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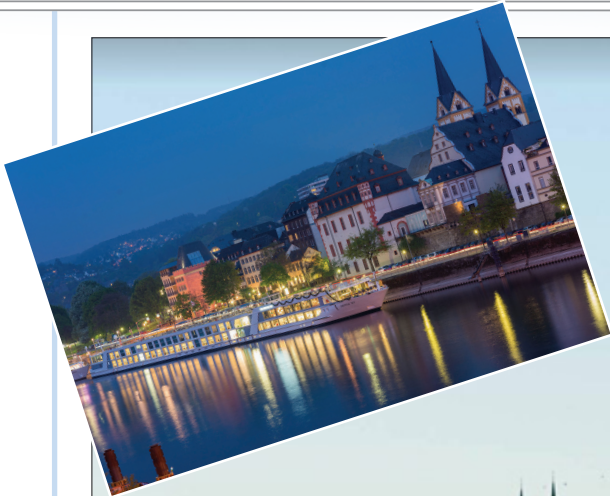
TECHNICAL BULLETIN:

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FALL 2018 CROSSFLOW

THE OFFICIAL NEWSLETTER OF THE ONTARIO SHEET METAL CONTRACTORS ASSOCIATION



INDUSTRY EVENT



OSM set to Cruise the Danube for 2019 Annual Convention

The Ontario Sheet Metal Contractors Association (OSM) is looking forward to cruise the Danube River for the 2019 Annual Convention being held April 13 to 21.

On April 13, delegates will arrive in Budapest, Hungary and spend the night

at the deluxe Budapest Marriott Hotel.

Following the OSM Annual General Meeting at 9 a.m. on April 14, delegates will board the luxury river cruise ship – Emerald Waterways “Destiny,” the newest member of the Emerald Waterways Star-Ships fleet. Elegantly designed and

effortlessly welcoming, the Emerald Destiny provides a sophisticated and comfortable passage along the timeless waterways. All cabins on the Vista and Horizon decks are equipped with a revolutionary open-air system, designed to

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OSM set to Cruise the Danube for 2019 Annual Convention

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ensure all-weather enjoyment while taking in Europe's beautiful landscapes.

After boarding the cruise ship, delegates can enjoy some time to explore Budapest and then join fellow travellers for a traditional Hungarian dinner. Later in the evening, attendees will enjoy a Hungarian folk dancing and musical performance.

Monday, April 5 will be spent in Budapest, said to be eastern Europe's liveliest and most cosmopolitan city centres. Delegates will enjoy a guided tour of the city sights including the Hungarian Parliament building, the Buda Castle and the Chain Bridge linking Buda and Pest. Alternatively, guests can partake in a hike on the Buda Hill.

On Tuesday, April 16, the Emerald Destiny will arrive in Vienna, Austria. Delegates will have a choice of two activities to participate in. Some may choose to explore Austria's capital beginning with a drive along the Ringstrasse, where they will see some of Vienna's world-famous attractions such as the Opera House, Burgtheater, Spanish Rid-

ing School, Town Hall, St. Stephen's Cathedral and the Hofburg Imperial Palace. Others may wish to take in the sights via a guided bike tour.

On the morning of Thursday, April 18, the group will arrive in Dürnstein, Austria, one of the most enchanting villages of the Wachau wine region. This is the site of the castle where Richard the Lionheart was imprisoned after returning from the crusades in the 12th Century. Delegates will drive through the picturesque landscape of the district to the 900-year-old Benedictine Abbey of Melk, which features Austria's finest Italian baroque architecture.

Friday, April 19 will see the group arrive in Linz, a modern city with a long and eventful history. After a tour of the European capital of culture and unique

Baroque Hauptplatz, delegates will have an opportunity to stroll through the marvelous city old quarter or sit in an Austrian Coffee House to sample some of the local specialties.

Cobblestone streets and graceful arcades will welcome delegates on Saturday, April 20, as they arrive in the beautiful city of Passau. On this morning's walking tour, attendees will stroll through the old town's narrow alleys and see the hilltop Oberhaus Fortress from the town below. Delegates can also visit St. Stephen's Cathedral, a wonderful example of Baroque architecture and home to Europe's largest church organ with more than 17,000 pipes.

On Sunday, April 21, the group will bid farewell to fellow passengers and disembark the ship for a transfer to Munich Airport.

