

OCTOBER 2023

Inside...

- 2 2023-24 Executive Board
- 2 Chair's Note
- 3 Meeting Sponsor: ASK Chemicals Group
- 3 2023-24 Chapter Program
- 4 Sustaining Members
- 4 ASM Detroit Chapter Program
- 6 2023 Professional/ Student Mixer Re-cap

Micro-Examiner

An Evaluation of the Staircase and Over-Stress Probe Methods for Fatigue Life Characterization in Aluminum Sand Castings

Nemak is a leading provider of innovative lightweighting solutions for the global automotive industry, specializing in the development and manufacturing of aluminum components for e-mobility, structure & chassis, and ICE powertrain applications. In 2022, it generated revenue of US\$4.7 billion.

Laboratory-based fatigue test methods are often used to estimate the life of components in service conditions. Some of these components require fatigue durability assessments before being approved for production, and then follow through on a continuous fatigue monitoring program for the remainder of the production lifespan.

Two common laboratory-based methods used for fatigue durability are the Staircase and the Over-Stress Probe (OSP) methods. Both methods are widely used in academia and industry; both have benefits and limitations in adequately providing for a lifespan estimation. A study was conducted to examine the results from staircase and OSP fatigue tests on 176 specimens taken from AISiCuMg engine block castings. The OSP method was found to allow a more complete fractographic assessment of porosity compared to the staircase method. It is concluded that the OSP method yields information to better drive decisions regarding process changes that influence desired specific outcomes in terms of product performance and durability

Bio: Dr. Robert Mackay began his career in the metal casting industry 25 years ago at Oberdorfer Industries Limited, Syracuse, New York, in product engineering of cast aluminum components. Following that he moved to Haley Industries Limited, Haley, Ontario, as a process engineer with a focus on precision sand aerospace magnesium and aluminum castings. After that Dr. Mackay began an Internship with the Ford Motor Company's Casting Process Development Centre (CPDC) in 1999 while working on a Doctorate of Philosophy degree in Materials Engineering at the University of Windsor.

In 2003, Dr. Mackay joined Nemak of Canada after completing his Doctorate and his current title is Principal Metallurgist for Nemak. Robert is also a former Adjunct Professor at the Mechanical, Automotive and Materials Engineering Department at the

Bios continued on page 3



Speaker
Dr. Robert Mackay
Principal Metallurgist
Nemak USA/CAN



Dr. Glenn Byczynski
R&D Manager
Nemak USA/CAN



Tech Chair
Prof. Robert Cryderman,
FASM
Research Associate Professor (Retired)

ASM-Detroit and DWAFS Joint Meeting

Monday, October 9, 2023 • 5:30 – 8:00 p.m.

Speaker: Dr. Robert Mackay, Nemak

Topic: "An Evaluation of the Staircase and Over-Stress Probe Methods for Fatigue Life Characterization in Aluminum Sand Castings"

Location: Location: Livonia Marriott

Social Hour 5:30 pm • Dinner 6:30 pm • Announcements 7 pm • Speaker 7:15-8 pm

Special 23-24 Season Rate of \$20pp with a Reservation (\$5 for Students)

For reservations e-mail to AsmDetroitChapter@gmail.com before Thursday, October 5th

2023-2024 ASM-Detroit Chapter Executive Board

CHAPTER OFFICERS

Nicholas Lessnau
Chair

Mark Harper
Vice-Chair

Rajan Bhambroo
Secretary

Daniel Baker
Treasurer

Julie Nimer
Chapter Administrator

EXECUTIVE COMMITTEE MEMBERS

Jason Coryell
Attendance/Publicity Chair

Nikki Tiernan
Young Members/
Student Affairs - Co-Chair

Maxwell Mayhew
Young Members/
Student Affairs - Co-Chair

JP Singh
National Affairs

Kae Poor
Chapter Council Representative,
Education/MEI/Roundtable Co-Chair

Tristan Brohm
Education/MEI/Roundtable Co-Chair

Tim Stachowski
Entertainment Co-Chair

Trisha Rouse
Entertainment Co-Chair

Manish Mehta
Awards/Recognition Chair

Eric McCarty
Finance/Council of Fellows Chair

Angella Sell
Membership/Sustaining
Members Co-Chair

Yi Liu
Membership/Sustaining
Members Co-Chair

James Boileau
Member-at-Large

Robert Cryderman
Papers/Programs Chair

Kathy Hayrynen
ASM Teacher's Camp

Peg Jones
ASM Teacher's Camp



Nicholas Lessnau
ASM Detroit Chapter
Chair, 2023-24

Chair's Note

Hello, ASM Members and friends, I'm writing to you here at the end of September and we just wrapped up our annual Student Mixer at Connor O'Neill's in Ann Arbor. We had a great turnout with students from Schoolcraft College, University of Michigan, and Wayne State University. Thank you to our professionals that came out and to our sponsors AFC-Holcroft and Joyworks Studio. If you ever have any suggestions on how we can further improve our student mixers, feel free to reach out to me.

