SUMMER 2017

Sheet Metal Journal

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Western Washington

PROJECT SPOTLIGHT

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JATC Makeover

Northwest Apprentice Contest

Sheet Metal Estimating

SMACNA
WESTERN WASHINGTON
Official Journal of
Record for SMACNA-WW

OUR CONTRACTORS SET THE STANDARDS FOR THE INDUSTRY

SMACNA-Western Washington is a trade association and a Local Chapter of the Sheet Metal & Air Conditioning Contractors National Association (SMACNA), which is located in Chantilly, Virginia.

SMACNA Contractors are heating, ventilating, air conditioning (HVAC), and sheet metal experts. They are your assurance of quality in the fabrication and installation of ductwork and air handling systems.

SMACNA contractors are also skilled professionals in:

- Architectural sheet metal
- Industrial sheet metal
- Kitchen equipment
- Specialty stainless steel work
- Manufacturing and custom fabricating
- Repair services
- Siding and decking
- Flow testing & balancing
- Energy management & maintenance

Well known and respected within the construction industry, SMACNA contractors provide the highest quality workmanship, professionalism, and service to their customers. They care about the life cycle of the project, not just the winning bid.

You'll find SMACNA contractors working in all areas of construction whether industrial, commercial, institutional, or residential.

SMACNA contractors developed the technical manuals and standards that today are accepted worldwide in the construction community. As leaders in their industry, they continue to adopt and apply the latest technologies to HVAC and sheet metal work. Everything from duct construction and installation to air pollution control, from energy recovery to roofing, from seismic restraint to welding… they do it all!

STATEMENT OF PURPOSE

The ultimate goal of SMACNA - Western Washington, Inc. is to achieve and maintain the following principles and programs for the sheet metal industry:

1. To establish advertising, publicity, and promotional activities that advise the public of the nature, extent, and availability of services performed by the industry.
2. To promote educational programs to formulate high quality standards of sheet metal construction.
3. To aid in the formulation of uniform sheet metal specifications and improvement of state and municipal codes.
4. To expose fraudulent or misleading advertising or representations intended to deceive the public.
5. To encourage and promote trade practices that will eliminate unfair competition or exploitation of the sheet metal industry.
6. To encourage and promote the establishment of a uniform pattern of payments by customers during the progress of jobs to avoid inequitable payment delays and economic penalties.
7. To provide a forum for the discussion of the common interests and problems of labor and industry, and to encourage and promote harmonious relations between labor and industry.
8. To encourage any proper activity that will increase the efficiency of the industry and its ability to serve the public.

SMACNA
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SMACNA - Western Washington, Inc.
13810 SE Eastgate Way, Ste 445 Bellevue, WA 98005
Tel: 425-289-5010 • Fax: 425-289-5011
www.smacnaww.org

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GROUP PUBLISHER
Lara Perraton
lperraton@pointonemedia.com

EDITOR
Jessica Kirby
Direct: 250.816.3671
jessica.kirby@pointonemedia.com

CONTRIBUTORS
Tiffannie Bond
Mark Breslin
Kathleen Collins
Karen Forner
Norm Grusnick
Mark Halvorsen
Julie A. Muller-Neff
SMACNA-WW /
ICC Code Committee

COVER PHOTO
Submitted by Hermanson Company, LLP

ADVERTISING SALES
Christina Tranberg
877.755.2762 ext 1408
Direct: 250.667.0401
ctranberg@pointonemedia.com

GRAPHIC DESIGNER
Lara Perraton
877.755.2762 ext. 1407
Direct: 250.714.4973
lperraton@pointonemedia.com

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SMACNA WESTERN WASHINGTON

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Photo courtesy of Viaduct Sheet Metal.

FEATURES

DEPARTMENTS

Next issue: Green Market • Safety Culture • Project: Specialty Work

GET SOCIAL: IT'S GOOD FOR YOUR HEALTH

By / Jessica Kirby

By / Jessica Kirby, Editor

This issue of *Sheet Metal Journal - Western Washington* truly brings home the importance of golf and other professionally-angled social events. We all know at least one person (you may actually *be* that person) who loves golf enough to tout its benefits just for an excuse to hit the green, but this is actually quite right for many reasons.

As a general principle, golf, like any sport, brings people together. Rifts, uncomfortable encounters, and social anxiety are swept away when people come together under the pretence of enjoying a common interest together. The focus is on the activity, the rules, and the physical challenge and not on individuals.

When you extrapolate these concepts to an industry event – a business, networking, or company social event – you combine the common interest with a captive audience and a general sense of collective effort. You all know why you are there and that playing a round with a few post-golfing beverages makes it easier to connect later in the business sphere.

In general, people attend industry events like conferences, dinner meetings and, yes, golf for a number of reasons. They are more likely to connect with people they wouldn't otherwise see. These events are an open forum to discuss industry issues and challenges on neutral territory—most even find it easier to run problems past their competitors for opinions or solutions, especially at conferences where people come from all over and competitors may have geographic separation.

Guest speakers, keynote addresses, and educational programs all contribute to a state of higher learning and leave attendees with a sense of feeling refreshed. Even a comedic presenter can pull out some painfully funny truths about our working lives and leave us feeling understood and like the small stuff maybe isn't that important.

One important area social events tend to address is inter-generational working relationships. Even when differences divide people, relaxed, social settings bring out the sameness in others, and open the floor for conversation, sharing personal stories, and opportunities to link people beyond demographic barriers. It may be easier to understand the millenial glued to his phone if you have a conversation over scotch about the way it helps him stay connected to his family and put in longer hours at the office. Maybe the new young employee will understand a mature business owner's strict work ethic when she realizes that business owner's family worked tooth and nail for every dollar in the company, building it from the ground up through challenging financial times.

Most of all, industry events are a chance to unwind. Hard-working business owners almost never take time to relax and have some fun—they are managers, bosses, and employees all at once and their families get relatively minor glimpses of their loved ones when it is all work and no play. There is science behind the physical, emotional, and intellectual benefits of downtime and having fun, social time with friends, family, and colleagues. I believe the technical phrase is: you'll live longer, happier, more productive lives.

So the moral of the story is, you work hard and everyone knows it. Be sure to take full advantage of the many opportunities SMACNA-WW offers by way of convention, dinner meetings, education, guest speakers, Christmas parties, and, yes, golf. In other words, whenever the invitation comes out, the answer should be, "sign me up." ▪

SMACNA-WESTERN WASHINGTON'S WORKFORCE RECRUITMENT AND RETENTION EFFORTS

By / Julie A. Muller-Neff, Esq.
Executive Vice-President, SMACNA-WW

As many of you know, Seattle is in the middle of a construction boom and currently hosts a greater proportion of cranes per area than any other US city. The by-product, of course, is a strong need for construction professionals and union workers, and the industry is responding with innovative and fresh ideas to help strengthen our workforce. The workforce as we know it is changing to reflect our diverse demographics and to support military men and women—these are exciting times as we foray into new horizons.

