PACE Advisory Meeting Minutes
June 3, 2003
Dulles Airport Marriott

Attended Companies

Paul Beckwith Alpha Corporation
John Brock Burt Hill Kosar Rittelmann Association
Mike Arnold Foreman Program and Construction Managers
Bill Moyer James G. Davis
Stacie Condrell Pentagon Renovation Program/ DMJM+H/ 3DI
Dennis Raymond The Austin Company
Bob Grottenthaler Barton Malow
Doug Turner Centex Construction Company
Bill Headly Holder Construction Company
Dan Liscinsky John J. Kirlin, Inc.
Ted Lynch Southland Industries
Anne Pernell Turner Construction Company

PSU Attendees
David Riley; PACE Director
Michael Horman; Associate Professor
Michael Pulaski; Graduate Student

Companies not in Attendance

Alexander Constructors Baker Concrete
Bovis Lend Lease Skanska
EDIS Dick Corporation
Gilbane Building Company EMCOR Group
Hensel Phelps Kajima Construction Services
McGraw Hill Construction Information Group The Clark Construction Group
Haskell Company Truland Systems Corporation
I. Introduction
The meeting began with introductions and an overview of the 2002-2003 PACE activities.

Key points of business:

1. PACE Activities
   Fall ’02 Roundtable
   The fall roundtable was very well attended and lead to the definition of several research areas that were pursued by student and faculty teams: Green buildings and the role of the contractor, RFP definition and development, Mold and IAQ liability, and 3D and 4D CAD applications in construction.

   Spring ’03 Research Seminar
   The research seminar was well attended at the Vienna, VA location. Feedback forms and verbal comments about the event were very positive, in particular the relevance of topics and quality of speakers. Areas for possible improvement were the student’s interaction, and length of speakers (too short or too long). The event will be held next year at the Toftrees resort in State College.

2. Current Research Thrusts at PSU under guidance of CM Faculty
   • Integrating Lean and Green Building Concepts -Horman
   • 3D / 4D CAD virtual construction -Messner
   • Strategic Decision Making / Learning in organizations - Messner
   • Role of contractors on integrated / green design - Riley
   • Developing the workforce – Riley, Horman, Messner

3. Membership
   Burt Hill Kosar Riddleman joined PACE in April 2003. They become the first architecture firm to join.

   We are currently discussing membership with two other firms: 3D International and Center line Associates.

   Marshal Erdman’s PACE contact, Steven Davis, has retired and no replacement was named. M.E. will be removed from the list of active members.

4. Funding
   Contributions and student sponsorships have decreased significantly in the last two years. (2002 Contributions = $36,500). An effort will be made by Riley and Messner to follow up with members to secure member contributions by August 2003.

Amendment
PSU requires new language to be included in letters that accompany PACE contribution (gift) checks.

Correct Language:
“The enclosed check in the amount of $5000 (check no # 203000) is given as a charitable contribution to support PACE activities.”

Problem language:
- does not list amount
- states funding is for membership fee
- does not include the term gift or charitable contribution
- letter states funding is for research and mentions results

6. Feedback from Members:
GC (General comment)

<table>
<thead>
<tr>
<th>Company</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Austin Co</td>
<td>Stressed importance of leadership and professional development</td>
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<tr>
<td>Foreman Group</td>
<td>Students should have exposure to medium sized project and not just mega projects. Diversity in the workforce is challenge</td>
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<tr>
<td>GC</td>
<td>We need to get students away from computers and interacting in groups and with industry. The interest groups should address and assist with this issue.</td>
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<tr>
<td>Austin Co</td>
<td>Construction management is process of managing people. Group Facilitation training is very important</td>
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<td></td>
<td>What are the motivating factors for students and young professionals? Introduce psychology courses into the curriculum</td>
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<td>PenRen</td>
<td>Students need to learn about Strategic Decision Making</td>
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<tr>
<td>Turner</td>
<td>Students need a “dose of professionalism”. An industry mentor program could help. Students could either find their own or one is assigned to them. The could meet or X number of times a year and shadow them for a day. Stacy Condrel noted that Dupont has a very good model mentoring program.</td>
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<tr>
<td>Southland and others</td>
<td>Getting quality trades people is a major problem. Big workforce development issue. PSU has previously research this issue and found that AGC and others have been working this issue for some time. The construction Industry roundtable has a subcommittee dedicated to this effort. It was noted that we might be able to get involved with a technical college, Penn Tech, in Lock Haven. A hands-on experience results in better appreciation and understanding of field workers, which is important for young engineers to understand.</td>
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<tr>
<td>Turner</td>
<td>The presentations appeared to be all from the same format. Personalizing and creativity in presentation format is encouraged</td>
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</tbody>
</table>

II. Proposed Working Groups
Working groups were proposed to the Advisory Board as a new PACE initiative. The purpose of these groups is to focus the program on key research areas and provide a mechanism for students to engage industry for questions and advice on research. Interested industry members from PACE companies would align themselves with the working group.

