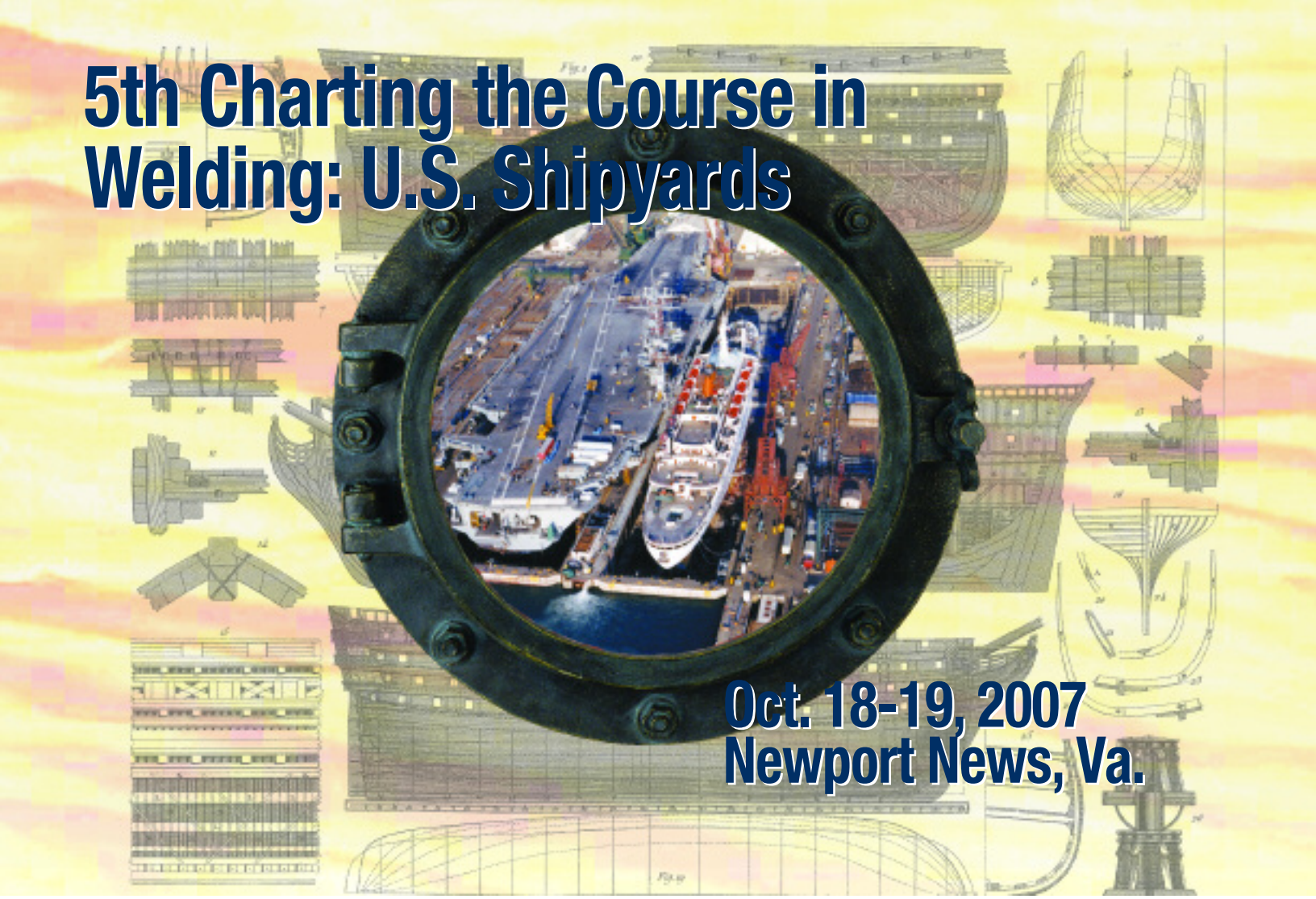
5th Charting the Course in Welding: U.S. Shipyards



Oct. 18-19, 2007
Newport News, Va.

