Preface

The Construction Institute (CI) of the American Society of Civil Engineers (ASCE) and the CRC2014 Organizing Committee are pleased to present the Proceedings of the 2014 Construction Research Congress (CRC2014) held on May 19-21, 2014, at Georgia Institute of Technology, Atlanta, Georgia, USA. CRC2014 is proudly hosted by the School of Building Construction at Georgia Institute of Technology.

The theme for this conference is "Construction in a Global Network.” It highlights the importance and relevance of construction engineering and management (CEM) research, where schedules and networks are among the most distinguishable subjects, and the impact of globalization continues to transform the industry and the education of students, professionals and researchers alike. The effect of professional and social networks is dramatically changing existing communication patterns and information sharing paradigms in the way we live, practice, conduct research, and educate students in the domain of CEM and beyond. As a reflection of current integrated practice and project delivery, network technology is also allowing a better communication among construction owners, architects, engineers, construction managers, subcontractors, consultants, and facility managers. The School of Building Construction (BC) resides in the College of Architecture at Georgia Tech, which carries a legacy of enormous contributions in the fields of Building Information Modeling (BIM), high performance buildings, and Geographic Information Systems (GIS), among others. In this context, BC lies at the intersection of planning, architecture, engineering, management, and technology, thereby becoming a fertile ground for supporting the goal of CRC: to provide academics and industry professionals a platform to present and discuss research needs and findings that have profound impacts on the future of the architecture-engineering-construction industry. To better understand the goal of CRC, this Preface contains an opening article by Halpin et al. that describes the early days of the Construction Research Council, recognized as the premier forum for CEM research.

The Conference Proceedings contain 242 peer-reviewed papers, which stemmed from 580 abstracts submitted, 501 abstracts accepted, and 301 final papers submitted. In addition to the signature tracks traditionally offered by previous CRCs, this Congress is incorporating new tracks that reflect some of the emerging integrated practices and technologies such as building information modeling, interactive geospatial information systems, integrated facility and program management, sustainability-conscious design, and building performance, for a total of 18 tracks:

- Information Technology, Modeling and Simulation
- Construction Education
- Sustainable Design and Construction
- Productivity and Workforce Issues
- Construction Means and Methods
- Construction Planning and Control
- Risk and Safety Management
- Facility Management and Program Management
On behalf of the Construction Institute of the American Society of Civil Engineers and the CRC2014 Organizing Committee, I extend best wishes to you for a memorable and remarkable occasion.

Daniel Castro-Lacouture, Ph.D., P.E.
Conference Chair
Georgia Institute of Technology
Acknowledgments

The members of the CRC2014 Technical Committee are acknowledged for their commitment and service that led to the publication of the CRC2014 Proceedings.

Conference Chair:
Daniel Castro-Lacouture, Georgia Tech, (dcastro@gatech.edu)

Technical Co-Chairs:
Javier Irizarry, Georgia Tech, (javier.irizarry@coa.gatech.edu)
Baabak Ashuri, Georgia Tech, (baabak.ashuri@coa.gatech.edu)

