



American Concrete Institute®
Advancing concrete knowledge

AGENDA

RESPONSIBILITY IN CONCRETE CONSTRUCTION COMMITTEE

**Flamboyant Room B
El Conquistador Resort and Spa
Fajardo, PR
Sunday, October 14, 2007
2:00 p.m. – 4:45 p.m.**

MEMBERS

Jon Mullarky, Chair
Kenneth Bondy
Ronald Burg
Boyd Clark
Jeffrey Coleman
Peter Emmons
Geoffrey Hichborn, Sr
Brad Inman
Mohammad Iqbal

William M. Klorman
James E. Kretz
Colin Lobo
Thomas Malerk
Christopher Mosley
Ava Shypula
Eldon Tipping
Bert Weinberg

Michael L. Tholen, Staff Liaison

1.0 APPROVAL OF MINUTES AND AGENDA

1.1 Approval of Minutes of 2007 Spring Meeting—Atlanta, GA

The Responsibility in Concrete Construction Committee (RCCC) is asked to approve the minutes of the meeting in Atlanta, GA, held on April 22, 2007, as distributed.

1.2 Approval of Agenda

RCCC is asked to approve the Puerto Rico 2007 Agenda.

2.0 MEMBERSHIP

Chair Jon Mullarky will announce two new members of the RCC Committee (Peter Emmons and Chris Mosley) and introduce any visitors at the meeting. Members are asked to ensure that the data on the roster (*Exhibit 2.0*) are correct.

3.0 ACTIVITIES OF THE COMMITTEE

3.1 Case Studies

Bill Klorman has requested that case studies be kept as an open item on the RCCC agenda. Case studies dealing with responsibility issues can be used by college professors who teach courses including this subject, and it has been noted that courses dealing with responsibility issues may be included in ABET accreditation requirements for schools.

Action: Committee members should forward any pertinent case studies to Chair Mullarky

3.2 Future Convention Session

In Charlotte, the Committee chose the topic "Use and Misuse of ACI Documents" for a future convention session. In Denver, the Committee decided to move the session from the Fall 2007 Convention in Puerto Rico to the Spring 2008 Convention in Los Angeles. Topics for speakers suggested during discussion of the session included: confusion between guidance and mandatory language documents; varying interpretations of documents; cases studies; and topics that will be covered in the new responsibility document. The Committee also felt that a panel discussion would be an interesting format to pursue if it would fit the topics submitted by the speakers. Jim Kretz volunteered to become the co-moderator and will help Boyd Clark obtain speakers and coordinate the session.

Boyd Clark was unable to attend the convention in Atlanta. Staff Liaison Tholen reported for Boyd Clark that a call for papers was published in *Concrete International* and that Clark had suggested RCCC members solicit presentations from likely candidates. Eldon Tipping suggested that an overall presentation about the proper use of ACI documents and the things ACI is doing to provide guidance would help set the stage for the session and that he or Bruce Suprenant may be able to present the topic. Norm Scott suggested that floor flatness and levelness was a topic that should be covered. Jeff Coleman said he would be willing to present some case studies from his book. Chair Mullarky said he may be able to find someone to present about a bonded overlay case he is aware of. Brad Inman suggested that it was important to keep the presentations constructive and not let the session turn into a series of complaints about contractor or engineer mistakes. Tipping suggested that this could be done by focusing the presentations on how it should have been done.

Action: Boyd Clark and Jim Kretz will update the Committee on the status of the Convention session.

3.3 New Responsibility Document

In Washington, DC, RCCC members decided to draft a new responsibility document, with task groups assigned to each of the different entities involved in a construction project: owner, design professional, general contractor, D-B contractor, subcontractor, specialty subcontractor, material supplier, testing/inspection, and forensic consultants. Scott suggested "Guidelines for Forensic Engineering Practice," published by ASCE, as a source of good information (*Exhibit 3.5* in the New York Agenda). It was noted that each task group may publish opinion papers as they deal with issues during document development. The following motion was unanimously approved: "RCCC develop a new document, 'Responsibility in Concrete Design and Construction,' and to do so, establish nine task groups. Each task group is associated with an entity involved in construction. Each task group will have a chair whose responsibility it will be to draft an outline of each group's goals 30 days before the San Francisco convention, and to report on these findings at the convention."

In Charlotte, the outlines for each section were discussed and expanded at the Committee meeting. The expanded outlines were posted to the forum on the Committee website. The Committee was requested to forward any updates to the document to Staff Liaison Tholen, who will update the document and post the new version to the forum.

