

CANWELD24

EXPO & CONFERENCE 2024

METAL FABRICATING - WELDING - FINISHING

Productivity and Workforce Development



TORONTO

Ontario

JUNE 12-13



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SCHEDULE OVERVIEW

DAY 1: WEDNESDAY, JUNE 12, 2024

7:30-8:15 BREAKFAST & EVENT OPENING: Max Ceron- CWB Association Room: Sutherland 3-5						
8:15-8:45 Patricio Mendez- University of Alberta, Voltage and Heat Input in Arc Welding Room: Sutherland 3-5						
Room: Sutherland 1			Room: Sutherland 2			
9:00-9:30	Nairn Barnes	IRIS NDT	The Importance of Taking Field Repair Seriously: Vibrating Screen Cloth Failure Analysis	Jason Wooley	Scansonic	Highly Productive Laser Welding of Battery Trays, Fuel Cells, Hair Pins, Cap-Can and Battery Contacts
9:30-10:00	Kevin Bagheri	University of Ottawa	Welding Automation in Fabrication of Navy Combat Ship Gas Turbine Exhaust System	James Sharp	ESAB	Digital Solutions for the Shop Floor
10:00-10:30	Hellen Christodoulou	Corbec	Welding Steel Before and After Galvanizing (Best Practices & Recommendations)	Scott Fong	Cooperheat	Considerations for the successful execution of High-Temperature Local Heat Treatment
BREAK 10:30-10:45						
10:45-11:15	George Gritziotis	Ontario Tripartite Labour Resource Council	Organized Construction Sector Strategic Workforce Planning System (Skilled Trade Demand/Supply Forecasting Program)	André Boulianne	CWB Group	CWB Electrodes Certification - Extent of Qualification
11:15-11:45	Mark Fernandes	CWB Group	CSA Structural Design and Welding Requirements	Zahra Khodamoradi	University of British Columbia	GMAW of Inconel 686 on Stainless Steel: Welding Parameter Effects on Residual Stress and Distortion
11:45-1:00 LUNCH Room: Sutherland 3-5, FABTECH Viewing						
Room: Sutherland 1			Room: Sutherland 2			
1:00-1:30	Joyce Lam	PCL Industrial Management Inc.	The Hydrogen Economy vs. Standards & Regulations - A Practical Perspective	Tetsuya Oyamada	University of Waterloo	Laser Microwelding of NiTi and PtIr Alloy Wires
1:30-2:00	Jay Flowers	Scansonic	How can Process Monitoring and Quality Assurance for Laser Joining be Improved?	Hassan Saghafifar	Seaspan	Introduction to Seaspan Welding Centre of Excellence
2:00-2:30	Ashiqur Khan	CWB Group	Laser Beam Welding Procedure Qualification	Kaiping Zhang	University of Waterloo	On the Control of Intermetallic Formation in NiTi-Stainless Steel Welding
BREAK 2:30- 2:45						
2:45-3:15	Ebrahim Harati	University West	Efficient welding of high strength steels in regard with static and fatigue strength	Daniele Calista	University of Alberta	A Novel Approach to Solving the ERW Weld Zone
3:15-3:45	Will Healey	Universal Robots	Elevate Your Technology Strategy & Upgrade Your Workforce in Fabrication with Cobots	Ryan Boyd Cedrik Rochon	Walter Automation	A Roadmap to Implementing Robotic or Automated Material Removal in Metalworking Operations