SMACNA-WW is doing its share by working together with the Western Washington Joint Apprenticeship Training Committee (JATC), Local 66, and member companies on internships, programs, and recruitment focusing on building and maintaining a healthy and ample workforce. These efforts are focused on three main areas:

College and High School Recruitment – *Areas of Engineering, Construction Management, and Business Management*

SMACNA-WW is developing a college internship/leadership program to assist member companies with recruitment and retention of young talent in the sheet metal and mechanical industries. In 2016, SMACNA-WW formed the SMACNA Young-Leaders Association (SMAC-YA) as a networking group of over 100 young professionals. This group is led by a Committee of 12 peer members and is supported by SMACNA staff. During its inaugural year, the group hosted a Kickoff Happy-Hour Networking Event, Santa Pub Crawl, and College Night for College Students at the Mariners Game. The most recent networking event was held at ACME Bowl and was open to all SMACNA-WW and SMAC-YA members. Please contact the SMACNA-WW office if you are interested in joining SMAC-YA.

SMACNA-WW is also working to garner interest in the construction industry among high school students. Our Association participated in the 2017 Imagine Tomorrow Challenge, which encouraged students in grades nine through twelve to seek new ways to support the transition to sustainability. In the program, students researched complex topics related to sustainability, then innovated technologies, designs, and plans to mobilize behavior. They forged connections in their communities and created positive change. Lisa Connors, Project Manager at ACCO, represented SMACNA-WW and judged the event finale.

SMACNA-WW acknowledges that the future of the industry is with our young professionals and college and high school students. We are using best efforts to capture this talent and immerse interested individuals into the mechanical industry.

Women in the Industry – *"We Have Been Doing It"*

Local 66's Women's Committee is tackling the manpower shortage by promoting and encouraging women to enter and stay in the mechanical industry. Led by Vanessa Carman with Hermanson Company, the Women's Committee is creating mentorship for female apprentices through a Women's Mentoring Program. During the Mentoring Program kickoff event, the story of Rosie the Riveter was brought to light. Rosie, a well-known poster-woman for females entering the construction trades, was modeled after women working at Boeing in Seattle during World War II. Rosie's classic tagline, "We Can Do It," has been modified by the Women of Local 66 to "We Have Been Doing It," since it all started with women working sheet metal right here in Seattle. The Committee is devoted to maintaining a presence of the women in the industry and works nonstop to facilitate and assist with outreach, recruitment, and mentorship.

SMART Heroes – *Honoring our soldiers by providing them a path into the sheet metal trade*

SMACNA-WW, Local 66, and the JATC are excited to announce that the Army just approved the SMART Heroes Program. This is a seven-week intensive apprentice training program for military service men and women, providing soldiers with job opportunities once they complete their terms in the military. See page 10 for more information. The training will kick off this summer. This is an exciting and important program that will provide essential mentorship opportunities, while creating sponsorship and promotion for individuals entering the industry.

Enjoy the gorgeous summer weather. Until next time.▪

Do you have an article idea you'd like to share? Great!

Please reach out to our editor, Jessica Kirby, to table your suggestions for a future issue of *Sheet Metal Journal - Western Washington*

Contact Jessica at:
250.816.3671 or email jkirby@pointonemedia.com

CONSTRUCTION MANAGEMENT COLLEGE NIGHT AT THE SEATTLE MARINERS

SMACNA-Western Washington's young leaders (SMAC-YA) hosted its first ever college night to help promote the construction industry. Approximately 55 college students attended Seattle's Safeco Field to enjoy an exciting evening networking with local owners while taking in a stellar game. These junior and senior construction management program students from Central Washington University, Seattle University, University of Washington, Washington State University, and Pierce College had a wonderfully successful evening, This was a great first step to introducing future professional leaders to our specialized industry, and more events like this are in the works for the future. For more information about SMAC-YA, contact SMACNA-WW at www.smacnaww.org. ▪

SMACNA – WW & MCAWW JOINT MEMBERSHIP EVENT A GREAT SUCCESS

The first joint SMACNA-WW / MCAWW membership meeting was a great success with 145 in attendance. SMACNA-WW and MCAWW came together to network and hear from guest speaker, Keni Thomas. In the summer of 1993 Staff Sergeant Keni Thomas was deployed to Mogadishu, Somalia with the 3rd Ranger Battalion as part of an elite special operations package called Task Force Ranger. On the 3rd of October, Keni and his fellow rangers distinguished themselves in an 18-hour fire fight that would later be recounted in the highly successful book and movie *Black Hawk Down*. Keni told the incredible story of extraordinary individuals and how they fought to bring each other home, and provided heartfelt and informative insight on leadership in any situation. Keni finished his presentation with a stellar guitar performance while singing one of his many original songs. The first 25 registered attendees received a free copy of Keni's book, *Get It On* and additional copies were available for purchase. A book signing and general conversation with Keni concluded the evening. ▪

2017 SMACNA-WESTERN WASHINGTON PAC-12 GOLF TOURNAMENT
NEW LOCATION

Friday, August 4, 2017 at Washington National Golf Club

Represent your favorite PAC-12 School by wearing your college colors. Polos, hats, and collegiate gear are encouraged. The team with the most school spirit wins a prize.

Schedule & Registration

8 a.m.	Registration, Driving range open, Continental breakfast
9:15 a.m.	Crane drop / Putting contest
9:45 a.m.	Shotgun start – Scramble format
3 p.m.	Happy hour and Tournament scoring
4 p.m.	Dinners, Awards, and Prizes

SMACNA-WW's annual golf tournament is set for an exciting new venue this year: Washington National Golf Club in Auburn. Don't miss it! Photo courtesy of Washington National Golf Club, Auburn.

For more information please email Carrie Heinrich at SMACNA-WW at cheinrich@smacnaww.org.▪

ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS, 3RD EDITION, NOW AVAILABLE

The revised *Round Industrial Duct Construction Standards*, 3rd edition, 2013, an American National Standard, ANSI/SMACNA 005-2013, is now available. SMACNA members will receive an email shortly with instructions on how to receive their gratis copy.

The standard expands the scope of the second edition, updating the duct materials to include aluminized steel, temperature correction factors for round industrial, and minimum decimal thickness for aluminum duct selection tables. Several chapters offer a standardized, engineering basis for design and construction of industrial duct of Class 1 to Class 5 air.

A spiral duct chapter for Class 1 and Class 2 air covers design pressures ranging from 30 in. wg negative to 50 in. wg positive, plus carbon and galvanized steel tables. The 660 page-book includes expanded tables for stainless steel and aluminum, expanded tables for duct sizes up to 96 inches in diameter, plus Class 5 systems handling corrosives and spiral lock-seam pipe.

