Award Winning Castings

Here are two examples of NADCA Chapter 10 area companies producing award winning die castings at the 2018 Die Casting Congress in Indianapolis.

**Aluminum Die Casting - Structural/High Integrity**
Award Winner: AMT Die Casting Inc., St-Cyprien, Quebec
Part: Right Member for Snowmobile Chasis
Material: Aural 2, heat-treated
Weight: 3.4 lbs
Advantages Gained: AMT’s high vacuum process allowed the designer to create a series of light castings, resulting in a very stiff and light snowmobile platform.

**Magnesium Die Casting - Over .5 Lbs**
Award Winner: Awanfeng
Meridian, Strathroy, Ontario
Part: Magnesium Subframe Casting
Material: AE44 Magnesium Alloy
Weight: 23 lbs
Advantages Gained: 31% weight savings and reduction from 15 major stampings and reinforcements to one casting.

Next Meeting

**NADCA Chapter 10, Ontario Canada**
Date: Wednesday, December 4, 2019
Speaker: Wes Byleveld, Exco Engineering Additive Manufacturing (see page 16)
Topic: Additive Manufacturing for Die Casting Applications
Meeting Place: Grand Chalet, Milton
324 Steeles Ave, Milton, ON
Networking Cash Bar: 6:00 – 7:00 p.m.
Dinner: 7:00 – 8:00 p.m.
Cost: Members & Guests – $30.00 (GST included, cash or cheque)
Presentation: 8:00 – 9:00 p.m.

To assist Dinner Reservations, Members and Guests are asked to place their reservation no later than Monday, December 2, 2019.

Contact: Ralph Timm (905) 830-1730 or Fax (905) 830-1339
Email: rafetech@gmail.com

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When your Company is considering new equipment options, materials, supplies or services we encourage you to give consideration to our Bulletin Advertisers.

Attention Chapter Members!

Has your address or company affiliation changed?
Has your phone number or fax number changed?
Do you have an Email address?

If so, be sure to let the Chapter Membership Chairman, Mr. Rabi Bhola, know to ensure that you will continue to receive the monthly meeting notices. In addition, NADCA headquarters will be notified.

Mr. Rabi Bhola  Email: rabi@bholstertech.ca

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Tel: (905) 830-1730  •  Fax: (905) 830-1339
Email: rafetech@gmail.com

For NADCA on line courses & webinars click here

NADCA Chapter 10: Technical Program • October 2019 – May 2020

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<td>Overview of Industrial CT Scanning</td>
<td>Dylan Yazbeck</td>
<td>Grand Chalet Milton, Ontario</td>
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<td>Jesse Garant Metrology Center</td>
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<tr>
<td>December 4, 2019</td>
<td>Additive Manufacturing for Die Casting Applications</td>
<td>Wes Byleveld</td>
<td>Grand Chalet Milton, Ontario</td>
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<td>Exco Engineering Additive Manufacturing</td>
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<td>NADCA</td>
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<tr>
<td>April 1, 2020</td>
<td>Eliminating Die Solder with Pinpoint Accuracy Using Simulations</td>
<td>Rabi Bhola</td>
<td>Grand Chalet Milton, Ontario</td>
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<tr>
<td></td>
<td>Bolster Technologies</td>
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<tr>
<td>May 14, 2020</td>
<td>TBD</td>
<td>TBD</td>
<td>Elio Restaurant, Montreal</td>
</tr>
</tbody>
</table>
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This is a flow simulation, but Bholster takes this to a new level with actually showing how gas porosity is formed in the part.

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- Heat loss during pour into shot sleeve
- Specify shot profile required to make a good casting using simulations
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Chapter NEWS

October Meeting Review

Our Speaker Dylan Yazbeck did a very detailed Presentation about Industrial CT Scanning. Jesse Garant Metrology Center is a specialized part inspection service company utilizing Computer Tomography (Industrial CT Scanning, 3D X-ray, X-ray CT). 10 years of experience and a focus on client driven goals have led to the development of unique processes that ensure repeatability and positive project outcomes. The Computed Tomography imaging process is imaging by section, these sections are produced via part rotation during the scan. These images (projections) are compiled into an image stack and are reconstructed allowing complex data visualization and calculation. The datasets can be used for detailed part inspection allowing geometries to be evaluated and material to be visualized for internal defects. The workflows used on a daily basis can allow rapid evaluation of products with complex internal geometrics, internal defect sizes, along with many other geometric or densiometric evaluations. If you would like to find out more information, or how CT could assist with your part inspection needs, don’t hesitate to reach out using the contact information below.