DAY 2: THURSDAY, JUNE 13, 2024

8:00-9:00 BREAKFAST Room: Sutherland 3-5						
8:20-8:50 Adrian Gerlich, University of Waterloo- Recent Developments in Welding of Transportation and Energy Materials Room: Sutherland 3-5						
Room: Sutherland 1			Room: Sutherland 2			
9:00-10:00 Sam Barrett, Walters Group- It's a Small World: Building Relationships and Exceptional Project Experiences FABTECH Mainstage						
10:00-10:30	Ernst Miklos	Linde	New Approaches to Control GMAW Welding Fumes: Research Results, Regulatory Foresight, Business Sustainability.	J. Eduardo Alvarez Rocha	University of Alberta	Deep Learning to Characterize the Morphology of the Arc and Metal Transfer in GMAW
10:30-11:00	Haitao Wang	Linde	Welding Productivity Improvements - Starsolver™ Program	Nitheesh Kumar Ramasamy	University of Alberta	Determination of Bead Dimensions and Catchment Efficiency in Laser Cladding
BREAK and FABTECH Viewing 11:00-11:30						
11:30-12:30 LUNCH Room: Sutherland 3-5						
11:45-12:15 Jim Brown, Ontario Power Generation- The Business of Welding: Navigating Trends and Challenges Room: Sutherland 3-5						
12:30-1:30 Women's Panel- How Associations and Employers Can Empower Women to Create New Workplace Cultures FABTECH Mainstage						
Room: Sutherland 1			Room: Sutherland 2			
1:30-2:00	Mahyar Asadi	Novarc Technologies	Vision-Based Adaptive Welding Solutions for the Top Three Challenges in Welding Fabrication	Sofia Salazar Torres	University of Alberta	Mathematical Model of Friction Stir Welding: Scaling Analysis of Heat Transfer and Plastic Deformation Phenomena
2:00-2:30	Craig Brazil	Sheridan College	Incorporating VR Technology Into Training Future Welders	Hasan Habib	University of Waterloo	Integrating 3G Advanced High Strength Steel into Automotive Production - Development of High-Quality Joints with High Stacking Ratio
2:30-3:00	Michael Klee	Lincoln Electric	VR Welder Training: The Way of the Future	Shima Akbarian	University of Waterloo	Revolutionary intermetallic compounds formation during Laser Braze Welding of Zinc-coated Automotive Steels
3:00-3:30	Duncan Beaumont	Translas North America	Revolutionizing Welding Excellence: Automated Technologies and Intelligent Fume Extraction Systems	Shadab Sarmast	University of Waterloo	Advancements in Gas Metal Arc Brazing Technology for High-Strength Steel to Aluminum Joints for Automotive Applications
3:30-4:00	Paul Cheng	Fuse Ring	Joining Nuclear Fuel Rod to End Cap w/ no Flaw Repeatable	Jihui Yan	University of Waterloo	Fabrication of High Entropy Alloy Coating Using Electrospark Powder Deposition
4:00-4:30 Max Ceron, CWB Association- Closing Remarks Room: Sutherland 3-5						

Productivity and Workforce Development



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METAL FABRICATING - WELDING - FINISHING

WELCOME MESSAGE

JOIN US FOR CANWELD 2024:

Embracing Productivity and Workplace Development

CWB GROUP

Doug Luciani | President & CEO CWB Group

Dear CWB Group Community,

As CanWeld 2024 approaches, the excitement at the CWB Group is a clear testament to the growth and evolution of our annual conference—an example of resilience and adaptability within our industry. This year, we are thrilled to unveil our theme: “Productivity and Workplace Development.” Our focus is set on empowering the Canadian welding and joining sector to tackle the pressing labor challenges and harness the potential of automation and technological advancements. This theme is dedicated to boosting productivity and enhancing competitiveness across the industry.

We are excited to convene once again at the Toronto Congress Centre on June 12th and 13th, in Toronto, Ontario in conjunction with Fabtech Canada. CanWeld 2024 promises to be a pivotal gathering point for educators, influencers, suppliers, and decision-makers alike. This meeting of the minds will undoubtedly ignite engaging discussions on current trends, breakthroughs in welding technology, and the paramount issue of health and safety in our fields. This year, our partnership with EWI emphasizes our commitment to fostering industry-wide collaboration and pushing the envelope in technological innovation. Our goal is to spotlight cutting-edge technological solutions and provide a global stage for North American companies to showcase their expertise and insights.

CanWeld 2024 is more than just a conference—it is integral to collaboration and innovation that spans multiple industries, from mining and power generation to fabrication and manufacturing. We aim to offer a dynamic platform for professionals across diverse sectors, including steel, shipbuilding, pulp, and paper, to network, engage, and contribute to the broader dialogue. Reflecting on last year’s focus on automotive welding, we are broadening the spotlight this year while maintaining our steadfast goals: to forge meaningful connections, highlight the latest advancements in our industry, and collectively envision a brighter future.

A special thank you to all our participants, both returning and new. Your enduring support, particularly through challenging times, forms the foundation of CanWeld. We eagerly anticipate welcoming each of you, celebrating your achievements, and charting the path forward.

Thank you for joining us for another conference. Let’s make CanWeld 2024 an event to remember.