In Atlanta, the task groups were reviewed to find replacements for outgoing committee members. The new task groups are as follows:

Owner

Jon Mullarky-Chair
Bert Weinberg
Tom Malerk

Design Professional

Jeff Coleman-Chair
Ken Bondy
Eldon Tipping
Chris Mosley

General Contractor

Bill Klorman-Chair
Jim Kretz
Brad Inman

Specialty Subcontractor

Ken Bondy-Chair
Bill Klorman
Chris Mosley

Material Supplier

Colin Lobo-Chair
Ken Bondy
Jon Mullarky

Geoff Hichborn

Testing/Inspection

Ava Shypula-Chair
Geoff Hichborn
Boyd Clark
Eldon Tipping

D-B Contractor

Brad Inman-Chair
Bill Klorman
Jim Kretz

Subcontractor

Jim Kretz-Chair
Ken Bondy
Bill Klorman

Forensic Consultants

Boyd Clark-Chair
Ken Bondy
Bill Klorman
Geoff Hichborn
Eldon Tipping

During discussion of the outline in Atlanta, Eldon Tipping suggested that part of the owner's responsibility should be to provide information on the intended use of the facility to the designer. Brad Inman suggested that areas where responsibility is not clear or may vary should be included in the document. Norm Scott suggested focusing on the outline to be sure all items are there, all items are appropriate, and suggested that fitting the entire industry into subcategories will be a difficult task. He also pointed out that the precast industry is struggling with issues regarding the building official's responsibilities, pointing out that the building official often has great authority, but little responsibility. Ward Malisch volunteered to help expand the "Subcontractor" section. Jeff Coleman suggested that expanding the current outline should be the next step and volunteered to expand the "Design Professional" section. Coleman's expanded section was posted to the forum for review and comment following the Atlanta Convention and is included as *Exhibit 3.3*.

Action: Committee members are asked to review the expanded section of the document posted by Coleman and be prepared to comment on it at the meeting.

Action: The task groups are asked to update the Committee on progress for their section.

3.4 Discussion of ACI 318-05 Review for Responsibility Statements

In New York, staff was asked to perform a search for "responsibility" or related words in mandatory-language ACI documents. Discussion of the responsibility statements in ACI 318-05 was held at the meeting in Kansas City. Chair Mullarky and Brad Inman stated that they did not see any issues with the responsibility statements in ACI 318-05 during their review. It was noted that the intent of Section 3.6.1, which requires approval of admixtures by the engineer, was vague.

In Charlotte, the Committee had no new responsibility issues with ACI 318-05, and a motion was passed to report to Committee 318 that the Committees review was complete. Chair Mullarky was chosen to report to Committee 318 that the review of responsibility statements was complete and suggest that they clarify the intent of Section 3.6.1.

In Denver, Chair Mullarky handed out a preliminary letter to Committee 318 shown in (*Exhibit 3.4* in the Denver minutes) for discussion. Minor editorial comments were discussed.

In Atlanta, Chair Mullarky reported that he had sent the letter to Jim Wight, Chair of ACI Committee 318. Wight passed the letter along to Terry Holland who contacted Chair Mullarky to explain that admixtures were part of the mixture design approved by the engineer and that he did not see a conflict. Chair Mullarky explained at the meeting that he felt Section 3.6.1 of ACI 318-05 was redundant and would suggest to Holland that it be removed in future editions.

Action: Chair Mullarky will update the Committee on his discussions with Terry Holland.

3.5 Discussion of ACI 332-04 Review for Responsibility Statements

In New York, staff was asked to perform a search for “responsibility” or related words in mandatory-language ACI documents. Discussion of the responsibility statements in ACI 332-04 was held at the meeting in Kansas City. Mohammad Iqbal questioned whether responsibility for supplying concrete suitable for high sulfate exposure should be assigned. It was pointed out in the meeting that the registered design professional is assigned the responsibility for determining the requirements for mixture proportions when soils with high sulfate contents are encountered (see Section 4.2.5). Further discussion centered on the introduction on page 1 of the document. It was noted that responsibility for establishing health and safety practices and the applicability of all regulatory limitations was assigned to the user of the document. However, the user is not well defined and there was no mention of which health and safety requirements or regulatory limitations were to be considered. Considering that the user may not be an architect or engineer, the Committee felt that further clarification was needed.