Various meal and accommodation packages may be purchased for this outstanding river cruise. Please consult the OSM Annual Convention information package or visit the association web site at osmca.org for additional details.

Labour Relations Committee Seeks Member Input



The Labour Relations Committee (LRC) is encouraging local associations to hold meetings with their membership in order to obtain viewpoints for the upcoming collective bargaining.

The LRC representatives have been tasked with collecting input from their local area membership in preparation for the next committee meeting in the fall. LRC representatives for 2018 / 2019 include:

- **Mike Dietrich**, LRC Chair – Waterloo-Wellington Sheet Metal Contractors Association – mike@rozell.ca

- **Daryl Brisco** –

Provincial Cladding and Decking representative – dbrisco@vixman.com

- **Jim DiNovo** – Brantford, Hamilton & Niagara Sheet Metal Contractors Association – dinovo@bmlmultitradesgroup.ca

- **Robert King** – Mechanical Contractors Association of Kingston – rking@rksheetmetal.ca

- **George Gallant** – London Sheet Metal Contractors Association – ggallant@london.com

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Newly-Appointed Ontario Government Ministers Introduced

With the election of the new Ontario Provincial Government in June comes the introduction of new Ministers responsible for industry-specific ministries.

Representing the riding of Haliburton - Kawartha Lakes – Brock, the new Minister of Labour is the Honourable **Laurie Scott**. Scott

can be reached at (416) 326-7600 or ministeroflabour@ontario.ca.

The Ministry of Training, Colleges and Universities will now be led by the Honourable **Merrilee Fullerton**, MPP from Kanata-Carleton. Fullerton can be reached at (416) 326-1600 or merrilee.fullerton@ontario.ca.



NEW MEMBER BENEFIT

Two Grey Suits

Providing resources to improve employee engagement

Two Grey Suits (TGS) is a professional, on-line resource which provides companies, both large and small, with a wealth of tools and information to help them hire, manage, engage and retain employees. And now, this valuable resource is available to OSM member companies.

"We've been HR professionals for the last 25 years and we know where companies are making their big mistakes," said Ron Guest, senior partner at TGS. "Human resources has always been known as a necessary evil, but that changed 10 years ago when research came out that finally drew a line in the sand."

According to Guest, the compelling global research concluded that only 30 per cent of employees are fully engaged at work. Engaged employees are involved and enthusiastic about their jobs. They also care about the future of the company and are willing to invest their knowledge, wisdom, time and energy in order to see the organization succeed.

"Employee engagement is not just a concept anymore, it's actually a fact," Guest said. "Start managing your people in a different way and increase engagement with your employees, and it will have a positive impact on your profitability as a company."

TGS came to fruition when partners Ron Guest and Barry Chapman combined their vast human resource management knowledge and launched "Bottomline HR" 14 years ago. Although the name stuck through the company's infant years, feedback received from clients was that it sounded as though the company provided "cheap HR." Not wanting to be

considered as bottom end, the partners dressed up the name and changed it to Two Grey Suits.

TGS is an on-line bank of information that includes a wealth of resources to assist companies with their people management skills and business policies. In addition to a 24/7 HR Hotline, TGS offers a six-module HR certification training program, as well as over 800 non-industry-specific documents pertaining to all things "people management."

"Many companies are making less informed decisions around hiring people and also managing people," Guest said. "We want to equip managers with the tools they need to hire, coach, provide proper feedback, train and ultimately engage employees so they feel motivated, inspired and supported."

The 24/7 Hotline – 1-888-661-9234 – provides TGS with insight into company "pain points."

"If people are willing to pick-up the phone and call a stranger, they must be hurting quite a bit," Guest said. "Companies tend to let small issues fester to a point where it really starts to hurt the business. The Hotline provides a relief point and a resolution to these problems."

In an effort to assist other businesses with similar issues, TGS has taken the questions they have received on their 24/7 Hotline and posted them in the FAQ section of each module on the website.

TGS also offers a six module on-line Employee Engagement certification training program which addresses the key drivers of employee engagement and

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RECOGNITION

Wally McIntosh Memorial Scholarships Awarded

Wally McIntosh would certainly be proud of the hard-working students recognized each year through a Memorial Scholarship award presented in his name by the Ontario Sheet Metal Contractors Association (OSM).

