

FAILURE ANALYSIS & PREVENTION

Special points of interest:

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- CALL FOR PAPERS—ANTEC 15
- DR. HAUSER RECEIVES DR. MYER EZRIN BEST PAPER AWARD
- ANNOUNCEMENTS
- 3-DAY FAILURE ANALYSIS COURSE TO BE HELD AT UW-MILWAUKEE
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Letter from the Chair — Andy Shah

Letter from the Chair:

Welcome to the Failure Analysis and Prevention SIG's Summer 2014 Newsletter! I am happy to report that once again, the FAPSIG sessions at ANTEC 2014 in Las Vegas, NV were well attended. In addition to the technical paper presentations, the tutorial sessions provided an excellent forum for exchange of technical and relevant information for FAPSIG members. A special thank you to our Technical Program Chair, Jennifer Hoffman and our tutorial speakers for volunteering their time.

Our next ANTEC meeting will be held between March 23-25, 2015 in Orlando, FL. ANTEC 2015 is fast ap-

proaching, and it is strategically co-located with NPE2015 to take advantage of the largest plastics trade show and conference of the plastic industry. I encourage all of you to submit your technical papers prior to the paper submission deadline date of September 26, 2014.

In addition to the technical presentations, tutorial sessions, FAPSIG TPC is also planning an interactive discussion session with a panel of industry experts. More exact details regarding sessions at ANTEC 2015 will be provided in our Spring newsletter. FAPSIG will also hold its business meeting during one of the sessions at ANTEC

and I encourage you to participate and voice your suggestions, ideas, and opinions so that the FAPSIG board can continue to address the needs of our members. Please visit the FAPSIG community page on SPE's website for information regarding contacting your board members.



Andy R. Shah, M.S., P.E.
Engineering Systems Inc.
Chair, Failure Analysis and Prevention SIG

ANTEC 2014 Recap

by Jennifer Hoffman, FAPSIG TPC

FAPSIG had two well-attended sessions at ANTEC 2014 in Las Vegas. Our paper session on Failure Analysis Investigations and Techniques showcased five technical papers, followed by a presentation of the Dr. Myer Ezrin Best Paper Award to Ray Hauser, consultant at Ray Hauser Expertise, for "CPVC Sprinkler Pipe in Contact with Suspected Off-Ratio Urethane Foams." Dr. Brian Ralston (Best Paper Award Chair), Cambridge Polymer Group, presented the award.

We also offered a half-day tutorial session where invited industry experts gave educational presentations on failure-related topics. Dr. Maureen Reitman, Principal and Practice Director at Exponent, discussed the importance of failure analysis in product development in her presentation titled "Turning Failure into Success: Tools, Techniques and Practical Examples for the Product Development Engineer." Michael Sepe, consultant at Michael P. Sepe, LLC, talked about important considerations for accelerated testing and shared several practical examples in his presentation titled "The Problem of Confounded Mechanisms in Accelerated Testing Protocols." Dr. Myer Ezrin, University of Connecticut, Institute of Materials Science (Retired), gave an interesting perspective on the similarities in chemical nature and failure susceptibility between synthetic and human biopolymers (e.g. DNA, lipids, and proteins) in his talk titled "Trends in Failure of Synthetic Polymers and Human Biopolymers."

FAPSIG would like to acknowledge our sponsors for ANTEC 2014. Thank you to Cambridge Polymer Group, Element, ESI, Exponent, IMR Test Labs, The Madison Group, and Plastic Failure Labs for their contribution to a successful conference. Each sponsor received a full page advertisement in the FAPSIG newsletter and their company logo was displayed during the sessions (see our banner below). In addition, sponsors handed out Starbucks gift cards at the end of each session as a thank you to the attendees. If your company is interested in becoming a sponsor for ANTEC 2015, please contact Jeff Jansen (jeff@madisongroup.com).

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Broutman to do Signing of New Collection of his Photography

Chicago, September 7, 2014

Larry Broutman, a former professor of materials engineering at Illinois Institute of Technology, former president of SPE and an early leader in the field of failure analysis of polymer and composite products, is celebrating his passion for photography with the release of a new collection of his work in Chicago. Larry took up nature photography more than two decades ago. His passion for this subject has taken him to Africa (several times), Vietnam, the Arctic and many other locales around the world. One of the recent applications of his work was in the newly constructed Ann & Robert H. Lurie Children's Hospital in Chicago, where pictures combining his wildlife photos with images of Chicago landmarks were used in the hospital building. Now Larry's work has been compiled in a new book which is available at the Chicago Architecture Foundation store. A book launch will be held at the Foundation's store on September 7. Congratulations to Larry on yet another milestone in his long and highly varied career.