The Round Industrial Duct Construction Standards, 3rd edition, 2013, is available in both book and PDF formats. Subscriptions are also available. Order online at: www.smacna.org/store. ▪

UPCOMING SMACNA-WW EVENTS

August 4
Annual Golf Tournament
NEW LOCATION: Washington National Golf Club
Auburn

September 20
SMACNA Membership Event
An Evening at the Space Needle
Seattle

October 22 - 25
SMACNA National Convention
Maui, HI

November 8
SMACNA Membership Meeting
SeaTac Marriott

November Membership Meeting w/ Ron Magnus
Mark your calendars for November 8, 2017, and join your fellow SMACNA-WW members at our membership meeting with guest speaker, Ron Magus with FMI Corporation. Ron will speak on the topic "Overview: Past, Present, and Future: How Contractors Succeed and which Trends are Emerging." This meeting will be held at the Seatac Marriott, and begins at 4 p.m., followed by reception and dinner. Watch your email for more information.

December 1
SMACNA Annual Holiday Gala
Seattle Waterfront Marriott

MASTER DIGITAL AND SOCIAL MEDIA MARKETING

Award-winning website designer Mitch Seifert will share his most effective ways to market your business in this fluid environment in "Marketing with Digital and Social Media," during SMACNA's Annual Convention, Oct. 22-25, in Maui.

He'll show you how to critique and improve your website, ways to effectively use website content, the importance of understanding website analytics, and everything you need to know about improving your corporate visibility online.

You will learn how to use web copy more effectively, including images and video. Attendees will take away the very best practices for search engine and mobile optimization in the sheet metal industry. In addition, Mitch will present ideas and concepts on how to attract potential customers online using social media and effective campaigns.

Mitch Seifert, director of web services with Nehlsen Communications, has more than 10 years of experience in web design and development. He specializes in creating front-end website structure, navigation, layout, and design. He has worked with such companies as John Deere, SMACNA Greater Chicago, and IMAX.

Register today on SMACNA's Annual Convention webpage. ▪

SEATTLE'S CONSTRUCTION BOOM: NO END IN SIGHT

Development in downtown Seattle has reached an 11-year high, according to the Downtown Seattle Association's tally of 68 major buildings under way at the end of last year.

The number crept up slowly from 65 buildings in progress last spring, but has doubled since the end of 2015. Seattle's previous record sat at 51 buildings underway at once just before the economic downturn, which began in 2008-2009.

Residential buildings account for nearly two thirds of the activity, bringing approximately 6,000 new rental and for-purchase units to the area—a significant increase above any year for over a decade.

There is also about 5.4 million square feet of new workspace underway, a slight decrease from last year, with another 6.5 million on the way over the next ten years.

By Mobilus In Mobili (Seattle Nov 2014 Rainy Day Space Needle) [CC BY 2.0 (http://creativecommons.org/licenses/by/2.0)], via Wikimedia Commons

Some of the largest projects on the books are approximately 10 million square feet of office space Amazon will occupy over the next ten years, The Mark office and hotel tower ($450 million), and the soon-to-come $1.6 billion expansion to the Washington State Convention Center.

According to plans submitted to the city's officials, development is expected to maintain its current level or possibly increase well into 2019 and beyond, subject to national and global financial conditions. ▪

SMACNA-WW WINS SECOND PLACE COMPLETING NATIONAL SURVEY

Congratulations to SMACNA-WW and it's great members who completed their Annual National SMACNA Safety Survey. Our Chapter won second place and will be recognized at the national convention. Congratulations to Auburn Mechanical, Inc. the winner of the Best Buy gift card for their participation. We truly appreciate everyone who took time to show support and completed the survey.

ICC PARTNERSHIP WITH ASHRAE, AIA, USGBC, AND IES MEANS HIGHER PERFORMING BUILDINGS WILL BE EASIER TO ACHIEVE

A unified green building code that could become the foundation for LEED certification was created in 2011, thanks to a partnership among ASHRAE, the International Code Council (ICC), the American Institute of Architects (AIA), the Illuminating Engineering Society (IES), and the U.S. Green Building Council (USGBC).

That effort got a boost in August 2014, when ICC and ASHRAE agreed to align the technical requirements of ASHRAE's Standard 189.1 for High Performance Green Buildings (189.1) with ICC's International Green Construction Code (IgCC) into one single model code.

Continued on page 23

SMACNA
WESTERN WASHINGTON

SMACNA members perform work in industrial, commercial, institutional, and residential markets. They specialize in heating, ventilation and air conditioning, architectural sheet metal, industrial sheet metal, kitchen equipment, specialty stainless steel work, manufacturing, siding and decking, testing and balancing, service, and energy management and maintenance.

CONTRACTOR MEMBERS

ACCO Engineered Systems
Air Handlers, Inc.
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Apollo Mechanical Contractors
Argo Blower & Mfg. Co., Inc.
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Pinchiff Mechanical LLC
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PSR Mechanical
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Shinn Mechanical, Inc.
Sunset Air, Inc.
Temp Control Mechanical Services Corp.
University Mechanical Contractors, Inc.

AFFILIATE MEMBERS

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AIREFCO, Inc.
Armacell LLC
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Milwaukee Tool
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Performance Contracting, Inc.
Star Rentals Inc.
Sunbelt Controls
Trane
Winroc-SPI

Sheet Metal and Air Conditioning Contractors' National Association - Western Washington Chapter
Executive Vice President: Julie Muller-Neff, Esq.
13810 SE Eastgate Way, Ste 445 Bellevue, WA 98005
Tel: 425-289-5010 • Fax: 425-289-5011 • www.smacnaww.org

JATC Makeover in Western Washington

By / Jessica Kirby • Photo courtesy of / Don Steltz

SMACNA-Western Washington's apprentice program is growing.

Donald A. Steltz became Executive Administrator of Western Washington Sheet Metal Joint Apprentice Training Committee (JATC) a little over a year ago with a plain and simple mission: to make it the place everyone wanted to go and get trained.

Steltz tackled the mission, leading by example and sharing his experience with others. “I work hard and want others around me to do the same,” he said. “I worked my way up the ranks from pre-apprentice, to journeymen, to supervisor, to manager, to a leader in the Union and JATC. I barely made it through high school – as a matter of fact my mother put “Thank God” on my graduation cake – but now have a Bachelor of Arts in Labor Education.”

Improving the JATC's offering was a top priority and first required meeting with contractors and contractor reps to find out exactly what the committee could do to ensure training curriculum met contractors' needs. “What did they see coming up and where the shortage of workers might be?” said Steltz.