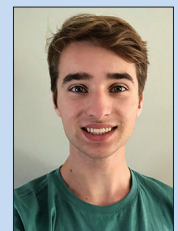
The former OSM president, who passed away in 1982 at the height of his career, always held education in high esteem. Each year OSM offers two, \$2000 scholarships to children of OSM member firm employees who are graduating from high school and entering college or university studies.

Each year presents a new challenge for the panel of five judges to decide on the two most deserving applicants. Not only are their academic achievements considered, but so are their extracurricular activities, community outreach, leadership qualities and employment history.



Teanna Kavanagh

After much deliberation and discussion, the panel narrowed their decision to **Teanna Kavanagh** and **Bryan Marr**.



Bryan Marr

Daughter of Spada Sheet Metal's Lorraine Kavanagh, Teanna is attending the University of Windsor studying Human Kinetics.

Bryan Marr is the son of Renee Marr of E.S. Fox Ltd. Bryan is attending the University of Ottawa in

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Message from the Executive Director

I hope you have enjoyed the summer and were able to take some vacation time to decompress from the day-to-day pressures of business life. As the season draws to a close, I thought I would share a short yarn from my own vacation experience this year.

For several years a group of close friends and I have taken a week-long road trip. It's our lamer version of "Wild Hogs" where some guys ride bikes while others, like myself, cruise in sports cars. Our group has done everything from driving the "Tail of the Dragon," to attending the Indianapolis 500, to eating fresh lobster plucked straight out of the ocean. It's always a great week away.

But this year, I discovered a method to by-pass a system that has annoyed me for many years. It has to do with filling your ride at any U.S. gas station. You see, when travelling in the States you are required to enter a ZIP code at the pump prior to filling. If you do not enter a ZIP code, you are required to go into the station and either pay up front or comply to some other extorted arrangement. This year, when I pulled in for some fuel, I received a tip from a friend to get around this silly ZIP code issue. It was suggested that I take the three numbers out of my postal code and add three zeros. (For example, if your postal code is L4B 1B9, you would enter 419000 as the ZIP code). Lo and behold, it worked. Many of you may already know this trick and are probably saying 'well, duh Stewart.' But all I know is that after all the years that we have done these road trips, my good pal had been bogarting that nugget of information for far too long.

Now, down to the shop talk. As I reported in the summer edition of *Crossflow*, we have acquired an association management software program and are in the process of transferring our database, as well as setting up a new website. This program is very robust and will not only save costs over our current systems, but greatly improve our ability to communicate and engage the membership.

On page 3 of this edition, you will see an article on TwoGreySuits (TGS). Through our membership in COCA, OSM receives a discounted association price that is an exponential savings compared to individual TGS business membership fees. The association cost is covered by OSM and allows OSM members complete access to the resources and services of TGS. Take some time to familiarize yourself with the vast information available to your business through TGS. Your seasoned human resources staff will find the available business tools extremely helpful. As an OSM member, you should have received your log-in credentials for this valuable program. If not, please contact Diana Ramirez at our office.

Not surprisingly, the availability of manpower continues to be a problem in the industry for both the union and non-union sectors. The difference is the union sector plays by the rules by only employing sheet metal workers to engage in the trade scope of practice who are registered with the Ontario College of Trades.

In an effort to solicit new recruits, OSM partnered with the Ontario Sheet Metal Workers and Roofers Conference last fall to collaborate on a marketing campaign. The Toronto Sheet Metal Contractors Association also partnered with Local Union 30 in a similar advertising campaign, in addition to the solo efforts made by LU30.

While the union has not provided the hard numbers of new recruits obtained through these initiatives, I do know that local unions in London, Waterloo-Wellington, Ottawa and Toronto have brought into their fold qualified sheet metal workers from the non-union and CLAC sectors. Organizing companies and the recruitment campaign have also verified what we already knew about the industry for many years – many non-union contractors do not register employees into apprenticeships. The union has now signed up some of these individuals as apprentices and some of them have over 20 years of experience working in the trade.

This recruitment effort will assist towards alleviating the manpower issue, but done and said, growing the union member numbers is not just a short-term issue,

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Two Grey Suits

how to implement them. According to Guest, managers can complete this training on their own time. Generally, it takes approximately six months to complete.

The modules of the training program cover such areas as: Employee engagement overview; Hiring right the first time; Clarity of the job; Building people management skills; Developing your HR policies and Code of Business Conduct; and, Communicating for engagement.