You should have read a note in last month's issue regarding the upcoming Mentorship Program. Nikki and team have been working diligently on developing a program that will be beneficial to our young professionals and soon-to-be graduates. This initiative came out of a round robin session where the question "how can we offer additional value to our young members" was asked. We began talking about the fact that a tiny fraction of us had absolutely no idea what we were doing before and immediately after graduating. We know for a fact that the ASM-Detroit Chapter is strong in the education and support of educators space, but how do we help the folks that benefited from those efforts take the next step? The team thinks that the mentorship program is a good answer.

We have got a couple of great speakers coming up this fall. Be sure to see the chapter program for all the dates. You will notice that we have a few TBD locations on the program. Stay tuned for updates. We are working on making sure that all of our technical talks and dinners are at locations that support the style meetings we have while maintaining a competitive price. Despite the overall increase in prices, we have chosen to keep our fees unchanged for this season. It has generated a little work on our end.

As always, if you have any comments, suggestions, questions, or concerns then please reach out to me. My email address is Nicholas.Lessnau@MNP.com.

Looking forward to seeing everyone soon.



MetLab Corporation 54
www.metlabcorp.com
800-828-6866

FOR ALL YOUR METALLOGRAPHIC NEEDS SINCE 1968



TITAN
METALLURGY, L.L.C.

**YOUR SOURCE FOR
METALLURGICAL TESTING,
ANALYSIS & CONSULTATION.**

**10400 Capital St.
Oak Park, MI 48237
Telephone: (248) 543-3578
testing@titanmetallurgy.com
www.titanmetallurgy.com**

We specialize in quick turnaround time and customer satisfaction.

University of Windsor. Dr. Mackay has served extensively in the Detroit-Windsor Chapter of the American Foundry Society over the last 20 years, serving as a three term Chairman, one term as Vice Chairman, and finally a two-time Board of Director Member.

To date, Dr. Mackay has authored or co-authored over 75 publications from work stemming mainly for metal casting science and its application to product development and/or manufacturing. This publication record includes one textbook, titled *Al-Si Alloys: Automotive, Aerospace and Aeronautical Applications*, published by Springer Nature in 2017, and a Best Paper Award in the Light Metal and Aluminum Division in the 2022 AFS Congress.

Bio: Dr. Glenn Byczynski, R&D Manager Nemak USA/CAN, received his Ph.D. in Metallurgy and Materials Science from the University of Birmingham in the U.K. in 2002. He holds a Master of Applied Science in Materials Science (1997) and Bachelor of Applied Science in Mechanical Engineering (1994) both from the University of Windsor. During his 28 year career in metal casting he has held several R&D and Engineering positions within Nemak and Ford Motor Company including R&D Manager for the European Business Unit of Nemak based in Germany (2007-2009) and Engineering Manager at the Nemak Windsor Aluminum Plant (2005-2006).

He was Chairman of the Detroit-Windsor Chapter of the American Foundry Society (AFS) in 2006, and is currently President of the Foundry Education Foundation Canada, and holds posts of Adjunct Professor at Toronto Metropolitan University, University of Windsor and of Industry Professor at McMaster University. He is also a registered Professional Engineer in the Province of Ontario and is a Fellow of the Institute of Materials, Minerals and Mining and recently elected a Fellow of the Canadian Academy of Engineering.

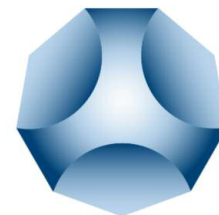
Dr. Byczynski has over 60 academic publications and 2 patents related to the casting of metals.

