// FALL / WINTER / 2014 //

Building Futures®

THE CONSTRUCTION INDUSTRY JOURNAL FOR STUDENTS

a publication of the Oregon Building Congress // $3.95 //

Sparking Careers

Career Technical Education programs give students view to their futures

Work Anywhere From The Ground Floor To The Top Floor

For students with a great attitude seeking a career in the trades.

As glaziers, painters, drywall finishers and flooring installers, the Finest in the Finishing Trades puts the "finishing" touches on many well-recognized buildings throughout Oregon and Southwest Washington. And it doesn't require a college diploma to get you there. You just need a great attitude and the right apprenticeship program. The fact you get paid throughout your training comes as an added bonus. After three to four years of apprenticing, you gain your journeyman level status and earn a very competitive wage along with health care and pension benefits.

For information on training and apprenticeship opportunities contact:

Linoleum, Carpet & Soft Tile Applicators Training: John Lawson, 503-481-3420
Painter's, Drywall Finishers Training Center: Bill Regan, 503-287-4856
Glaziers, Architectural Metal & Glassworkers: Alan Brown, 503-491-7359

www.finishingtrades.org | 503-222-1584

The Finest in the Finishing Trades

Paint | Glass | Floors | Drywall

Four Trades. One Mission.
Jobsite Safety, Training and Productivity.

Building Futures®

FALL / WINTER 2014
Vol. 17 Issue 2

Distributed by: Oregon Building Congress
9450 S.W. Commerce Circle, Suite 260
Wilsonville, Oregon 97070
Phone: 503-685-8313 Fax: 503-682-1696
e-mail: tgoodhue@obcweb.com
www.obcweb.com

OBC Executive Director: Tom Goodhue
Publisher: Brian Hunt
Editor: Theresa McKinlay
Design: Shannon Vincent
Advertising Sales: Nick Bjork
Contributing Writers:
Mark Clifford, Julie Coleman, Kristin Gunson, Connor Huske, Kyle Laier, Mary Ann Naylor

Published by:
Daily Journal of Commerce
921 SW Washington St., Ste.210, Portland, OR 97205
Phone: 503-226-1311; Fax: 503-226-1315
e-mail: brian.hunt@djcoregon.com

Index to Advertisers

Building Futures®

FALL/WINTER 2014 // Vol. 17 Issue 2

ON THE COVER

Cutting torch and pole climbing photos by Lindsay Cimina Photography for Oregon Tradeswomen Inc. Students talking with architect photo courtesy Sabin-Schellenberg Professional Technical Center. Student construction photo courtesy ACE Academy.

BUILDING FUTURES MAGAZINE ONLINE!

See expanded coverage at djcoregon.com/building futures! Are you interested in joining the effort to educate young people about the construction industry? Contact Tom Goodhue, Oregon Building Congress executive director, tgoodhue@obcweb.com.

Welcome **From Executive Director, Tom Goodhue**

Sustainability for CTE Programs

Tom Goodhue

In January the Oregon Legislature awarded $11.1 million in grants to 32 applicants for CTE and STEM programs in our public schools. The impact of those grants will be felt at 154 schools across the state. Of that $11.1 million, $9.1 million is for CTE programs (Career Technical Education). The Legislature, like many tax payers and citizens, recognized that the trend has been to eliminate CTE programs in our public schools rather than add programs that give students the opportunity to explore potential career pathways. Faced with reduced revenues, many schools and school districts have been left with few choices in order to balance their budgets.

The CTE and STEM revitalization grants have been a real game changer. Schools are seeing the opportunity to expand course offerings and many are bringing back construction and manufacturing curriculum along with supporting engineering classes. That is good news for construction-based employers that are anticipating a huge need for future employees.

One word of caution to those schools and districts that have received a grant: Remember, it is a "REVITALIZATION" grant. Many grants that I have reviewed rely heavily on industry support to continue their programs. Past experience has demonstrated that while industry may support programs in kind, financial support is more difficult. Schools that put their expectations solely on industry support will find it a full-time job trying to raise funds rather than concentrating on educating their students.

Let me suggest another model, Student Based Enterprises. Let's face it, CTE classes are just expensive to run. It requires a shop, consumable materials and other supporting costs that are totally different than a conventional classroom setting, not to mention a lower student/teacher ratio to ensure the safety of the students. Programs should explore neighboring schools and districts, leveraging their resources to create world-class programs. Ultimately the program needs to develop a product that can be marketed and sold at a profit to support itself. Students in several classes could all have real-life learning experiences in the venture. Business classes could be developing business plans for the product, while marketing classes could be figuring out how to approach the marketplace. Engineering and architectural classes could be designing, while construction and manufacturing classes make the final product. This entire process could be tracked financially by an accounting class. This is very similar to the Junior Achievement model with the added real-life business aspect that actually sufficiently supports the sustainability of the program.