Dylan Yazbeck
Operation Manager
dylany@jgarantmc.com
www.jgarantmc.com
519-962-5300 ext 403
519-984-9554

You can see some of the slides from Dylan’s presentation on page 17.

Dylan during his Presentation.

Program Chair Wilfried Schwark presents Speaker’s gift to Dylan Yazbeck

NADCA Chapter 10 Invited Speaker for December 4, 2019

Invited Speaker

Wes Byleveld
Director of Additive Manufacturing
Email: wesselb@excoeng.com
Exco Engineering Additive Manufacturing
1314 Ringwell Dr.
Newmarket, Ontario
L3Y 9C6
Phone: 289-716-5702

We are pleased to announce that Wes Byleveld from Exco Engineering Additive Manufacturing will be speaking at the upcoming NADCA chapter meeting in Milton on December 4th.

Professional Background

Wes Byleveld has worked at Exco Engineering in die cast tooling and process engineering for more than 15 years and has spent the last 5 years leading Exco’s investment in additive manufacturing, spending time at machine builders, universities and die casters across the globe. Wes was personally instrumental in developing additive manufacturing processes and methods for die casting steel components and in the design and delivery of some of the world’s largest and most complex additively produced tooling for the high pressure die cast industry.
Here are some of the slides from Dylan Yazbeck’s presentation of the Overview of Industrial CT Scanning he gave at the October 2019 Chapter 10 Meeting. Please contact Dylan Yazbeck for more information.
North American Die Casting Association Chapter 10 Ontario Award (1 award) $2000

Award for a full time Mechanical Engineering student in 3rd or 4th year with high academic achievement in Materials related courses and a demonstrated interest in metal casting.

Faculty of Engineering and Architectural Science

North American Die Casting Association Chapter 10 Ontario Award

To provide financial assistance and to recognize the academic achievement in Materials related courses.

Eligibility and Application Process

Applications must be submitted to the Mechanical and Industrial Engineering Department office in EPH 300 by the date and time stated on the Mechanical and Industrial Engineering Department website.

Applicants must meet the following criteria:

- Be a Canadian Citizen, a Permanent Resident or a Protected Person;
- Be an Ontario resident;
- Demonstrate financial need as determined by Ryerson University through completion of a detailed budget submission in accordance with OTSS guidelines;
- Demonstrate interest in metal casting;
- Demonstrate good academic performance in their studies, particularly in Materials related courses, with a cumulative GPA of 3.0 or higher;
- Write a one page letter of application explaining how they meet the criteria
- Provide letters of support demonstrating interest in metal casting.

Criteria for Selection

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget/Financial Need</td>
<td>50%</td>
</tr>
<tr>
<td>CGPA, Academic Standing</td>
<td>20%</td>
</tr>
<tr>
<td>Letters of support (up to three) demonstrating interest in metal casting</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Adjudication

The Department of Mechanical and Industrial Engineering Awards Committee will recommend the name of a candidate to the Chair for final selection. All prospective recipients of the award must complete a detailed budget that demonstrates financial need.

Please submit an APPLICATION LETTER outlining how you meet the criteria and include the completed Student Budget and letters of support in a sealed envelope addressed to the Chair, Department of Mechanical and Industrial Engineering, EPH 300.

Here are the winners of the NADCA Chapter 10 Award for the last 5 years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
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<tbody>
<tr>
<td>2014</td>
<td>Jasjeet Sing</td>
</tr>
<tr>
<td>2015</td>
<td>Nikola Kuzmic</td>
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<tr>
<td>2016</td>
<td>Shekinah Shilesh</td>
</tr>
<tr>
<td>2017</td>
<td>Michael Rinaldi</td>
</tr>
<tr>
<td>2018</td>
<td>Nicholas Prabaharan</td>
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On behalf of NADCA Chapter 10, it was a pleasure to attend the unveiling of the Donors Wall at Mohawk College. Our Chapter 10 scholarship provides annual funding to a student of the college to complete or upgrade their studies. I’d like to share the appreciation and gratitude for our support that was expressed by the Mohawk leadership.