Bio: Robert Cryderman FASM

- Research Associate Professor (retired)
- Advanced Steel Processing and Products Research Center
- George S. Ansell Department of Metallurgical and Materials Engineering
- Colorado School of Mines

Meeting Sponsor:

ASKCHEMICALS



ASK Chemicals Group

A Global Supplier of High-Performance Industrial Resins and Materials

The Foundry division, which is one of the world's largest and most innovative suppliers of foundry chemicals and consumables, offers an exceptionally wide and innovative range of foundry chemicals including binders, coatings, release agents as well as high-performance consumable i.e. mini-risers, filters or metallurgical products for iron casting.

The Industrial Resins division is a leader in the field of specialty phenolic resins. It serves a large variety of applications such as abrasives (e.g. sand paper), friction (e.g. disk brake pads), refractory (e.g. heat resistant material for furnaces), impregnation (of paper or felt) and timber (e.g. plywood). Our phenolic resins are the preferred choice when it comes to meeting the highest requirements in the areas of fire protection, energy consumption, service lifetime, health, and safety at work.

Trend-Setting Technologies

Our customer-specific applications and trend-setting innovations are developed effectively and quickly in our research and development centers in Europe, North America, Asia and Africa. This allows ASK Chemicals to offer its customers tailor-made technological solutions in response to complex problems.

It is important for us to always work hand-in-hand with our customers in developing successful solutions for the increasingly complex requirements regarding quality, cost efficiency, productivity and environmental friendliness.

Think Globally, Act Locally

Thanks to our global network, complemented by a local presence on site, our customers benefit from rapid access to state of the art technology as well as the complete technological expertise of ASK Chemicals in its entirety. Besides, we offer our customers first-class quality, safety and continuity for their production requirements at all times.

Dedicated to the Environment

The challenges facing the global industries are mainly to be found in energy and resource efficiency as well as the reduction of emissions. As a global supplier of high-performance industrial resins and as one of the leading suppliers for the foundry industry, ASK Chemicals therefore systematically develops solutions for environmentally and employee-friendly applications that also increase efficiency along the entire production process.

The ASM Detroit Chapter Thanks It's Sustaining Members for Their Continued Support!

Aalberts surface technologies
AFC Holcroft
Ajax Tocco Magnethermic Inc.
Allied High Tech Products Inc.
Autokiniton
Auto/Steel Partnership
Bruker Nano Inc.
Buehler
Burris Law
Darrow Mustafa PC
Dubois - Heatbath Park
Metallurgical
Element Materials Technology
Gasbarre Thermal Processing
Systems
GM Global R&D Laboratories
Inductoheat
Kolene Corporation
MetLab Corporation
Michigan Metrology
MSU Libraries/Serials
Acquisitions
National Element Incorporated
Nitro-Vac Heat Treating Inc.
OMNI Metals Laboratory
Incorporated
Rolled Alloys
RTI Laboratories, Inc.
Solar Atmospheres
Struers
Sun Tec Corporation
Surface Combustion
Incorporated
Titan Metallurgy
United Technical Inc.
Upton Industries Incorporated

2023-2024 ASM Detroit Chapter Program

October 9, 2023

Fall Joint ASM/AFS

DR. ROB MACKAY – Nemak USA
An Evaluation of the Staircase and Over-Stress Probe Methods for Fatigue Life Characterization in Aluminum Sand Castings

November 13, 2023

Fellows Night

DR. JULIO VILLAFUERTE, FASM
Cold Spray History, Technology and Current Applications

February 12, 2024

Membership Night

DR. ROBERT CRYDERMAN, FASM
History of Steel

March 11, 2024

Woodside Lecture

DR. KATHY HAYRYNEN, FASM

April 8, 2024

Spring Joint ASM/AFS Meeting

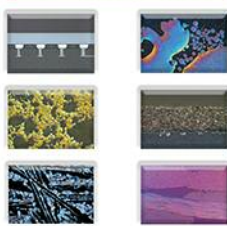
ROBERT HILL, Solar Atmospheres
Oil Quenching

May 6, 2024

National Officers Night/ Sustaining Members Night

ASM International President-Elect (2023-2024)
PRADEEP GOYAL, FASM

ALLIED
HIGH TECH PRODUCTS, INC.



