The Materials Information Society

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Santa Clara Valley Chapter

March 2004

Volume 47, Number 7

Wednesday, March 10

Inertia Welding of Nitronic 40 Pressure Vessels for Hydrogen Containment

C.H. Cadden
Sandia National Laboratories

Please remember to indicate a meal selection when you sign up!

5:30 pm Social/Networking……..…..…6:15 pm Dinner…….……..……7:30 pm Speaker

Meeting Location:
Michael's at Shoreline
2960 Shoreline Blvd.
Mountain View
(650)962-1014

Dinner Cost: ASM Members $20, Students $10, Guests $25
Meal Choices: London Broil, Stuffed Prawns with Lobster Sauce, or Mushroom Crepe

RESERVATIONS REQUIRED:
Stacy Ewert at (408) 742-2521 or *stacy.s.ewert@lmco.com*
Reservation deadline is 1pm on Monday, Mar 8 ($5 late fee after this time)

Be a Science Fair Judge!! See page 6

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Santa Clara Valley Chapter
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Meeting Directions

To get to **Michael's at Shoreline** from highway 101, exit at **Middlefield Rd. / Shoreline Blvd.**. Head **north** on **North Shoreline Blvd.** Michael's is at the end of North Shoreline adjacent to the Shoreline golf course, about 2 miles from 101.

RETURN SERVICE REQUESTED

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Have You Moved Recently?
If so, please remember to correct your address by logging onto the national website, *www.asminternational.org*, where you can review and update your membership record.

About the Topic

Inertia Welding of Nitronic 40 Pressure Vessels for Hydrogen Containment

Successful development of inertia welding as a manufacturing process for the fabrication of stainless steel pressure vessels offers the promise of both lower cost and improved performance compared to conventional designs. However, this process represents a severe departure from the well-characterized and understood fusion welding techniques that have been used successfully for over fifty years.

In the inertia welding process, joints are produced through the simultaneous application of force and relative motion. Bonding occurs in the solid state at temperatures that are determined by welding parameters. However, the prediction of weld microstructure is complicated by the macroscopic material flow that occurs during this joining process. Our research found that an austenite-to-ferrite transformation can occur at temperatures below that predicted by the Nitronic 40 phase diagram, and that remnants of this ferrite are retained after cooling to room temperature. Hydrogen-charged specimens were tested to determine the sensitivity of various microstructures to hydrogen-assisted fracture susceptibility. Results indicate that while all specimens displayed hydrogen-induced reductions in ductility, subtle microstructural differences produced substantially different responses.

About the Speaker

C.H. Cadden

Sandia National Laboratories, Livermore

Chuck Cadden received Bachelors and Masters Degrees in Metallurgical Engineering from Rensselaer Polytechnic Institute, where he was part of the Welding Research group led by Prof. Warren Savage. Upon graduation he joined the Research Department of the Haynes Division of Cabot Corporation, where his activities focused on the development of nickel- and cobalt-based superalloys and associated welding issues. He left Haynes to become leader of Joining Process Development at the Allison Gas Turbine division of General Motors, where he worked on Advanced Military Engine programs. In that capacity, Chuck developed brazing processes for the production of 4-piece single crystal turbine blades and fabricated the world's first rotating MMC engine component. For the past decade, Chuck has been employed at Sandia National Laboratories in Livermore California, conducting research in welding and metal/ceramic brazing. He currently manages the Engineered Materials Department which performs research in several areas of Materials Science, including welding and joining, radiation detection materials, hydrogen effects in metals and plasma facing materials for fusion reactors.

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ASMI-SCV would like to thank Buehler for sponsoring our February meeting. Buehler is the world's premier manufacturer of scientific equipment and supplies for use in materials analysis. Buehler's products are used throughout the world in manufacturing facilities, quality laboratories, and universities to enable material characterization, ensure quality, and perform materials research. We appreciate Buehler's support, which enables us to provide quality technical programming to our membership at a reasonable cost.

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Participate in Your Chapter!

Consider joining one of these teams and help to shape the ASM-SCV the way you want it:

Technical Program (monthly dinner meetings) - *Contact: Ramas Raman, ramas@surmet.com*

Sponsorship (advertising and meeting sponsors) - *Contact: Dave Himmelblau, dave.himmelblau@lmco.com*

Membership (servicing and expanding membership) - *Contact: Fred Landry, fred@altairusa.com*

Education (interfacing with local schools and Chapter education) - *Contact: Mingwei Li, mli@splasers.com*

Yearbook (publishing the Chapter membership directory) - *Contact: Shari Yokota, shari.yokota@cpii.com*

Publicity (newsletter and website) - *Contact: Scott Dickerson, scott_dickerson@amat.com*

Long Range Planning (long-term Chapter goals and development) - *Contact: Jacques Matteau, Jacques@altairusa.com*

We are still seeking Meeting Sponsors!

