15 producer and 9 users. Associate members stand at 25, and there are also 17 consulting members. The total membership of the committee is thus at 114. Membership information is now available to members online at the ACI Website.

5. APPROVAL OF COMMITTEE DOCUMENTS

No specific documents are under approval.
6. REPORT FROM THE STEERING SUBCOMMITTEE

The Steering Subcommittee met and discussed the new committee structure. Positive feedback from a majority of the committee members was reported. Various issues related to the sub-committee tasks and organization were discussed. These included issues on sub-committee membership requirements, coordination among various sub-committees, and issues related to the sub-committee on structural uses.

7. SUBCOMMITTEE REPORTS

Production and Application (544-A):

Chairman Tatnall reported that the sub-committee has 2 task groups.
1. A Task Group headed by Jim Speakman that is putting together a document showcasing field applications of FRC. The goal is to provide potential users with a quick access to case histories that can be used in specific FRC applications. The Task Group is developing a format and a set of criteria for information submittal. All field applications will be included, regardless of whether the related information was previously published or not. It is anticipated that the Washington meeting will complete the first phase of setting up the format and criteria for information input.
2. 544-3R document – a Task Group headed by Tatnall is involved with major re-writing of this document. The name of the document has been changed to 'Guide for Specifying, Proportioning, Mixing, Placing and Finishing Steel Fiber Reinforced Concrete'.

Education (544-B):

Tatnall reported activities of two Task Groups within 544-B:
1. Task Group on FRC Seminars – The Task Group has reorganized the material from the FRC seminar presentations and is conducting the final preparation for its release to educational institutions. It is expected that a CD will be ready for the release by the ACI Convention in Washington, D.C. (Spring 2004).
2. Task Group on Student Competition - Bowling Ball Student Competition has been popular. Ways of encouraging even wider student participation have been discussed. Additional sub-committee discussions included issues on limited testing-machine capacity as well as publishing of the competition rules on the ACI web-page. Sufficient funds are currently available for continuation of this effort. The following contributors have been acknowledged: Fiber Reinforced Concrete Association, University of British Columbia and Nemy & Kavita Banthia, Peter and Mary Lou Tatnall, Engineering Analytics, Inc., Fibercon International, Forta Corporation, Kapejo, Inc., Master Builders, Inc., Saint-Gobain Vetrotex America, Inc., and SI Concrete Systems.

Testing (544-C):

Banthia reported that the sub-committee is updating and re-writing the existing document 544.2R "Measurements of the Properties of FRC". The document contains six chapters including: properties of fresh FRC, testing of hardened FRC, mechanical properties, testing of long term and durability-related properties, testing of "other" properties such as electric or magnetic properties, etc. A document draft will be available by the Washington meeting.
**Structural Uses (544-D):**

Chairman Criswell reported that the sub-committee has 30 members. Majority of the sub-committee efforts are geared towards providing the practicing engineers with design information necessary for wider use of FRCs in structural applications. These efforts include: (1) development of a comprehensive State-of-the-Art report, (2) development of guidelines for structural use of FRCs, (3) interaction with committee 318 with the goal of introducing FRC into its report. The sub-committee is closely interacting with other 544 sub-committees to obtain information needed for structural design. Other sub-committee activities include: writing of a state-of-the-art paper on structural applications of FRC, to be published in Concrete International, and collecting information for a potential state-of-practice technical session. The sub-committee also suggested future technical sessions: one for the San Francisco Convention (Fall 2004) and two for the New York convention (Spring 2005).

**Mechanical Properties (544-E):**

Batson reported that the sub-committee reviewed and discussed the mission statement. Interaction with the sub-committee 544-D and information sub-committee 544-E should be providing were reviewed. The sub-committee also discussed organizing a session on mechanical properties of FRC.

**Durability and Physical Properties (544-F):**

Chairman Mobasher reported that the first goal of the sub-committee is to develop a state-of-the-art report. The report will not only emphasize the existing applications of FRC but will also provide directions for the potential applications. The sub-committee anticipates having the first draft of the document available by the Washington convention. The sub-committee also suggested future sessions on the use of FRC in durability retrofit, to be co-sponsored with committee 549.