The working groups may conduct periodic conference calls to discuss specific research issues or address questions students may have. It was suggested that each group have an industry member as the chair, and that person would report to the advisory board for a yearly update. The working groups discussed were:

- **Green and Lean**
  - Focus on how to do green buildings better. Specific areas include:
    - Commissioning process/total building commissioning
    - How green projects can be better performed
    - Integrated teams in sustainable projects: better coordinated and better planned, lean processes embedded in design
  - A discussion ensued regarding the combination of Green building and production planning into the same working group. Concerns regarding the relevance and similarities between the two areas were discussed. Finally, it was decided to keep the production planning and green building in the same working group.

- **Virtual Design and Construction - 3D/4D CAD**
  - Objective: Investigate methods to improve the design and construction planning process through the use of virtual models.
    - Investigate 3D / 4D Case Studies
    - Explore use of immersive virtual environments
    - Provide case studies for educational use of virtual reality modules

- **Developing Leadership**
  - This topic was the source of much discussion, and focused on developing the current generation of graduates, and the particular challenges and opportunities that students present during their initial education and subsequent development. A group will be formed to focus on how we can better:
    - Define core competencies for graduating CM students that related to leadership skills, including *basic business manners, accountability, results oriented, and professionalism.*
    - Identify opportunities to build these competencies into the curriculum
    - Identify guest speakers and other activities to develop competencies in students

- **Risk analysis and project delivery**
  - Identify methods to improve the assessment and management of project risk, and investigate innovative delivery methods to improve the building process.
  - Sample Activities:
    - Investigate the application of risk assessment/management tools
    - Analyze improvements to project delivery method
- Study critical issues facing the industry, e.g., mold

- **IT in facilities construction**
  - An additional working group for “IT into Facilities Construction” or “IT Infrastructure” was suggested by Stacie Condrell. IT has become a significant component of today’s building industry. Since technology changes every three years, systems need to be upgraded. Managing and planning for IT infrastructure and these frequent changes/system upgrades is an upcoming and important element of construction. Building IT infrastructure and the building itself operate at different cycles, rhythms, and patterns: IT being faster. How can we develop better solutions to accommodate these differences?

### III. Brainstorming Potential Key Issues

- Leadership, especially with people technology
- PM systems: How to make people change to technology
- Succession planning: Developing new leadership
- Risk management: Surety market and bonding
- Commissioning in green projects
- Diversification patterns within companies: Pressures and achievements
- Best value selection process in Federal government projects: e.g. PSU using a Parsons Brinckerhoff formula for BV selection on the SALA
- What are 100% CDs? What is the quality of documents when you get “100% CDs?” What/who are the drivers of this quality?
  1. Project contingencies
  2. Design management vs. construction management
  3. What steps of the architect add value and do not add value to construction?
  4. Document quality: Better quality documents are produced if drawings have an end use, like as-builts for facilities management
- Employee performance evaluations: What are people using?
- Getting the right quality people: Is there a skill vs. expectation difference?
- Best practices for integrating and training the young
- How to eliminate lawyers
- Getting primes to buy into the project schedule
- How to do a program (company with multiple projects), rather than project, well. There are different issues beyond just scale.
  1. How to bank lessons learned to reduce learning curve: Learning organizations, structures
  2. State Department looking at it as well
  3. Technology integration: Knowledge banks, interest groups/innovation groups, toolsets
- How to fit 3D CAD design into old deliverables of 35, 55, 75, 95% design documents
  1. Timing issues, when done, etc.
  2. Commissioning systems
3. Shop drawings
- Team building: Leaders and followers
- Management of geographically dispersed teams
- LEED requirements in specs in relation to getting certified