Donald Duvall

SAVE THE DATE

Sunday, September 7, 2014

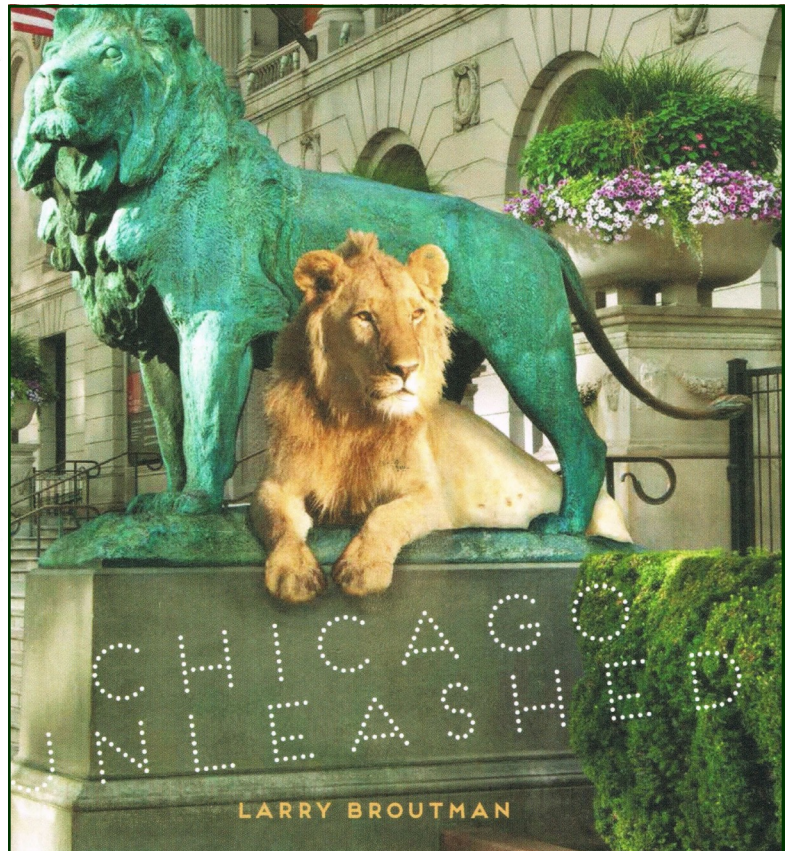
3:00pm-7:00pm

Help celebrate the book launch of *Chicago Unleashed*, by Larry Broutman. Combining unexpected whimsical images with iconic Chicago locations, this charming and amusing concept was first developed for permanent lobby displays at the Ann & Robert H. Lurie Children's Hospital of Chicago.

Books are available at the Chicago Architecture Foundation store and at the launch event which will be hosted at the Chicago Architecture Foundation, 224 South Michigan Avenue.

All author proceeds will be donated to the Chicago Lighthouse for the Blind and Access Living.

An inspiring event you won't want to miss!



Call for Papers— ANTEC 2015



The Failure Analysis and Prevention Special Interest Group (FAPSIG) is soliciting papers for the next ANTEC® conference, which will be co-located with NPE2015 and held on March 23-27 in Orlando, Florida.

Many aspects of product and process development, material selection, manufacturing, and end-use/service life testing fall under the umbrella of failure analysis and prevention. Papers can be submitted addressing failure analysis and prevention related to plastic and composite materials, including automotive, consumer products, medical, construction, piping, etc.