Sample Preparation Solutions for YOUR Materials

- Metals
- Composites
- Plastics/Polymers
- Electronics
- Ceramics/Glass
- Thermal Sprays



jbutchart@alliedhightech.com
www.alliedhightech.com



**Surface
Combustion**

**Industrial Furnaces and
Thermal Processing Equipment**

1-800-537-8980
surfacecombustion.com

Atmosphere
 Batch
 Continuous
 Controls
 Vacuum
 Allcase® Batch Integral Quench Furnace
 OEM Aftermarket Parts & Service
 RX® Endothermic Gas Generators

regional sales manager

Mark Bergel

M: 231-342-5686

mark.bergel@aalberts-st.us

Aalberts surface technologies
specialized heat treatment U.S.
209 West Mount Hope Ave.
Lansing, MI 48910

www.aalberts-ht.us



SOLAR
ATMOSPHERES

Vacuum
Heat Treating
& Brazing Services

Five Locations
• Michigan
• Eastern PA
• Western PA
• South Carolina
• California

ISO9001 • AS9100 • Nadcap

1-855-WE-HEAT-IT

solaratm.com



Tribology and Mechanical Testers

CONTACT OUR TRIBOLOGY EXPERT

Steve Papanicolaou

+1.408.410.5391

www.Bruker.com/tribology



RTI LABORATORIES, INC.

Environmental, Chemical & Materials Testing

- Full Service Independent Metallurgical Lab
 - Mechanical, Physical Testing and Chemical Analysis*
 - SEM/EDS Analysis and Metallurgical Failure Analysis*
- Environmental Exposure Testing
 - Salt Spray, Humidity & Corrosion Testing
- Materials Characterization & Analysis
 - Paint Failure Analysis and Product Deformation*



Contact us at
rtilab.com



Lloyd Kaufman

lkaufman@rtilab.com

734-422-8000 x 109



Materials Testing Division

33080 Industrial Road
Livonia MI 48150



ISO/IEC 17025:2005 accredited lab service
*Parameters that are specifically referenced in scopes of accreditation

BUEHLER
Your Partner for Success



Proven Innovations for
Metallography Laboratories

- ▲ Semi-Automatic Sample Preparation
- ▲ Hot Compression Double Mounting
- ▲ Automated Hardness Testing Systems
- ▲ Quick Ship Superior Consumables

Visit www.buehler.com
or to shop consumables
www.shop.buehler.com

For More Information Contact:

Jon Peavey

(734) 276-5064 | Jon.Peavey@buehler.com

NATIONAL ELEMENT, INC.

Largest Heating Element Bank In The World

- Rod Elements • Ribbon Elements • Coil Elements
- Ceramic • Refractory • Roller Chain • Pintle Chain
- Chain Edge Belts • Hinge Plate Belts • Forced Air
Plugheaters for Tempering • Annealing

www.nationalelement.com

1-800-600-5511 / info@nationalelement.com

AFC HOLCROFT
Industrial furnace solutions

Technology Leader for Thermal
Processing Equipment

AFC-Holcroft, L.L.C.
49630 Pontiac Trail
Wixom, MI 48393-2009
U.S.A.
www.afc-holcroft.com

Phone +1 248-624-8191
Fax +1 248-624-3710

sales@afc-holcroft.com

Reliability at work



SPECIALTY CORED WIRE
COATED WELDING ELECTRODES
TOOL STEEL MIG & TIG

Tel: 810-227-3251
Fax: 810-227-9266

12500 Grand River Road
Brighton, MI 48116 U.S.A.
www.cor-met.com

Oil Quenchants • Molton Salts
Polymer Quenchants

DuBois

www.duboischemicals.com


800 438 2647

Another Remarkable 2023 Professional/Student Mixer at Conor O'Neill's




The Detroit Chapter thanks all of the professional and student members who joined us on September 21st for our annual University Night at Conor O'Neill's in Ann Arbor. This year we had a total of 40 students and professionals who spent their evening discussing the latest trends in materials science and engineering. The chapter would like to thank and

acknowledge our evening sponsors, AFC Holcroft and Joyworks, both of whom have been strong and consistent sponsors of this event. It was wonderful to see students from the University of Michigan, Wayne State University, and Schoolcraft College at the event!


**SUN-TEC**
HARDNESS TESTING SPECIALISTS





sunteccorp.com



CERTIFIED
Rockwell Type
Knoop / Vickers
Brinell, Portable
Tensile / Compression
Ductility Equipment
Hardness Standards / Indenters

Metallographic
Equipment Consumables
Test Accessories
Accredited Repair
and Calibration


Calibration Cert #1934.01





**METALLURGICAL, CHEMICAL
& MECHANICAL TESTING**

We exist to help make certain that the materials and products that we test, inspect, certify and calibrate are always safe, quality, compliant and fit for purpose.