Warm regards,
Doug Luciani



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CANWELD24

EXPO & CONFERENCE 2024
METAL FABRICATING - WELDING - FINISHING

Wednesday,
June 12th, 2024

DAY 1

SESSIONS

Room: Sutherland 3-5

PATRICIO F. MENDEZ | Professor, UNIVERSITY OF ALBERTA

Voltage and Heat Input in Arc Welding

This presentation will discuss the deposition rate, and penetration in arc welding. What we call "Voltage" during welding is in reality the combination of many voltages. Voltage loss is not proportional through the arc, with the largest fraction of voltage drop concentrated at the electrode surface and the plate surface. Polarity, pulsing, shielding gas selection, and flux chemistry have much influence on these voltages; and understanding them will help answer the questions such as "why DCEP in GTAW can melt the tungsten?", "why AC can result in higher deposition rate in SAW and GMAW?", "why does reverse polarity increase penetration in stick welding?", and "why 6010 works with DCEP and 6011 with AC?" Ultimately, it will be clear that there is much more than heat input to make sense of arc welding. The good news is that a few additional concepts can help make sense of most of it.

Room: Sutherland 1

NAIRN BARNES | Welding and Materials Engineer, IRIS NDT

The Importance of Taking Field Repair Seriously: Vibrating Screen Cloth Failure Analysis

This presentation will present a case study of a vibrating screen cloth that was weld repaired in the field with several field related constraints with the goal of minimizing process downtime and thereby maintaining productivity. Following weld repair and overlay reinstatement, the screen cloth failed in service after less than half the anticipated service life. The audience will be exposed not only to the consequences of placing productivity above quality, but also to the thought process of a failure analysis and the recommendations made to the client at the end of the project to avoid recurrence.

Room: Sutherland 2

JASON WOOLEY | Managing Director, SCANSONIC

Highly Productive Laser Welding of Battery Trays, Fuel Cells, Hair Pins, Cap-Can and Battery Contacts

Welding speeds are often the limit for the productivity of a laser welding station. Laser welding battery trays, particularly 6XXX alloys that require filler wire to prevent hot cracking, the welding speed can be increased by adding an oscillating function and using smaller spots with tactile welding optics.

Productivity and Workforce Development



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Wednesday,
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DAY 1

SESSIONS

Room: Sutherland 1

**KEVIN BAGHERI, P.Eng | Welding and Materials Engineer,
UNIVERSITY OF OTTAWA**

Welding Automation in Fabrication of Navy Combat Ship Gas Turbine Exhaust System

Despite desires to move away from fossil fuels for transportation, worldwide demand for Naval Gas Turbine continues to be strong in 2024 and beyond. Across the world, investment in naval Diesel and Gas Turbine engine exhausts and intakes have hit record levels. In response, new manufacturing capacity is attempting to spin up. This was consistent across all Diesel and Gas Turbine exhaust systems but especially in warship and navy capacity, presently spinning up new capacity in 2024/2025 to reach new extremes never seen before. In times of skilled worker shortages, welding automation must play a key part in the industry's success. There are new options for even higher productivity and quality.

Room: Sutherland 2

JAMES SHARP | Territory Sales Manager, ESAB

Digital Solutions for the Shop Floor

This presentation will cover software applications that are tailored to meet the needs, improve workflow performance, provide real-time data analytics and achieve optimal production results for manufacturers and fabricators. Tracing critical weld data and analyzing the data is an arduous task if performed by humans and is often incorrect. Digital applications can connect data, machinery and processes across a mixed fleet of welding, cutting and robotic equipment, allowing effortless connectivity and provide real-time measurable results.

Room: Sutherland 1

**HELLEN CHRISTODOULOU | Executive Vice President,
CORBEC INC.**

Welding Steel Before and After Galvanizing (Best Practices & Recommendations)

Designers opt for galvanization as the corrosion protection system for structural steel fabrication since it ultimately provides the most sustainable solution with the lowest carbon footprint. The welding of steel prior to or after galvanization is common, both are compatible with the objective of providing excellent corrosion protection. The processes, however, involve specific considerations, recommended as best practices, to ensure the viability of both the structural integrity and the intended corrosion protection. It is key to reiterate some of the key considerations for the proper preparation and the importance of adherence to guidelines, which are essential for the successful welding of pre or post galvanized steel.