Another key objective is improving apprentices' view of the JATC by first identifying their concerns. “I would hear the apprentices said school was a waste of time and they are not learning anything,” said Steltz. “Last year the apprentice would have to go to school four weeks a year and attend 32 hours of night school. It was to the point the apprentice was just taking anything at night and not learning anything because they were 'just doing time' to get their raise or fill the obligation of the apprenticeship.”

This year, the JATC went to five weeks of school and eliminated night time hours and it has made a world of difference.

“The attitude of the apprentice has changed, and the contractors feel the apprentices are learning more in that extra week with better defined training,” said Steltz.

The JATC now has a greater presence at and is more accessible through multiple training centers and union meetings. “I made it a priority to make sure the JATC was represented and accessible,” said Steltz. “Our DuPont location rarely had coverage in the office—we now have coverage three days

a week, and I personally attend at least two to three union meetings a month."

Presence in these locations is also about talking regularly with apprentice classes to garner feedback and hear about issues that are preventing positive change.

"If we, the JATC, is not listening, it will be a long five years for the apprentices or our members who are looking to further their education," said Steltz.

The JATC has also been rebranded with a fresh logo, new colors, and inspirational posters.

"I'm all about in with the new and out with the old," he added. "We changed logo and the attitude—the perception was that the JATC didn't do much for the apprenticeship program but we changed and revitalized it. We re-did the website and worked on a lot of the little things people see, but might not realize are a big deal."

This summer will see the kick off of the SmartHeroes program, which brings active military men and women into the sheet metal industry.

Under the program, current active soldiers six months out from discharge will come in for a seven-week intensive program that will render them equivalent to a first-year apprentice.

The program will include a nation-wide agreement to honor the training and allow graduates to relocate anywhere in America.

The program will include a nation-wide agreement to honor the training and allow graduates to relocate anywhere in America and retain their standings to enter into a second-year apprenticeship program.

The class size will be 12–15 soldiers and include 224 hours of training, which is higher than most first-year apprenticeship training programs. Inside of that, participants will be exposed to various parts of the industry in hopes they would be able to pick which part of the trade they would most like to enter.

"Wherever they end up, they will either be in line for a job or at least get an interview for a job with an apprentice program so they are making a better living," said Steltz.

SmartHeroes will be a pilot program and the first in America, he adds. "The first class will start on August 15 and the program will have a second class starting in mid-October. That will be another exciting event for us." ▪

Northwest Region Hosts Contest for First Time in Nine Years

By / Tiffannie Bond
Photos courtesy of International Training Institute

Originally published in the spring issue of Focus on Funds

Apprentices from Alaska, Colorado, Oregon, Central Idaho, Montana, and Washington gathered at Sheet Metal Workers Local No. 55 in Pasco, Washington March 30–31 for the first Northwest Apprentice Contest since 2009.

The contest was open to training centers in Region 12 as well as schools outside the regional area that wanted to participate, and the contest welcomed 35 third-, fourth-, and fifth-year students in HVAC, industrial/welding, service, and architectural divisions.

Winners in the architectural division include Brandon York, Local No. 16, first place; Derek Estes, Local No. 66, second place; and, Robert Gow, Local No. 103, third place.

In the HVAC division, winners include Nathan Marquez, Local No. 23, first place; Stephen Serniotti, Local No. 16, second place; and, Raymond Kromhout, Local No. 9, third place.

In the industrial/welding division, Keaton Alvorson, Local No. 55, took first place, with Kolby Holmes, Local No. 66, in second place and Jared Bonney, Local No. 16, in third place.

For service, Eugene Kennedy, Local No. 55, placed first, with Chad Acheson, Local No. 16, in second place and Max Burnett, Local No. 23, in third place.

For the written portion of the contest, the committee chose to have apprentices complete it using TotalTrack, a first for an apprentice contest, said Don Steltz, Executive Administrator for Local No. 66's Western Washington Sheet Metal JATC.

After a nine-year hiatus, dusting off a contest can have its challenges, but coordinators began developing the contest's written exam, along with projects, as a team months ahead of time, said Ken Cox, coordinator for Local No. 55 in Pasco.

"Because it is rising back out of where it once was, I think to expect it to run flawlessly is an over-expectation," he said with a laugh. "Having said that, I think it went well. Region 12 has always done a good job at these contests throughout the years."

The Washington and Oregon coordinators had discussed bringing back the apprentice contest for a few years, and 2017 was the year to do it, Cox said.

"We were done talking," he added. "We either needed to stop talking about it or do it, so we decided to do it."

Contest aside, the comradery that stems from the event for the apprentices and the coordinators is priceless, Steltz said.

"The apprentices, while competitors each day, really showed great spirit when others won," he added. "At some point down the road, as a journeyperson, you could travel to neighboring locals, and they could be the foreman you are going to work for, so building these relationships now is invaluable." ▪

Highlights:

Locals participating:

Local 9	Apprentices from Denver, Colorado Springs and Grand Junction training centers
Local 16	Apprentices from Portland training center
Local 23	Apprentices from Anchorage and Fairbanks training centers
Local 55	Apprentices from Boise, Pasco, and Spokane training centers
Local 66	Apprentices from DuPont and Everett training centers
Local 103	Apprentices from Montana JATC
Local 280	Apprentice unable to make it. Participated as Proctor and Judge

Winners:

Architectural

1st Place	Brandon York – Local 16
2nd Place	Derek Estes – Local 66
3rd Place	Robert Gow – Local 103

HVAC

1st Place	Nathan Marquez – Local 23
2nd Place	Stephen Serniotti – Local 16
3rd Place	Raymond Kromhout – Local 9

Industrial

1st Place	Keaton Alvorson – Local 55
2nd Place	Kolby Holmes – Local 66
3rd Place	Jared Bonney – Local 16

Service

1st Place	Eugene Kenney – Local 55
2nd Place	Chad Acheson – Local 16
3rd Place	Max Burnett – Local 23

Sheet Metal Estimating:
A trade for the passionate ... and thick-skinned

by / Mark Halvorsen, Viaduct Sheet Metal
Photo courtesy of Viaduct Sheet Metal

The notion that an estimate can never be perfect is what separates the schools of estimation and accounting. Estimating and the costs associated with the final numbers result from making judgments based on past experience, and in that frame of mind, the variables are never the same.

The estimator has certain responsibilities for preparing the bid. Estimated materials and equipment costs are based upon "takeoff" quantities to be installed, plus tax and cartage. Labor costs are estimated man hours based on past experience times rate of pay, plus stat and vacation pay, E.I., C.P.P., W.C.B., Union charges (pension, medical, dental, other union funds), association dues, safety fund allowances, insurances, payroll financing, cellphone / pager, site expenses, metro travel expenses, and administration charges (project management, superintendent, payroll administration). There are other costs to consider as well, including rentals, tool allowance, bonds, and CAD / as-built charges.

