Attendees:

<table>
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<th>Name</th>
<th>Company</th>
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<tr>
<td>Allen, Harold Mr.</td>
<td>Forrester Construction Company</td>
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<tr>
<td>Arnold, Michael Mr.</td>
<td>Program and Construction Managers</td>
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<tr>
<td>Carlat, Stan Mr.</td>
<td>Hensel Phelps</td>
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<tr>
<td>Catlow, Kenneth Mr.</td>
<td>Parsons Brinckerhoff Construction Services</td>
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<tr>
<td>Evey, W. Lee Mr.</td>
<td>Design Build Institute of America DBIA</td>
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<td>Forrester, David Mr.</td>
<td>Forrester Construction Company</td>
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<td>Grottenthaler, Robert Mr.</td>
<td>Barton Malow Company</td>
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<tr>
<td>Hartman, Mike Mr.</td>
<td>Clark Construction Group</td>
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<tr>
<td>Horman, Michael Dr.</td>
<td>Pennsylvania State University</td>
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<tr>
<td>Juban, Marilyn Ms.</td>
<td>Gilbane Building Company</td>
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<tr>
<td>Lee, Steve Mr.</td>
<td>Benchmark Construction Company Inc.</td>
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<td>Manning, Russell Mr.</td>
<td>Pennsylvania State University</td>
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<td>Messner, John Dr.</td>
<td>Pennsylvania State University</td>
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<tr>
<td>Moyer, Bill Mr.</td>
<td>James G. Davis Construction Corporation</td>
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<td>Riley, David Dr.</td>
<td>Pennsylvania State University</td>
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<td>Shumaker, Thomas Mr.</td>
<td>Holder Construction Company</td>
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<td>Smith, Christopher Mr.</td>
<td>Benchmark Construction Company Inc.</td>
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<tr>
<td>Sweeney, Karen Ms.</td>
<td>Turner Construction Company</td>
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<tr>
<td>Tarpey, John Mr.</td>
<td>Balfour Beatty Construction</td>
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<tr>
<td>Wetcher, Raissa Ms.</td>
<td>Forrester Construction Company</td>
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<td>White, Paul Mr.</td>
<td>Skanska USA</td>
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Agenda:
- Overview of Past Year
- Brain Storming for Upcoming Academic Year
- Refining Focus for Upcoming Academic Year

Reference of Note Topics (Starting on Page)
- Feedback from Industry on Previous Academic Year:.........................1
- General Comments from the CM Faculty:........................................2
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Feedback from Industry on Previous Academic Year:
1. Student thesis topics for CM students need to be focused.
2. Overall CM student presentations seemed to be at a lower level this year (2006/2007).
3. Industry presentations (finalists) need to focus more on the meat of the work done. The broad approach (cover everything in 15 minutes) dilutes the ability for the CM students to compete against the other option finalists.
4. Presentation skills need to receive more focus to strengthen the CM presentations.
   a. Perhaps a result of trying to cover too much in 15 minutes.
   b. Give student finalists 20 minutes each might greatly improve overall ability to cover
      material effectively.
   c. Dr. Riley noted that the CM professors have been working on finding a balance of
      student interests, professor feedback and industry mentorship. 2005/2006 perhaps was
      too much professor feedback and 2006/2007 they may have over compensated, and need
      to increase the professor feedback in 2007/2008 a little more.

5. Potential for more integration with AE design options.  In the past there used to be a similar
   design seminar, however that no longer occurs.
   a. Dr. Riley noted that while more efforts are being made to invite/involve the design option
      faculty and students (inviting to roundtable and seminar, the intern workshop is open to
      all students), PACE will remain heavily focused on CM and predominately attended by
      CM students and industry members.

6. Seminar speakers were strong this year.  Encourage to keep that going.
   a. Also noted that one or two of the speakers’ times might have been to long for the subject
      material.  Try to balance that next year.
   b. Good mix of student presentations and the relation to the subject material of the industry
      speakers.