Topics for which FAPSIG is soliciting papers include:

- Identifying and demonstrating practical solutions to prevent or mitigate common industrial problems (e.g. adhesion failures, chemical resistance, environmental stress cracking)
- Case studies on failure prevention in product design and manufacturing
- Case studies illustrating the use of complimentary tools/techniques to determine the root cause of plastic failures
- Use of new methodologies in performing plastic product failure analysis
- Use of non-destructive methodologies (e.g. CT scanning, finite element analysis) to identify and prevent failures in plastic components
- Fracture behavior of polymers and the role of fractography in understanding plastic product failures
- Failure analysis and lifetime prediction of plastic pipe and fittings
- Failure of medical implants, including designed failures (e.g. resorbables)
- Prevention of plastic product failures with use of accelerated aging and/or service lifetime prediction methodology

Paper Submission Deadline: September 26, 2014

Submission format: Technical papers only in ANTEC format (.pdf file)

Submission Site: <http://antec2015.abstractcentral.com>

Please contact us if you have questions:

Jennifer Hoffman
FAPSIG TPC
E-mail: jmchoff@gmail.com
Phone: 650-339-0756

Barbara Spain
Events Program Manager
E-mail: bspain@4spe.org
Phone: 203-740-5418

Dr. Ray Hauser Receives FAPSIG Dr. Myer Ezrin Best Paper Award at ANTEC

2014 Dr. Myer Ezrin Best Paper Award

Each year the ANTEC papers submitted to FAPSIG are judged by a panel, with the winner being selected based on factors including technical merit, real world applicability, and impact on advancement of the subject. The award is named after Dr. Myer Ezrin, in honor of his exceptional contributions to the field of failure analysis and the establishment and growth of the FAPSIG. This year's award included the additional honor of being presented during the ANTEC 2014 FAPSIG sessions by none other than its namesake, Dr. Ezrin himself! The winner of the 2014 Dr. Myer Ezrin Best Paper Award was Dr. Ray L. Hauser, for his paper titled *CPVC Sprinkler Pipe in Contact with Suspected Off-Ratio Urethane Foams*.

From the abstract of Dr. Hauser's paper:

"This paper discusses failures in a residential fire sprinkler system using CPVC pipe surrounded by sprayed urethane foam insulation. The pipe had multiple circumferential cracks. The external surface had a brown coloration in cracked areas. Chemical analysis showed presence of chemicals in the polymer consistent with components that may have been present in the foam. These chemicals had solubility parameters and boiling temperatures consistent with causation of environmental stress cracking (ESC) of CPVC. Accelerated exposure of strained CPVC pipe sections to three of these chemicals showed rapid formation of suspected environmental stress cracks."



Dr. Myer Ezrin presenting Dr. Ray Hauser the FAPSIG Best Paper Award that is in his name.

Announcements

Dr. Hoffman joins AirXpanders



In March of this year Jennifer Hoffman, Ph.D., joined AirXpanders in R&D as Senior Manager, Materials Science. In this position, Dr. Hoffman is identifying and evaluating new and improved materials for next generation medical devices. AirXpanders Inc., based in Palo Alto, California, is developing novel technology for women who require tissue expansion for breast reconstruction following a mastectomy. AirXpanders is currently completing U.S. pivotal trial enrollment for their AeroForm™ tissue expansion device, which has been approved in Australia. The device is a temporary implant used to stretch the skin to accommodate a permanent breast implant. Unlike conventional saline expanders, the AeroForm device is patient-controlled, needle-free and expansion time takes weeks instead of months.

The Madison Group is pleased to announce the addition of Dayton Ramirez to its plastics consulting research team.



Dayton received his B.S. in Plastics Engineering from the University of Wisconsin– Stout in 2013 and joined the Madison Group after graduation. His responsibilities include performing failure and design analysis on thermoplastic, thermoset and rubber parts. He has gained previous experience in process/part evaluation, development and optimization while working at multiple manufacturing facilities on injection molding machines ranging from 15-3500 ton, thermoformers, multilayer sheet extruders, and multilayer blown film lines.

“We are pleased to have Dayton Ramirez join our growing team of engineers at The Madison Group. Dayton brings excellent hands-on experience and training in the behavior of plastics that will bolster our capabilities to help solve our customer’s plastics problems,” said Bruce Davis (CEO).

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Element New Berlin adds GC/MS Capability

A GC/MS instrument has been installed and brought on line at Element New Berlin. Sample analysis by direct inject Gas Chromatography/Mass Spectroscopy (GC/MS) involves the vaporization and separation of low molecular weight compounds using a capillary column. The compounds are separated by a combination of boiling point and molecular weight and then ionized using the mass spectrometer. The GC produces a chromatogram that represents abundance of a compound versus time, while the ions detected by the MS represent a “fingerprint” of the compound, which allows for definitive characterization and identification.

