The Linus Pauling Science Center: OSU’s Largest and Most Complex Academic Building

Featured article on page 3
A message from the Acting School Head

As winter term comes to an end and students return from Spring Break, activities in the School of Civil and Construction Engineering continue at full speed. It is an exciting time here on campus with new faculty joining our team and the search for six additional faculty positions underway. These additions to our team will have a significant and positive impact on our mission of producing top engineers and constructors. Burkan Isgor, from Carleton University (Ottawa, Canada) and Haizhong Wang, from Trine University (Angola, IN) will join us over the summer. Burkan’s area of expertise is structures and construction materials. Haizhong’s will be joining us in late summer. His focus area is transportation modeling and planning. As our faculty grows, our class sizes will decrease and our quality will be even better than it already is. Look for more information on our faculty additions in future editions of our newsletter.

We are also optimistic for our graduating students entering the workforce and continue to be grateful for the support of industry throughout these challenging economic conditions. Your presence on campus, in the classroom, at student group meetings, and through our networking and recruiting events has been a consistent reminder of the importance of growing our School and future hand in hand with our industry partners. With the continued support of our partners we have sent students to the ASC Reno Construction Competition, the Engineers Without Borders Conference in Las Vegas, NV, the Geo-conference in Oakland, CA, the Earthquake Engineering Research Institute’s Conference in Memphis, TN, and other student events. In addition, our partner support has had a significant impact on how our students perform at these competitions. At the ASC Reno Competition, OSU CCE students took two first place awards and one second place award. A special thanks to Dr. David Rogge and our industry partners that helped with coaching our teams. Read more about the 2012 ASC Competition in this edition of OSU Building Together.

In our last newsletter, I talked about the positive transition our School and The College of Engineering was undergoing. I anticipate that we will have a named, permanent Dean by our next newsletter. The School of Civil and Construction Engineering is a great institution. I look forward to continuing our progress, working with each of you to make it even better!

Go Beavs!
Sincerely,
David Trejo
Acting Head, Professor
Hal D. Pritchett Endowed Chair

SAVE THE DATE

Contractors’ Night
April 13, 2012

AGC Student Chapter Golf Invitational
May 4, 2012

CCE Graduation
June 15, 2012
The Linus Pauling Science Center: 
OSU’s Largest and Most Complex Academic Building

Named after OSU’s most famous alumni, the Linus Pauling Science Center brings scientists, staff and students together in a landmark facility designed to foster interdisciplinary collaborations in research, and to serve as a working monument to Linus Pauling.

Faced with a 24 month construction schedule, Andersen Construction served as CM/GC for the project and completed the project on time and on budget last September. The LEED Silver facility is now OSU’s largest and most complex academic building. And timing for the high-quality building couldn’t have been better.

“The timing of the project was a perfect storm,” said Brian Price, Andersen’s Senior Project Manager. “The economy had dropped and contractor’s pricing was very competitive. We were able to deliver the guaranteed maximum price under the budget that included all of OSU’s alternate additions and some additional ‘wish list’ items. Due to budget successes during the project, Andersen was able to transfer our construction contingency to OSU, which they then spent on furniture and added features for the building.”

Linus Pauling is known for his great contributions to the areas of science and health, winning two Noble Peace Prizes. The 4-story + basement, 105,000 square foot building echoes that greatness and now serves to inspire the next generation of scientists. Building functions include research labs, vivarium and clean room labs where experiments are carried out more efficiently. Even the innovative artwork has been thoughtfully placed. To achieve the highest level of quality, Andersen managed a collaborative process with end users throughout construction of the project.

“To ensure the highest value, we worked openly with stakeholders, applying their input,” said Price. “The end users (researchers and faculty) of the space were invited monthly to tour the site. Not only did this help us understand their usage, but also it allowed us to trouble shoot problems and make late changes in the end users programming.”

Over 60% of the building is dedicated to research, performed in 78 laboratories. The world renowned Linus Pauling Institute is located on floors 3 & 4. Cutting-edge research includes studies on vitamins, micronutrients and phytochemicals that may play a role in preventing or treating disease and achieving optimum health.

OSU’s Department of Chemistry is also located in the building. These modern chemistry labs allow students to learn critical components of their educational pursuits alongside 90 of the nation’s most talented researchers and scientists. The state-of-the-art laboratories include extensive ductwork and utilities, which resulted in major challenges early in design. 3D (BIM) modeling resolved these issues prior to and during fabrication and installation of these technical systems.

“BIM modeling was used to carefully plot all the mains and branch lines, which corrected over 21,000 conflicts,” said Price. “The BIM modeling process gave us the high levels of detail needed to fabricate ductwork and piping spools off site and then assembled in the labs.”

