Weld Process Efficiency Analysis

This interactive seminar will cover why a welding process analysis is important. It will look at what information and process variables are needed to assess a weld process and the overall efficiency and economics thereof. We will work through the factors that impact weld process efficiency, such as: gas to filler metal ratio, weld size, weld quality, operating factor, filler metal to welding torch consumption ratios, and shielding gas mix selection.

The action of benchmarking and how to test for and evaluate the economic impact of these different factors will be discussed. Information will be shared on the technology that is available to aid in production monitoring and further analysis of Shop Floor control.

November Technical Night/Educational Series Seminar

Thursday, November 10, 2016

“Weld Process Efficiency Analysis”

Schoolcraft College, VisTaTech Center
18600 Haggerty Rd, Livonia, MI 48152

Map/Directions

AGENDA
5:30 - 6:00pm  Welcome Reception & Networking
6:00 - 7:00pm  Dinner
7:00 - 9:00pm  Educational Presentation
9:00pm         Adjourn

Presenters
Ed Warzyniec
Jared Nevel
Nathan Moyer
Dale Albertson

AWS Technical Nights are open to everyone! We encourage that members bring students and non-members to learn more about our organization and industry.

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November 2016

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Nate Miller
(989) 245-4105 or email N8miller14@gmail.com
$10 refundable deposit to ensure your seat!
As I’m sure those who attended would agree, it would be foolish for me to move forward without first thanking Elizabeth Hetrick and her team for the tremendous work they did in organizing another great Sheet Metal Weld Conference (SMWC). Working on drastically compressed timing, the SMWC committee delivered an event that is truly unique to the industry at a fantastic new venue. It is important to keep in mind that all of the individuals involved with this process are volunteers, who take time out of their personal and professional schedules to coordinate an event that draws an international audience. I’d like to personally extend my thanks to the SMWC committee for all their dedication in making this conference a rousing success.

Looking forward, we now need to appoint a Chair for our next Sheet Metal Weld Conference in the fall of 2018. If you are interested, or know someone who might be, please do not hesitate to contact me or any member of the AWS Detroit Section Executive Committee. We want to ensure that the next Chair is appointed in time to receive a proper hand off. If the SMWC Chair is more than you want to take on, but you still have an interest in participating as a volunteer, I encourage you to consider putting your name on the ballot for the Detroit Section Executive Committee. Each year we strive to fill the ballot with new names from the industry for election. We need everyone’s help to keep the section and its activities relevant and serving the needs of our membership. Please, do not hesitate to contact me directly if you’d like to be considered.

November is usually one of the busier months for the Section and this November will not disappoint. November 10th is our first “Education Series” event of the season focused on “Welding Process Efficiency,” November 16th-18th is FABTECH in Las Vegas, and the month closes with US Thanksgiving. It is a busy time of year for sure.

On behalf of all of the members of the Detroit Section Executive Committee I would like to wish you and your family a safe and happy Thanksgiving holiday.

Respectfully,
Tyler Alexander
Mr. Ed Warzyniec attended Washtenaw Community College and Eastern Michigan University. Ed began his career in welding in 1977. Over the course of his career he has held various positions working with thermal cutting and welding processes including laser cutting and welding. He is currently a Weld Process Specialist with Airgas Air Liquide Company serving customers in Southeastern Michigan. Ed served on the American Welding Society C4 Committee, Oxy/Fuel Gas Welding and Cutting and the Compressed Gas Association, Industrial Gases Apparatus Committee. He has published several articles on gases, welding and cutting. He is a 28 year member of the AWS and is a CWI, CWE and CWS.

Mr. Jared Nevel graduated from Ferris State University in 2011 with a Bachelor of Science in Welding Engineering Technology. He began his career as a Welding Engineer in Monroe, MI at a start-up wind tower manufacturing facility. There he gained experience with Submerged Arc Welding as well as AWS D1.1, Welding Procedure Specifications, and Performance Qualification. Jared joined Airgas Air Liquide Company in 2014 as a Welding Process Specialist serving customers in Northern Ohio and Southeastern Michigan. In this role he is responsible for providing process improvement services to customers to aid business growth. Jared is a member of the American Welding Society and a CWI.