In Charlotte, Staff Liaison Tholen reported that the language regarding safety was in response to a TAC comment on a shotcrete document that discussed safety issues and that the section was being included in several ACI documents. Chair Mullarky said he would prepare a discussion of the section to take to TAC. Section R4.2.1 was also discussed, and it was decided that the responsibilities of the concrete supplier to supply strength verification are vague. Colin Lobo was asked to prepare a discussion of the section to take to Committee 332.

In Denver, Chair Mullarky handed out a preliminary letter to TAC (*Exhibit 3.5* in the Denver minutes) for discussion. Minor editorial comments were discussed. Chair Mullarky stated that he would incorporate a section from Colin Lobo into the letter and forward it to the Committee for review before sending it on to TAC.

In Atlanta, Chair Mullarky reported that he was waiting for the section from Lobo and that no action had occurred since the Denver convention.

Action: Chair Mullarky will update the Committee on his letter to TAC.

3.6 Additional ACI Documents to Review

In Denver, the Committee reviewed the minutes of the ACI Standards Board from recent conventions to discuss which documents to begin reviewing next. Staff Liaison Tholen was asked to forward the following documents to Committee members who will review the documents for responsibility issues and suggest whether the full Committee review the documents:

Bill Klorman	ACI 350.3-06, "Seismic Design of Liquid-Containing Concrete Structures and Commentary"
	ITG 4.1, "Specification for High-Strength Concrete in Moderate to High Seismic Applications"
	ACI 117-06, "Specifications for Tolerances for Concrete Construction and Materials and Commentary"
Ava Shypula	ITG 4.1, "Specification for High-Strength Concrete in Moderate to High Seismic Applications"
	ACI 216.1-XX, "Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies"
	ACI 503.7-XX, "Specification for Crack Repair by Epoxy Injection"
Jon Mullarky	ACI 305-XX, "Specification for Hot Weather Concreting"

In Atlanta, Chair Mullarky reported that during his review of the ACI 305 document he felt that it was unclear who the document was written for. Bill Klorman and Ava Shypula were unable to attend the convention. Chair Mullarky then reviewed the list of ACI documents that are or will soon be available for public discussion. Brad Inman volunteered to review ACI 530 before public discussion closes on May 15. Eldon Tipping noted that ACI 117 is on a short cycle to review and would like to have any comments as soon as possible.

Action: Brad Inman will update the Committee on his review of ACI 530.

Action: Committee members Klorman and Shypula are asked to report on their review of the documents and suggest whether the full committee review the document.

3.7 Discussion of ACI 350-06 Review for Responsibility Statements

In Denver, Staff Liaison Tholen was asked to perform a search for “responsibility” or related words in ACI 350-06, “Code Requirements for Environmental Engineering Concrete Structures and Commentary.” The highlighted document was posted to the document library on the committee web page in the draft documents folder.

In Atlanta, no action was taken.

Action: The Committee is asked to continue their review of ACI 350-06 and post any items they feel inappropriately assign responsibility to the Committee forum for discussion.

3.8 ACI Strategic Plan

In Atlanta, the Committee was asked to review the previous Strategic Plan as approved by the Board at its Spring 2001 meeting and discuss revisions to the Plan. The Committee was also asked to discuss the question “What one piece of advice would you give to the Strategic Planning Task Group as the update ACI’s strategic plan?” The committee suggested that improving the quality of concrete in the field should be a major component guiding the strategic plan. The committee did not have any specific recommendations for the timetable of their other recommendations, but suggested the following items be addressed in the strategic plan:

- Appropriately describe our international role and goals;
- Stress certification programs as a method of improving and assuring quality concrete construction;
- Address concrete for the future and facilitate innovation; and
- Consider the effect that Building Information Modeling will have on the future of the concrete industry.

During the Summer of 2007, a Strategic Plan Task Group Developed a new Draft Strategic Plan included as *Exhibit 3.8*.

Action: The Committee is asked to review the Draft Strategic Plan and provide comments for Chair Mullarky to bring to the Board Planning and Discussion meeting.

4.0 NEW BUSINESS

4.1 Committee Review of ACI 121R-XX

On September 10, 2007, Staff Liaison Tholen received a request from Dan Falconer, Managing Director of Engineering at ACI, to have RCCC serve as external reviewers for the TAC review of ACI 121R-XX, “Guide for Concrete Construction Quality Systems in Conformance with ISO 9001,” which he passed along to Chair Mullarky on September 11, 2007. The documents and an explanation were also passed along

to the RCCC Members on September 11, 2007.