"Although the training is called Employee Engagement Certification, it really is essential skills supervisory training," Guest said. "Some of the feedback we have received thus far is that the training is not easy to pass. To those who say, it's difficult, I say it has to be because this is serious stuff. If you don't study up, you don't pass."

To supplement the certification training, TGS also provides an HR Tool Kit which includes over 800 documents and forms, 70 guides and over 300 FAQs all relating to effective management. The categories in the HR "Power Centre" include the following:

- **HR Basics** – employee communication, preparing job descriptions, setting performance objectives, etc.
- **Recruitment** – setting proper pay rates, sourcing and screening candidates, interviewing and selection, etc.
- **Performance Management** – proper management skills, managing poor performance, etc.
- **Pay & Benefits** – evaluating jobs for internal equity, customizing your compensation plan, etc.
- **Administration** – HR metrics, HR policy guide, social media policies, code of business conduct, etc.
- **Risk Management** – federal and provincial employment laws, termination management, privacy legislation, health & safety, human rights, etc.

"Two Grey Suits embraces the concept of instant information," Guest explained. "It offers quick and organized information that gets you on your way pretty fast. We're all about providing companies with all the tools and information they need so they can be effective and successful people managers."

For more information, please visit www.twogreysuits.com.



43rd Annual Canadian Apprentice Competition



Sheet metal workers were in the spotlight in Victoria, BC, as apprentices from across Canada put their skills to work at the 43rd Canadian Apprentice Competition on July 5 and 6, 2018.

Hosted by Local 276 of the Vancouver Island Sheet Metal Workers' and Roofers' union, the competition was held in conjunction with the Canadian Council of Sheet Metal Workers' and Roofers' annual convention at the Delta Ocean Pointe Resort. A "pop-up shop" was created under a tent at the busy Ship Point location.

In a C-Fax 1070 radio interview, Competition Organizer Scott Wood said, "we do certain events like this to showcase what we can do."

"A lot of people look at sheet metal workers and roofers and they don't actually know what we do," he said. "Our trade is so broad and we do so many different things – architectural, siding and decking. This event shows the creative side, the architectural side, and gives people a look at what we do."

According to Rick Carter, apprentice training co-ordinator with Local 276 and designer of the 2018 project, the idea of bringing the competition to the Inner Harbour was to give more public exposure to the craft and add an element of

fun to the proceedings.

This year, the 19 apprentices were given eight hours to create a binnacle, which is a housing for a compass that is installed on a ship's bridge. In addition to the hands-on portion of the competition, the apprentices were also engaged in theory testing off-site.

The winners were announced on Saturday, July 7 at a special ceremony held at the Delta Ocean Pointe Resort. Congratulations to the competition winners:

- First place – **Sam Townsend**, LU8 Edmonton.
- Second place – **Derek Sabbe**, LU235 Windsor – Spada Sheet Metal.
- Third place and the Congeniality Award – **Matt Heyman**, LU 269 Kings-ton – RK Sheet Metal.
- Fourth place – **Chris Muha** – LU537 Hamilton – Lancaster Group (now with Panels and Pipes).



OSM Hosts Regional Meetings

Regional meetings will take place in Waterloo, ON, during the Ontario Apprenticeship Competition, being held October 11 to 14, 2018. A subsequent meeting will be held in Ottawa, ON, on November 15. The OSM Board of Directors looks forward to meeting with the local area memberships. Further details will be made available to local area members.

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Wally McIntosh Memorial Scholarship Awarded

the Biomedical Sciences Program – French immersion stream. His academic goal is to "continue to work hard in pursuit of being accepted to medical school and training to become a physician." He is also very excited to be part of the French immersion stream as his goal is to become fully bilingual.

In past years, the scholarship fund also offered a \$1000 scholarship to a deserving student enrolled at Lambton College, located in McIntosh's home town.

In 2019, the Board of Directors decided to discontinue this scholarship. Instead OSM will award the \$1000 scholarship to the graduated apprentice of the Ontario Sheet Metal Workers Training Centre who obtains the highest average mark in all three phases of day school, as well as the highest pass mark achieved on the Certificate of Qualification exam. Only apprentices that have attended all phases of day school at the training centre will be eligible.

SMACNA Safety Awards Presented

SMACNA is pleased to recognize Canadian member companies for their outstanding health and safety performance over the past year.

Each year SMACNA's Safety Excellence Awards Program (SSEAP) recognizes members with the lowest injury/illness rates over the previous calendar year. The association began the SMACNA Safety Excellence Award Program – Canada (SSEAP-C) in 2016.