Mr. Nathan Moyer graduated from The Ohio State University in 1999 with a Bachelor of Science in Welding Engineering in 1999. Over the course of his 17 year career has worked with a wide variety of metal fabrication facilities covering many processes, materials, filler metals, gases and equipment. His experience also covers many levels of automated cutting and welding applications and various welding codes. Nathan works as a Weld Process Specialist with Airgas, an Air Liquide Company serving customers in Central Ohio. He has a passion to increase weld quality and thus increase productivity while lowering costs for his clients. Nathan has been a member of AWS since 1996 and is a CWI and CWS.

Mr. Dale Albertson graduated from Ferris State University with a Bachelor of Science in Welding Engineering Technology in 2006. He began his welding engineering career with John Deere Harvester Works in East Moline, Illinois. In 2009 he relocated back to Western Michigan as a District Manager for Miller Electric. In 2013 he assumed Industrial District Manager responsibility for Miller Electric and Hobart Brothers in Eastern MI. He is a CWI as of 2015 and enjoys expanding his knowledge of welding and joining processes.

Presenter’s Bios
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SMWC Re-Cap

The AWS-Detroit Section hosted the 17th iteration of its biennial Sheet Metal Welding Conference. The conference was preceded by a one-day Workshop hosted at AET Integration, Inc., in Troy, Michigan. The event featured an informative lecture, case studies, and active welding demonstrations including joining process, weld characterization, and quality assessment for both steel and aluminum sheet metal. Presenters from EWI, Fronius U.S., IPG, Stanley Engineered Fasteners, AET Integration, FCA US LLC, Ford Motor Company, General Motors, and Tessonics took part in the presentations.

There were 55 “students.” The event was organized by 14 committee members and put on by 18 speakers/teachers all of whom were volunteers.

The Sheet Metal Welding Conference in cooperation with ALAW (Advanced Laser Applications Workshop), AET Integration Inc., and EWI was held Wednesday and Thursday, October 19th and 20th. The event was kicked off by three Key Note speakers providing insight into the Department of Energy’s perspective on the challenges and opportunities of dissimilar materials, a European viewpoint on 21st Century BIW joining challenges, and the need for advanced joining technologies for a mixed material vehicle. Held over two days at the Laurel Manor Convention Center in Livonia, Michigan, this year’s conference was attended by over 218 welding professional participants. Forty-one papers focused on resistance spot welding of steel and aluminum in separate sessions as well as laser and mechanical joining processes which represent the latest developments used in sheet metal joining.

All conference attendees and the public were also able to attend the popular Vendor Display Night. This year visitors could view over 31 displays. As with all other Detroit Section events, all the proceeds from the Conference and Vendor Display Night benefit our scholarship and educational activities throughout the year.

Thank you to everyone who came out to the conference, whether a speaker, a participant or a volunteer. This event was a success and we hope everyone found it to be informational and educational as well as comfortable and inviting. The AWS Detroit Section and SMWC committee hope to see you attend the 2018 SMWC.
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Hello Sarah, welcome to the Meet our Member Column for the AWS Detroit Section. If you don’t mind, would you start off our interview with a little bit about yourself?
Hello AWS Detroit, my name is Sarah Gambill. I am a Welding Engineer/Welding Instructor at Oakland County Technical School’s Southeast Campus.

Could you tell us what you like about the position you hold as a Welding Instructor/Engineer?
I love working with the kids, and giving them the option to work in a hands-on environment. They have a bright future if they enter the welding field with the right skills and knowledge to support them.

Why did you join AWS?
I earned a scholarship from the AWS Student Welding Competition at Schoolcraft Community College in 2007. I was automatically enrolled and I enjoy having resources that AWS can provide, such as textbooks, training and networking with other welding professionals.

Everyone in our section has a favorite AWS Detroit Event, what is your favorite event?
The AWS student welding competition (for my own students!)

What do you like to do outside of work?
I enjoy Brazilian Jiu-Jitsu.