The estimated break even cost is the three above plus fixed overhead, and the estimated bid/ change order price is the break even cost plus profit and risk.

Estimators can complete their tasks manually or using a software application and there are components of each method estimators love and hate.

Manual estimating methods include stripping the drawings to create the take-off, quantifying or squaring up the items taken off, and creating extensions—multiplying the quantified items above by both the materials cost of each item and the labor units chosen for that particular project.

Totalling up means adding like items, and multiplying their cost per hour in the terms of labor items and by PST in term of materials items. Add these together along with sub-trade prices, room and board, travel, freight, supervision, and bonding charges to arrive at the total before adding mark-up—overhead, profit, and risk.

Computerized estimating using software applications is a newer concept, but one that is gaining traction in all facets of the construction industry. Because software systems are automated, they helps address the lack of specialized estimation training available to workers in the industry. Using computerized estimating relieves time pressures on job sites, relieves corporate profit pressures, and helps reduce manual errors in quantification and addition. Software allows for a more professional presentation and breakout pricing is easier to achieve.

Computerized systems can also help alleviate some of the associated with change orders. Change orders are disruptive and annoying and contractors must receive fair compensation covering all the costs incurred in performing the change. Be realistic but ensure you have everything covered with an added risk factor. Companies very rarely allow enough for disruptions to the project that a change causes.

Estimating is not just stripping off drawings and sending quotes out to customers hoping to land a project or two. An estimator takes years to learn and perfect his or her craft.

Estimators put as accurate a bid together as they can, allowing risk money / hours for areas of the drawings / specs that are not cleared up prior to closing. The estimate (accurate guess) acts as a budget for the operations manager, project manager, project coordinator, outside supervisor, site foreman, the field crews, the shop supervisor, the shop foreman, and the fabricators to work from.

Cost certainty is never attainable because of the multitude of job variables.

The materials, sub-trades, supplier's items, and the shop labor are easier to predict as these costs are fairly controlled. Field performance varies greatly from foreman to foreman, crew to crew, PM to PM, customer to customer, and between general site conditions, not to mention general contractor and developer differences. The most successful projects are usually ones in which the field labor meets or is below the estimate.

The estimator has other responsibilities beyond creating the bid. He or she is responsible for sales duties associated with estimating including liaising with customers, engineers, and owners; making the company aware of present and upcoming market conditions; and, through contacts, searching out select tender opportunities, and helping negotiate favorable purchase orders.

The brass tacks estimating responsibilities begin with obtaining drawings, bidding and following up tenders, and tracking bids and adjusting them accordingly to ensure we are getting the maximum available profits through an appropriate market.

Estimators also liaise with sub-trades, suppliers, customers, and engineers; prepare project budgets; and, place purchase orders with sub-trades and suppliers. It is up to them to review the project with the construction team – specifically the project manager – during the construction phase as required and quote any changes that may occur.

They must get to know the competition and understand when they are flush with work, in need of work, and when they have way too much work on the go because all of these factors will affect the available markup on the project. In response to these and other fluctuations, the estimator must rework the estimating data as the need arises (ie: new machinery is purchased increasing productivity, materials pricing changes); and, upon completion, he or she must perform reviews of completed contracts to ensure the estimated figures match the actual. Understanding why they don't and applying this knowledge is critical to the success of future bids on similar projects.

A quality bid takes into account the company's need for each specific project it is bidding on, the company's capabilities (is the project a good fit?), the capabilities of the mechanical contractor, the probable markup, the customer's capability to promptly pay his bills, the known site conditions, the condition of the market place, the company's ability to properly perform the work, the schedule, any outside influences, banking pressures, bonding capabilities, capacity issues, the company's corporate goals/budgets for the year, any personal connections that may be affected performing the work, and, of course, the availability of time (does the estimator have enough time to put together this bid in a manner that gives the company the best opportunity to secure the project?).

Estimating is not just stripping off drawings and sending quotes out to customers hoping to land a project or two. An estimator takes years to learn and perfect his or her craft. Industry connections with a company's competition, its customers, and the engineering community will assist a quality estimator with performing his very important piece of the construction team's puzzle with the greatest proficiency. Estimating is a passion for perfection that can never be mastered. Estimates, after all, are only educated budgets with targets for a company's construction team to attempt to achieve.

Estimating can be a very rewarding profession. The thrill of compiling an accurate take-off together with industry intel that leads to a quality quote can be exhilarating. But, generally, an estimator should strive for a 20 percent success rate. Any more than that and the bids are probably leaving some profit points on the table. Any less and he or she is probably not spending the time required to search out and eliminate the risk factors involved that force a company to add risk dollars.

Be aware, though, although an estimator may fall in love with the project and the bid he has put together, 80 percent of the time he is not going to be successful. Estimators should be passionate and disappointed if they do not secure the bid they just poured their heart and soul into, but they can't take losing one project too seriously. There will always be another and the good quality work will flow towards those who do their due diligence and always strive to put out the best bid they can.

If you live by that mantra you will be successful in estimating. Patience is surely a virtue with this profession. ▪

Project Spotlight:
Hermanson Company, Seattle

By / Jessica Kirby • Photo courtesy of Hermanson Company

Summary

Project name: The Mark
SMACNA member: Hermanson Company
Designer: ZGF (Architect) / Hermanson Company (HVAC Engineer)
Location: 5th & Columbia Seattle, WA
Completion date: September 2017

Hermanson Company is the design-build HVAC contractor for the new 44-storey The Mark tower at Fifth and Columbia in downtown Seattle. This landmark structure consists of a nine-level garage (below and above grade), the SLS Seattle Hotel on levels 2-16, and 26 floors of office space with two levels of mechanical penthouses.

Hermanson first began work on the design for HVAC systems at The Mark in 2008, although because of economic conditions, construction did not start until 2015. Through the years, system designs went through several iterations of design, review, and budgeting before the final system was selected. Initial designs were for a chilled water / floor-by-floor system typical of high-rise office buildings for the entire structure.

The final HVAC systems are a blend: a chilled water / floor-by-floor system, and a condenser water system with a riser

The integration of a luxury hotel on 15 floors of the original office tower inspired exploration and budgeting of both air-cooled and water-cooled VRF systems, but these were ultimately dismissed because of their first cost impacts. Additionally, the inclusion of the complete gut and replacement of HVAC systems in the adjacent historic Methodist Church to develop conference and restaurant space serving the hotel added another level of challenge, because it meant finding systems that serve the purpose and fit within the historic structure.

The final HVAC systems are a blend: a chilled water / floor-by-floor system serves AC units for office floors and fan coils for the hotel, and a condenser water system with a riser runs the full height of the building for heat pumps in the Hotel Conference Center and for 24x7 loads throughout the building, as well as serving a water-cooled emergency generator located in the basement.