Welding is the most vital and fundamental manufacturing process in the construction of ships and metal hull boats. AWS's fifth shipbuilding conference endeavors to provide up-to-date information on new and emerging technologies being developed for shipbuilding applications. The conference serves as a forum for communicating the focus and progress of these new innovative developments, as well as their potential value and impact to the shipbuilding community. Join an outstanding assemblage of experts from academia and industry to explore the state of the art in shipbuilding technology. This conference is a compelling opportunity for shipbuilders, designers, suppliers, researchers, educators, and administrators involved in ship procurement and construction.

AWS Conference
Charting the Course in Shipbuilding: U.S. Shipyards
October 18-19, 2007

This two-day conference will cover topics such as:

- Adaptive sensor and control systems
- Portable induction brazing
- Induction fairing
- Orbital pipe welding advances
- Tandem and double-electrode GMAW and SAW
- Tandem SAW for large tee joints
- Hybrid laser-arc welding
- Friction stir welding in naval applications
- Transient thermal tensioning to minimize buckling
- Cr-free consumables and strategies
- Portable x-ray fluorescence
- Modeling and simulation for multi-pass welding

American Welding Society

5th Charting the Course in Welding: U.S. Shipyards

THURSDAY, OCT. 18

CONTINENTAL BREAKFAST **7:30 am – 8:30 am**

WELCOME REMARKS **8:30 am – 8:45 am**
Lee Kvidahl, Conference Chair

SENSOR TORCH BASED ADAPTIVE INTELLIGENT SYSTEM FOR CIRCUMFERENTIAL WELDING OF PIPE

8:45 am – 9:30 am
YuMing Zhang, President, Adaptive Intelligent Systems LLC, Lexington, Ky.
An adaptive sensor and control system has been developed that can detect the depth of the weld pool surface. The system uses an innovative control approach to maintain the depth of the weld pool surface at a desired level to achieve the desired full penetration. As a result, it allows a worker without welding experience to hold and move the torch along the circumferential weld seam for full-position welding of pipes, despite variations in the torch-to-work distance and travel speed. This system may also be used in mechanized orbital systems to eliminate the need for experiments to find optimal parameters around the clock.

INDUCTION BRAZING EQUIPMENT FOR SHIPBUILDING APPLICATIONS

9:30 am – 9:50 am
Tom Brown, EFD Induction Inc., Madison Heights, Mich.
Compact, portable induction heating equipment using handheld transformers is an excellent alternative to traditional flame-brazing in shipbuilding applications.

INTRODUCTION OF TERAC – FAIRING WITH INDUCTION

9:50 am – 10:15 am
Mark Wells, Product & Application Manager, EFD Induction A.S., Skien, Norway
This presentation will cover the use of induction to realize rapid, effective, and aesthetically improved straightening of decks, bulkheads, etc.

MORNING BREAK **10:15 am – 10:30 am**

SINGLE-PASS GMAW OF PIPE SOCKET WELDS

10:30 am – 11:15 am
Michael Ludwig, Chief Welding Engineer, General Dynamics–Bath Iron Works, Bath, Me.
Bath Iron Works welds thousands of socket welds on current ships. Pipe fabrication standards have always required that pipe welds be composed of two layers. Advancements in GMAW power supplies have shown that very high-quality welds can now be made in difficult materials like copper-nickel. This presentation will cover efforts to develop GMAW-P procedures for the welding of stainless steel, copper-nickel, and steel pipe—and the rationale to go to a single pass for U.S. Navy applications.

ORBITAL PIPE WELDING TODAY: AN OVERVIEW

11:15 am – 12:30 pm
Kenneth J. LeDuc, Technical Specialist–Training & Service, Magnatech Limited Partnership, East Granby, Conn.
Mr. LeDuc will review the types of equipment available today for specific applications, giving the pros and cons for each. Mechanized welding can bring significant productivity gains, but certain requirements for successful implementation will be discussed.