This is one of my favorite questions to ask, because we get a variety of answers. What is the funniest moment or story that you would share about your experience with welding?
When I started my first welding job, the guys in the shop had me looking for a missing key to the downstairs area of the shop for about an hour. I asked for the key from every single person, before I realized that we had fork-trucks driving over our floor and it wasn’t possible for our small warehouse building to have a basement...

What would be your most memorable moment, thus far?
I was training another employee on the job and he said to me that he thought I would be a great teacher.

If you could share something with your students or others that you see as very dear to your heart of a very important subject, what would it be?
I make it very clear to my students that if their welds fail in the field, people can die as a result. 100% effort is the minimum requirement you need to make it in a welding career. Welding is something that you put your heart into and if you are not willing to do so, pick another trade.

Do you have someone who has mentored you that you would like to mention? Yes, a former coworker of mine, Walt Sisler. I worked with him as a welder after graduating high school and he encouraged me to earn my B.S. in welding engineering technology at Ferris State University. I owe him my career.

Sarah, how did you get your start in welding?
I started out welding at Flat Rock High School’s welding vocational program under Miles Tilley. He encouraged me to compete in Skills USA and helped me find a job after graduation.

What do you see as the biggest challenge for the welding community in the future?
Creating more welders of course! We all know that there is a shortage but did you also know there is a shortage of qualified teachers? There are plenty of students willing to learn but it is very difficult to lure in professionals from the field to the classroom. Sometimes welding pays TOO well!

What would you tell someone who may be “on the fence” about getting into welding as a career?
I’m not even 30 years old yet and I have paid off all of my student loans. I’m now paying for my M.S. degree in cash and I’ve purchased a house and a new car. What is there to be on the fence about? –Do you want to earn a good living? Get into welding.

Congratulations, Sarah! THAT is awesome… Not many adults can say that. That’s a real incentive to look into the field of welding.

Would you encourage more schools (both high school and junior high) to encourage more young people to look into technical schools and jobs and not just degreeed positions? Absolutely. Welding is really a no brainer; you can work as a blue collar professional as a Boilermaker or Pipe Fitter and still make just as much money as a welding engineer working on the plant floor or designing cars in an air-conditioned office. Every level of our industry is hiring and paying well.

Finally, if you weren’t involved in the welding industry, what would be your dream job?
I would work as an archaeologist and/or researcher at the Museum of Natural History in Vienna, Austria. Fortunately, there are plenty of high-paying jobs available in welding, unlike archaeology where most graduates in the field cannot find a job in the field at all.

Thank you, Sarah, for taking some time to be our featured member this month! It’s been a pleasure meeting you and learning a little about your world in welding!
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“We were looking at changing our steel source for several of the parts we produce. However, one of the new materials is not approved by the automotive OEM. What approval process are they talking about as the proposed replacement appears to be the same as our existing one?”

This month we will review a few of the elements that can come into play with Laser Welding (LW) during the characterization process.

Characterization Methodology (LW)

While the predominate method utilized by all of the automotive OEM manufacturers for material welding characterization is still Resistance Spot Welding (RSW), with Gas Metal Arc Welding (GMAW) gaining some momentum, the LW process has really begun to come to the fore with regards to material weldability characterization, particularly when the materials in question are the Advanced High-Strength Steels (AHSS). This is no surprise as the LW process presents some interesting advantages with regards to the joining of Body-In-White (BIW) components.

Similar to the GMAW characterization process, the automotive OEM’s have adopted a more generic approach towards LW weldability characterization. A partial list of these unique LW manufacturing elements that are specified could include:

- **Laser Type**: There are several possibilities here, including CO2, YAG and Disc. Each one has its own inherent quirks, benefits, pros and cons. Regardless, as with any of the different characterization procedures, whatever is specified is what is used.

- **Laser Power**: Despite the capability of the equipment that may be utilized to perform the laser weldability evaluation, most procedures are going to place some sort of constraint on the power that can be used by the facility to perform the actual evaluation. As with our GMAW constraint on wire size, this limitation on laser power can be a real challenge. As an example, at a mandated output of 4.0 kW, you may discover that your travel speed while welding 2.90 mm material to itself is just a bit slower than you might expect to see in a production environment.