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DAY 1

SESSIONS

Room: Sutherland 2

SCOTT FONG | Chief Executive Office/Group Director,
COOPERHEAT EQUIPMENT

Considerations for the Successful Execution of High-Temperature Local Heat Treatment

With many Petrochemical and Power Generation facilities being pushed past their original designed life span, these facilities have been running into unique repair situations requiring High-Temperature Local Heat Treatment Applications (i.e. Solution Annealing) more frequently. We will be defining High-Temperature Local Heat Treatment as being in situ applications that exceed 1500°F, which is generally accepted as the upper limit of Post Weld Heat Treatment. I will discuss areas of consideration around Equipment Power Supplies, Consumable Selection, workpiece support, distortion avoidance and expansion.

Room: Sutherland 1

GEORGE GRITZIOTIS | Executive Director, ONTARIO TRIPARTITE
LABOUR RESOURCE COUNCIL

Organized Construction Sector Strategic Workforce Planning System (Skilled Trade Demand/Supply Forecasting Program)

The organized sector currently undertakes a significant amount of the construction project work within Ontario. The available capacity will become far more challenging as the Infrastructure Ontario transitions to the post-secondary sector, hospitals, and long-term care centers. For the buyers (owners) of construction and maintenance services, it is critical that there is available capacity to bid, plan, manage, build, and maintain the increasing requirement for public and private infrastructure. An important part of this is the availability of skilled trades, qualified supervisors, project managers, and senior management.

Room: Sutherland 2

ANDRÉ BOULIANNE | Manager, Procedures & Electrodes
Certification, CWB GROUP

CWB Electrode Certification – Extent of Qualification

An overview of the CWB certification process for welding consumables will be discussed, along with the limitations on the extent of their qualifications. Topics include the range of shielding gas compositions, diameter ranges, point of manufacture – electrodes, wires and fluxes, private labels, and equivalencies.

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Room: Sutherland 1

MARK FERNANDES | Manager of Engineering, Procurement and Construction, CWB GROUP

CSA Structural Design and Welding Requirements

The purpose of this presentation is to provide attendees with a summary of the welding requirements for Design, Welding Standards, and Certification for Structures. The presentation will explain the connection between the CSA welding certification programs and Canadian building codes that are filtered through the design and fabrication standards. It will also outline the welding certification requirements and help attendees identify if these requirements are being met by welding fabricators and erectors. At the end of the presentation, we will present some examples of welding deficiencies, and risks involved when using non-certified CWB organizations and suggest the next steps required to address them.

Room: Sutherland 2

ZAHRA KHODAMORADI | Student, UNIVERSITY OF BRITISH COLUMBIA

GMAW of Inconel 686 on Stainless Steel: Welding Parameter Effects on Residual Stress and Distortion

This study investigated the impact of welding parameters on residual stress (RS) and distortion during automatic gas metal arc welding (GMAW) of Inconel 686 onto stainless steel plates. To systematically evaluate this, travel speed, voltage, wire feed speed, amperage, and heat input were varied across fourteen 6-inch square plates. Distortion was measured using a Coordinate Measuring Machine (CMM), while Electronic Speckle Pattern Interferometry (ESPI) was employed to quantify RS. Our results demonstrate that an increase in heat input from 10.55 KJ.in-1 to 17.81 KJ.in-1 led to a corresponding increase in residual stress.

Room: Sutherland 1

JOYCE LAM | Welding Engineer, PCL INDUSTRIAL MANAGEMENT INC.

The Hydrogen Economy vs. Standards & Regulations – A Practical Perspective

Due to federal government policies regarding climate change, a steep transition from coal, oil and/or gas to more environmentally friendly alternatives for power generation has been imposed across Canada. It is predicted that hydrogen will play a significant role in the energy transition. The Government of Alberta has recognized the potential and opportunities provided by the hydrogen economy and released an "Alberta Hydrogen Map" to show provincial commitment to decarbonize the economy and capitalize on Alberta as a leader in the emerging clean hydrogen economy. To be successful, several gaps and challenges must be addressed, including standards and regulations.

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Room: Sutherland 2

TETSUYA OYAMADA | PHD Student, UNIVERSITY OF WATERLOO

Laser Microwelding of NiTi and PtIr Alloy Wires

NiTi alloys with compositions near equiatomic Ni and Ti have unique properties such as excellent shape memory effect, superelasticity, and biocompatibility. A combination of NiTi and PtIr alloys is used for biomedical devices such as stents, catheters, and guidewires due to its distinctive mechanical properties and X-ray visibility. Although laser microwelding is a useful welding technique, brittle inter-metallic compounds (IMCs) formed in the fusion zone (FZ) may deteriorate the joint strength of NiTi and PtIr alloys.