Sustainability not only means financial continuation, it also requires sustaining support from school administrators. As I travel and speak in front of many groups with CTE teachers, I always ask one question: If you were to retire today or leave, would your school continue the program? Overwhelmingly CTE teachers say no. Passion for these programs rests entirely with the teachers who are teaching them. Many administrators still believe that college for all should be the goal. Unfortunately, while some 66 percent of graduating high school students will attend college, only 25 percent of those that enroll will graduate with degrees. Administrators need to embrace jobs in the construction industry and support educational programs that will help to educate and train students for high-demand, high-pay positions.

In the state of Oregon, the average age of an apprentice is 28 years old. This statistic is universal throughout the United States. The construction industry is in desperate need to create a pipeline to the family wage earning jobs they offer. Why should it take a person 10 years to finally find their passion for a career in construction? Schools that seek industry support need to realize that industry stake holders want something more than just an opportunity to help with the CTE program. Their motivation is simple, they want the ability to influence and recruit future employees for their industry.

Without the support of administrators, the teaching of career technical education programs, and an engaged industry, the continuum is broken and the model is unsustainable.

OBC is a resource to those schools and districts with CTE programs. Let us help you make your efforts a successful business model.

BY JULIE COLEMAN

Scaling New Heights

Sabin-Schellenberg Professional Technical Center's CAD students win national architectural award

North Clackamas School District's Sabin-Schellenberg Professional Technical Center students are always up for a challenge, especially if that challenge involves creativity, collaboration, and the opportunity for achievement. So, when the SSC advanced CAD students opted to compete in the 6th annual Mock Firms Architectural Design Competition in Chicago last spring, the school supported them wholeheartedly. "The Strength to Soar" was the theme for the design project, demanding sustainable principles, a design aesthetic, a strong presentation, and a well-organized mock architectural firm. And soar they did, as five SSC CAD students took Second Place in the Western Region as well as Second Place in the overall National Skyscraper Championship.

Their challenge was to organize a simulated or "mock" design firm to conceive, coordinate, construct and commercialize a skyscraper, to be located in downtown Dallas, Texas. The project parameters included the creation of a mixed-use "vertical village" incorporating retail and office space, residential units, sports facilities and green space. Paramount was the inclusion of sustainable features and elements to promote a healthy, active lifestyle.

To closely simulate industry realism, student participants submitted a project proposal to qualify for participation in the Mock Firms competition. Their declaration summarized the scope and general design of their building project, including preliminary sketches of the partner's initial design ideas, an organizational chart outlining the functions of the contributing team members, and promotional materials. In addition to the proposal, the final project consisted of a video introducing their company and design; board presentations showing plans, perspectives and sections of the building; a scaled physical model of the building and its surrounding environment; and a 10-minute oral presentation which included descriptions of materials used, architectural styling, amenities, features, innovations, sustainability and LEED design goals, creative financing plans, and community benefits.

Team members (left to right) Logan Gillis, Dustin Lurie, Noah Davis, Bree Wescovich, Haley Wilson, David Gerritzen, Marinn Longenecker, Madison Phillips and Brett Sonflieth (front) with both models

The event offered students the unique opportunity to interact with some of the industry's leading design professionals, and drew talent from around the U.S. and

the world. CAD Instructor Nancy Merchant knew from attendance at last year's event just how strong the competition would be, so she advised this year's 11 student participants to ramp up their efforts. "I said … you're really going to have to work hard to compete in this. It's like a collegiate or professional design competition."

So, SSC CAD students reached out to local design professionals and members of the American Institute of Architecture Students' Portland State University chapter. They received support from two Portland architectural firms – ZGF Architects LLP and GBD Architects, as well as structural engineering firm KPFF Consulting Engineers.

Two teams of five students each created mock "firms" for the competition, with each student assigned a different position in the firm. Both teams created a company logo, business cards, a website and other required marketing materials. Another student, Rex Putnam High School senior Brett Sonflieth, served as an independent consultant to both teams and built physical models of the two teams' designs. "New Generation Architects" or NGA consisted of team members Noah Davis, Logan Gillis, Andy Le, Dustin Lurie and Bree Wescovich. Kevin Alfara, David Gerritzen, Marinn Longenecker, Madison Phillips and Haley Wilson dubbed themselves the "Architects of Rebellious Innovation," or ARI. ARI's winning design featured a building with two towers, rising from a podium and connected by sky bridges as well as a distinctive fin-shaped element. The design was an effort by everyone on the team, who drew plans in AutoCAD and 3D modeled it in SketchUp. Merchant, the group's instructor, appreciated how each student brought something different to the design. All were interested in the creative process, but some focused on the nitty-gritty stuff, like how much the building would cost, while another focused on transporting the piece from Oregon to Illinois (Hint: He used video camera cases).

Helping design a 121-story skyscraper was a daunting task for ARI team lead architect Marinn Longenecker. "It was a very big lesson in perspective, in how big a skyscraper is," the Clackamas High School senior said. Marinn said she learned a lot through the design process, especially about fitting in all the required

ARI's winning presentation board.

elements. "Doing elevators in the building – that was also a very challenging thing," she said. "You have to accommodate for how much space they take and also the space you have to have for all the mechanical pieces for the building. That was eye-opening."