- Cleanliness Testing (ISO 16232/VDA 19)
- Failure Analysis & Consulting
- Weld Procedure Qualification
- Wear & Abrasion testing
- NADCA/H13 Die Steel Qualification
- Hot Hardness Testing (up to 1400 °F)
- Salt Spray, Humidity & Cyclic Corrosion Testing (CCT)
- Fatigue Testing (HCF & LCF)
- IPC Certified Circuit Board Sectioning & Inspection



Europe: +44 808 234 1667 Germany: +49 800 000 5137 Americas: +1 888 786 7555

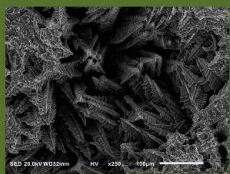


Accredited Metallurgical & Mechanical Testing Laboratory

One Source for Your Complete Project

Weld Evaluation
PQR & WPS Documentation and Testing

Non-Destructive Testing
Ultrasonic Testing (UT)
Penetrant Examinations (PT)
Magnetic Particle Examination (MT)
Visual Inspection (VT)
Radiographic/X-Ray Inspection (RT)



A complete list of services is available at unitedtech1.com

Metallurgical and Mechanical Testing

Failure Analysis
Fatigue
SEM/EDS
Chemistry
Grain Size
Impact Testing - CVN
Tensile Testing
Micro & Macro Etch
Mosaic Image Analysis
Case Depth

✓ **PROVEN** ✓ **TRUSTED** ✓ **EXPERIENCED**

Destructive Testing | Non-Destructive Testing | Weld Engineering | Corporate Training

Full-service company that has provided technical solutions for over 12 years



See AZLA website for list of accreditation



Visit unitedtech1.com, call 248-667-9185 or email sales@unitedtech1.com

1081 E. North Territorial Rd
Whitmore Lake, MI 48189



INDUCTOHEAT

An Inductotherm Group Company

Carl Wesolowski
carlw@inductoheat.com
cell 248 376-6565

Tim LeClair
tclair@inductoheat.com
cell 248 556-6454

32251 North Avis Drive
Madison Heights, MI 48071

www.inductoheat.com

INDUCTION HEATING

Paul Bogdajewicz
Regional Sales Manager
pbogdajewicz@ajaxtocco.com
(317) 815-1126

Chris Pedder
Technical Sales Manager
cpedder@ajaxtocco.com
(248) 691-2290

Cris Candela
Aftermarket Sales Mgr.
ccandela@ajaxtocco.com
(586) 215-8709

www.AjaxTocco.com
24/7 Customer Service
800-547-1527



30100 Stephenson Hwy ■ Madison Heights, MI 48071

Induction Scanners Power Supplies Parts, Maintenance & Service

2022-2023 ASM Detroit Chapter STEM Outreach Sponsor!



FLUXTROL® Centre for Induction Technology™

Thanks to Fluxtrol's generous donation we are able to offset the dinner cost at our monthly chapter dinner meetings for our STEM Outreach attendees. These attendees include: Teacher Scholarship Winners, University Scholarship Winners, Community College Scholarship Winners, Metro Detroit Science Fair Winners, and ESD Future City Winners.

College and university students can also attend our ASM Detroit Chapter dinner meetings for just \$5 thanks to this generous donation!

COMPLETE LINE OF THERMAL PROCESSING EQUIPMENT



Batch ■ Continuous ■ Atmosphere ■ Vacuum ■ Rebuilds
Upgrades ■ Alloy Fabrications ■ Replacement Parts

734.656.2000 | 12250 Belden Court, Livonia MI 48150 | GasbarrelFS@gasbarre.com

www.gasbarre.com



Marc Glasser
Director of Metallurgical Services



125 West Sterns Road
Temperance, Michigan 48182
800-255-2340 734-847-9450
Fax: 734-847-6917
mglasser@rolledalloys.com



Ensuring Certainty

Metallography & Hardness Testing

When it comes to your metallographic preparation and testing solutions, Struers delivers...

Powerful Equipment
High-Quality Consumables
Intelligent Support
Outstanding Service

Contact Struers Account Representative
Jeff Wiswary at +1 616.323.3483
jeffery.wiswary@struers.com
struers.com



Intellectual Property Attorneys

300 River Place Drive | Suite 1775 | Detroit | Michigan | 48207-4291
burrisiplaw.com | 313-393-5400