Room: Sutherland 1

JAY FLOWERS | Laser Welding and Brazing Expert, SCANSONIC

How can Process Monitoring and Quality Assurance for Laser Joining be Improved?

To stay competitive, manufacturing facilities must continue to get smarter and more efficient. Artificial Intelligence technology is proving to be the key factor in driving optimum performance and improved quality in product manufacturing. Combined with high-speed Intelligent Laser Optics with real time integrated process monitoring, the Smart Factory is teaching itself. Accurate Data Driven Decisions can now be made by production equipment itself, minimizing human decision making, and thus improving process control.

Room: Sutherland 2

HASSAN SAGHAFIFAR | Welding Inspector

Introduction to Seaspan Welding Centre of Excellence

The Seaspan Centre of Excellence (COE) has been established to enhance welding capability and productivity. The COE comprises three primary areas: (i) Welder Training and Qualification, ensuring the performance and competency of welders, (ii) Welding Technology Centre, dedicated to researching new consumables, processes, and technologies, and (iii) Welding and Material Testing Lab, which supports testing for welding procedure qualifications and material verification.

Productivity and Workforce Development



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Room: Sutherland 1

ASHIQUR KHAN | Supervisor Procedures Approval, CWB GROUP

Laser Beam Welding Procedure Qualification

Handheld laser beam welding machines are becoming increasingly popular and are widely used by various fabricators. Laser beam welding procedures qualification process under CSA W47.1 (steel) and CSA W47.2 (aluminum) will be explored in this presentation. Essential variables in established standards will be reviewed with possible implications for the extent of the procedure qualification tests. Requirements for welder and welding operator qualification will be discussed.

Room: Sutherland 2

KAIPING ZHANG | PHD Student, UNIVERSITY OF WATERLOO

On the Control of Intermetallic Formation in NiTi-Stainless Steel Welding

NiTi and stainless steel (SS) are both widely used biomedical materials. Recently, the demand for the fabrication of multifunctional biomedical devices requires the reliable joining/welding between NiTi and SS. However, the formation of harmful intermetallic (IMCs) is a tough problem for NiTi-SS welding since these IMCs have a high formative driving force within a Ni-Ti-Fe-Cr metallurgical system and they are generally considered as brittle phases. During the past few years, our research group has proposed several effective strategies on the control of IMCs formation in NiTi-SS welding, which are mainly focused on the microstructure modification by introducing other alloying elements, as well as the restriction on the mixing of dissimilar molten metals.

Room: Sutherland 1

EBRAHIM HARATI | Program Director – Department of Engineering Science, UNIVERSITY WEST

Efficient Welding of High Strength Steels in Regard with Static and Fatigue Strength

In the ongoing quest for a more sustainable world, the importance of making heavy constructions lighter cannot be understated. Weight reduction, especially in industries like automotive manufacturing, holds the potential to increase payload capacity, resulting in reduced fuel consumption and lower greenhouse gas emissions. To attain lighter yet robust structures, high-strength steels (HSS) with yield strengths above 700 MPa are indispensable. This paper provides a comprehensive overview of several research projects conducted on the topic of welding high-strength steels. These investigations were carried out at University West, Sweden, in collaboration with industrial partners over recent years.

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DAY 1

SESSIONS

Room: Sutherland 2

DANIELE CALISTA | PHD Student, UNIVERSITY OF ALBERTA

A Novel Approach to Solving the ERW Weld Zone

Since ERW is a complex and multi-physical process, understanding each of the occurring mechanisms is crucial to further understand which ones contribute to penetrator defects. At the heart of ERW, and thus penetrators, is the heat distribution with the process' vee. This overarching thesis work seeks to develop a useful set of equations that model the heat distribution in ERW with a minimum required accuracy over a large range of process parameters. While increasing heat input has been directly correlated to penetrators, the connection between the two is not direct. One significant phenomenon that links heat input to penetrators is the evolution of a narrow gap, or vee length extension, at the process' weld point.