Robert Petty, head of the model-making department at ZGF Architects, mentored Brett Sonfleith as he built the physical model. This mentorship enabled Brett to lay out all the pieces and then work with ZGF to cut them using lasers. "The 'fin' at the top was 'printed' on our new MakerBot 3D printer," Merchant said. "It was challenging to take a 3D surface model and convert it to an .stl file that could run the 3D printer, but Brett stuck

with it until it worked."

Sonflieth said the experience helped solidify his decision to study construction engineering management at Oregon State University. Not only did he learn firsthand how much dedication it takes to design a building, "I had to quit baseball, but it was totally worth it," he said. "What it takes to complete a project like this is not just the time you schedule, but much more."

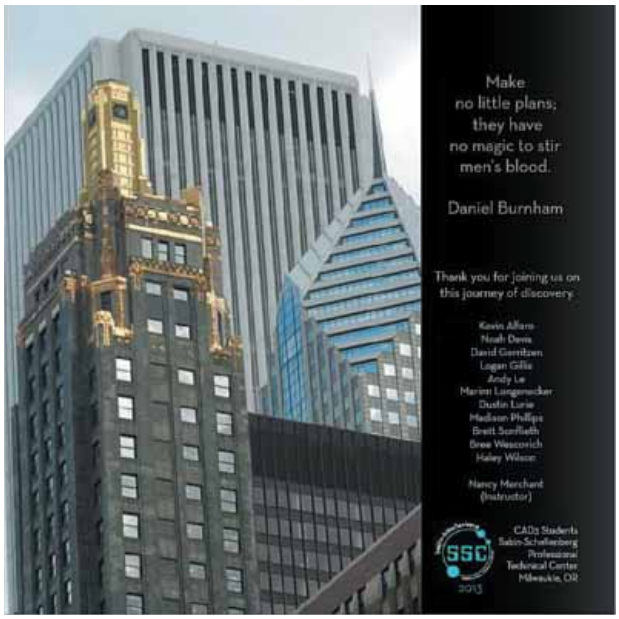
For eight months, these 11 aspiring young architects and engineers collaborated with each other, their instructor, and outside professionals as they pitched their design concepts, receiving immediate feedback and evaluation of their work. Throughout this process, the students honed their final projects, making them ready for presentation before some of Chicago's top design professionals. ZGF staffers helped the students refine their talking points for a 10-minute presentation to sell their concept to the judges. The students also took advantage of the firm's laser cutter to create 4-foot-high models of their skyscrapers.

According to ZGF project architect Brian Dueltgen, "If you're in a competition, not only do you have to do the required model, but you have to tell a good story. It's a really important thing that you have to craft. Getting (the students) to think about the big idea was one of the things we talked a lot about."

The competition proved to be an ideal opportunity to expose the high school students to what it's like to work as an architect. "I think this is a really great springboard for them to think about the construction industry and architecture," Dueltgen said. Instructor Nancy Merchant agreed. "That, to me, was the real value of it," she said. "I want to get the kids out there and see how people really do it ... they knew their stuff because of all the mentoring."

Working closely with Portland-area design professionals was one of the most rewarding parts of the process for team member Marinn Longenecker, who plans to study engineering at Clackamas Community College.

"We ran into several problems as we



Page 30 from the students' coffee table book.

were going through the design process," she said. "That was a very good experience ... to hear what they thought of our designs and give us tips."

GBD principal-in-charge and project manager, Craig Davis, volunteered to review the students' designs. Davis said ARI's concept stood out. "Their model was pretty impressive. These are huge buildings, and they had a nice scheme that had a good look. In the long run, I did nothing except nudge them in the right direction. They worked super hard. Having them come out in second place in the nation, that's pretty amazing," he said.

ARI's Haley Wilson presenting in Chicago with architect from Will & Perkins firm

Work on the project began in earnest in January. Weekdays were spent on their design work, and weekends were for fundraising, to get both teams to Chicago for the four-day trip – a costly proposition, especially since one of the students was homeless and several had limited resources. To help them understand just how tall their buildings were at the required 100 stories, these CAD students participated in a "Climb to Chicago" activity. With per-story sponsors making pledges, they spent Saturday mornings in February-March climbing over 1,700 stairs on selected climb routes in Happy Valley, Mt. Tabor, and on the OHSU campus in Portland. Generous sponsorships from local architectural, engineering and construction firms, as well as parent-led fundraising activities, raised more than $8,000, allowing all 11 students, their faculty advisor and a parent chaperone to attend the competition event in Chicago for only $20 per person.

Ultimately, the students gained lifelong skills in design perspective and experienced opportunities for new discoveries and achievements through collaborative learning. The project fostered cooperative educational experiences for these students, helped prepare them for a workplace environment, and allowed them to enjoy a level of satisfaction unparalleled among other personal experiences. Not only did some of these teenagers win second place in a nationwide competition, they all experienced the opportunity to learn the history of skyscrapers as they researched, wrote a "coffee-table photo book" and then got to actually visit many of the most famous high-rise buildings in the city where it all began, Chicago. After all, "*Like cathedrals and palaces of the past, skyscrapers today define their cities' identities as they shape the skyline.*"

Julie Coleman is with Sabin-Schellenberg Professional Technical Center.