The project targets LEED Gold and Hermanson Company has provided full HVAC systems design and BIM / MEP co-ordination for the entire project. ▪

Photo caption: The photograph submitted is a composite illustrating 3D modeling of HVAC systems and the installed system on the Level 6 of the building.

Materials

G-90 galvanized
Black iron grease duct
Aluminum for high humidity areas

SUBCONTRACTOR RETAINAGE AND OTHER CONTRACTOR BILLS PASS LEGISLATURE

Victory For SMACNA, MCA, NECA, and CMC Subcontractor Groups

Besides dealing with the well-publicized issues like education funding, the Legislature passed a number of bills related to contracting procedures this session.

Governor Jay Inslee (seated) sign HB 1538, subcontractor and bond retainage bill. Also in the photo: Prime sponsor, Rep. Melanie Stambaugh, Republican from Pierce County; Senator Bob Hasegawa, Democrat from Renton; Senator Mark Miloscia, Republican from Federal Way and Chair of Senate State Government; Julie Muller-Neff, Executive Vice-President of SMACNA-WW; Kathleen Collins, Legislative Consultant for SMACNA-WW; staff and contractors from MCA and NECA; and, the lobbyist for the Building Trades Council. Photo by: Legislative Support Services.

Subcontractor's option to bond retainage

One of the last bills to be signed is the most important contractor bill that passed this session. HB 1538 gives subcontractors the ability to use a bond for retainage instead of cash on public projects. The new law allows a subcontractor to ask the prime contractor to provide a bond for the subcontractor's portion of the retainage. Since retainage can be as much as five percent and can be held until all claims are resolved, subcontractors may have to wait a number of months to get their cash back. Bonding retainage means subcontractors have less money tied up in a project.

The new law stipulates:

- The prime contractor must provide a bond for the subcontractor's portion of retainage if the subcontractor requests this option.
- The subcontractor must pay for his/her portion of the bond premium.
- The bond must be accepted unless the public body shows good cause for refusing to accept it, the bond is not commercially available, or the subcontractor refuses to pay his/her portion of the bond premium.

By / Kathleen Collins,
SMACNA Legislative Consultant

This new law will be a great benefit to SMACNA contractors. SMACNA worked along side the Mechanical Contractors Association, the National Electrical Contractor Association, the Conference of Masonry Contractors, and the Building Trades Council to get the bill through the process. The Associated General Contractors (AGC) and the National Federation of Independent Businesses (NFIB) opposed the bill.

Small contractors and minority contractors

Two new laws are aimed at improving access for small contractors and minority contractors.

SB 5734 reduces the retainage burden for contractors working on small public projects with the following changes:

- Increases the threshold amount of a public works contract allowing a public entity to retain a percentage of payment in lieu of requiring a surety bond from $35,000 to $150,000.
- Decreases the percentage of the amount of a public works contract retained by the public entity in lieu of a surety bond from 50 percent to 10 percent.
- Increases from $100,000 to $150,000 the amount of a contract for which a public entity may accept full payment and performance bond from an individual surety.

SB 5631 requires the University of Washington to be more proactive in including the Office of Minority and Women's Business Enterprises in the alternative contracting process for construction of critical patient care or specialized medical research facilities. It also removes the expiration date for the UW's alternative contracting process.

Responsible bidder and other contracting laws

SB 5301 amends the low responsive bidder law. It adds a requirement that the bidder cannot have been found in violation of: wage payment requirements, minimum wage payment, or proper wage deductions for benefits and contributions. Violations of any of these laws within a three-

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LOUVER INSTALLATION

By / Norm Grusnick, P. Eng.
Commercial products manager, ECCO Supply

In many cases, installation is just as important to louver function as is design. Specifying the correct frame style and options can substantially improve installation. In many cases, louver manufacturers have specific models and accessories to make installations faster and easier.

Louvers generally connect to surrounding structures through their perimeter frames. The most common types of frames are flange and channel (Fig. 1).

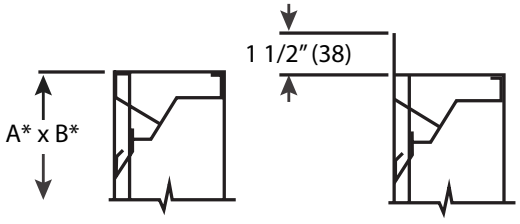

Fig. 1: Channel frame (left), front flange frame (right)

Channel frames provide a consistent outside dimension around a louver's perimeter. They do not extend beyond the overall width and height of the louver. For installation flexibility, they are the most versatile. They can be installed flush with the face of a wall, inset from the face, or slid inside a sleeve.

Flange frames are channel frames with one leg longer than the other. Flange lengths usually are 1 to 1½ inches. Front flanges are the most common style; however, rear flanges are also available. The installation of flange frames is limited to flush mounts outside of a wall. Front flange frames help hide inconsistent gaps between louvers and the openings caused by uneven sizes or out-of-square conditions. The most common louver-installation method uses fasteners in surrounding walls or structures. In masonry walls, concrete screw anchors often are used. For metal structures, self-drilling metal screws are common. Lag bolts are used for wood frame installations. While manufacturers' specific installation instructions should always be followed, a common fastener location pattern is 6 inches from the corners and 12 inches centre-to-centre on all sides.

If a louver is small and the blade spacing wide enough, fasteners can be installed directly through the web of a jamb frame into a wall. However, if blade spacing is too narrow or a frame has downspouts that channel rain water, the installation of fasteners directly through a jamb should be avoided. This is the case with most wind-driven louvers. In such cases, installation angles can be utilized to connect the rear of a frame to an opening (Fig.2). For louvers with blade supports, angles should connect the tops and bottoms of the supports to a structure. Angles typically are provided as clip angles, which are 2 to 4 in. in length. They also can be supplied in full lengths for each side of a louver. These are known as continuous angles. Continuous angles cost more because of the material, but are faster to install. Installation angles can be used with channel or flange frames.

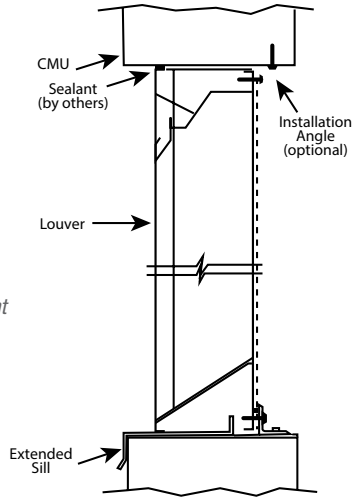

Fig. 2:
Installation - angle attachment

Some louver installation methods do not require the use of fasteners in walls. These methods often are time savers for contractors. One example is a sleeve with a retaining angle. This installation style utilizes front flange frames, perimeter sleeves, and continuous angles for the rear. The sleeved louver is slid into the opening from the front. Then, angles are installed to the rear of the sleeve with one leg against the wall. The other leg is fastened to the sleeve with screws. The flange and angle secure the louver tightly to the wall without the need for anchors, saving substantial installation time.

