Mold Making & Mold Design

Division of Society of Plastics Engineers | Volume 36, Issue 2, Summer/Fall 2014

Message from the Chair

Glenn Starkey

SPE Mold Making and Mold Design Division Chair

It is my honor and pleasure to greet you as your Division's new Chair.
Happy new SPE year!

The SPE year begins July 1 and I follow, and am grateful for, the work that past chair Scott Peters has done over the years. Because of Scott, Wayne Hertlein, and other long-time board members our division has persevered during very challenging times for our industry. Heartfelt thanks to all for their continued support.

Looking back to the more recent events, ANTEC in April was very much a success. Our full day of technical speakers presented great information, which generated productive Q&A afterwards. Then, in June, our division partnered with the organizers of Amerimold, providing and moderating a half-day session that covered topics that, at times, are considered "gray areas", such as mold venting methods, best approaches for flow analysis and more. Special thanks to TPC Cyndi Kustush. Apparently, coordinating ANTEC just isn't enough fun, and pulling double duty providing two great programs for ANTEC and Amerimold definitely kept her busy.

Looking at the landscape of various trade groups that serve our industry, there is a

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A Message from the Newsletter Editor

Cyndi Kustush

SPE Mold Making & Mold Design Division
2014 Technical Program Chair and
Newsletter Editor

Dear Fellow SPE Members:

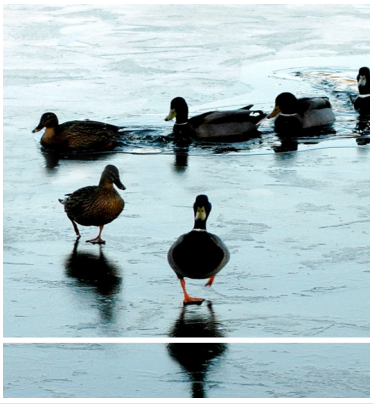
I hope everyone is enjoying the beautiful fall weather – It's hard to believe it's already time to ramp up for ANTEC 2015 in Orlando, FL!

ANTEC, which is taking place **March 23-25, 2015**, will be co-located with NPE2015. If you have not yet registered to attend, please do! This is a wonderful opportunity to attend not only the SPE's highly respected annual technical event but you will get the added bonus of attending the SPI's incredible National Plastics Exposition, which only takes place every three years. Come out and make the most of it!

Details for ANTEC can be found at **www.antec.ws**. Word to the wise: book your hotel room as soon as possible – it will be a sell-out situation before you know it!

I'm happy to submit to you the summer/fall edition of our Division newsletter. It's packed with news and updates, as well as informative articles and meeting minutes from your Board of Directors. If you have news to share, please send it along to my attention via email: **cyndi.kustush@procomps.com**.

Enjoy this issue of our Division newsletter, and let us know if you'd like to get involved through volunteering at various industry events in the coming year.



"You don't have to hold a position in order to be a Leader."

Anthony J D'Angelo

DIVISION HOTLINE

For questions or comments about the SPE Mold Making & Mold Design Division please contact Glenn Starkey at:

gs@procomps.com
1-630-369-9120

Message from the Chair *(continued)*

global group of mold engineers, tool buyers, hot runner engineers and service technicians, maintenance repair techs and more who could benefit by this division being a resource. To reach these individuals and grow our division, we are working to develop a stable of technical experts for presentations, and we're partnering with other industry groups and event organizers to further be a valuable and viable resource.

For example, we are currently working with Gardner Publications, Plastics News and SPI to offer expertise within our division's realm to their event audiences.

During the past year, our board has taken a hard look at not only how we can be more active through various events, but even reflected on our division name and logo. I personally spoke with our division founders and long-time board members and past presidents and received a resoundingly green light for changes ahead. I will be bringing to our board recommendations for a division name that accurately reflects the wide scope of our membership.

Exciting times! If you'd like to be a part of it, either by being a technical presenter or by discussing what it entails to be a board member, I'd welcome the conversation. Please feel free to contact me at gs@procomps.com and we can discuss what role might work out best for all.

Last but not least, thanks again to our current board: First, for your patience and understanding while we transition with new roles and initiatives; secondly, thanks in advance for your help on the work ahead (Now you can't say it's a thankless job!).