Maddie, Marinn and Haley meet with KPFF's Norm Faris.


CAD3 students consult with Craig Davis of GBD Architects.

BY KYLE LAIER

CAIS shines light on next generation of workers

More than six years ago, local manufacturers responded to a shrinking pool of skilled workers and the dwindling number of high school's offering industry relevant training to prepare the next generation of workers by creating the Clackamas Academy of Industrial Sciences (CAIS). Partnering with the Oregon City School District and Clackamas Community College (CCC), these manufacturers founded a high school with the vision of creating tomorrow's innovative workforce in manufacturing, engineering and construction trades.

Four years later, the Clackamas Academy of Industrial Sciences has shown exceptional progress toward the aggressive vision of preparing a highly-skilled, adaptable and diverse workforce worth the expenditure of resources committed. Additional companies have joined the founders to build an exceptional high school. Graduates from the first two classes have earned industry-recognized certifications from CCC and the American Welding Society. Internships have translated into high-wage, high-demand jobs for graduates. This year, more graduates will leave with industry certifications than the first two graduating classes. In addition, CAIS will graduate its first group of students with manufacturing- and engineering-related associates degrees from CCC.

The number of students graduating with certifications and associates degrees doesn't tell the whole story. The faculty and governing board of industry leaders at CAIS have worked hard to create a school that takes preparation to a new level. The pillars that support CAIS cultivating tomorrow's innovative workforce are a career-relevant education, industry exposure, internships and the goal of all students graduating with relevant certifications or associates degrees.

The most critical pillar of the educational experience at CAIS is the focus on making every course career relevant. Many high schools with a similar mission have traditional academic courses and technical courses. At CAIS, we have taken on the challenge of making all traditional academic courses as career relevant as the technical courses. We've done this by creating English courses that focus on teamwork, soft skills, lean manufacturing and equity in the workplace. Math courses focus on solving real construction and manufacturing problems. Students learn history through the lens of economics. Unlike any other high school in the region, students in core academic courses are learning the required Common Core State Standards and industry-needed skills and knowledge at the same time.

Many students will leave CAIS having participated in an industry-related internship.

Industry exposure is vital in motivating students and assisting them in finding a career that is right for them. Many in our communities believe manufacturing is gone, or even worse, a dumb and dirty job. They don't realize that manufacturing is still the backbone of our economy and innovative companies are spread throughout the metro area desperately searching for a skilled workforce. Students are introduced to these companies and their opportunities through field trips, guest speakers and hands-on activities put on by our partners. Most importantly, it gives CAIS students an opportunity to learn and network with those they will be colleagues with in the near future.

Many students will leave CAIS having participated in an industry-related internship. Past graduates have participated in internships at Benchmade, Enoch, Pioneer Pump, Miles Fiberglass, GK Machine and Northwest Technologies to name a few. This helps tomorrow's workforce practice the vital soft skills needed on the job, build a solid resume and create a strong network.

We emphasize the idea of diploma plus to our students. Young people don't understand that in today's economy a high school diploma is no longer the key to an entry-level job with growth opportunities. Education or training beyond a diploma is a must. Our students access CCC to earn certifications in areas such as welding and machining. Students looking to continue on to a four-year college in engineering or other career paths can work toward industry-related transfer degrees.

The Clackamas Academy of Industrial Sciences is committed to creating a highly-skilled, adaptable and diverse workforce to meet the regional workforce need. CAIS is a district-sponsored charter school open to any student living in Oregon. The school serves students in 8th through 12th grades. Manufacturers and construction organizations interested in supporting the school through board membership, field trips, guest speaking, donations or internships are encouraged to contact the school at 503-785-7860.

Kyle Laier is the principal at CAIS, http://caisoc.com.

BY CONNOR HUSKE

Bowmen House 3D fabrication a lesson in real-world skills

As an aspiring engineer there are many talents one must demonstrate and maintain in a field consisting of new design and ever-changing technology. My name is Connor Huske, currently 18 years old and a recent graduate of the Sherwood High school class of 2014.

The City of Sherwood is an amazing community to develop an understanding in engineering. With the engineering equipment available at my grasp I was allowed endless possibilities of creativity. Equipment included 3D printers, laser cutters, plasma cutters, CNC routers, vinyl machines, and 3D scanners. Our engineering lab is a constructive environment where others collaborate and expand from each other's knowledge. When taking those classes I woke up every morning excited for school. I wanted to get to the lab and start drawing up models on the computer.

My teacher was Mr. John Niebergall. He is the leader to my vision of becoming an engineer. I learned a lot from him, not only technical tricks related to the computer programs, but real life skills that persist as you venture into the real world and are applying for your dream job. It is without a doubt that without this class and Mr. Niebergall as an educator, I most likely would not be pursuing the engineering field.

Well, enough introduction – let's get down to the cool stuff. As my skills continued to grow I took on a major feat: A scale replica consisting of our very own Bowmen

House. What is the Bowmen House you may ask? It is a long process of building an actual house that is put up for sale. The school funds the property and the woodworking students are educated on the basic parts of framing a house. The interior design students assist in the theme of the landscaping and design aspect. In the end, there is a finished house assembled by the hands of high school students. How I come to play in this whole scheme of things is three basic parts: the architect, the builder, and the engineer. I was all three as I drafted the original plans with a professional architect, Richard White, as well as nailed the boards in the building process, and manufactured a scale model using my engineering skills.