The GC/MS allows for the identification of unknown compounds and confirmation of the presence of expected materials, beyond those detected by FTIR alone. With the use of an internal standard, semi-quantitative results for those materials can be provided. Current analysis capabilities are limited to identifying liquid samples and/or dissolvable residues. We are also able to extract, isolate, and identify plasticizers, with an emphasis on phthalate identification and quantification. Additional capabilities will be added to the instrument in the coming year.



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3 Day Course on Plastic Part Failure to be Given at UW— Milwaukee

The University of Wisconsin—Milwaukee School of Continuing Education is offering a 3-day course entitled, “**Plastic Part Failure: Analysis, Design & Prevention**” taught by The Madison Group engineers Antoine Rios, Erik Foltz, Javier Cruz, and Jeffrey Jansen. The course will cover a broad range of topics essential to understanding and preventing plastic failure. Get introduced to the strategies behind analysis, design and prevention with course material that includes:

- Essential knowledge of why plastic components fail
- The five factors affecting plastic part performance
- The process of conducting a failure investigation
- Ductile-to-brittle transitions and their role in plastic component failure
- Methods for understanding how and why a product has failed
- Approaches to more quickly respond to and resolve plastic component failure
- Methods and techniques to avoid future failures

For more information contact:
Murali Vedula UW-Milwaukee
mvedula@uwm.edu, p:414-227-3121

October 13 — 15, 2014



FAPSIG Looking for Sponsors

The Failure Analysis and Prevention Special Interest Group (FAPSIG) is looking for sponsors for the ANTEC track of presentations and this newsletter. The FAPSIG newsletter reaches approximately 5,000 people. Sponsors of the ANTEC will have their logo placed on a banner that is

displayed during all FAPSIG presentations. The logo is also shown on the presentation screen before and after presentations. All money raised will be used for activities related to the FAPSIG and SPE, such as student travel to the ANTEC conference. Contact Jeff Jansen for more information to

become a sponsor at p(608) 231-1907 or at jeff@madisongroup.com



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FAPSIG—Board of Directors Meeting Minutes (April 29, 2014)

Roll Call:

- Anand Shah – Chair
- Brian Ralston – Best Paper Award
- Jennifer Hoffman – Technical Program Chair (TPC)
- Steven MacLean – Treasurer
- Dale Edwards – Past Chair
- Paul Gramann - Newsletter
- Javier Cruz – Education
- Todd Menna – Secretary
- Jeffrey Jansen – Sponsorships
- Don Duvall – Memberships
- Antoine Rios – Activities
- Kathy Schaow – SPE Liason
- Mike Hayes – Social Networking
- Sue Mantell (Univ. of Minn)
- Jose Perez (Element)
- Maureen Reitman (Exponent)
- Mike Sepe (Mike Sepe)
- Myer Ezrin
- Ron Parrington (IMR)

Board (Shah):

- All Board Member positions to remain the same until 2014
- Brian Ralston to also take on “TPC in Training” role
- New Board position created: Webmaster. Sue Mantell nominated to the position; all in favor, motion passed

Finance (MacLean):

- As of 12/31/2013, balance was \$6,469.97
- Sponsorship contributions and ANTEC 2014 gift card and Ezrin expenses led to balance of \$9,157.07 as of 4/25/14. This amount does not include the Best Paper Award or Student Travel expenses incurred for ANTEC 2014.
- \$500 Student Travel sponsorship renewed; all in favor, motion passed.

TPC Update (Hoffman):

- Paper turn out for ANTEC 2014 less than expected
- Begin soliciting papers ASAP
 - Work with other Special Interest Groups (SIG) to create joint sessions and/or make sure papers are presented in the correct SIG.
 - Will publish a call for papers for ANTEC 2015 in the next FAPSIG newsletter. (Gramann and Hoffman)
 - Hoffman to contact individuals attending ANTEC 2014 FAPSIG paper sessions for potential papers for ANTEC 2015.
 - Potential special topics: CT scanning / Nondestructive testing, Case Studies, Design (molding, product, material selection), Manufacturing, others needed.

Activities (Rios absent):

- MacLean to speak with SPI to determine if FAPSIG can contribute to SPI talks at NPE 2015.
- Hoffman to speak with TA Instruments to determine if FAPSIG can offer booth talks at NPE 2015.
- TOPCON option? Need seed money, topic, location.