Falconer also suggested that TAC may be interested in having RCCC review more documents for responsibility concerns during the TAC review process instead of waiting for public discussion or until the document has been published. The Committee will discuss whether they are interested in taking on this task.

Action: Committee members will report on their review of the ACI 121R document.

5.0 NEXT MEETING

The RCCC meeting at the Los Angeles convention will be held on Sunday, March 30, 2008, from 2:00 to 5:00 p.m.

6.0 ADJOURNMENT

Attachments:

- Exhibit 2.0: RCCC roster
- Exhibit 3.3: Expanded Document Outline for Design Professional section
- Exhibit 3.8: Draft ACI Strategic Plan

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Exhibit 2.0 - 1

Membership Roster

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Exhibit 2.0 - 2

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RESPONSIBILITIES OF THE DESIGN PROFESSIONAL

1. PERFORM ALL PROFESSIONAL SERVICES, INCLUDING, DESIGNING THE WORK IN ACCORDANCE WITH THE STANDARD OF CARE.

Design professionals generally have the responsibility to perform their services, including designing the work, in accordance with the “Standard of Care”. The Standard of Care is generally determined on a case-by-case basis; however, it can be defined in the contract between the parties. If not defined in the contract between the parties, it is generally defined as “the exercise of that skill and judgment which can be reasonably expected from similar situated professionals” and “to exercise such care, skill, and diligence as men in that profession ordinarily exercised under like circumstances”. Thus, the Standard of Care creates a responsibility on the part of the Design Professional to perform their services in the same manner that a prudent designer would perform their services in a similar geographic area and in a similar timeframe.

2. CODE COMPLIANCE WITH APPLICABLE CODES.

Design professionals have a responsibility to perform their services, including design of the project in accordance with applicable codes. However, there may be instances where the building code represents a minimum design standard. In those cases, the applicable Standard of Care may require that the Design Professional exceed minimum code requirements.

3. COORDINATE WITH OTHER DESIGN PROFESSIONALS.

A lead Design Professional has a responsibility to coordinate its work with other sub-consultant Design Professionals. However, if the Owner has retained other Design Professionals under direct contract with the Owner, then the Owner has a responsibility to designate which of the multiple prime Design Professionals has the responsibility to coordinate the work of the various multiple prime Design Professionals.

4. PREPARE ANALYTICAL AND DESIGN JUSTIFICATION (CALCULATIONS) USED FOR THE PREPARATION OF DESIGN DOCUMENTS.

The Design Professional has a responsibility to prepare design calculations as appropriate and consistent with the Standard of Care. The Design Professional does not have a responsibility to issue or publish those calculations unless required by the contract documents, applicable codes, regulations or laws.

5. PROVIDE DESIGN DOCUMENTS FOR CONSTRUCTION WHICH SHOULD, AT A MINIMUM, INCLUDE THE FOLLOWING ITEMS: drawings, specifications (preferably in CSI format), bulletins, addenda, change orders, and construction change directives as applicable.

The design documents are not expected to be perfect; however, the design documents should be adequate to describe the intended final outcome of the project and the final performance criteria of the components of the project and the overall completed project.

6. ISSUE MATERIAL SPECIFICATIONS AND INSTALLATION SPECIFICATIONS CONSIDERING LOCAL PRACTICE.

The Design Professional has a responsibility to specify the types of materials required for the project. The Design Professional does not have a responsibility to specify quantities of such materials unless required in its contract with the Owner. The Design Professional should specify installation procedures that are necessary for the proper completion of the project. However, the Design Professional is not responsible for specifying the Contractor's means, methods, techniques, sequences, or procedures, as those are the responsibility of the Contractor. There are, however, instances where the Design Professional must specify means, methods, techniques, sequences and procedures so that the Contractor understands not only the materials to be provided for the project, but how those materials are to be installed so as to meet the Owner's final criteria.

7. PROVIDE FIELD OBSERVATION IF REQUIRED IN THE OWNER'S CONTRACT AND/OR APPLICABLE CODES, REGULATIONS OR LOCAL LAWS.

The Owner is responsible for determining the amount of field observation that the Design Professional will provide and the Owner is responsible for paying an adequate fee to allow such field observation.

8. PERFORM ALL INSPECTIONS, OBSERVATIONS AND REVIEWS OF CONSTRUCTION ON-SITE IF REQUIRED BY THE CONTRACT, OR APPLICABLE CODES, REGULATIONS OR LAWS.