Ignacio Musalem, Delegate/Board Member

Ron McKerlie (President of Mohawk College) emphasized that without the help of the many donors, it would be impossible for grad students to complete their academic program.
Chapter NEWS

2018 Student Bursary at Work at Mohawk College

November 21, 2018

Mr. Mike Jurcic
North American Die Casting Association
c/o Craft Casting Engineering Inc
21 Metcalfe Crt
Georgetown, ON L7G 4N7

Dear Mr. Jurcic,

Your commitment to our Awards Program has made a profound difference to our students by helping them complete their academic journey. On behalf of all those students who have benefitted, and those who will benefit in the future, please accept our sincere appreciation for your support of the North American Die Casting Chapter 10 Bursary.

We are pleased to let you know that students have been selected as the 2018/19 recipients of the North American Die Casting Chapter 10 Bursary. In recognition of your generosity, you will find enclosed, a special thank you letter.

There is nothing more gratifying than watching students grow, taking new knowledge and translating it into the essential skills for their chosen career path. The financial assistance you provide to our students makes education accessible and sets an incredible example of community support.

Once again, thank you for your ongoing dedication to Mohawk College and our students. Because of donors like you, our graduates emerge future-ready!

Regards,

Gena Cureault
Senior Development Officer

November 6, 2018

North American Die Casting Chapter 10 Bursary

To the generous donors of the North American Die Casting Chapter 10 Bursary:

I am writing this letter to thank you for your incredible generosity in choosing me to receive this award. My name is Benjamin K. and I am enrolled in the Manufacturing Engineering Technician – Automation (Industrial Mechanic Millwright) program at Mohawk College. I’ve always enjoyed working with my hands, fixing things, and learning how machines work. This is why I chose to enroll in this program at Mohawk, so that I could get the training I needed to help me launch a successful career as a millwright.

Recently I confirmed a 1-year co-op job offer with Stelco, and if all goes well, I hope to be offered a full-time position after I finish my final semester of school following the co-op term.

I’d like to thank you again for the amazing kindness in your donation. I will do my best to use it wisely and succeed in my studies. I finished my first year with a 92 GPA and I continue to strive for excellence so that I can graduate with honours.

Sincerely,

Benjamin K.
Ontario

Thursday, November 15, 2018

To the Generous Donors of North American Die Casting (NADCA) Chapter 10 Bursary:

My name is Nicholas F. and I am enrolled in Manufacturing Engineering Technician: Industrial Mechanic Millwright at Mohawk College. I am currently in my third semester of the program. Through my education and skills learned, I have been able to get a co-op placement at Stelco at the Nanticoke plant in the Hot Strip Mill. My short term plan is to remain at Stelco and complete my apprenticeship. I would be happy to make a career for myself at Stelco but also keep my eyes open for different opportunities.

Being a full-time student puts financial strain on myself and others who rely on me for support. I work when and where I can, but it simply is not enough to keep up with bills and other expenses. I am aware this situation is only temporary, so I will not let it put a burden on my lifestyle. However, receiving this award is very appreciated. I would like to share how much it really does help me in my current situation and honestly cannot thank you enough. This will help me advance in my studies at school by removing some of the stress accompanied by financial strain.

I would like to close by giving another heartfelt Thank You to the North American Die Casting Chapter 10 Bursary. I believe I can speak for all students who receive this award, that we truly appreciate what the donors do to the help the students.

Sincerely

Nicholas F.
Eliminating Die Solder with Precision Using Simulations

R. Bhola (Bholster Technologies); G. Muller (Gibbs Die Casting)

Die solder is a common occurrence in the HPDC process and is a leading cause of down time and decrease productivity. Research and foundry experience show that die solder coincides with hot areas of the die exposed to thick casting sections and that die solder can be managed with increased internal and external cooling. Experimental research identified the critical die temperature and times at which die solder begins. This work seeks to establish computer models that can predict die solder. Gibbs die casting collaborated with Bholster Technologies to successfully established precise correlation between their computer models and actual foundry experience in predicting and eliminating die solder for A383 alloy. Results of simulation prediction of die solder are presented and compared with actual die and cast part. Methodology for eliminating die solder at precise locations is outlined.

Effect of Metal Powder Properties on AM-MS Die Cast Components

A.T. Lausic, W. Byleveld (Exco Engineering)

Exco Engineering has successfully used additively manufactured (AM) maraging steel components to triple the service life of conventional H13 components. In addition to conformal cooling, the material properties of the powder were a large factor in delivering long-lasting components. Six suppliers of various tool steel powders were tasked with delivering a material comparable to the MS1 maraging steel successfully developed by Exco and EOS for the HPDC tooling industry. Minute differences in critical alloying elements and particle size distributions had pronounced effects on the mechanical properties as seen across 300+ Charpy, tensile, and density specimens.