Room: Sutherland 1

WILL HEALEY II | Global Industry Manager, UNIVERSAL ROBOTS

An Introduction to the Modern Collaborative Welding Tool: Elevate Your Technology Strategy & Upgrade Your Workforce in Fabrication with Cobots

Metal fabrication has undergone a substantial transformation with the introduction of automation, most recently with collaborative robots, or cobots. Rather than replacing human labor, collaborative robotic systems support fabricators by enhancing productivity, upholding exceptional work quality, and boosting worker engagement. But with rising material & labor costs, and challenges with recruiting & retaining workers, manufacturing leaders are struggling. Many turn to traditional automation as the answer but the inflexibility and high upfront investment are tough to justify. In this session, we will share case studies from real-world fab shops that are leveraging the value cobots bring to the production floor.

Room: Sutherland 2

RYAN BOYD | Director of Sales Engineering, WALTER AUTOMATION

CEDRIK ROCHON | Director – Technology and Engineering, WALTER AUTOMATION

A Roadmap to Implementing Robotic or Automated Material Removal in Metalworking Operations

This session discusses the many benefits of implementing automated or robotic solutions and walks industrial end-users, shop floor supervisors and business owners through how to assess readiness, evaluate requirements, and set objectives, as well as selecting the right technology, designing the system, testing and integration, training, and ongoing maintenance.

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Thursday,
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DAY 2

SESSIONS

Room: Sutherland 3-5

ADRIAN GERLICH | Professor, UNIVERSITY OF WATERLOO

Recent Developments in Welding of Transportation and Energy Materials-

The increasing demands for material performance and welding productivity have driven new advances in welding process and filler materials. This presentation will showcase some of the main research directions and results that relate to welding of automotive materials and the energy sector such as pipelines and nuclear materials in the past year. For example, the use of laser welding to join advance high strength steels with low melting point braze materials has allowed excellent surface finish to be achieved in thin sheet joints. Also, the use of wobble laser welding was shown to improve alloy mixing in thick section joints. Future research directions will also be discussed as they relate to the nuclear energy sector.

Room: FABTECH Mainstage

SAM BARRETT | Vice President – Preconstruction & Sales, WALTERS INC.

"It's a Small World." Building Relationships and Exceptional Project Experiences

Join us as we explore the interconnected world of design and construction – it's smaller than you might think. With a rich history spanning over 65 years in designing, fabricating, and constructing steel for commercial and industrial projects across North America, the Walters Group commitment to being a true partner echoes through every bolt and beam. Join us in this keynote as we explore the intricate web of connections within the construction industry, weaving together our journey of innovation and collaboration.

Room: Sutherland 1

ERNST MIKLOS | European Welding Engineer, LINDE CANADA INC.

New Approaches to Control GMAW Welding Fumes: Research Results, Regulatory Foresight, Business Sustainability

GMAW, FCAW, MCAW are the most frequent arc welding processes used by a global population of welders estimated at approx. 11 million. Along with unique benefits, these welding arcs unfortunately can also emit hazardous fumes (particles), which have recently gained increased attention mainly for 2 reasons. Exposure measurements in welding workshops indicate that still many workplaces exceed existing OELs, despite technical measures like local fume extraction and room ventilation. IARC reclassified welding fumes as carcinogenic to humans in 2018, triggering OSH authorities to revisit existing regulations and consider additional measures to protect workers.



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DAY 2

SESSIONS

Room: Sutherland 2

J. EDUARDO ALVAREZ ROCHA | MSC Student, UNIVERSITY OF ALBERTA

Deep Learning to Characterize the Morphology of the Arc and Metal Transfer in GMAW

The heat input is a key component of a welding procedure, which is dependent on fall voltages and amperage settings that directly impact the mode of metal transfer in GMAW. The mode of metal transfer achieved significantly influences the characteristics and quality of the weld bead deposited.

Traditionally, high-speed videography for analyzing metal transfer characteristics (e.g. droplet formation and arc length measurements) has depended on human interpretation for both qualitative and quantitative assessments. Although effective, human interpretations are time consuming and prone to error. Thus, making it desirable to interpret these high-speed videos through automated means, which allow for a larger number of frames to be interpreted in a fraction of the time.

Room: Sutherland 1

HAITAO WANG | SR.Metal Fab Productivity Specialist, LINDE CANADA INC.

Welding Productivity Improvements with Linde Starsolver™ Program

Linde Starsolver™ program is a systematic process to deliver continuous improvements to metal fabricators through a rigorous and systematic process. In the presentation, real cases in Canadian welding companies, which show welding process improvement in productivity, overall cost, welding environment by conducting Starsolver™ program, will be introduced.