IV. PACE Topics 2003-2004 – Detailed discussion on selected topics that had consensus interest from the group.
- Leadership
  - What are the leadership skills needed to manage projects? There are technical skills; what is needed in addition to these to manage projects?
  - What entity should take the lead in projects/ phases? When should there be handoffs?
  - When do you lead and when do you hand off?
  - Definition of high performance teams. What are the skills? There is a lot of research on this outside of construction
  - Correlation between performance and teaming methods
  - How to be a team player

- New hire traits
  - Communication (listening and responding)
  - Conflict resolution/avoidance
  - Professionalism in CM graduates: Good manners
  - Managing skilled trades. How to effectively manage skilled trades. Dos and don’ts
  - Survey/interview recent hires: What problems? Misconceptions?
  - How to work with “baby boomers”
  - Team player (me vs. we)
  - Motivation level

- Sustainable design and construction
  - Contractor role in the commissioning process of green buildings
  - Legitimize LEED certification: LEED V2.0 - How should the green certification process be improved? How do you make LEED certification mean something rather than be just a commodity?
  - How to develop lessons learned of green projects: Avoid making the same mistakes
  - Process learning: Do it right earlier so cost is less, rather than tack on
  - What projects lend themselves to LEED certification? Most likely to succeed.
  - Develop a tool to systematically list features and costs of obtaining LEED rating
  - Where is sustainability on owner’s radar?
  - Enhancing the commissioning process: Relationship to delivery systems, who is the lead? Contractor led? Tax incentives, owner motivators.

- 3D/4D CAD Virtual Construction
  - What software is available? Rating?
  - Demonstration during seminar, show value
  - Educating others in the organization
How do we communicate design when design is in 3D?
Design protocols for handling and hand off of 3D from design to construction
- What can the design team do?
- Liability and ownership
- Standards
- D/B collaboration
Timeframe for 3D/4D CAD: 3-5 years out

**IT infrastructure in buildings**
- How do we deal with requirements and how are these rapidly changing through building use? How do we future proof buildings against future IT changes? Related issues: Security, evolving technology
- Impact of high rate of change on design approaches
- Designing and building for evolving technology and security

**Design Management**
- What is out there to manage design? How do you manage the design process?
  - Get the hard stuff done first
  - Adopt lean processes
  - Work structuring, constructability considerations
  - What are the important issues for the team?
  - Look ahead scheduling
- Definition of contract completion?
- How use contingencies to manage design?
- How do you organize design?
- What is the ability of collaborative instruments, e.g. partnering, for managing design? Higher level of collaboration, more required on sustainable projects
- Coordination (shop drawing level)
  - Who is responsible for what?
  - Top 10 common problems with design
  - Educate owner community
  - Willingness to participate and make early decisions

V. **PACE Potential Themes 2003-2004**
- Leading collaborative efforts
- How to become lean, green and (not-so) mean
- Maximizing team capabilities
- Analyzing (or Building) high performance teams
- The right way to build
Amendment

Topic of interest (From EDiS):

Risk Management
  - Currently they do not carry E+O insurance. It would now cost between $75,000 and $100,000 per year, so their company has chosen not to carry it now. The possibility exists for many potential liabilities for errors and omissions, and how do they vary with each contracting form (CMa, CMC or Design/Building). Mold mitigation could possibly fall into this category of risk management.
  - Many of the companies PM’s and almost all of the superintendents do not fully understand the risks taken with various types of contracts: CMa, CMC Design/Build and GC. This is a weakness because these are people making the decisions daily that could affect the liability of the company. These people should be educated on the types of contracts and their risk implications.

Quality Management:
  - Huge need for some kind of quality management in the construction industry. Mistakes happen all the time, many of which are costly and time consuming to fix. Many of the mistakes come from errors of omission rather than commission. The PM’s or supers sometimes do not think ahead to avoid a problem before it comes up. Or our supers assume that the contractors which are working on our projects know what they are doing, and have qualified people to do the work. As a result, a lot of work is poorly planned or put in incorrectly and has to be replaced. It was once said that 30% of the work on a construction site is put in wrong initially, this percent is too high and should be dealt with better.

Leadership Development:
  - Find that the companies’ project managers and supers have to have leadership skills. They can not just be technically smart, if they are, they will lack the skills to lead, solve problems, resolve conflicts, manage projects and relate well with the companies clients. All are characteristics that are looked for in prospective employees and they are characteristics that are developed in current ones. (Frankly, the Penn State graduates typically have those leadership and social skills that the companies look for).