9. PERFORM SHOP DRAWING REVIEW IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE CONTRACT BETWEEN THE DESIGN PROFESSIONAL AND THE OWNER.

10. UNDERSTAND AND CONVEY THE OWNER'S REQUIREMENTS IN THE PLANS AND SPECIFICATIONS.

The Design Professional should endeavor to fully understand the Owner's requirements; however, the Owner has a responsibility to communicate those requirements and also has the responsibility to accept the cost and/or schedule consequences of changes in those requirements.

11. REVIEW SUBMITTALS FOR GENERAL CONTRACT COMPLIANCE IF REQUIRED BY THE CONTRACT BETWEEN THE OWNER AND THE DESIGN PROFESSIONAL.

12. EITHER PERFORM, OR CONFIRM WHO WILL PERFORM SPECIAL INSPECTIONS REQUIRED BY BUILDING CODES, IF APPLICABLE.

DRAFT

ACI Strategic Plan 2007: Setting the Future Course

ACI's strategic plan details a vision for the Institute and the actions needed to fulfill that vision. The comprehensive plan balances ACI's core mission and values with its long-range future goals, establishing a projected vision for the Institute and the actions needed for continued success.

The goals and objectives of the strategic plan will be used to guide the Institute's direction and decision-making within a 3- to 5-year timeframe. As part of the long-range planning, a number of assumptions regarding the nature of the concrete industry within the next 10 years are also presented.

ACI's MISSION

Core purpose and values

ACI's core purpose is to provide knowledge and information for the best use of concrete. The core values of ACI's mission include:

- **Benefit to Society** — public interest, trust, and safety; value and cost-effectiveness; commitment to sustainable technology.
- **Credibility** — unbiased information free of commercial or political influence; meticulous technical review process; trust, integrity, timeliness.
- **Personal and Professional Growth** — exposure to all aspects of industry; technical diversity; personal growth through responsibility and achievement; lifelong learning.
- **Consensus** — inclusive and diverse working groups; collaboration through open discussion; bridging differences through constructive compromise.
- **Camaraderie** — a place for everyone with a technical interest in concrete; mutual respect, cooperation; friendship, social interaction; volunteers as key to success; exposure to diverse opinions on the best use of concrete; member-staff partnership.

ACI's VISION

ACI will be recognized as the prime source of knowledge, insight, and influence regarding concrete and its application.

The Envisioned Future

- ACI will be a catalyst and collaborator in the development of concrete knowledge and improvement of concrete construction worldwide. Through communication, cooperation, and collaboration, ACI will facilitate the formation of a unified global concrete knowledge community, with an organized worldwide body of knowledge on the design, construction, use, repair, and maintenance of concrete products, structures, and facilities.
- ACI's influence on the industry will be universally valued: ACI documents will set the standard for the industry on a global basis; ACI codes will serve as a template and will be translated into many languages; and ACI certification will be universally accepted. ACI members will enjoy the prestige of membership and will have access to the most authoritative knowledge and people in the industry.
- There will be improved concrete construction worldwide through ACI technical programs, documents, education, and certification programs. This knowledge will be disseminated worldwide through the use of the most advanced technologies.
- Concrete will be universally recognized as a high quality, durable cost-effective building material for sustainable development, and ACI will lead efforts that position concrete as sustainable and environmentally-friendly.

ACI's GOALS AND OBJECTIVES

These goals, formulated within the context of a 3- to 5-year planning horizon, represent a strategic approach to move ACI toward the realization of the future vision. A set of objectives for each goal outlines probable actions that will be required to address the key issues facing ACI in the near future.

Goal #1: Knowledge

ACI will be recognized as the leader in developing and disseminating concrete knowledge.

Objectives

1. Improve efficiency of identifying and evaluating new technologies.
2. Improve the code development process.
3. Increase active participation of younger and experienced members in ACI committees.
4. Enhance ACI's electronic portal to keep it at the forefront of communication technology.

Goal #2: Sustainability

ACI will lead efforts that position concrete as sustainable and environmentally friendly.

Objectives

1. Expand understanding of the sustainability issue among membership.
2. Expand resources to support sustainability issues.
3. Increase the content on sustainability in ACI documents and products.
4. Improve the perception of concrete relative to sustainability within green movement.

Goal #3: Industry Collaboration

ACI will collaborate with construction-related organizations and associations in the interest of improving the quality of concrete construction.