Room: Sutherland 2

NITHEESH KUMAR RAMASAMY | MSC Student, UNIVERSITY OF ALBERTA

Determination of Bead Dimensions and Catchment Efficiency in Laser Cladding

The geometry of the clad bead in a laser cladding procedure is critical in determining a lot of necessary information. To ensure dimensional accuracy and efficient operation, it is crucial to forecast the size and the fraction of material powders that contribute to the clad bead. By providing practitioners with practical expressions for predicting these, the time and expertise required in multiple trials and numerical modeling can be avoided. This presentation discusses mathematical expressions developed based on analytical modeling for predictions using known process parameters.

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DAY 2

SESSIONS

Room: Sutherland 3-5

JIM BROWN | Vice President of Construction Services, ONTARIO
POWER GENERATION

The Business of Welding: Navigating Trends and Challenges

This presentation explores the evolving landscape of the welding industry within the energy sector. With energy demand on the rise, and as the sector continues to expand, welding skills will be in high demand. Welders play a critical role in fabricating, maintaining, and repairing the intricate systems underpinning energy production, distribution, and storage infrastructure. We'll discuss key trends, challenges, and market factors shaping the industry. By understanding these dynamics, stakeholders can better navigate the complexities of this vital sector.

Room: FABTECH Mainstage WOMEN'S PANEL

How Associations and Employers Can Empower Women to Create New Workplace Cultures

This panel discussion will address the current state of workplace cultures and the unique challenges women face while highlighting the importance of diversity, equity, and inclusion in fostering innovative and resilient work environments. Let's explore strategies for how employers can implement a supportive atmosphere for women and practical solutions for how professional associations can help support leadership training and mentorship programs.

Room: Sutherland 1

MAHYAR ASADI | Vice President Innovations, NOVARC
TECHNOLOGIES

Vision-Based Adaptive Welding Solutions for the Top Three Challenges in Welding Fabrication

With over 100 robotic deployments in high-mix welding environments and a decade-long commitment to engaging with welding fabrication, we have identified the top three challenges facing this industry: fit up variation, tack adaptation, and seam tracking. Adaptive welding technology that responds dynamically to live welding scenes, represents a crucial advancement that could address these challenges effectively. Unlike the current solution, which relies on pre-scanning and has been met with limited enthusiasm due to its significant preparation time and reliance on costly and scarce programming expertise, vision-based adaptive welding technology operates in real-time, mirroring the actions of skilled human welders.



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CANWELD24

EXPO & CONFERENCE 2024

METAL FABRICATING - WELDING - FINISHING

Thursday,
June 13th, 2024

DAY 2

SESSIONS

Room: Sutherland 2

SOFÍA SALAZAR TORRES | Grad Research Asst – Fellowship,
UNIVERSITY OF ALBERTA

Mathematical Model of Friction Stir Welding: Scaling Analysis of Heat Transfer and Plastic Deformation Phenomena

This research develops Friction stir welding mathematical model to predict the ideal temperature and plunging force to optimize the weld path quality, by considering only material properties. The Heat transfer and plastic deformation equations for describing the phenomena, specifically the deformation caused by friction of the metal, are revealed in this study. The Analysis considers temperature transfer and principles from fluid mechanics. The model enhances precision and concentrates on crucial FSW conditions by implementing scaling and calibration techniques using literature data. The temperature at the outer limit of the shear layers is determined using a geometric method, which accounts for deformation rate, stress, and temperature.

Room: Sutherland 1

CRAIG BRAZIL | Associate Dean, SHERIDAN COLLEGE

Incorporating VR Technology into Training Future Welders

Sheridan College's welding certificate and diploma programs are leaping into the future of curriculum by incorporating virtual welders. This forward-thinking approach not only exposes students to cutting-edge technology but also eliminates consumables, booths, and reduces emissions. This presentation highlights the dual benefits for learners and institutions/employers, emphasizing safety, cost savings, and an enriched curriculum.

Room: Sutherland 2

HASAN HABIB | MASC Student, UNIVERSITY OF WATERLOO

Integrating 3G Advanced High Strength Steel into Automotive Production – Development of High-Quality Joints with High Stacking Ratio

In automotive sector, there are continual innovations for lighter and stronger materials to reduce emissions while maintaining passenger safety is a key priority. Incorporating third-generation advanced high-strength steels (3G-AHSS) into the vehicle body-in-white (BIW) using resistance spot welding (RSW) is a promising solution. The present work focuses on joining dissimilar 3G-AHSS sheets with different thicknesses ranging from 0.65 mm to 2.4 mm, and various tensile strengths ranging from 270 to 2,000 MPa, that are welded in both three- and four-sheet lap joints.