LUNCH (PROVIDED) **12:30 pm – 1:30 pm**

TANDEM GAS METAL ARC WELDING FOR OUT-OF-POSITION HIGH-STRENGTH STEEL ERECTION JOINTS

1:30 pm – 2:15 pm
Nancy C. Porter, Project Manager, Edison Welding Institute, Columbus, Ohio
Northrop Grumman Newport News currently uses the pulsed gas metal arc welding (GMAW-P) process for out-of-position welding of high-strength steel erection joints for aircraft carrier construction. Learn how, during the CVN-78 project, weld process stability was improved, deposition rates were doubled, and welding speeds increased through the use of tandem gas metal arc welding as an alternative to GMAW-P.

DEVELOPMENT OF A LARGE TEE WELDER

2:15 pm – 3:00 pm
Michael Ludwig, Chief Welding Engineer, General Dynamics–Bath Iron Works, Bath, Me.
Bath Iron Works needed a highly mechanized welding system to weld very large tees that were several inches thick and up to 30 feet long of high strength material. The system developed utilizes tandem SAW and a very unique fixture that was custom designed for the application. This presentation discusses the effort undertaken to conceptualize, design, build, and implement this system.

AFTERNOON BREAK **3:00 pm – 3:15 pm**

HYBRID LASER-ARC WELDING OF PIPE & THIN STEEL PANEL STRUCTURES

3:15 pm – 4:00 pm
Dr. Shawn Kelly, Research Associate, Applied Research Laboratory, Penn State University, State College, Penn.
Recent advances in the development and implementation of hybrid laser arc welding processes for selected shipyard applications will be addressed. With the assistance of ARL Penn State and Wolf Robotics, NASSCO recently implemented a hybrid laser arc welding system in their pipe shop for productivity improvements. In addition, ARL Penn State is working with NGSS to transition hybrid weld technology for panel and stiffener welding of thin steel structures to reduce distortion. Details of the development, benefits, and implementation of these shipyard applications will be addressed.

FSW FOR NAVAL SHIPBUILDING

4:00 pm – 4:45 pm
Maria Posada, Materials Engineer, Naval Surface Warfare Center, West Bethesda, Md.
This presentation will review recent and ongoing efforts supporting implementation of friction stir welding for naval shipbuilding. In addition, the presentation will discuss research and development activities that support future potential shipbuilding applications.

FRIDAY, OCT. 19

CONTINENTAL BREAKFAST **7:45 am – 8:45 am**

TANDEM MAG

8:45 am – 9:30 am
Lars-Erik Stridh, IWE. Process R&D, Application Manager, ESAB AB, Gothenburg, Sweden
This presentation will cover the process description, possibilities, limitations and important features of welding torch design. Results from trials with different wire types, wire diameters, and the process window will be presented.

INDEPENDENT CONTROL OF MELTING SPEED AND BASE METAL CURRENT USING DOUBLE-ELECTRODE GMAW

9:30 am – 10:15 am
YuMing Zhang, Professor, University of Kentucky, College of Engineering, Lexington, Ky.
In traditional GMAW, base metal current is the same as welding current, which melts the wire. Increasing welding current to increase melting speed causes the same increase in base metal current. The developed double-electrode GMAW adds a second (either GTAW or GMAW) torch to bypass part of the welding current back to the power supply without going through the base metal. A system has been developed to control base metal current at any desired low level, while the total welding current can increase freely. In addition, spray transfer can be achieved with a base metal current as low as 50A. Its implementation is realized by adding a control system, which includes a bypass torch to an existing GMAW process.