A louver-installation method is responsible for more than just holding a louver's dead weight in a surrounding structure. It also must secure a louver during high wind conditions in severe storms. In applications with extreme wind loads, it is a good idea to specify the submittal of structural calculations from a registered structural professional engineer. Another way is to select louvres that bear a third party certification such as Underwriters Laboratories. Listings/approvals are for both louver and installation method.

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GREASE SCRUBBER EXHAUST DUCT

By / the SMACNA-WW/
ICC Code Committee

A recent issue the SMACNA-WW/ICC Code Committee discussed concerned a project where the contractor would be installing a grease scrubber for the kitchen hood grease exhaust. The contractor had questions about whether or not the duct downstream from the scrubber to the louver (termination) is required to be constructed per grease duct code, or whether it can just be constructed as normal, non grease, unprotected exhaust duct, since, theoretically, the grease is supposed to be removed by this point.

It was agreed on by the committee that the only argument that could be submitted for the duct downstream from the scrubber would be to have manufacturer's installation instructions that state the duct downstream does not need to be of Class 1 construction (installation instructions usually defer to the jurisdiction in which the scrubber is installed). In this case, the installation instructions for the scrubber proposed for installation on the project in question did refer back to the local jurisdiction. It was recollected that this issue goes back to a project in 2000 where it was determined that the duct downstream from the scrubber had to be treated as a Class 1 installation. No one could recall seeing a scrubber installation, then or since, that did not require fire wrap/ protection downstream from the scrubber to termination. All jurisdictions would look at the duct on the downstream side of the scrubber to be of grease duct construction and protection as required in the code.

As always, please check with the authority having jurisdiction in your area regarding local code enforcement.

Seattle New Permit System Update

Seattle is replacing its current permitting system with a new software program. It will replace the permit portal it currently has in use. All permitting, licensing, inspections, and complaints functions are being converted to the system in phases, which started over the Memorial Day weekend with an internal launch within Seattle Department of Construction and Inspections (SDCI). After a few weeks, the city will begin inviting groups of customers to use the system for new projects.

Existing systems will stay in place during the transition. Since the system will be launched in stages, there will be no SDCI office closures during the launch. The new Seattle Services Portal will allow you to:

- Apply for a permit, access project updates, pay fees, research property information, check the status of a permit, schedule inspections, and more—all in one place
- Access the information on your smartphone
- Select project sites from a map, as well as with an address, when applying for permits
- Pay fees more easily, with the ability to pay all outstanding City of Seattle fees all at once

The city will be posting updates on all the upcoming changes, how-to guides, and information that you'll need to know on its website: http://www.seattle.gov/sdci. ▪

SMACNA NATIONAL CONVENTION

SMACNA in Maui. You know you're going, so why not register now and get the best prices and the best early-bird discounts? You deserve the best of the best. Bring your family and key staff. Combine business with pleasure, the way it was meant to be. Book your flights now for SMACNA's 74th Annual Convention Oct. 22-25 in Maui, Hawaii. Hotels to choose from are the Grand Wailea and the Wailea Beach Resort along with our Chapter Members room block at the Four Seasons Resort next door. Please visit the Annual Convention webpage for updates and announcements. Our early-bird savings are exceptional, but end July 15. Register today on SMACNA's Annual Convention webpage. For any questions please contact Heidi Coleman at the SMACNA-WW office.

TRY THESE TWO NEW AWARDS FOR YOUR ORGANIZATION

By / Mark Breslin

Everyone in the workplace likes recognition. Recognition is a powerful way to show employees what an organization values. It visibly displays the values and priorities. I would like to share with you two ideas to create powerful award programs that will make a real difference.

New Award 1: Mentor of the Year

Honestly, I have never seen this given by any of my hundreds of clients. Seems to me that it's kind of a no-brainer. People development is a huge part of our business and there is often a time barrier for leaders to engage in it. Why not raise it up the flagpole? Why not give accolades to those who are not only working for the company and their check, but for the success of their co-workers? If you do this, remember it does not only have to be the senior people mentoring the juniors. I have seen some great technology mentoring being done out there from the younger bucks to the old dogs.

New Award 2: Innovator of the Year

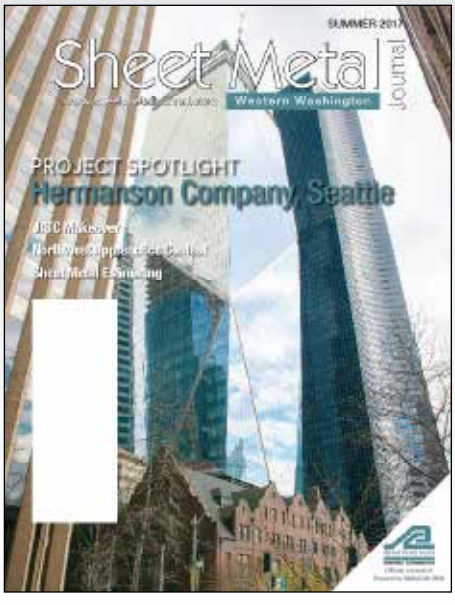
How do you gain input from your field operations personnel? The day of the suggestion box has long passed. The best way possible is to provide a visible set of rewards for those willing to participate in improving performance or operations. Now, the biggest barrier to this is often middle managers or even field leaders. The problems that exist include, not wanting others to get credit, not taking the time to listen, and no compelling reasons to do so. Innovator of the Year is not the person who has the best idea. Instead, it is given to the leader or manager who got the most ideas and innovations out of their people. Recognition is two-fold here—it goes to the leader and to those who he or she has elevated by pushing their ideas up the chain of command.

In pushing innovation though you must be willing to follow up on the ideas and innovations. You can't put them in some file to "get around to eventually" or you'll lose buy-in and credibility.

Remember, when people see their ideas in action their loyalty and extra effort are all yours. ▪

Submit your news, story, or photo idea

CONTRACTORS AND SUPPLIERS



SMJ-WW is on the lookout for interesting HVAC, architectural sheet metal, testing & balancing, and industrial / specialty news and feature topics. If you have a great idea, notice an industry issue that needs addressing, or want to weigh in on a technical subject, we would love to hear from you.

We also need great pictures – current and historical – of people working in all aspects of the sheet metal industry. If you have something to share, please email it to our editor, Jessica Kirby, with a caption about what is going on in the photo.

Questions about how else to get involved in a future issue of *Sheet Metal Journal*? Reach out to jessica.kirby@pointonemedia.com or 250.816.3671 and get the scoop.