Anchoring the facility is a 180-seat auditorium that includes full multimedia capabilities and the ability to capture and display events for distance education. Students learn chemistry in modern 24-person laboratory modules. OSU anticipates thousands of undergraduate and graduate students of nearly every major will utilize this state-of-the-art facility each year.
AGC Student Chapter at Oregon State University

The AGC Student Chapter maintained a full calendar of Speaker Meetings throughout the Winter Term. With one to two presentations weekly, our students had the opportunity to meet a variety of contractors with the opportunity to secure summer internships or post graduation employment.

Student Officers are also hard at work planning the two flagship events of the year—Contractors’ Night and the Annual AGC Student Chapter Golf Tournament.

Contractors’ Night will take place on Friday, April 13. We are excited for our keynote speaker, Jack W. Peters, Speaker and Author of *Work with a Crowbar*. Peters, also an Oregonian businessman, will present his principles of success on how to do more with less.

The 27th Annual AGC Student Chapter Golf Tournament is schedule for Friday, May 4 at Trysting Tree Golf Course in Corvallis, OR. Registration will begin in early April and will be available at Contractors’ Night as well.

For more information on these events, or to register to attend, contact Margie House at (541) 737-4096 or via email at margie.house@oregonstate.edu.

2012 Associated Schools of Construction (ASC) Student Competition—Reno, NV

The School of Civil and Construction Engineering had eight teams represented Oregon State University at the 25th annual Associated Schools of Construction Student Construction Management Competition in Reno/Sparks, Nevada. We are proud of the professional performance of all of our teams. In addition, the Mechanical and Marine teams were awarded first place by the judges, and our Heavy Civil team was awarded second place. These positive results would not be possible without the educational foundation delivered by our faculty and the generous outpouring of support from industry.

A special thanks to the following companies for their contribution of time and energy to help educate our teams:

- Advanced American Construction
- Alliant Systems
- Fortis Construction
- Hoffman Construction
- Howard S. Wright
- Kerr Construction, Inc.
- Kiewit Bridge & Marine
- Lease-Crutcher Lewis

And, thank you to our Sponsors for assisting in making the trip possible:

- Andersen Construction
- Coral Construction Company
- Howard S. Wright
- Kerr Contractors, Inc.
- National Electrical Contractors Association (NECA)
- Portland Mechanical Contractors Association (MCA)
- Walsh Construction
- Wildish

Thank you to our industry partners who visited campus this Winter:

- Bremik Construction
- Hoffman Construction Company
- Kiewit Underground District
- Sierra Nevada Construction District
- Temp Control Mechanical
- Turner Construction Company
- Walsh Construction
- US Army Corp of Engineers

Schedule a Speaker Meeting
Contact Jacob or Mitch at: osuagc@gmail.com

We look forward to seeing you on campus!
Engineers Try to Catch Up to Contractor’s Innovation for Trenchless Pipeline Installation

The Oregon Department of Transportation (ODOT) has recognized that pipe ramming, an efficient and relatively recent, trenchless technology for new pipe and culvert installations could produce significant savings in its culvert construction work. Contractors have been using pipe ramming for some time and with great success, however, engineers haven’t really caught up with their experience and expertise. Although planners want to take advantage of pipe ramming, they’d prefer to use traditional or improved engineering approaches to help select the appropriate pipe wall thickness and strength. The only problem is that there are no existing approaches for pipe ramming installations – a significant barrier for recommendation and use by engineers.

To improve their understanding of pipe ramming applications, ODOT has teamed up with Professor Armin W. Stuedlein, P.E., of the School of Civil and Construction Engineering at Oregon State University. Professor Stuedlein and his students began the study in January 2010 with the goal of understanding the mechanics of pipe ramming installation, and then adapting existing pile driving and pipe jacking models for use with pipe ramming construction. Given the lack of existing data on installation performance, the first order of business was to perform a full-scale instrumented pipe ramming installation. However, this feat required significant input from experienced contractors. It turns out the State of Oregon is home to a number of expert trenchless tech contractors. The Oregon and Southwest Washington Chapter of the National Utility Contractor’s Association, led by Immediate Past President Lyle Schellenberg, and Executive Director Melinda Dailey, worked to organize a cadre of member firms that would volunteer equipment, labor, and expertise to support the ODOT pipe ramming study (see Table).

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<th>Armadillo Underground</th>
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<td>Gonzales Boring and Tunneling</td>
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<td>J.W. Fowler Construction</td>
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<td>Moore Excavation</td>
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<td>Emery &amp; Sons, Inc.</td>
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<td>Peterson Machinery Co.</td>
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<td>Wyo-Ben, Inc.</td>
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<td>RDO Equipment</td>
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“I was honored to work side-by-side with NUCA member firms. The degree of cooperation and teamwork exhibited by NUCA members throughout the planning and installation of the test ram was critical,” says Dr. Stuedlein. “There is no doubt that the credit for our success with the field study rests with the contractors and equipment suppliers who volunteered their property, equipment, labor, and effort. If I had to do it again, I wouldn’t change a thing.”