General Comments from the CM Faculty:

1. Each faculty member introduced their respective areas of work, and specifically significant
   progress made in each area.
   a. Dr. Messner: Advanced visualization technologies to improve project design and
      construction education through the use of virtual facility prototypes (VFP).
   b. Dr. Horman: Design and construction of high performance “green” buildings.
   c. Dr. Riley: The Delivery of Green Buildings; Sustainability Education in Engineering
      Education; Housing and Economic Development in First Nations Communities;
      Leadership Development in Construction

2. Dr. Riley presented the Solar Decathlon effort. More information can be found at the new
   website http://solar.psu.edu.
   a. Noted the opportunity for industry sponsorship of the program. Approximately $500K
      still needed.
   b. On the DC Mall 03 – 23 October. Come out and support PSU’s Team!

3. Dr. Riley presented an overview of the past year in PACE.
   a. Efforts made to increase Industry membership.
      i. New contribution levels unveiled this year: Partner, Associate and Donor.
      ii. Benefits of levels discussed. More details can be found at the PACE website
      iii. Appreciation to the historic and consistent PACE Industry contributors.
      iv. Noted those firms that have made increased commitment to move Associate and
      v. Appreciation to the new members.
   b. Noted administrative improvements: Overhaul of PACE database, and upgrades and
      improvements to the PACE website.
   c. PACE Intern Workshop initiated and first year went well.
d. Industry presentations and onsite interviews --- Advised to sign up early. Register on the PACE website: [http://www.engr.psu.edu/pace/RegistrationForm/recruitingform.aspx](http://www.engr.psu.edu/pace/RegistrationForm/recruitingform.aspx).

4. Next year highlighted events:
   a. PACE Roundtable coincides with CONVR2007 ([http://www.engr.psu.edu/convr](http://www.engr.psu.edu/convr))
      i. CONVR2007 22-23 October
      ii. 2007 Roundtable 24 October (Dinner 23 October)
      iii. Both at Nittany Lion Inn
   b. Dates highlighted on PACE website ([www.engr.psu.edu/pace](http://www.engr.psu.edu/pace)).
   c. Intern Workshop: 23 October, Days Inn

5. AE Department Head search underway. Dr. Messner briefed industry on current efforts and working timeline.
   a. Includes faculty from every AE option, 1 undergraduate student and 1 graduate student
   b. Industry noted that industry involvement might be beneficial. Perhaps a luncheon with industry and short list candidates to allow industry to provide relevant feedback to College of Engineering (COE).

6. Dr. Riley noted that all three CM professors have sabbatical leave coming up.
   a. Sabbaticals will be coordinated.
   b. Industry and graduate student support will be sought to help ensure CM course remain strong during this time period.

7. Faculty noted that Department of Civil Engineering is loosing some of their CM professors in the near future and that has impact on the AE CM curriculum.

8. Seeking help from industry to help expand industry contacts. Especially owners and design firms that would have synergistic interests with the CM program.

General Conversation & Questions:

1. Industry asking what is limiting the number of students allowed into the program?
   a. Dr. Riley and Dr. Messner explained limitation to AE department and noted that while they want to strength and grow the AE pool they don’t want to over grow the program either.
   b. New faculty offer ways to expand program with support.
   c. Focusing on the road ahead. Seeing what other programs are doing that is innovative or new.

2. How do we increase industry / student interaction at the PACE activities?
   a. Require students to interview 2 industry members and write a paper for a grade on this.
      List minimum required information to gather.
   b. Industry round-robin where they industry members have short 15-30 minute discussions with Roundtable students.
   c. Start with an ice breaker activity.
   d. Continue pre-brief by faculty to students about what to expect at the events, etiquette, etc.
   e. Coach student on network (how-to and value of) prior to the job fair.

3. How do we get more owner’s involved?
   a. Work with program’s focusing on developers
      i. COAA – Construction Owner’s Association of America (Bob Grottenthaler for pres contact information)
      ii. CURT – Construction User Round Table (contact information Mr. Evey)
   b. Invite them as speakers. PACE members will help provide recommended speakers.
c. Different annual contribution or registration fees for owners. Currently PACE does this, but perhaps formalize it more?
d. It was noted that while PACE companies may be willing to help pay for the attendance of a sponsored owner, many owners avoid this because of perceptions of conflict of interest.
e. Pair speakers – owner and AE and/or builder
   i. Focus concept on coming together as equals.
   ii. Roundtable focus on solutions to AEC industry problems (avoid complaint session) – e.g. might be a moderated BIM session keeping on track with solutions to implementation.
f. Add design aspect to event structure.