Newsletter (Gramann):

- Gramann to work with Barbara Spain and Kathy Schaow at SPE to determine how to reach out more to Universities and college SPE chapters.
- One SPE email blast allowed per month, but greatly underutilized.

Best Paper (Ralston):

- Keep best paper award regardless of how many papers are submitted.
- Future Criteria: Include presentation in the award criteria and judge throughout the day. Winner to be announced at end of session. Ralston to formulate new “rules” and distribute for approval by the Board.

SPE Failure Analysis and Prevention SIG Board Members

Andy R. Shah
ANTEC Head TPC
Engineering Systems, Inc.
3851 Exchange Avenue
Aurora, IL 60504
Work Phone: (630) 851-4566
arshah@esi-il.com

Dale B Edwards
Past Chair
Engineering Systems, Inc.
3851 Exchange Avenue
Aurora, IL 60504
Work Phone: (630) 851-4566
dbedwards@esi-il.com

Todd J. Menna, Ph.D.
Secretary
Element Materials Technology
3200 South 166th Street
New Berlin, WI 53151
todd.menna@element.com

Steve MacLean, Ph.D.
Treasurer
Exponent, Inc.
17000 Science Drive, Suite 200
Bowie, MD 20715
Work Phone: (585) 387-0327
smaclean@exponent.com

Jennifer L. Hoffman, Ph.D.
ANTEC TPC
AirXpanders, Inc.
1047 Elwell Ct.
Palo Alto, CA 94303
P: 650-390-9015
jhoffman@airxpanders.com

Paul J. Gramann, Ph.D.
Newsletter Editor
The Madison Group
5510 Nobel Dr Ste 215
Madison, WI 53711-4951
Work Phone: (608) 231-1907
paul@madisongroup.com

Javier Cruz, Ph.D.
Education Comm. Chair
The Madison Group
5510 Nobel Dr Ste 215
Madison, WI 53711-4951
Work Phone: (608) 231-1907
javier@madisongroup.com

Jeffrey A. Jansen
Sponsorship
Engineering Manager
The Madison Group
5510 Nobel Dr Ste 215
Madison, WI 53711-4951
Work Phone: (608) 231-1907
jeff@madisongroup.com

Michael Hayes, PhD
LinkedIn Chair
Engineering Systems Inc
6190 Regency Parkway
Norcross, GA 30071
Work Phone: (678) 990-3280
mdhayes@esi-atl.com

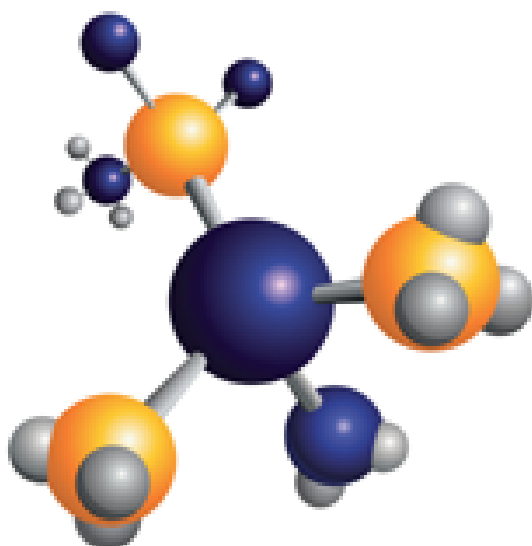
Prof. Susan Mantell
Website Coordinator
University of Minnesota
ME 11A
Minneapolis, MN 55455
Ph: 612-625-1324
smantell@umn.edu

Antoine Rios, Ph.D.
Activities Chair
The Madison Group
5510 Nobel Dr Ste 215
Madison, WI 53711-4951
Work Phone: (608) 231-1907
antoine@madisongroup.com

Myer Ezrin, Ph.D.
Director
43 Morgan Ridge
Longmeadow, MA 01106
mezrin80@comcast.net

Brian Ralston, Ph.D.
Best Paper
Cambridge Polymer Group
56 Roland St., Suite 310
Boston, MA 02129

Donald E Duvall, Ph.D.
Membership Comm. Chair
Engineering Systems Inc
3851 Exchange Ave
Aurora, IL 60504
Work Phone: (630) 851-4566
deduvall@esi-il.com



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