**8. LIAISON REPORTS**

- **ACI 506:** Tatnall reported that the fiber shotcrete subcommittee is working to update the committee document (506.1R) on Fiber Reinforced Shotcrete. It is anticipated that the document will be available for review in 2004. The committee will also release a document on underground shotcreting that will cover topics on FRC shotcreting.

- **ASTM C 09.42:** The committee is balloting two strength methods. The committee’s goal also includes establishing performance criteria for classifying types of FRC concrete.

- **ASTM C 1560-03:** J. Jones reported the committee has not recently met. Its latest activity is publishing of a standard on *Test Method for Hot Water Accelerated Aging of Glass Fiber Reinforced Cement Based Composites (ASTM C 1560-03).*

- **ASTM C 1227-02 B:** Galinat reported that the latest version of the standard specifications for precast concrete septic tanks has just been published. The standard now allows use of synthetic FRC as reinforcement of septic tanks.

- **RILEM 162:** Banthia, Bentur and Rossi reported that the committee has developed a document on test and design methods for using FRC in structural applications. Other RILEM activities include establishing of a new group on Hybrid FRC, headed by Von Mier.
9. **NEW BUSINESS**

Galinat reported that TAC comments on the State-of-the-Art report on synthetic fibers have been received. Comments will be addressed and the document will be re-submitted to TAC. Galinat volunteered to take charge of the process.

Nanni reported that during his lectures in Napoli (Italy) he had already used the educational lectures sub-committee 544-B has been organizing. He found them quite useful and has extended his thanks and appreciation to the sub-committee members for their efforts.

10. **ADJOURNMENT**

The meeting was adjourned at 6 p.m.

Respectfully submitted,

Neven Krstulovic

Secretary, ACI 544

February 29, 2004
<table>
<thead>
<tr>
<th>Sub#</th>
<th>Sub-Committee</th>
<th>Chair</th>
</tr>
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<tbody>
<tr>
<td>SC</td>
<td><strong>Steering Subcommittee</strong>: Organizes and coordinates the activities of various subcommittees. It distributes work, and minimizes redundancies. It also sets the general goal/directions for this committee, and coordinates co-sponsored sessions, events, documents, and activities both within and outside of ACI.</td>
<td>Banthia</td>
</tr>
<tr>
<td>A</td>
<td><strong>Production and Applications</strong>: Deals with materials, mixtures, processing, dispersion, workability, curing, finishing and other practical issues. Also showcases applications.</td>
<td>Tatnall</td>
</tr>
<tr>
<td>B</td>
<td><strong>Education Subcommittee</strong>: Oversees student affairs including the bowling ball competition and devises new ways of generating more interest in FRC among students. It also develops teaching and instructional tools for bringing FRC to undergraduate and graduate curricula. Oversees the seminar series and updates them as necessary. Liaises with ACI education department.</td>
<td>Hays</td>
</tr>
<tr>
<td>C</td>
<td><strong>Testing Subcommittee</strong>: Deals with testing related issues and specifically highlights areas where FRC is different from plain concrete.</td>
<td>Gopalaratnam</td>
</tr>
<tr>
<td>D</td>
<td><strong>Subcommittee on Structural Uses</strong>: Develops design guidelines and liaises with ACI 318 and the newly formed Task Group on Building Codes.</td>
<td>Criswell</td>
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<tr>
<td>E</td>
<td><strong>Subcommittee on Mechanical Properties</strong>: Deals with fiber-matrix bond, micromechanical interactions, compression, tension and shear responses, toughness, residual strength, crack growth resistance, impact/blast resistance and fatigue endurance, etc.</td>
<td>Krstulovic</td>
</tr>
<tr>
<td>F</td>
<td><strong>Subcommittee on Durability and Physical Properties</strong>: Deals with long term properties, shrinkage crack control, creep, freeze-thaw resistance, scaling resistance, corrosion of fibers, UV resistance, electrical and magnetic properties, fire resistance, etc.</td>
<td>Mobasher</td>
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