**Brain Storming Discussion:**

1. **Healthcare** remains a strong market. The growth in this area is also stressed by increased costs, shortages in skilled labor, increased oversight by bonding firms, scale of the projects limiting competition.

2. Does **prefabrication** offer answers to the problems?
   b. Does prefabrication offer opportunities to “outsource” pieces of construction that are an increasing void of skilled labor nationally right now?
   c. Affects on cost, time and quality?
   d. Stronger at the trade levels.
   e. Missing at the project level.
   f. Limitations of owner perceptions of prefabrication?

3. **Project Supervisor as a career choice.** Helping students realize this can be as strong a career (professionally and financially) as project managers.

4. **Commercial Market Boom?**
   a. Massive amount of work in commercial sector leaving some owners will fewer options.
   b. Residential construction slump has caused residential contractors to look toward commercial construction. Is knowledge base from residential really transferable to commercial?
   c. Increase in construction across the AEC industry is allowing sub contractors to be very selective of which projects they want to work on.

5. **Labor shortage.** Skilled journeymen retiring, not enough new skilled labor to replace them. Exacerbated by the large demand in the AEC commercial market right now.
   a. Language an increasing problem.
   b. Internal relationships between different cultures.
   c. Increasing pressure on immigration and illegal aliens.
      i. Estimated 1/3 of the construction labor pull is illegal?
   d. Training required to increase skill sets and bring in new skilled labor.
      i. Union apprenticeship programs have slowed or stopped.
      ii. Community colleges starting to fill void in limited fashion (e.g. Community College in OH providing strong program for laborers / tradesmen).
      iii. What is the role of CM/GC in training and mentoring sub-trades? How do we make each job a training program also?
1. One thing noted is that CM/GC and sub contractors can (and do now) provide site visits and educational tours or seminars to high school students to get them interested in the industry and specifically in the trade skills.

   iv. Opportunities to work with city governments where the project is located.

   1. Examples were given to compare Hensel Phelps and the Baltimore program to the Clarks’ experience with the DC Program.

   v. Need to identify what is currently out there and working? AGC; Penn Tech (www.pct.edu). Try to get more involvement from Penn Tech School of Construction and Design Technologies (http://www.pct.edu/schools/cdt/).

   e. Lack of skilled labor means an ever increasing amount of supervision required. Blowing GC/CM management budgets.

   f. Shared problem: Owner’s, designers, builders (GC/CM, subs and specialty contractors), users. It has reached a national problematic level. Affecting productivity, quality and costs.

   g. Building Information Modeling (BIM) helping move project development, coordination and construction ahead.

      a. Owner awareness remains the major driving force in the industry. Some owner’s knowledgeable, and some not.

      b. How does this resource get marketed?

      c. How is it getting applied?

      d. What is BIM?

      e. Paying for it? Range: Some see it as an additional service to be funded by the owner. Others see it as an efficiency multiplier and are finding it increase productivity “leaning” the company business practices and more than paying for itself.

7. Collective / Collaborative approach to solve the problems.

   a. Owner’s, designers, builders (construction contractors and managers)

   b. Mr. Evey (DBIA) noted that designers and builders can be referred to as practitioners of the construction industry.

   c. Balance of Risk the cost impacts on a project’s structure.

   d. How do we get owners, designer, contract writers, bond agents and builders to work collaboratively to make smarter more efficient contracts and procurement processes that support the AEC industry, versus fight it and causing barriers?

   e. What matters in the industry? Delivery, Contracting, Procurement, Team Selection. General agreement was that Team Selection (i.e. the members of the team) far out weigh any of the other factors.

   f. Outsourcing AE overseas was briefly discussed. To remain relevant/competitive the AEC industry needs to be able to express what the US AEC industry does that adds value.

      i. It was noted that integrated projects force collaboration and distance is not best to support collaboration. Being present has meaning and adds value all other factors being equal.

   g. Owner Knowledge Growth.

      i. Market has changed. Owner’s need to understand this or risk some large disappointments.
ii. See discussion on commercial market boom. Builders are in a position to select which owners they want to work with and which owners they don’t.

iii. Owner’s need understand how their actions affect projects.

iv. Learn what is important to AEC practitioners, especially contractors (builders).

v. Understand what is viewed as a good owner and what is not?

h. Understanding of change in AEC industry:
   
i. AEC use of technology tools versus creating new tools. Point here is that the tools exist, industry is learning how to use them effectively. (e.g. BIM).
   