Objectives

1. Minimize or eliminate tolerance and compatibility issues.
2. Improve coordination among ACI documents.
3. Improve coordination between industry groups to help minimize overlapping efforts.
4. Increase participation of Intra/Inter industry groups on ACI committees.
5. Increase awareness in the Owner/Design community of constructibility/compatibility issues.
6. Increase cooperation with international partners.

Goal #4: Education

ACI will expand its education, certification, and career-related programs to improve the quality of concrete construction.

Objectives

1. Expand ACI certification referenced in standards and project specifications.
2. Increase educational programs to fill gaps in the education of concrete professionals.
3. Develop programs that fill gaps in the education of engineering students.
4. Expand tools offered to help the design community and certified professionals use concrete.
5. Broaden the scope of the Student Fellowship Program to include and attract a wider variety of donors and recipients.

Goal #5: Member Value

More people in the construction industry will find value and benefit in ACI membership.

Objectives

1. Increase the number of student/younger members and their level of participation.
2. Increase participation by local ACI chapter members in national ACI activities.
Increase membership recruiting efforts based on marketing research.
3. Increase personalization of web interface and other communication.
4. Reduce real and perceived barriers to participation in ACI.
5. Increase ACI's perceived value over other construction-related organizations.

OUR CHANGING INDUSTRY

To project the future environment in which ACI will need to position itself, assumption statements have been created regarding the next 5 to 10 years. As conditions change, strategies will need to be reconsidered. Assumptions about the key challenges ahead include:

Social, cultural, and consumer factors

- While the U.S. population will become more diverse, outsourcing of technology creation and associated tasks will have a negative impact on the U.S. economy. U.S. involvement in international conflicts will also impact the industry.
- The sustainability movement will continue to expand with a growing emphasis on green building and increased concern over global warming.
- Consumers will demand “reliable” information instantly and free.

Demographic factors

- Younger members will foster changes in established methods of information distribution.
- Immigration will cause a shift in ACI members and users. As the world population shifts to urbanization, increased demands will be made on the construction industry.
- Potential exists for a knowledge gap and volunteer gap. A decline in engineering students worldwide may cause reduction in membership and committee involvement. Additionally, there may be difficulty in getting U.S. students interested in careers that are being outsourced. Employers will need to support younger members' participation on committees.

Legislative and regulatory factors

- Laws will likely be enacted regulating CO₂ emissions, as well as regulating the building industry regarding green-construction issues. A unified voice within the concrete industry will be needed.
- Trade and environmental regulations could affect materials supply and composition.
- Immigration reform will affect cost and availability of labor.
- Homeland security legislation will affect structural design and construction.
- Special interest legislation could have a damaging effect on the concrete industry.

Economic factors

- Energy prices will increase, leading to a demand for alternatives to petroleum-based construction materials.
- Faster growth will occur outside of North America, putting pressure on resource availability globally.
- Global consolidation will continue resulting in decisions being made based on global impact versus North American impact.
- Fewer people will enter the workforce requiring greater efficiency and less emphasis on cost of materials.
- The U.S. dollar will continue to be weak against other currencies.

Industry structure factors

- Concrete-related associations will work more closely with each other.
- Globalization will change the way everyone in the concrete industry works.
- Engineering education will focus on “soft side” / management versus technical. If courses on concrete are cut, technology will be compromised.
- Global consolidation will impact the concrete industry and global standards will be necessary.
- Continued de-evaluation of the U.S. dollar will expand international involvement and ownership in U.S. industries.
- Restructuring of the cement and materials industry will shift from local to global, causing the costs of cement and the mining of aggregate costs to increase. Internet-based knowledge systems will reduce the reliance on experts.
- Offshore consulting will change the design community.
- The shift to “sustainability” will cause a major change in design priorities.

Technology factors

- There will be more information available in a shorter period of time; increased use of the Internet for business communications.
- Sustainability will require the development of new technologies.
- Transition to an all-electronic workflow, with more work done via the Internet. Virtual interactions will change ACI.
- Construction will become more automated.
- New materials might replace concrete or reinforcement. Shift to more durable and greener materials.
- Industry will look to technology to improve construction document effectiveness.
- Acceptance of performance-based specification and codes will be slow.
- Industry will look to technology to solve industry problems.
- Proprietary technology will make ACI's role as "knowledge disseminator" more difficult.
- Technology will emerge which is not anticipated and will have a major impact.