This year, SMACNA recognized **Vollmer Inc.** with an honourable mention award for safety excellence in the under 100,000 man-hours category. Additionally, **Lancaster Group** received an honourable mention award for safety excellence in the over 100,000 man-hours category.

Submissions for the 2019 Safety Excellence Awards can be made electronically on the SMACNA web site after January 1, 2019.

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Message from the Executive Director

but rather a long-term issue that we must remain focused on. I will share more thoughts on the labour shortage in the Winter edition of the *Crossflow*.

In closing, I would like to remind everyone of our upcoming annual convention which will see attendees cruise the Danube River. Registration for the 2019 event opened at the end of June and will close on October 7. I realize this is earlier than in the past, but this is due to contractual terms with the organizing agency. We have had very good interest this year, so I encourage everyone not to miss out. The highlight of the annual convention for me is having the opportunity to speak one-on-one with you, the member. I hope you can attend!

– Darryl Stewart

TECHNICAL BULLETIN

SMACNA Flat Lock Seam Soldered Copper Joints Study

The International Training Institute (ITI) commissioned Simpson Gumpertz & Heger Inc. (SGH) to evaluate 1/2-inch-wide flat lock seam soldered joints. The industry's current recommended widths are 5/8-inch-wide flat lock seams (Architectural Sheet Metal Manual by SMACNA) and 3/4-inch-wide flat lock seams (Copper and Common Sense by Revere Copper).

The study investigated the in-service cyclical thermal loads that flat seams typically experience, and to test varying levels of dressing extent, joint gaps, voids in solder, edge seam solder geometry and solder extent, to help analyse the minimum requirements for meeting the intended service life of 75 years without failure in a 1/2-inch-wide flat lock seam.

PHYSICAL TESTING

All specimens tested were 1/2-inch-wide seams.

The analysis used multi-geographical formats to gather thermal cycling and the amplitude applied to specimens simulating 75 years of in-service flat seam roof panels. The analysis evaluated stresses on copper roof seams due to thermal expansion and contraction. Seventy-one 16 oz. copper specimens were subjected

to this cyclic testing all with varying degrees of dressing extent, joint gaps, voids in solder, edge seam solder geometry and solder extent. No common specimens were tested.

A hydraulic tester was used to apply loads to the specimens according to thermal cycles simulating 75 years or until the specimen failed. There were five groups tested in two phases.

Phase One consisted of three preparation methods:

- **Method One** – pre-tinning of the front and back of the 1/2 copper pieces, turning them 180 degrees to form hooks, applying flux to the inside of the hook seam on both pieces, hook both pieces and flatten, applying flux to the outside of the seam and then soldering the joint on the side with flux only to sweat solder completely through the joint.

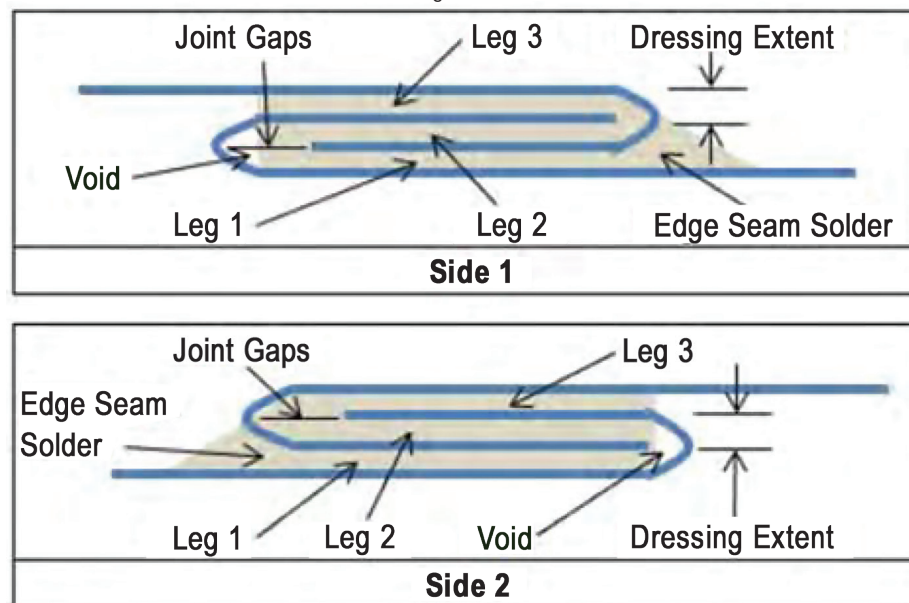
- **Method Two** – no pre-tinning was done, but otherwise the same actions were followed.