UPDATES TO WASHINGTON'S PREFERRED WORKER PROGRAM

By / Karen Forner

Washington State's Department of Labor & Industries has updated incentives for returning injured workers to the job in modified, light duty positions. The Department administers the state's Workers' Compensation system directly through its State Fund system and indirectly by monitoring Self-Insured Employers.

In overseeing Washington's Workers' Compensation system, the Department emphasizes returning injured workers to work as quickly and safely as possible. To that end, it encourages employers to accommodate an injured worker's medical restrictions while they are recovering by offering temporary light duty (TLD) opportunities. This keeps workers active and invested in their employment while allowing an employer to benefit from the worker's productivity while limiting the cost of time-loss compensation (TLC) on the claim.

Returning an injured worker to their original position is the best outcome, but sometimes injury causes permanent impairment that prevents this. In this circumstance, the Department may authorize vocational retraining. Employers should make every effort to avoid this long and expensive process. Fortunately, employers have the option to offer a permanent modified duty position that accommodates a worker's claim-related restrictions. Even better, the Department incentivizes employers to find such permanent accommodations through its Preferred Worker Program. Employer benefits from making a permanent modified duty job offer with preferred worker certification include:

1. Waived Accident Fund and Medical Aid Fund premiums for the worker for three years for state fund employers.
2. Costs of any new claims filed by the worker for three years are charged to the Second Injury Fund rather than the employer's account, if State Fund.
3. Reimbursement for 50% of wages up to 66 days or $10,000.
4. Reimbursement for clothing, tools, and equipment.
5. Possible one-time incentive payment of up to $10,000 if worker continuously employed for 12 months.

The clock begins running from the day the Preferred Worker starts work after receiving certification. These benefits can be substantial, particularly if the Preferred Worker suffers a significant further injury that renders him or her totally permanently disabled and eligible for a pension.

Until recently, the Employer of Injury for the claim resulting in Preferred Worker certification was barred from receiving Preferred Worker benefits. This meant very few employers could benefit from the program because other employers did not know if they were hiring Preferred Workers or not. Now, it is easier, but the process can still be complex.

First, the worker's claim must be open or closed without a final order. This means employers need to move to take advantage of the Program as early in the claim as possible.

Second, the worker must meet criteria for the Program. Generally, the worker must be entitled to a permanent partial disability (PPD) award for their claim and receive permanent work restrictions that prevent return to the job of injury. The restrictions can prevent performance of an essential job duty, restrict the worker to a lighter work category, or make the worker eligible for vocational retraining.

Third, the Preferred Worker Request form must be completed and submitted to the Department. Employers can request Preferred Worker certification for one of their workers with an open claim. The form may be completed by a vocational provider and requires medical evidence that the worker cannot return to the job or injury, that the worker's permanent restrictions are related to the claim, and that the worker is at or near maximum medical improvement.

Fourth, the employer must offer an appropriate job to the certified Preferred Worker. The job must be consistent with the Preferred Worker's permanent restrictions and approved by the Worker's treating provider and a vocational counselor. Copies of the approved job analysis and the accepted job offer must be submitted to the Department. Once the Department receives the necessary paperwork and approves the job, the three-year period begins.

You can hire Preferred Workers who received certification with a different employer, but the Worker must volunteer information about their certification. Inquiries regarding certification status could be considered discriminatory.

The Department's updates to the Preferred Worker Program

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INDUSTRY NEWS

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With that agreement, and with the subsequent definition of each organization's roles, the ASHRAE Standard 189.1 committee continued revising the standard so it could provide technical content for the IgCC, with the ICC responsible for the administrative sections and publication.

This integrated document, coined the "IgCC powered by 189.1," will become the 2018 version of the IgCC (2018-IgCC), due to be published in summer 2018.

By collaborating on developing the 2018-IgCC, these organizations envision a new era of building design and construction that includes environmental health and safety as code minimums. The goal of the 2018-IgCC is to provide fundamental criteria for energy efficiency, resource conservation, water safety, land use, site development, indoor environmental quality, and building performance that can be adopted broadly.

With that foundation, local jurisdictions can build upon regulatory requirements by leveraging complementary leadership strategies that support and encourage the evolution of the building community. Initial steps in achieving these outcomes include publishing the 2018-IgCC, streamlining compliance for aligned strategies in LEED certification, and promoting the use and implementation of these tools.

For more information visit ASHRAE at www.ashrae.org or The International Code Council at https://www.iccsafe.org/ ▪

LEGISLATIVE UPDATES

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year period preceding the bid solicitation will make the contractor ineligible to be a low responsive bidder for public works contracts and for goods and services contracts.

HB 1395 allows public transportation benefit districts (public transit agencies) to use job order contracting. Job order contracting is a process where a public agency hires a contractor to perform a variety of public works over a fixed period of time, not exceeding four million dollars a year. Individual work orders are limited to no more than $350,000. Job order contracting is available to the state, larger cities and counties, and other local governments.

SB 5036 authorizes a public utility district to procure public works with a unit priced contract for completing anticipated types of work based on hourly rates or unit pricing for one or more categories of work or trades. ▪

Kathleen has worked for SMACNA-Western Washington as its Legislative Consultant for over 20 years. She has a government affairs consulting business, Capitol Strategies Consulting, and represents other business and transportation clients.

ENGINEER'S DESK

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No matter how effective a louver is in preventing rain penetration, water will find its way into a building if the installation is not properly caulked. First, the joint between the perimeter frame and opening must be sealed with backer rod and caulk. In flange frame applications, apply caulk around the flange perimeter and the wall. In addition to perimeter joints all other joints should be caulked.

By incorporating the louver features and proper installation practises, designers and installers can benefit from easier installation and better performance of their louvers. ▪

IT'S THE LAW

Continued from page 22

reflect its stated priorities in returning an injured worker to a job with their original employer when possible by allowing the employer of injury to benefit. It also makes it easier for workers and employers to get all the available information to get certification for a Preferred Worker and request benefits. ▪

Karen Galipeau Forner is the founder and managing member of K-Solutions Law in Bellevue, Washington. Karen represents employers in the areas of workplace safety, workers' compensation, administrative appeals, and employment law. She is a frequent presenter at continuing legal education seminars and to employer groups. Karen has over 25 years' experience defending and resolving a wide range of workers' compensation, WISHA, and employment law matters. Prior to starting K-Solutions Law, Karen worked as senior attorney at a law firm in Seattle and for the Washington State Attorney General's Office. She was the Program Advisor for the Industrial Insurance and Washington Industrial Safety and Health Act (WISHA) Discrimination Programs for more than 10 years and the Program Advisor for the Workers' Compensation Sren also litigated complex WISHA, Industrial Insurance, Third Party, and Crime Victims Compensation Act cases. She recently served on the Washington State Bar Association Character and Fitness Board.

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