MORNING BREAK **10:15 am – 10:30 am**

TRANSIENT THERMAL TENSIONING TO CONTROL BUCKLING DISTORTION

10:30 am – 11:15 am
Randal M. Dull, P.E., Sr. Engineer, Edison Welding Institute, Columbus, Ohio
Transient thermal tensioning is a newly patented technique that can be used to minimize buckling distortion when welding large-scale, thin-section, stiffened steel panels. Buckling mitigation is accomplished during welding, minimizing the need for post-weld processing.

HIGH SPEED TANDEM SAW

11:15 am – 12:30 pm
Nancy C. Porter, Project Manager, Edison Welding Institute, Columbus, Ohio
Northrop Grumman Ship Systems (NGSS) currently uses a modified two-electrode series arc submerged arc welding (SAW) process for single-sided butt welding, which was originally developed for thicker materials and, when applied to thin materials, results in inconsistent weld quality and excessive distortion. This project reduced welding distortion and improved weld consistency through the use of high-speed, tandem narrow groove SAW procedures, with improved flux copper backing using advanced power supplies and controlled weld joint root gap openings.

LUNCH (PROVIDED) **12:30 pm – 1:30 pm**

DEVELOPMENT OF A CR-FREE CONSUMABLE FOR JOINING AUSTENITIC STAINLESS STEELS

1:30 pm – 2:15 pm
Dr. Brian Alexandrov, Professor, The Ohio State University, Edison Joining Technology Center, Columbus, Ohio
A new Cr-free electrode based on the Ni-Cu system has been developed for joining austenitic stainless steels. This consumable eliminated the generation of hexavalent Cr (CrVI) during welding of Type 304 stainless steel. By controlling the Cu content in the range from 5-10 wt% and with the addition of small amounts of Pd or Ru, the corrosion potential can be controlled such that this consumable is compatible with 18-8 type stainless steels. The mechanical properties of this new consumable meet or exceed the minimum requirements for the base metal. Weldability testing has been conducted to determine the susceptibility of the weld metal to solidification, liquation, and ductility dip cracking.

THE USE OF PORTABLE XRF FOR RAPID ALLOY VERIFICATION AND ANALYSIS

2:15 pm – 3:00 pm
Bree Allen, Thermo Scientific NITON Analyzers LLC, Billerica, Mass.
The advent of x-ray fluorescence (XRF) technology into a portable handheld device has enabled significant changes in the way that alloy analysis can be performed in manufacturing and restoration industries. This talk will provide an overview of the XRF technique, a history of XRF analyzers, and a discussion about the specific uses of this technology in shipbuilding applications.

AFTERNOON BREAK **3:00 pm – 3:15 pm**

IMPACT OF THE NEW OSHA HEXAVALENT CHROMIUM STANDARD

3:15 pm – 4:00 pm
Susan R. Fiore, Senior Engineer, Edison Welding Institute, Columbus, Ohio
In May 2006, the Occupational Safety and Health Administration lowered the 8-hour time-weighted average permissible exposure limit (PEL) for hexavalent chromium (Cr(VI)) and for all Cr(VI) compounds from 52 to 5 micrograms per cubic meter of air, as an 8-hour time-weighted average. This presentation will outline the details of the new standard, discuss the ramifications for businesses, and provide guidance to help companies reduce exposures.

EVALUATION OF MODELING AND SIMULATION SOFTWARE FOR MULTI-PASS WELDED STRUCTURES

4:00 pm – 4:45 pm
Garrett Sonnenberg, Engineer IV, Northrop Grumman Newport News, Newport News, Va.
Many past research programs have investigated the impact of weld distortion and methods to avoid or mitigate the problem. Experience has been the best teacher for these methods yet the number of personnel staying in the industry gaining this experience is dwindling. To counter this loss, recent advancements in computer software and hardware have prompted the development of modeling and simulation (M&S) software for the welding process to "predict" results. This presentation describes the efforts that Northrop Grumman Newport News has undertaken in the investigation of commercially available M&S tools for this manufacturing process. It discusses the fabrication and data collection from the test articles needed to develop analysis models. The test articles were thick-material joints with a high number of weld passes. The presentation will cover the software comparison of the accuracy, speed, and operator interface. It will also discuss the follow-on investigation of the application to alter a joint to minimize backside welding volume.