With a major project ahead of me I looked at the big picture, then figured sections to break down. Step one was to analyze the plans of the house and use an architect's ruler to scale correctly. Then I would draft the 2D sketches of the pulled dimensions on a program called Rhino. After the sketches were drawn I would send it to the laser cutter to cut and etch the walls and panels. The entire process was a jumble of notches similar to a puzzle in order for everything to snap together. There were many mistakes but that is part of the learning process. I felt like I used more math in that class than an actual math class. Once the skeleton of the house was together I added minor details, such as 3D printed furniture and appliances, laser etched cabinetry, plexi glass to resemble windows, and small LEDs as lighting.

The final product was phenomenal to say the least. It drew in eyes from everyone, staff and other schools getting into the engineering technology. A lot of time and energy was put into this piece of work, but I couldn't have done it without help from Hannah Bandith, as she was very into the interior design, as well as Leo Urmini, an expert in modeling furniture and printing good products. And utmost gratitude to Mr. Niebergall, for without him, none of this would exist.

I am very excited to see what evolves from this generation's engineers. May there be an excellent future out there for us engineers – we're ready for whatever is coming.

Connor Huske is a recent graduate of Sherwood High School.

BY KRISTIN GUNSON

Lane ESD tackles CTE issue head on with help of grant

"This is the year for CTE!" says Kristin Gunson, Regional Career Technical Education coordinator with the Lane Education Service District in Eugene, Ore. Partnering with schools, industry and Lane Community College, Lane ESD has several new projects already underway this year.

Leaders in the construction industry are speaking clearly about their need for skilled and trained workers. According to the Oregon Employment Department, Oregon's Construction and Transportation sectors will experience double-digit workforce growth (new and replacement employees) between the years of 2012 and 2022. For example, employers will need 831 cost estimators (28.1 percent increase); 1,148 supervisors and managers (a 26.6 percent increase), and 735 civil engineers and technicians (combined 13.5 percent increase). Table One (see page 12) illustrates labor market growth for this sector.

In addition to this labor market growth, construction and transportation engineering technicians continue to be underserved and under-represented. For the most part, the construction engineering technology and civil engineering workforces were white and male. Between 2006 and 2010, females represented only 10.6 percent of the civil engineering workforce and only 7.1 percent were construction managers. The number is even more disparaging for first-line supervisors of construction trades and extraction workers; only 1.8 percent of this workforce were women between the years of 2006-2010. For same years, 89.5 percent of all Oregon civil engineers and 94.9 percent of all surveying and mapping technicians were white. Table Two (see page 12) depicts a sample demographic profile of occupations within the construction and civil engineering technology workforces. This data illuminates a need for targeted recruitment, education and training strategies to support "middle skill" and knowledge-based occupations within the Construction (e.g., bridge, highway, roads) and Transportation industries.

The jobs of the future require technical skills and knowledge. Here a student learns state of the art surveying techniques

To meet this labor market need, Lane County's Construction Engineering Technology Program is building on work that has already been done, enhancing existing high school CTE Construction, Drafting, or Engineering Technology Programs of Study, and ramping up the number and diversity of high school students enrolling and completing a CTE Program of Study in Lane County. This work is supported by a recent Career and Technical Education Grant from the Oregon Department of Education. Ten to 12 Lane County high schools, Lane Community College, the Lane Workforce Partnership, several Registered Apprenticeship Training Programs, and a host of construction employers are grant partners.

The grant builds on an earlier investment of the 2011 Legislature to bring

Lane ESD helps coordinate Construction Career Day

Working with sponsors in local utilities and construction, Cindy Post from Lane ESD helped coordinate a long-time high school favorite event, the Construction and Utilities Career Day on Oct. 16 at the Eugene Water and Electric Board facility.

Demand was high with more than 500 students expected to participate in booth exhibits staffed by contractors, utilities, state agencies, apprentice programs, and representatives from two-year and four-year colleges. Students also got to try their hand at climbing utility poles, fixing leaky pipes, pounding nails, drilling concrete, and operating heavy equipment all under the tutelage of skilled construction and utility professionals.

"Students and teachers get really excited about this event because of the wonderful opportunities they are given to participate in fun, exciting, and educational events," said Post, noting they were expecting their biggest turnout ever this year.

Students from all over Lane County arrive for Career Day.

back vocational programs to 21 middle and high schools with an initial investment of $2 million (HB 3362). During the 2013 Oregon Legislative session, a bipartisan coalition sponsored and passed legislation (SB 498) that quadrupled the initial investment to extend hands-on learning to more Oregon students. (Oregon Department of Education, January, 2014)

Grant funds will be used to build a Regional Construction and Engineering Technology learning community for Registered Apprenticeship Training Programs, construction employers, high school teachers and their students. One activity is a series of professional development workshops for high school math or science and a CTE teacher teams. Each professional development workshop is based on industry-vetted construction and engineering competencies. For example on the Engineering Design Day, teachers will learn about the State of the Construction Industry from Tom Goodhue, the Executive Director of the Oregon Building Congress. They also will hear from Con O'Connor, the Junior Partner/Operations from Hamilton Construction and the Project Manager for the new Willamette River Bridge in Eugene. On another day, teachers will learn about Geographic Information Systems and technologies used in mapping and surveying. Other topics include calculation, estimation, value engineering, constructability, environmental considerations, and workplace culture. Finally, teachers will also learn about some recruitment and retention strategies for young women and other under-represented population.