- **Beam Focal Diameter**: This critical parameter may also be specified. With values of 600 µm fairly common, the beam focal diameter, along with output power, quickly determines how a material is going to be welded, and what parameters will be adjusted in order to make a weld that meets the requirements of the qualification procedure. A fixed beam focal diameter also means that the focal length of the laser is a variable that is not controlled as part of this procedure.

- **Fume Extraction/Plume Suppression**: Both fume extraction and plume suppression are critical to the laser welding process, but for different reasons. The first is for the health & safety of the folks doing the welding. But the second (plume suppression) is an essential variable that can directly affect the power of the laser that is reaching the material and not being absorbed and/or misdirected. In other words, you can dramatically alter your weld geometry just by changing the plume suppression.

- **Travel Speed**: If the output of the laser is fixed and the beam focal diameter cannot be changed, then altering the travel speed of the beam across the part becomes your chief means of adjustment. It is here that one can see a wide range of values as the laser technicians and engineers adjust their equipment to weld a variety of gauges (and coatings) that could vary from 0.60 mm all the way up to 3.0 mm. And remember, as this is characterization welding, all materials are welded to themselves.

- **Part Gap**: The lap welding of coated parts will drive the need for a controlled gap so that the resultant outgassing can be relieved. However, as one might assume, the amount of allowable gap is often specified by the procedure. Accurate, robust tooling, and good quality panel samples are an essential part of maintaining a consistent gap.

- **Other LW elements** such as the addition of a welding wire, or the use of a shielding gas, are mentioned in many of the characterization standards, but they are to be used only if there is no other means to obtain a weld that meets the requirements of the standard. Much more often than not, they are not needed.

An important point to keep in mind is that no one characterization evaluation can cover all possibilities. In fact, despite the performance of a thorough weldability characterization, it may be difficult to predict the necessary weld setup parameters for production operations. The reason for this is that each test is a singular condition among many possibilities and cannot account for the potential litany of material combinations, gap or fit-up concerns, general condition of the tooling, or other production variables. However, if the weldability characterization is conducted in a consistent manner, the process will allow for the determination of significant material traits that, when compared to other similar materials, can reveal where deviation from the norm has occurred and thus permit the OEM to screen for potential issues.

A special thanks to Jeff Dreffs, Engineering Manager-Laser at R&E Automated Systems, LLC, for his assistance with this article.

If you have more questions about this topic, Don can be reached at:

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 dmaatz@reautomated.com

References:
1) AWS D8.9:2012
Editor’s Note:

Well, it’s November already. We made it through another Sheet Metal Welding Conference, and I think we all may have become a little more “enlightened” about alternative metals and welding procedures – especially, aluminum. The Vendor event night was a great success. SMWC had several new vendors, and faces at the show. We were honored that Efram Abrams from AWS National in Miami came to support our section and the SMWC.

Looking at our calendar, activities really start to ramp up over the next few months. This month is FABTech in Las Vegas, where what happens in Vegas stays in Vegas, unless it’s some great new welding technology, AWS members being honored for their years’ of participation in the society, or some of the interesting vendor displays at the show. If you or your company are able to go to this event, please feel free to let us know what you thought of it, send pictures, etc. We’d love to get our members feedback about these events.

This month we have one of our first educational night series for this season. Hosted by Schoolcraft college with presenters from Airgas. If you missed signing up, go back to page one (1) and get your seat reserved!

Next month, it’s time for our annual Holiday/Christmas party event. So be sure to check out the invite, and get yourself, your significant other, friends and colleagues registered for this event.

Enjoy what’s left of autumn, and remember to make “Thanksgiving” an event in your life each and every day! Show some kindness, encourage someone, maybe talk to a student about welding, manufacturing, engineering or teaching in the wonderful world of welding!

And, until next month...

*Keep On Welding!*

Robin Michon – e-bulletin editor
(Robin.Michon@kukanao.com)