We planed the Congress papers from Wes Byleveld of Exco and Rabi Bhola of Bolster Technologies to put it into our December Bulletin, however both papers would make the Bulletin too large to send it by email.

When you are interested in this Congress papers inform me wschwark@sympatico.ca and I am going to send them.

Our December meeting with Wes Byleveld as Speaker is a different presentation!
Optimizing Plunger Lubrication
Martin Hartlieb, Maurice Hartlieb (Viami International); C. Raone (Motultech Baraldi); C. Kornblum (Caro-Prometa Metallvertriebs)

A lot of effort is being put into optimizing die spraying and die lubricants, but for the plunger lubricant and its application there is still a lot of room for improvement, and although the pressure is less (there is not that much lubricant being used that it hurts as much as on the die), the negative impact of poor practices can reflect directly on the part quality and even on health and safety of operators around the die casting machine. We still often see graphite for example being used for the plunger and many are familiar with the problems like flow-lines on the part and the mess (dirt) it can create. Minimum lubrication and in the right place is also important on the plunger tip, this is why atomized (minimum) spraying of optimized lubricants (with the right ingredients and viscosity) behind the plunger tip can make a huge difference compared to traditional methods/lubricants. This paper describes the latest technological advances in plunger lubricants and their application, and how they can impact part quality, improve durability of equipment, minimize

6xxx Type High Pressure Die Casting Alloy
F. Breton, J. Fourmann, M. Morel (Rio Tinto)

The Aluminium Association pink sheets are the reference for chemical composition limits of castings and foundry ingot. Currently, the 6xxx series is not used because 6xxx type alloys such as AA6061 or AA6082 exhibit poor castability. However, these alloys are capable of excellent mechanical properties by optimization of the magnesium and silicon ratio to form a target amount of MgSi precipitation during artificial ageing. As a result, 6xxx series alloys are suitable for structural applications. In addition, due to their relatively low solute content, they are frequently used where good electrical conductivity is required. However, to take advantage of all these benefits and increase the use of 6xxx series alloys in foundry applications, their castability must be improved. 3xx.x series casting alloys use excess silicon to obtain good castability for the Al-Si-Mg alloy system. However, for structural die casting applications, these alloys must also contain low iron levels to prevent the formation of brittle AlFeSi phases in combination with a manganese addition for die soldering resistance. 3xx.x series alloys provide good mechanical properties, but exhibit low electrical conductivity due to the high solute content. This paper describes the development of a new alloy using an alternative eutectic system to provide fluidity and die soldering resistance to Al-Mg-Si 6xxx type alloys. This new alloy provides excellent strength, ductility and electrical conductivity making it suitable for structural parts and also electric vehicle applications produced by high pressure die casting.

Manufacturing Bi-Material Molds to Improve Thermal Extraction
D. Levasseur, A. Bois-Brochu, B. Tougas (Centre de métallurgie du Québec); N. Savard (Canimex Torque Force)

Heat management is one of the key technological challenges in tool design. In fact, the heat transfer rate defines the cycle time and the heat balance in the die. Issues such as soldering and even shrinkage can be linked to high temperature regions of the mold caused by insufficient heat extraction. Hot work tool steel that can withstand liquid metal erosion and thermal fatigue have limited thermal conductivity (~25 W/m/K), while copper alloy can conduct heat at a much faster rate (~200 W/m/K). Therefore, the mechanical combination of copper and H13 is being used for mold manufacturing to enhance heat extraction. The drawback of mechanical assembly technique is the inevitable contact heat resistance between the two materials. The objective of this study is to develop a process to obtain a highly conductive metallurgical bond between the copper alloy and H13 tool steel and assess the associated heat transfer gain. Such a bond was achieved by brazing of a graded Cu-H13 composite cover manufactured by Directed Energy Deposition (DED) on a suitable machined copper alloy base. The DED process is an additive manufacturing technology that is able to build parts with composition gradient, which should be very beneficial to the durability of the bond between two materials with very different coefficient of thermal expansion. The bond quality was evaluated using metallography and ultrasonic testing. The heat transfer performance of mechanical assembly and metallurgical bonding was compared using a laboratory scale prototype and a mold insert used in commercial aluminum die casting production. The insert heat extraction was simulated using ProCast™ software to evaluate the potential cycle time reduction.

2018 Perfect Safety Award
Simalex Manufacturing Company Ltd
Langley, British Columbia.

Winners of this award 5 years in a row.

Congratulation from Chapter 10!