Productivity and Workforce Development



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DAY 2

SESSIONS

Room: Sutherland 1

MICHAEL KLEE | Technical Sales Representative, LINCOLN ELECTRIC

VR Welder Training: The Way of the Future

The demand for welders is constantly rising. With that, the need for newer and better ways to entice and train a younger generation into the welding trade is becoming more and more important. Traditionally, welding schools incurred large costs for materials, shielding gases, electrodes, and electrical power while training beginner welders. The introduction of VR welding simulators helps to engage and attract young/new people to the welding trade, and build good welding techniques with welders.

Room: Sutherland 2

SHIMA AKBARIAN | PHD Student, UNIVERSITY OF WATERLOO

Revolutionary Intermetallic Compounds Formation During Laser Braze Welding of Zinc-Coated Automotive Steels

This study investigates laser-weld-brazing (LWB), a prevalent automotive joining method prone to intermetallic compound (IMC) formation at the braze/substrate interface, causing joint mechanical degradation. LWB was applied to thin gauge zinc-coated interstitial free steel sheets using Si-bronze filler material in a double-flanged lap joint configuration. An innovative approach was developed to shift IMC formation from the interface to the interior, termed interface IMCs, enhancing joint strength and ductility. IMC formation mechanisms were investigated using an electron probe microanalyzer (EPMA) to understand the segregation behaviour of the elements.

Room: Sutherland 1

DUNCAN BEAUMONT | President, TRANSLAS NORTH AMERICA

Revolutionizing Welding Excellence: Automated Technologies and Intelligent Fume Extraction Systems

Automated Welding Technologies, with a specific focus on fume extraction systems, play a pivotal role in elevating the precision, safety, and environmental sustainability of welding processes. This presentation delves into the integration of cutting-edge fume extraction technologies with robotic welding systems and automated welding machines. The implementation of advanced vision systems ensures the efficient tracking of weld seams, while automated inspection systems contribute to the meticulous quality control of welds and



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METAL FABRICATING - WELDING - FINISHING

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June 13th, 2024

DAY 2

SESSIONS

Room: Sutherland 2

SHADAB SARMAST - GHAFAROKHI | PHD Student,
UNIVERSITY OF WATERLOO

Advancements in Gas Metal Arc Brazing Technology for High-Strength Steel to Aluminum Joints for Automotive Applications

The goal of multi-material automotive design is to reduce fuel consumption by making vehicles lighter, thereby lowering greenhouse gas emissions while enhancing safety. One effective approach is joining steel and aluminum (Al), which balances environmental concerns with safety considerations. Although fusion welding methods like resistance spot welding or laser welding are commonly used, challenges arise when welding Al alloys to zinc (Zn)-coated steels due to issues like brittle intermetallic compound (IMC) formation and hot cracking. Weld-brazing has emerged as a promising method, offering better heat control and minimal heat-affected zone softening. However, achieving high strength in dissimilar Al-to-steel joints remains a challenge.

Room: Sutherland 1

PAUL CHENG | Retired International Management Consultant, FUSE RING

Joining Nuclear Fuel Rod to End Cap w/ no Flaw Repeatable

Weld integrity of fuel rod to end cap has improved dramatically over the past several decades. Published 'touch up' rate is less than 0.1%. But with SMR the number of fuel rods required globally will rise absolutely. 0.1% per million rods equals possible failures of 1,000; location and timing of failure is uncertain. All rods are joined at the shoulder using high energy, GTAW or induction. FuseRing proposes a different approach. Instead of joining tubing to end cap at the shoulder where all forms of stress are concentrated, take the welded joint and stress away from the shoulder.

Room: Sutherland 2

JIHUI YAN | MASC Student, UNIVERSITY OF WATERLOO

Fabrication of high entropy alloy coating using electrospark powder deposition

This study will investigate the manufacturing process of the coating and perform the characterization of the coating to ensure the target material, as well as the basic tests of microhardness and the wear test. This report aims to study the feasibility of the powder deposition and gain positive feedback, which may be spread for the manufacturing of high entropy alloy coating with a wider range of element combinations.

Room: Sutherland 3-5

MAX CERON | Director, CWB Association

CLOSING REMARKS

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