Track Coordinators:
Tariq Abdelhamid, Michigan State University, (tariq@msu.edu)
Tristan Al-Haddad, Georgia Tech, (tristan.al-haddad@coa.gatech.edu)
Thais Alves, San Diego State University, (talves@mail.sdsu.edu)
Godfried Augenbroe, Georgia Tech, (godfried.augenbroe@coa.gatech.edu)
Salman Azhar, Auburn University, (salman@auburn.edu)
Yong Bai, North Dakota State University, (yong.bai@ndsu.edu)
Amir Behzadan, University of Central Florida, (amir.behzadan@ucf.edu)
Brian Bowen, Georgia Tech, (brian.bowen@coa.gatech.edu)
Jason Brown, Georgia Tech, (jason.brown@coa.gatech.edu)
Hubo Cai, Purdue University, (hubocai@purdue.edu)
Qingbin Cui, University of Maryland, (cui@umd.edu)
Islam El-Adaway, Mississippi State, (eladaway@cee.msstate.edu)
Khaled El-Rayes, University of Illinois, Urbana-Champaign, (elrayes@illinois.edu)
Michael Garvin, Virginia Tech, (garvin@vt.edu)
Russell Gentry, Georgia Tech, (russell.gentry@coa.gatech.edu)
Mani Golparvar-Fard, University of Illinois at Urbana-Champaign, (mgolpar@illinois.edu)
Paul Goodrum, University of Colorado - Boulder, (paul.goodrum@colorado.edu)
Subhro Guhathakurta, Georgia Tech, (subhro.guha@coa.gatech.edu)
Matthew Hallowell, University of Colorado - Boulder, (matthew.hallowell@colorado.edu)
Timo Hartmann, University of Twente, (t.hartmann@utwente.nl)
Marwa Hassan, Louisiana State University, (marwa@lsu.edu)
John Haymaker, Georgia Tech, (john.haymaker@coa.gatech.edu)
Amy Javernick-Will, University of Colorado - Boulder, (amy.javernick@colorado.edu)
David Jeong, Iowa State University, (djeong@iastate.edu)
Vineet Kamat, University of Michigan, (vkamat@umich.edu)
Amr Kandil, Purdue University, (akandil@purdue.edu)
Hamed Kashani, Sharif University of Technology, (hamed.kashani@sharif.edu)
Sinem Mollaoglu-Korkmaz, Michigan State University, (korkmaz@msu.edu)
Sanghyun Lee, University of Michigan, (shdpm@umich.edu)
Phil Lewis, Oklahoma State University, (phil.lewis@okstate.edu)
Min Liu, North Carolina State University, (min_liu@ncsu.edu)
Gunnar Lucko, The Catholic University of America, (lucko@cua.edu)
Pavan Meadati, Southern Polytechnic State University, (pmeadati@spsu.edu)
Giovanni Migliaccio, University of Washington, (gianciro@uw.edu)
Esther Obonyo, University of Florida, (obonyo@ufl.edu)
Mehmet Ozbek, Colorado State University, (mehmet.ozbek@colostate.edu)
Ennis Parker, Georgia Tech, (ennis.parker@coa.gatech.edu)
Pardis Pishdad, Georgia Tech, (pardis.pishdad@coa.gatech.edu)
Aminah Robinson Fayek, University of Alberta, (aminah.robinson@ualberta.ca)
Kathy Roper, Georgia Tech, (kathy.roper@gatech.edu)
Jennifer Shane, Iowa State University, (jsshane@iastate.edu)
Xinyi Song, Georgia Tech, (xinyi.song@coa.gatech.edu)
Timothy Taylor, University of Kentucky, (taylor@engr.uky.edu)
John Taylor, Virginia Tech, (jet@vt.edu)
Ali Touran, Northeastern Tech, (a.touran@neu.edu)
Xiangyu Wang, Curtin University, (xiangyu.wang@curtin.edu.au)

Reviewers:
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|                 | Ken-Yu Lin         |                |                  |

**Student Assistants:**

- Aakash Arun
- Laura Florez
- Ebrahim P. Karan
- Mehdi Nourbakhsh
- Natalia Quintanilla
- Silvia Tijo
- Yun Zhou
- Samaneh Zolfaghiar

**Webmaster:**

Ebrahim P. Karan, Georgia Tech, (p.karan@gatech.edu)

**Conference Coordinators:**

Brenda Morris, Georgia Tech, (brenda.morris@coa.gatech.edu)
Lorie Wooten, Georgia Tech, (lorie.wooten@coa.gatech.edu)
Rachel Von Ins, Georgia Tech, (vonins@coa.gatech.edu)
Introduction

Early Days of the Construction Research Council

Daniel W. HALPIN1, Richard L. TUCKER2, John D. BORCHERDING3, SangHyun LEE4, Amr KANDIL5, and Susan BOGUS6

1 Professor Emeritus, School of Civil Engineering, Purdue University, 550 Stadium Mall Drive, West Lafayette, IN 47907; email: halpin@purdue.edu
2 Professor Emeritus, Dept. of Civil, Architectural and Environmental Engineering, University of Texas, 301 E. Dean Keeton St., Austin, TX 78712-1056; email: rltucker@mail.utexas.edu
3 Adjunct Professor, Dept. of Civil, Architectural and Environmental Engineering, University of Texas, 301 E. Dean Keeton St., Austin, TX 78712-1056; email: sborch@mail.utexas.edu
4 Chair of Construction Research Council, Assistant Professor, Dept. of Civil and Environmental Engineering, University of Michigan, 2350 Hayward St., Ann Arbor, MI 48109; PH (734) 764-9420; FAX (734) 764-4292; email: shdpm@umich.edu
5 Vice Chair of Construction Research Council, Assistant Professor, School of Civil Engineering, Purdue University, 550 Stadium Mall Drive, West Lafayette, IN 47906; PH (765) 494-2246; FAX (765) 494-0644; email: akandil@purdue.edu
6 Secretary of Construction Research Council, Associate Professor, Dept. of Civil Engineering, University of New Mexico, MSC01 1070, Albuquerque, NM 87131; PH (505) 277-1395; FAX (505) 277-1988; email: sbogus@unm.edu

ABSTRACT

The Construction Research Council (CRC) has served researchers in Construction Engineering and Management as a major clearing house for about 40 years. The number of members has continued to grow, and is currently over 300 worldwide. However, little historical record exists, and thus there is a need to document the early days of CRC for future generations. In an effort to address this issue and promote future growth, the authors gathered materials from our members and put together a short article. The article describes the early days of CRC. As a concluding remark, the authors recommend that the CRC increase efforts for creating opportunities to engage and advance the industry. This would be in the spirit of CRC’s early days.