- **Method Three** – no pre-tinning was done and they “Apply solder to seam at a slightly faster travel pace using approximately 20 to 25 per cent less solder.”

Phase Two consisted of two preparation methods:

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FIGURE ONE. Four Parameters for Evaluating Flat-Seam Solder Joints.



CHAPTER UPDATE

SMACNA Board of Directors Report

By DANNY DILLON,
President of Dillo Mechanical and a
Past President of OSM



As your SMACNA Board representative, I am pleased to provide you with the following update from SMACNA:

SMACNA's Technical Services has been busy working on publishing various technical documents for the industry. This summer, the group released the HVAC Duct Construction Standard – Fourth Edition. Other publications which are currently under review include the HVAC Total System Air Leakage Test Manual – First Edition; the Fire and Smoke Damper Manual – Sixth Edition; and Kitchen Grease Duct Construction Tables. Currently in development are the Seismic Bracing Manual, Food Service Guidance Manual and an Infection Control Risk Assessment guide.

SMACNA's upcoming technical services projects include the following:

- Testing, Adjusting and Balancing Manual;
- Rectangular Industrial Duct Construction Standards;
- Development of short videos demonstrating the various means/methods of applying the SMACNA Technical Standards to enhance member knowledge, and educate Building Code officials and the design community.

SMACNA has also embraced technology by creating various APPs to assist members. These include a Duct Leakage Calculator, HVAC Duct Construction Standard, Round Industrial, and Downspout and Gutter Sizing. Future APPs that the association hopes to launch include "Duct-o-lator" and Rectangular Industrial.

The Member Services, Market Sector Councils, Business Management and Education group are working on a variety of educational documents for the betterment of the industry. These documents include the following:

- The New Horizons Foundation study on "Productivity Tracking in the HVAC Industry for Design, Manufacturing and Installation."
- SMACNA's HVAC Systems: Understanding the Basics Manual.

• SMACNA's Reference Manual for Labour Units – developing a cloud-based change order program incorporating MCAA's long-established productivity factors.

- Contractor Operation Manual.

SMACNA's business management and educational programming continues to sell out every year. These programs include the Business Management University, Supervisor Training Academy, Project Management Institute, Financial Boot Camp, the newly-introduced Executive Leadership Development Program and Advanced Project Management Institute. Please consult the SMACNA website for further information on the dates of these extraordinary programs and don't forget to register early.

SMACNA continues to provide the highest quality speakers and programs to its Chapters. This year the association is offering a selection of 15 Chapter programs along with one new program – "Build the Business: It's More Than Revenue."

Additionally, SMACNA continues to work on the development of the Student Chapter initiative. More details will be provided directly to the Chapters.

As part of SMACNA's strategic plan, the association has hired Jeff Henriksen as the new communications and marketing director. Henriksen is currently working on enhancing the content and design of the SMACNA web site, making it easier to navigate while offering additional content. Please take the time to review and check out all of the information and resources now available on the web site at www.smacna.org.

To further communication, SMACNA is also working on creating a daily "SMACNA SmartBrief" to keep the membership up-to-date on current events affecting the industry.

Finally, the 2018 SMACNA Convention will be held in San Diego, CA, from October 14 to 17. For more information and to register, please visit <https://www.smacna.org/annualconvention>.

If you have any issues, questions, suggestions for SMACNA, please do not hesitate to contact your SMACNA Chapter representative so that we may continue to offer the best in service and value to you, our member contractors.

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SMACNA Flat Lock Seam Soldered Copper Joints Study

• **Method Four** – pre-tinning of one side of the ½ copper pieces, turning them 180 degrees to form hooks, applying flux to the inside of the hook seam on both pieces, hook both pieces and flatten, applying flux to the outside of the seam and then soldering the joint on the side with flux only to sweat solder completely through the joint.

• **Method Five** – was the same as Method Four with one exception: "Apply solder to seam at a slightly faster travel pace in order to sweat partially through joint."

FINDINGS

• **Method One** – 10 specimens tested: All completed 75 cycles of testing.

• **Method Two** – 12 specimens tested: five completed 75 cycles; one completed 73 cycles; four ranged from 37 to 65 completed cycles; and one failed at 19 cycles.