Teachers also will spend time at the

Table One: Oregon Sample Labor Market Projections for Construction and Civil Engineering Technicians

	2012 Employment	2022 Employment	Change	% Change
Supervisors & Managers (SOC 47-1011)	4,323	5,471	1,148	26.6%
Construction Managers (SOC 11-9021)	2,927	3,673	746	25.5%
Construction & Building Inspectors (SOC 47-4011)	1,229	1,422	193	15.7%
Cost Estimators (SOC 13-1051)	2,958	3,789	831	28.1%%
Civil Engineering Technicians (SOC 17-3022)	935	1,003	68	7.3%
Civil Engineers (SOC 17-2051)	3,382	4,049	667	19.7%

Table II: Oregon Construction Job Titles by Gender and Ethnicity in Oregon: 2006-2010

		Gender		Ethnicity: All			
	Total	Male	Female	White	Latino or Hispanic	Black or African American	Other
Civil Engineers (SOC 17-2051)	3,860	3,445 89.2%	410 10.6%	3,455 89.5%	80 2%	15 .4%	310 8%
Construction Managers (SOC 11-9021)	13,170	12,235 92.9%	935 7.1%	12,195 92.6%	475 4%	80 0.6%	420 3.2%
Construction and Building Inspectors (SOC 47-4011)	1,865	1,585 85%	280 15%	1,740 93.3%	110 5.9%	0%	15 .8%
Cost Estimators (SOC 13-1051)	1,975	1,705 86.3%	270 13.7%	1,750 88.6%	140 7%	0 0%	85 4.3%
Surveyors, Cartographers, and Photogrammetrists (SOC 17-1020)	1,330	1,080 81.2%	250 18.8%	1,315 98.9%	15 1.1%	0 0%	0 0%

Source: U.S. Census Bureau. Note: Due to rounding calculations, percentage totals may not equal 100%.

Left: Climbing utility poles is one of many challenges and opportunities for students. Center: Learning to operate heavy equipment takes time and a skilled mentor. Right: Learning to weld with a simulator under the watchful eye of an industry professional.

Sheet Metal Training Institute and the Plumbers and Steamfitters facility in Springfield. During each session, they will learn about the trade, tour the facility, and learn some applied math, science, and technical skills.

"Teachers will be infusing what they are learning into their curriculum and lesson plans. They will be working together across disciplines, districts, and sharing resources. As a result, students will be

"Teachers are some of our best ambassadors for apprenticeship programs. The more that they know about the trades and apprenticeship programs, the more they can share with their students."

– Susan Patterson, Project Manager for Construction Engineering

introduced concepts, technologies, and skills of the construction, transportation, and infrastructure industries. Teachers are some of our best ambassadors for apprenticeship programs. The more that they know about the trades and apprenticeship programs, the more they can share with their students," explained Susan Patterson, Project Manager for the Construction Engineering.

Another grant activity includes a series of youth trainings delivered by Registered Apprenticeship Training Programs in early 2015. Each trade-specific training is 30-40 hours long, free for high school students, and taught by experienced Registered Apprenticeship trainers. As of press time, participating Registered Apprenticeship Training programs include the Sheet Metal Workers International Association, Local #16; Central Electrical Training Center, International Brotherhood of Electrical Workers, Local #280; Plumbers and Steamfitters, Local #290; and Oregon Southern Idaho Laborers-Employers Training Program, Adair Village. There will be an evening Open House Fall 2014 and another one winter 2015 to promote the trainings for youth and apprenticeship careers.

The grant also supports the expansion

Gaining real world skills with tips from the professionals.

of Lane County's Construction Engineering Technology Advisory committee with additional construction employers and Registered Apprenticeship Training Program partners.

"This committee will provide us with current information about their workforce needs and what students need to know and do on the job. We hope that our employers will serve as mentors for our teachers and students, provide job shadows experiences, talk to the kids as a guest speaker, or host a teacher or student for an internship. We can't meet the workforce needs of the construction and transportation industries alone. This is why we are creating an engineering technology learning community in Lane County, so that resources and creativity can be shared for all teachers and their students," added Susan Patterson.

Racing to put skills to work at the jobsite.

The vision is pretty clear. "Each grant activity is designed with a clear goal in mind: Meet the workforce needs of the construction and transportation industries through leveraging resources, collaborative partnerships, and the delivery of state-of-the-art instruction for teachers and their students."

Kristin Gunson is Career Technical Education Regional Coordinator and Youth Transition Grant Manager for Lane ESD.