CONSTRUCTION RESEARCH COUNCIL

Research in Construction Engineering and Management (CEM) is an essential element of our industry. For almost 40 years, the Construction Research Council (CRC) has been a meeting point and clearing house for interaction and information exchange among CEM researchers pursuing fundamental and applied research in CEM. Particularly, given the early view on construction as a business rather than an
engineering activity, the importance of research can’t be underestimated in establishing CEM as an academic discipline (Halpin 2007).

CRC members have contributed to improving the industry through research in diverse CEM fields, such as constructability improvement, estimating methods, project planning and control, building information modeling and visualization, value engineering, innovative materials and means, innovative technologies, automation, project delivery methods, productivity analysis and improvement, risk analysis techniques, safety and health, and labor and organizations, to name a few areas. The members have also helped to disseminate this research through the authorship of textbooks, publications, guidelines, and specifications. They have also contributed to industry training and continuing education, and perhaps most importantly, to the education of our young practitioners through our universities.

CRC is a committee in the Construction Institute’s (CI) Education and Research Directorate. The committee is comprised of over 300 academics and practitioners who are dedicated to research in CEM. The objectives of the committee are:

- To be recognized as the premier forum for CEM research.
- To maintain an active membership of qualified construction professionals.
- To advance engineering knowledge and practice by stimulating and encouraging innovative research in the field of CEM.
- To disseminate knowledge by sponsoring activities and assisting members in educational and professional development initiatives.
- To promote the activities of CRC and its individual members that enhance the practice of and research supporting the discipline of CEM.
- To mentor professionals who aspire to be researchers.

EARLY DAYS OF THE CONSTRUCTION RESEARCH COUNCIL

The most pivotal event to re-establish CRC was the 1976 ASCE Spring meeting in San Diego. Meetings to organize CRC occurred in the early 1970’s under the leadership of L. R. “Dick” Shaffer, who was, at the time, the Director of the Construction Engineering Research Laboratory of the Army Corps of Engineers in Champaign, IL. CRC existed but did not meet regularly, however, until 1976. At this time, the Nuclear Regulatory Commission (NRC) in Washington D.C. contacted ASCE with the intention of identifying researchers who might assist with research into the construction of nuclear power stations. A group of approximately 12 researchers met at the ASCE Spring conference in San Diego; the meeting was led by the CRC chair at that time, Russel C. Jones. This triggered a visit to Washington, D.C. in the summer of 1976 to meet with representatives from NRC (Halpin 2007).

NRC by this time had changed research direction, dropping the earlier interest in supporting research. Instead, it was recommended that CRC (again led by Russel C. Jones) meet with program managers at the Energy Research and Development Agency (ERDA is now the Department of Energy (DOE)). Research managers at ERDA were receptive to proposals made by CRC. By the Fall of 1976, researchers with connections to CRC had received ERDA-funded projects in the amount of approximately $1 million. These grants included a workshop at the Pennsylvania State University, a project to study Information Management for Nuclear Power
Stations at the Georgia Institute of Technology, and other projects at The University of Texas at Austin and The Ohio State University. At a time when construction research projects were a rarity and projects in the amount of $12,000 a year were considered large, this level of funding was unprecedented. At least two of the funded projects were in excess of $300,000 over a multi-year period. This totally unexpected level of success lifted CRC into orbit, and it has been a cornerstone organization within the construction research community ever since (Halpin 2007).

GETTING MOMENTUM WITH INDUSTRY SUPPORT

The early days of CRC, as with any new group, were somewhat disorganized. The early members were a dozen or so academics and one or two industry members. Some of the early members are: Lance Bell, John Borcherding, Bob Carr, Fattah Chalabi, Marvin Gates, Dan Halpin, Donn Hancher, Vir Handa, Bob Harris, Bill Ibbs, Russel Jones, Bill Ledbetter, Ray Levitt, George Mason, Saxon Palmetter, Boyd Paulson, Randolph Thomas, and Richard Tucker.

Along with the ERDA projects that boosted construction research, the other major and concurrent activity evolved from the Business Round Table (BRT), in the form of a Construction Industry Cost Effectiveness (CICE) Project, headed by Charles D. Brown, vice-president of DuPont. That project, in its early research stage, was triggered by a dinner in New York City, to which several faculty members from CRC were invited. Some of those faculty members were then included at subsequent meetings of the Construction Committee of the BRT, which funded a few grants for specific studies.