The field study was conducted on the property of Emery and
Trenchless Pipeline Installation...continued

Sons, Inc., in August 2010. The test pipe consisted of a 115 ft, 42 inch diameter pipe, contributed by Gonzales Boring and Tunneling. The pipe was instrumented with over ninety strain gages, and two pairs of high-frequency strain gages and accelerometers (see Figures 1 and 2). The ground elevation above the pipe was monitored to detect ground displacement. Additionally, ground vibrations that developed due to the impact of the pipe hammer on the pipe were monitored. This information will be used to help develop new guidelines to help engineers plan and specify pipe ramming installations. For example, ODOT would like to adapt methods from pile design and installation for use with pipe ramming and to determine the suitability of pipe ramming hammers. The choice of a suitable hammer requires the matching of the energy required to get the pipe installed without providing so much energy that the pile will be overstressed and damaged. Selection of the suitable hammer and appropriate lubrication are ways in which ODOT and its engineering consultants can improve the design of its culvert installations.

Presently, Professor Stuedlein and his students are evaluating performance data and working to generate new methods to analyze the installation of pipes by ramming. It is anticipated that the end user, practicing engineers and contractors, will use these new methods in their planning and design of pipe ramming installations.

For more information, visit: http://web.engr.oregonstate.edu/~armin/H_PipeRamming.php

Initiation of the test ram with the 16 in Vermeer hammer. The pipe hammer is comprised of a double-acting pneumatically driven piston, delivering up to 240 blows per minute.

Undergraduate Research Assistant Mitch Madsen prepares the surface of the test pipe for resistance-type strain gages.

The College of Engineering is among the nation’s largest and most productive engineering programs. In the past six years, the College has more than doubled its research expenditures to $27.5 million by emphasizing highly collaborative research that solves global problems, spins out new companies, and produces opportunity for students through hands-on learning.
Welcome New Faculty

The School of Civil and Construction Engineering welcomes Dr. André Barbosa. Dr. Barbosa joined Oregon State University from the University of California – San Diego. He also spent some time in Portugal as a tenure-track assistant lecturer at the Universidade Nova de Lisboa. His industry experience in design of buildings and bridges, prior to joining the PhD program at UCSD, serves as the foundation for his current research and teaching interests.

Dr. Barbosa’s research interests include performance-based earthquake engineering, nonlinear structural analysis, risk analysis, multi-hazard loss estimation, assessment of robustness and resilient design of structures (reinforced concrete, steel, and timber), high-throughput computing, and virtual reality modeling of structures.

His teaching interests include structural analysis, structural dynamics, structural reliability and risk analysis, probabilistic methods applied to engineering, and performance-based earthquake engineering.

André Barbosa, Assistant Professor
541.737.7291
andre.barbosa@oregonstate.edu

Beaver Happenings

Feb. 28 & 29 CCE hosted over 50 young women in middle school and high school through the OSU AWSEM (Advocates for Women in Science, Engineering and Math) club. Traffic activities were led by Karen Dixon, Professor and CE Excellence Faculty Fellow. Students toured and tested the vehicles in our renowned driving simulator, observed how engineers use computer programming to test roadway safety, and were also exposed to areas of water resources engineering with the assistance of Arturo Leon, Assistant Professor.

On March 3, AGC Student Officers led middle school students in Winter Wonderings, a program geared towards talented and highly-gifted students, through a construction engineering management activity. Students worked in teams to design and build structures based on a set of specifications. Each team presented to our panel of judges and awards were given to the best bid, most creative design, and best presenters in each session. This was the second annual AGC Student Chapter session of Winter Wonderings—a much anticipated outreach opportunity!
OSU Building Together: CEM Industry Newsletter
School of Civil & Construction Engineering
Construction Engineering Management
101 Kearney Hall
Corvallis, OR 97331
http://cce.oregonstate.edu/

Address To...

First Last
Company Name Here
123 Everywhere Avenue
City, State, Zip

For over 35 years OSU’s Construction Education Foundation has supported the Construction Engineering Management Program through dedicated funding. Funds raised support scholarships, job-placement assistance programs, professional associations and faculty endowments helping make our program one of the premier construction education and research resources in the Pacific Northwest.

Interested in helping support the CEM Program or making a gift to the Construction Engineering Foundation:

Contact: Margie House, CEM Industry Relations Coordinator
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