BY MARK CLIFFORD

Top-Notch Training

ACE gives students chance to explore careers in trades

ACE Academy has been featured in previous issues of Building Futures magazine with articles focusing on the design of the school and the various programs we have at ACE. ACE Academy is a public charter school in East Multnomah County, and our students are here for a half day every school day, and our students, who are all juniors and seniors, spend the other half of their day at their home high school. The high schools we currently work with are Barlow, Centennial, Gresham, Parkrose, Reynolds, and Springwater Trail. The 2013-2014 school year was my first year as the director of ACE Academy, and one of my primary interests is to continuously improve the programs for which I am responsible. This article is going to focus on our construction program and what makes it an invaluable experience for any student thinking of going into the trades.

Because there are other construction programs in this East County region, it is important for the construction program at ACE to deliver more than any student could get at their high school. There are three things that make our construction completely different than any other programs: Instructor experience, the projects we are involved in, and our partners.

We brought a new teacher on board this year to lead our construction program. Her name is Katie Hughes. She has extensive experience working with young people who are looking toward joining the ranks of the employed in construction. Before coming to ACE, Hughes was an instructor, organizer, and recruiter for Oregon Tradeswomen Inc., and she has a passion for both construction and recruiting that rubs off on everyone.

Hughes also has a passion for community service and environmental responsibility. She is leading her students through several large projects this year including working with her juniors to build shelters for homeless and temporarily homeless Portlanders and then donating the structures to Dignity Village in North Portland. This project will provide our students with a finished product that they know will be providing shelter for those in need. The students also will be learning the skills they will need in order to take on the senior curriculum.

As seniors our construction students build mini houses. These small houses are less than 400 square feet but contain all

Making History

ACE first high school Chapter of AGC

By Tom Goodhue

Working with the Oregon Building Congress, the Oregon-Columbia Chapter of the Associated General Contractors, and the Oregon State University Chapter of AGC, ACE Academy is home to the first high school chapter of AGC.

At a ceremony during the back-to-school barbecue at ACE, Steve Malany, this year's president at AGC, presented a check to the new high school student chapter, commemorating the start-up of the new student organization. During his presentation Steve pointed out that the Oregon State Chapter had been the first student chapter in the country and holding with tradition, it seemed fitting that ACE became the first high school chapter.

The new student organization at ACE has already adopted its by-laws and has begun planning community construction projects in the neighboring area. In addition to community outreach, the organization allows students the opportunity to meet with professionals in the construction/build industry to develop networking connections. Professionals in architecture, construction and engineering will be invited to talk about their fields of expertise and provide students with guidance on how to pursue their careers.

As part of the chapter model, each year an AGC member contractor will volunteer to facilitate the school chapter, arranging speakers of the students' choice, and hosting the chapter's meetings. While providing students with opportunities to explore career opportunities is important, giving advice and connecting students to specific career pathways is invaluable.

If you are involved with a construction-based high school program and are interested in starting a student chapter, call or write to Oregon Building Congress (503-685-8313, tgoodhue@obcweb.com) and let's begin the process of access to construction industry career opportunities.

A student learns to set masonry at the back-to-school barbecue.

Tom Goodhue is executive director of the Oregon Building Congress.

the systems you will find in larger homes. This provides students with exposure and skills in carpentry, plumbing, electrical, sheet metal, roofing, and many more areas of construction that represent a number of trades. At ACE we believe it is our responsibility to do all we can to help students who are seriously interested in the trades. We do this by providing great instruction and opportunities to apply that construction in real world contexts like the shelters for Dignity Village and the mini houses.

Because we are working to provide this kind of experience for our students, we have great partners that help the school considerably and provide our students with experiences they cannot get anywhere else. ACE Academy is housed in the Pacific Northwest Carpenters Institute. This gives our students the very best place in which to learn, design and build. They work on the same floor as the apprentices that carpenters are training for a career in this line of work.

We also routinely bring in guest instructors from the regional training centers in the greater Portland area to deliver both specialized instruction and to share with our students the craft of each trade and the means by which a student can accelerate his or her journey toward a career in the trades. Recently, Clint Mapes from the Roofers and Waterproofers came to ACE and taught students how to shingle a house. Mapes will be out to ACE numerous times throughout the year. In addition, Doug McCarver worked with students on framing. Also, our construction students will be going to the Electricians training center for more instruction.

So what do you think the advantage is for our students in this kind of partnership? A lot of people would say that the answer is great instruction. That is a small part of the answer. Hughes provides great instruction, and has years of experience as a carpenter. The bigger answer is that ACE Academy students have an inside track to a career in the trades. The representatives of the trades come to ACE to help us out and to instruct out students, but most importantly, they are looking for students who have exceptional potential in the trades. They are looking for students with a real passion for working in commercial construction, and they want to help each of those students.

ACE Academy staff do all they can to help students who are seriously interested in the trades.

A student cannot get this kind of experience anywhere else. If you are a student who is planning on joining the trades, if you are a parent with a son or daughter who has a natural interest in this kind of career, if you are guidance counselor who wants the best for your students, if you are a young person or you know one who is curious about exploring the trades but has no access, then ACE is an important next step. ACE will provide you with experiences and contacts in the world of construction that you cannot get anywhere else. For more information, contact the ACE Academy at 503-546-9928.