Simultaneously with the BRT and ERDA research activities, a few of the BRT companies decided to hire academics as consultants to help improve their projects. The initial contacts came from the Annual Construction Productivity Conference that evolved from the earlier ERDA project under the leadership of John Borcherding at The University of Texas at Austin. The major companies in that regard were Procter & Gamble, DuPont, Monsanto, and Texaco, along with some companies from the UK. Most of the projects were cost-reimbursable, and the contractors were willing to cooperate with the academic consultants. Several tools—such as Foreman Delay Surveys, Time-Lapse Photography, and Work Sampling—were utilized, and the credibility of the academic involvement was enhanced.

One of the companies, Texaco, invited consultants from The University of Texas at Austin to engage in a large project in Louisiana, and agreed to deviate from the consulting mode with a research grant involving graduate students and faculty. That project was renewed for five years, with regular reports to the Texaco management, and involved both PhD and MS students, some of whom obtained leaves of absence from Texaco to pursue their advanced education on that project.

In the meantime, CRC decided to appoint a committee—including Richard Tucker, Lance Bell, and Bill Ledbetter—to develop recommendations for a CRC
structure and activities. Out of that committee came recommendations for the creation of the R. L. Peurifoy Award, and a program of CRC workshops (e.g., Construction Research Congresses) as well as a restructuring of the journals affiliated with the Construction Division of ASCE (e.g., Journal of Construction Engineering and Management). These complemented the Marvin Gates award for young faculty.

The activities of CRC, the BRT, the consulting activities of faculty on large projects, the multi-year research project between The University of Texas at Austin and Texaco, and the Construction Productivity Conference brought the stars into alignment at a Construction Productivity Improvement (CPI) Conference in 1982. (Significantly, only industry representatives were allowed to make presentations at the CPI Conference, offering their experiences.) One of the speakers at the Conference, from Texaco, stated that academic research had benefitted Texaco significantly in time and money savings on the Louisiana project. The speaker invited other companies to join with Texaco in pooling resources for academic research. That resulted in many brainstorming meetings involving representatives of industry and the Business Roundtable that culminated in the establishment of the Construction Industry Institute (CII) in October of 1983.

CII was carefully constructed to be a cooperative venture between academia and industry. Although it was to be headquartered at the University of Texas at Austin, it was structured to involve faculty and graduate students at many other universities, and to be a national organization. The ideas for its establishment were endorsed at a meeting of CRC, and the first CII Director who was, coincidentally, the Chair of CRC (Richard Tucker) selected the faculty members on the first CII Research Teams. The industry representatives were grateful, since they were not well acquainted with the construction faculty. There have now been many hundreds of faculty members and graduate students from most CRC universities that have participated in CII projects. CII has an Academic Committee that has the specific mission to include more faculty members in its research activities. Over the past 40 years, many industry-academic cooperative endeavors have evolved at other institutions.

Several other parallel activities also evolved from CRC. The increasing stature of CRC led to strong support from the National Science Foundation – the premier research agency of the federal government – leading to numerous grants to CEM researchers at major universities throughout the U.S. As part of its research oversight, CRC has recommended that ASCE Publication Standards incorporate actual data to improve their credibility with the industry. CRC has been a focal point for the evolution of academic/industry research over the years, including other regions of the world, such as Europe, the Middle East, South America, Australia, Japan, Korea, and China. ASCE has held at least two conferences in Saudi Arabia and Bahrain that involved representatives from CRC and comparable organizations in other countries.

**CONCLUDING REMARKS**

Although it is often overlooked, research is essential for the future of our industry!! As the challenges in CEM become larger and more complex, the need for research becomes more critical. A review of the early days of CRC offers a very
important lesson for the industry in general. Earlier efforts by the CRC were closely tied with the industry’s needs and this led to great mutual successes. Recent CRC activities have been a bit disjointed and drifted away from application within the industry.

As a first step to reestablish CRC’s relationship with the industry, the 2014 Construction Research Congress will host an ASCE Construction Institute (CI) board of governors meeting. This will provide a great opportunity to discuss how CRC members can conduct joint activities with the industry to improve its practice through research and dissemination activities. Such initiatives of this type should be continued to insure the success of CEM as an academic discipline as well as a profession.

This article is only a small recollection of CRC’s past. Efforts to document our past activities—like important milestones in the past 40 years—need to be continued. The authors hope that CRC members continue to work on such documentation, and thus can archive important milestones in CRC history. More histories and events related to CEM in general can be found in Halpin’s article in JCEM (Halpin 2007).

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REFERENCES