Contact Dave Himmelblau at (408)743-7893 for more information

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Upcoming Events

Mar 14-18: SPIE, "Smart Structures and Materials". Visit www.*spie.org*

Mar 17: IEEE-CPMT, "Semiconductor Packaging: Substrate and Interposer Issues". Visit *cpmt.org/scv/*

Mar 18 AIChE, "Exelixis: How to Survive in Biotech". Visit *www.aiche-norcal.org/meetings.html*

Apr 14: IEEE-CPMT, "Packaging & Board Assembly Technology Trends and Their Impact on the Supply Chain". Visit *cpmt.org/scv/*

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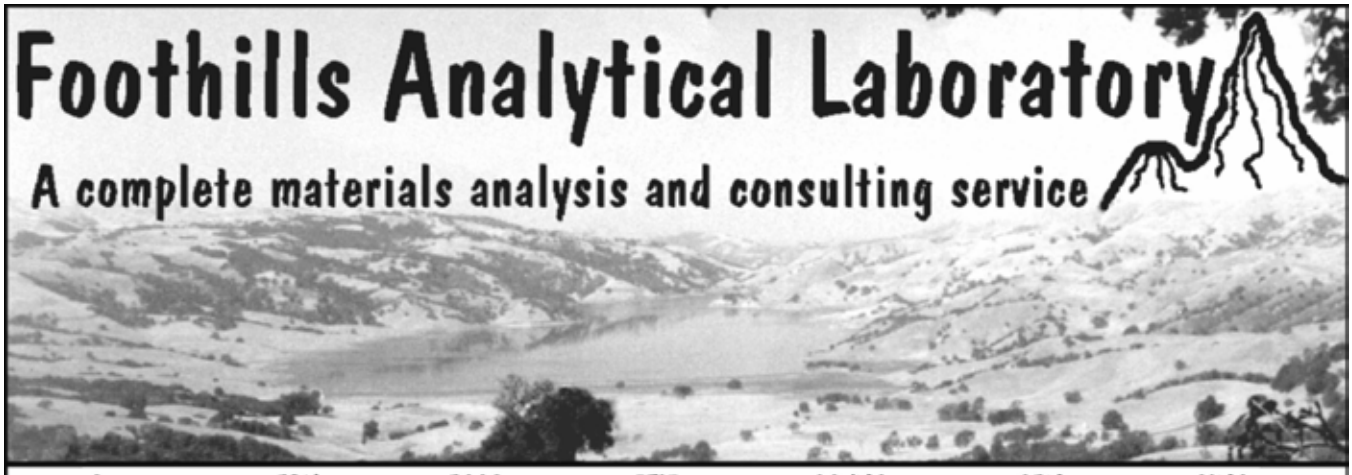

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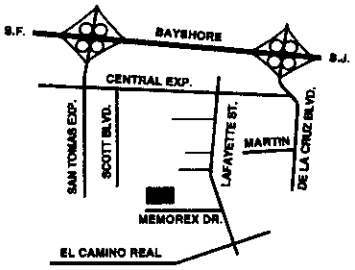

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Chapter Information & Upcoming Activities

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Vice Chair:	
Ramas Raman	(408)567-0941
Treasurer:	
Richard Chung	(408)924-3927
Secretary:	
Stacy Ewert	(408) 742-2521

Executive Committee

Mark Alexander	(831)338-4790
Paul Fojas	(510)538-7309
Ed Francis	(408)653-1700
Dave Himmelblau	(408)743-7893
Alfred Kwong	(408)248-1916
Fred Landry	(650)508-8700
Mingwei Li	(650)966-5735
Lou Wirtz	(408)756-0621
Shari Yokota	(650)594-4065

Special Positions

SVEC Rep:	
Ed Kaminski	(408)241-4842
Newsletter Editor:	
Scott Dickerson	(408)986-3655

Thanks to our ASMI-SCV Sustaining Member:

CSU - Fresno	Henry Madden	Fresno

Would your company like to support the chapter by being a sustaining member? To find out more, contact Fred Landry at fred@altairusa.com.

Executive Committee Meetings: *ASM-SCV Executive Committee meetings are held in September, October, January, March and May. Any member can attend! Call Jacques Matteau at (415)640-4948 for meeting times and locations, and to reserve a seat at the table.*

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- Failure Analysis
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Teachers' Materials Camp

For the last several months we've run reminders for the ASM Student Materials Camps. The application deadline for those events has now passed, but did you know that there is also a similar event for high school teachers? The format is analogous to the Student Materials Camp - it is a weeklong, residential, hands-on laboratory experience with the aim of assisting teachers in integrating applied engineering techniques into their classrooms. Participating teachers will leave with a comprehensive series of low/no cost laboratory demonstrations in applied science to use in chemistry, physics, math, technology, and industrial arts. The Faculty Instructors are a team of experienced "Master High School Teachers," university professors and industrial experts. A total of 30 high school science and technology teachers from North America will be selected. Housing, meals, tuition and curriculum tools will be provided free of charge, but participants must provide transportation to and from Teachers Camp. If you know of a teacher that might be interested, have them visit *www.asminternational.org/foundation* for more information (follow the "Materials Camp" and then "Teachers Camp" links on the left hand side). **The application deadline is Mar 31, 2004.**

Be A Science Fair Judge!

The Synopsys Silicon Valley Science and Technology Championship is an annual event where local students (grades 6-12) present the results of their science projects to judges from local educational institutions and industry. It's a great opportunity for the students to further their science education, and we at ASM-SCV are happy to support the event by providing (together with the local SAMPE chapter) a team of Special Judges. The Special Judges review projects in particular areas (materials science, in our case) and present Special Awards for the best projects in these areas. ASM-SCV has been involved in this event for years, and our volunteer judges always report that it is a fun and rewarding experience. This year we will divide our judges into 2 groups: grades 6-8, and 9-12. **If you would like to judge for the event, please contact Scott Dickerson at (408) 986-3655**. If you have a strong preference as to which age group you would like to judge, please indicate so when you sign up. The judging for this year's event will take place on Wednesday, March 17, 2004, from 10am until 5pm (a box lunch is provided) at the San Jose McEnery Convention Center. More information on the event itself can be found at *www.science-fair.org.*

Upcoming Meetings

Apr: *Materials Selection Software (joint with SAMPE)*
May: *Growth of Diamond Crystals (ASMI Trustee Night, Student Night, Awards Night)*