Mark Clifford is director of the ACE Academy. For more information, you can reach him at mclifford@acecharterschool.org.

BY MARY ANN NAYLOR

A world of possibilities unfolds at Oregon Tradeswomen's career fair

With school now in full swing, high school seniors are being encouraged by teachers and career counselors to solidify their plans for education and training to prepare for work and life after graduation.

Although exploring a four-year degree is commonly recommended to high school students, more teachers and advisors are recognizing that college is not necessarily the right path for everyone. In fact, many high school students are quite surprised and motivated upon learning there are opportunities for entering an apprenticeship in the trades, where you can start earning money, while at the same time, learning career skills for the future!

For young women, especially, apprenticeship and opportunities for a career in the trades are not often presented as realistic opportunities for their futures. This is where Oregon Tradeswomen Inc.'s Women in Trades Career Fair makes a strong impact! For the past 23 years, OTI has produced this three-day career fair to introduce middle- and high-school girls to a wide range of professional possibilities in the construction, mechanical, utility, technical, and highway trades.

A middle school girl learns to use the cutting torch from Angela Couture, Journey Ironworker with Ironworkers Local 29. Photo by Lindsay Cimina Photography.

In May of 2014, 620 middle school girls, 629 high school girls, and 556 adult women job seekers from all over Oregon and Southwest Washington attended OTI's interactive, three-day Women in Trades Career Fair to learn more about career options in the trades and what life might be like as a blue-collar professional. Many students coming to the fair don't exactly know what an apprenticeship is, but after attending the fair, many talk about the excitement of apprenticeship opportunities, the possibility of pursuing paid, on-the-job training, and the wish for a satisfying, living-wage career!

The Women in Trades Career Fair offers an array of interactive, hands-on workshops designed to acquaint middle- and high-school girls and adult women to many career possibilities in the skilled trades. In fact, OTI produces the Women in Trades Career Fair each year to not only help fill the gap in the labor force that is being created as expert trades people are retiring, but OTI also seeks to increase industry diversity and the overall number of women succeeding in trades occupations. Nationally, women make up less than 3 percent of all construction trades, however, in Oregon, that number is closer to 7 percent.

Both students and adult career seekers are able to participate in a wide variety of hands-on workshops at the fair, and they are appreciative for the chance to meet and talk with dozens of tradeswomen who are gratified in their choice of profession.

Tradeswomen Workwear Fashion Show models from left: Tawny Sayers, Laborer, Journey & Apprenticeship Coordinator; Evan Orlando, third year Sheet Metal Apprentice; Valentina Campa, third year Apprentice Carpenter; Cristi Sawtell, Journey Lineworker and Central Work Planner for Bonneville Power Administration; Efrocinia "Effie" Efimoff, second year Apprentice Iron Worker; and Magnolia "Maggie" Blackwood, Fire Fighter, Portland Fire and Rescue. Photo by Tim Curran.

In 2015, OTI's Women in Trades Career Fair will be held May 14-16 at the NECA-IBEW Electrical Training Center, 16021 N.E. Airport Way, Portland, OR 97230. For more information or how to register your school (registration opens in January), please visit www.tradeswomen.net. We hope to see you there!

Mary Ann Naylor is communications manager with Oregon Tradeswomen Inc.

A group of middle school girls work to stop a simulated water main break in a workshop with the Portland Water Bureau. Photo by Lindsay Cimina Photography.

A Careers for Women Day attendee learns to climb a utility pole in Portland General Electric's workshop. Photo by Lindsay Cimina Photography.

A very young girl learns to solder copper on Careers for Women Day from Sara Page, OTI pre-apprenticeship graduate and Plumber apprentice. Photo by Lindsay Cimina Photography.

High school girls learn to wire a light and switch in a workshop with the women of NECA IBEW Local 48. Photo by Lindsay Cimina Photography.

A high school girl learns to operate heavy equipment in a workshop with Goodfellow Bros. Photo by Lindsay Cimina Photography.

A high school girl learns to operate a jackhammer from Aida Aranda, Apprentice Coordinator for the Oregon & Southern Idaho Laborers-Employers Training Trust. Photo by Lindsay Cimina Photography.

A middle school girl learns the "torch down" roofing technique in a workshop with the Oregon & SW Washington Roofers & Waterproofers. Photo by Lindsay Cimina Photography.

A middle school girl learns about welding techniques in a workshop with Clackamas Community College. Photo by Lindsay Cimina Photography.

Build Your Dream Job!

Ignite your passions and launch your carpenter career with the Northwest College of Construction's new **Residential Carpentry Certification Program!**

- Trained by Construction Industry Experts
- Nationally Recognized Credentials from the National Center for Construction Education & Research
- One year comprehensive program: Hands On + Classroom Learning
- Pathway to Rewarding Careers — Good Pay & Job Satisfaction!
- Program licensed by the Oregon Department of Education
- Job Placement Support
- Financing Available

Start building your dream job today!

NW COLLEGE OF CONSTRUCTION

503-256-7300
www.nwcoc.com