   1. Requires an understanding of the tool purpose. Why are we using it?
   
   ii. Team formation. Not selected or formed the same way anymore. (e.g. DBB is not the same structure and evolution as DB projects).
   
   iii. What personal characteristics are needed in the new AEC world? Which personality traits work best?
   
   iv. How do we communicate effectively today? What are the pro’s and con’s? (Email is not always the answer, but the new generation focuses on it.)
   
   v. Does the AEC industry use the same benefits and rewards in the “new world” or does they need to align with changed motivations?

   i. Building the workforce – see labor shortage discussion.

8. **LEED® / USGBC Growth.** Purchasers (owners and occupants/lessee) driving demand.
   
a. Stronger on west cost, but pushing east.
   
b. Knowledge base is still fragmented.
      
      i. Designing for LEED with weak understanding of cost impacts.
      
      ii. Why are we doing certain things in LEED? Chasing points or chasing smart engineering and economically informed decisions?
      
      iii. Impacts of incorporating prefabrication – see prefab comments.

9. **Profit Margins.** Where can builders increase profitability?
   
a. Higher costs of materials, limited skilled labor, unskilled labor requiring more supervision, and competition squeezing already tight margins.
   
b. Where can more profits come from?
      
      i. Owner’s / AE’s paying more.
      
      ii. Process improvement (collectively – see discussion on collaboration)
      
      iii. Builders (GC/CM and subs) improving internal efficiencies – Leaning waste (materials, time, effort), increasing efficacy.
      
      iv. Learning from other industry models using improved supply chain management.
      
      v. Delivery methods which provide greater profit margins?

Regional Concerns:

Dr. Riley focused part of the discussion specifically on regional concerns. North-east, specifically PA and also National Capital Region (NCR). Some of the regionally focused PACE members were asked to discuss issues that they see on a regional basis.

1. Work force quality not as much a problem in Western PA.
   
a. Drywall and Masonary skills are trades with the biggest shortages.
   
2. Bidding using PA mandated multi-primes remains a challenge.

3. Eastern PA is seeing a large increase in Hispanic laborers, but not as much in Western PA.

4. Philly and Pittsburgh mostly union based.
Professional Development:
Specific time was allocated to discussing the idea of professional development within the curriculum.
   1. Significant because the AEC industry is a custom business and people are a key factor in success in the industry.
   2. Need to impart “Why do we do what we do?”
   3. **Conflict Resolution.**
      a. *Conflict Communication Skills* (general agreement most students are very weak in this area). Industry environment is very different from college educational environment.
         i. Learning to address conflict versus just avoiding the issues.
         ii. Learning to understand both sides of the table in the working world.
         iii. Suggested teaching through scripted conversational skills as a starting point.
         iv. Learning to use the phone and not relying to heavily on email.
         v. Peer mediation courses as an example of potentially useful classes.
   4. Education on people issues and roles in the AEC industry
   5. It is important for students to understand what the 1st year transition to industry is going to be like.
      a. What it means to work.
      b. Understanding the transition from being on top of the pile and going back to the bottom.
      c. People interactions (personal interactions) versus getting lost in the computer.
      d. Integrating emotional intelligence testing and discussion into the CM educational activities.
   6. General agreement that emotional intelligence is the skill to learn, but it can be learned and taught.
   7. Identifying with industry what skill sets you want versus personality traits? (Perhaps a research area)
   8. What is a “good” resolution to conflict and what are the goals?

Conclusion of Meeting:
   1. In conclusion to the meeting the brainstorming was reviewed and some key recurring topics were identified. These recurring topics are highlighted in **BOLD** above.
   2. General 2007/2008 themes were proposed:
      a. Collaboration
      b. Solutions
      c. Alternatives
      d. Innovations
      e. Value Added
      f. Focus
   3. General focus for the structure for 2007/2008 PACE events:
      a. AEC + Owner
      b. Collaborative panels focused on solutions.

Penn State’s Architectural Engineering (AE) PACE would like to thank all of those companies who contributed to the 2007 Advisory Board and specifically the attendees for time, candor and advise. We look forward to a collaborative and productive 2007/2008 academic year. Visit us at www.engr.psu/pace!