• **Method Three** – 10 specimens tested: one completed 75 cycles; one completed 61 cycles; six ranged from 20 to 45 completed cycles; and two failed at less than 20 cycles.

• **Method Four** – 17 specimens tested: 13 completed 75 cycles; and four failed at less than 30 cycles.

• **Method Five** – 23 specimens tested: All failed at less than 17 cycles.

SUMMARY

Two variables were determined to have a direct effect on the in-service life and failure mode of flat soldered copper seams. Based on their testing, solder extent and edge solder geometry both contribute to the ability of the seam to withstand cyclic thermal loading.

Every seam with any degree of solder present in the third leg

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Ontario Sheet Metal Contractors Association

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Crossflow is the official marketing publication of the Ontario Sheet Metal Contractors Association. Circulated four times per year, the e-newsletter is designed to provide association news and program updates, government affairs information, educational opportunities, as well as updates on current industry trends.

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SMACNA Flat Lock Seam Soldered Copper Joints Study

achieved the 75-year in-service life benchmark. These specimens varied in dressing extent, number of voids in the solder within the seam and edge solder geometry. *Figure One* shows the four parameters used to evaluate the flat seam solder joints.

Twenty-two out of 23 specimens with solder present in the third leg achieved the 75-year service life. One specimen that was sweated 90 per cent into the third leg failed during the 75th cycle. Not all specimens that achieved a 75-year service life had solder present in the third leg.

The specimens had various degrees of dressing extent, voids in the solder within the seam and edge solder geometry, yet a common characteristic among the seams was a moderate to high amount of edge seam solder present (*see Figure One*). The edge seam solder provided additional stiffness to a soldered seam and may extend the life of a seam.

The specimens in groups two, three and five had similar joint evaluation parameters aside from the amount of edge seam solder present. The specimens in groups two and three had a moderate to high amount of edge seam solder, and the specimens in group five had no edge seam solder present. The specimens in groups two and three completed an average of 59 and 37 cycles, respectively, while the specimens in group five completed an average of 10 cycles. The specimens that did not have any edge seam solder present failed after one-third fewer cycles than the specimen with edge seam solder present.

While edge seam solder may extend the life of a seam, it cannot be depended upon to provide a reliable soldered seam. The average life of a partially sweated joint with a moderate to high amount of

edge seam solder is 48-years. The standard deviation for this set of data was 23 years, indicating that results are highly variable and inconsistent.

CONCLUSION

Based on analysis and cyclical load testing, the following are recommendations for flat locked soldered copper seams:

1. In seams that are 1/2-inch in width, solder must be sweated into all three legs of the flat lock seam to provide appropriate service life, regardless of the extent of solder into the third leg.

2. In seams that are 1/2-inch in width, soldering only into the second seam leg is not sufficient to provide a long-lasting solder joint. Only two per cent of the seams tested with solder in the first two legs achieved the 75-year service life without failure.

3. In seams that are 1/2-inch in width, small voids in the solder at seam bends have marginal effect on service life.

4. In seams that are 1/2-inch in width, within the variances of the samples received, the dressing extent has little to no effect on service life. The majority of the samples received were fully dressed or nearly fully dressed. The worst sample had a dressing measurement of 0.07 in. (1.78 mm).

The pre-qualification of architectural sheet metal workers per the criteria outlined in the Architectural Sheet Metal Manual published by SMACNA and AWS B2.3 Specification of Soldering Procedure and Performance Qualification, is critical in ensuring a quality, long-lasting flat lock seam installation as the test data proves the most important factor in determining quality of a copper solder seam is the extent of the solder sweated through the seam.

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Labour Relations Committee Seeks Member Input

• **Cathy Godin**, Mechanical Contractors Association of Ottawa – cgodin@sksheetmetal.ca

• **Larry McDonald** – Sheet Metal Contractors Association of Sarnia – larry@mcintoshmechanical.com

• **Felix Lopes** – Mechanical Contractors Association of Sudbury – flopes@lopesltd.com

• **Walter Keating Jr.** – The Lakehead Sheet Metal Contractors Association – walterjr@keatinginc.ca

• **Jarrett Little** – Toronto Sheet Metal Contractors Association – jarrett@davidclittle.ca

• **Steve Koutsonicolas** – Mechanical Contractors Association of Windsor – caltabair@bellnet.ca