Conference attendees will have ample opportunity to network informally with the presenters and other participants. What's more, if you are a wine connoisseur, the 20th Annual Town Point Virginia Wine Festival is being held October 20-21, following the conference in nearby downtown Norfolk.

CONFERENCE REGISTRATION FEES

CONFERENCE CODE: COSB-5

AWS members: $550
Nonmembers: $680

Each nonmember attendee will receive a two-year complimentary membership in AWS. Registration includes all conference sessions, two continental breakfasts, two lunches, and refreshment breaks. The registration fee does not include hotel accommodations. Hotel accommodations are subject to hotel regulations and are the responsibility of the attendee.

Each participant will also earn 14 Professional Development Hours (PDHs) for attending the conference.

LOCATION AND ACCOMMODATIONS

Omni Newport News Hotel
1000 Omni Boulevard
Newport News, VA 23606
Phone: (757) 873-6664 / Fax: (757) 873-1732

http://www.omnihotels.com/FindAHotel/NewportNews.aspx

Take advantage of the specially negotiated rate of $83 for single and double occupancy. This rate is also extended to you three days before the conference and three days after the conference (depending on hotel availability). Be sure to mention the American Welding Society. The deadline for reservations at this special price is September 17, 2007. Each reservation must be guaranteed with a major credit card. Any room reservation cancelled via the website can be done 24 hours in advance. Any other reservations must be cancelled five days in advance of the arrival date and must be done directly with the hotel. There is no charge for parking.

ACCOMMODATIONS FOR THE DISABLED

Pursuant to the Americans with Disabilities Act, AWS and Omni Newport News Hotel strive to ensure accessibility for all their guests. Please inform the hotel when you make your reservations, and also contact the AWS Conferences & Seminars Business Unit at (800) 443-9353, ext. 229.

GUARANTEE

AWS guarantees that you will leave the conference a satisfied customer. If for any reason you are not satisfied, please send a letter as soon as possible to John Ospina, AWS Conferences and Seminars, 550 NW LeJeune Road, Miami, FL 33126.

REFUND POLICY

AWS knows your plans can change and offers a flexible refund policy. If you notify AWS at least two weeks before a scheduled conference that you're unable to attend, you will receive a full refund, less a $75 administration/hotel attrition fee. Notification received less than two weeks before the conference will result in a refund less a $175 administration/hotel attrition fee.

You may send a substitute at no additional fee. No refunds are given for no-shows.

Note: AWS reserves the right to cancel any event at its reasonable discretion. In the event of cancellation by AWS, registration fees will be refunded in full. AWS shall have no further liability.

CONFERENCE REGISTRATION FORM

FOUR EASY WAYS TO REGISTER:

1. **Go online: *http://www.aws.org/conferences***
2. **Call: 1-800-443-9353, Ext. 229**, between 8 AM and 5 PM EDT. Please have your AWS membership number and a purchase order number or credit card ready.
3. **Fax form: 305-648-1655**. Fax one copy per registrant.
4. **Mail registration form to:** (Mail one copy per registrant.)
   American Welding Society
   P.O. Box 440367, Miami, FL 33144-0367

Note: Registrant information needed for each registrant

Priority Code (from mailing label) _____

AWS Member No. (if any) _____

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P.O. Box 440367
Miami, FL 33144-0367

Method of Payment: ❑ Bill Me (AWS members only) ❑ Bill My Company (Must include Purchase Order No.) P.O. No. _____

❑ Check ❑ Money Order ❑ VISA ❑ MasterCard ❑ American Express ❑ Diners Club ❑ Discover ❑ Carte Blanche

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Code		Fee
COSB-5	**5th Charting the Course in Welding: U.S. Shipyards**	

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