Again, happy new SPE year! Here's to the success of our division and your careers ahead.

The Mold Making and Mold Design Division Board of Directors is in need of a ***"Few Good Men and Women."***

If you are interested in the continued betterment of our industry around the globe, and would like to be a part of the leadership within the Mold Making and Mold Design Division, then we have a place for you!

Please complete the form below and return to **gs@procomps.com.**

SPE® Mold Making & Mold Design

Name:_____

Mold Maker:_____ Mold Designer:_____ Both:_____

Phone:_____

Mobile:_____

E-Mail:_____

A Message from the Immediate Past Chair

Scott L. Peters

SPE Mold Making & Mold Design Division
Immediate Past Chair
2014-2016

Here we are at the beginning of the 2014 – 2015 business year for SPE and early in my second term as Immediate Past-Chair. This marks 4 years that I have had the privilege of serving on your board and in the lead seat of the division. My first two years were nearly a decade ago when I was living in Ohio and was able to participate face to face with our board, and these last two years were conducted from a remote location in South-East China, Guangzhou to be exact. And what a time it has been.

In the past two years we have had our fair share of folks come and go. Most of the resignations were due to changes in their professional life that precluded continued service to our division. They all had good intentions but the changing business climate left them, and us, doing things differently. There were a couple of long-time members that saw their time as being well served and so they took leave to pursue other endeavors. And of course there were those that, much like me, have been around for nearly 2 decades, or more, and just cannot get enough of the division and our industry.

We have also been fortunate to pick up some new members to the leadership. These folks have come on board with focus and energy that makes it exciting to be around. They have a vision for the future of our division and the mold making and mold design industry and they are all about casting it forward. It is with these folks taking the lead in the SPE that I am quite comfortable to step back and say “Let ‘er rip!”

To that point, have we completed a successful ANTEC 2014 in Las Vegas, NV, and AmeriMold 2014 in Novi, MI. Our TPC (Technical Program Chair) Ms. Cyndi Kustush is hard at work on the next event. This is the second year in a row that Cyndi has headed up our technical program at ANTEC and coordinated a ½ day session at AmeriMold. She has also been working with the SPI on a West Coast event, the Mike Koebel Western Moldmakers Trade Fair, to be held on Nov. 11 in Southern California. See our Events page for a link and more details.

As if all of the TPC activities aren’t enough, Cyndi has stepped up again. She is also serving as our Editor in Chief of the Division Newsletter. And let me tell you, having served in that role long before the self publishing days that we now are in, I can only imagine the hours she must be putting in. Yet, I haven’t heard a peep from her – not complaint one… She is a real trooper and if you cut her she bleeds “Di-Electric Fluid” because she has Mold Making and Mold Design in her veins.

We have also been lucky to have Mr. Glenn Starkey step back in. He is our new Division Chair and officially took the reins of the division on July 01, 2014. Glenn will serve the next two years and he has a real mission in mind. But I will let him tell you more in his Chair-Elect message.

We welcome three newly elected members to the board as well. They are all long-time friends of the division and are known by many of us in the industry. Christina Fuges (Mold Making Technology) Clare Goldsberry (Plastics Today) and Peter Kambouris (Wisconsin Engraving) are all joining with our incumbents Brenda Clark (HASCO – Education Chair), Victor Baez (Rockwell Automation – Division Secretary), Wayne Hertlein (Wilbert Plastics – Division Treasurer and Historian), Brian Lather

Message from the Immediate Past Chair *(continued)*

(HUSKY – Director at Large) and Jerry Fischer (Retired Tools and Troubleshooting – Division Sponsorship Chair) to lead into the third decade of the 21st Century. We welcome you all.

So with all of that said I kind of feel like the President of the US on his last day in office. I thank our membership for allowing me the opportunities to be of service and I welcome with great anticipation those that are following behind to assume the mantle of leadership. I look forward to your leadership and the marks of excellence you will each place on the history of Mold Making and Mold Design, both as an industry and within our division! God's Speed to you all!

It has been great!

Scott L. Peters, Immediate Past Chair, 2014-2016
The Society of Plastics Engineers, Inc., Mold Making and Mold Design Division

2014 SPE Mold Making and Mold Design Division Board of Directors Contact Information

Division Chair
Glenn Starkey**
Progressive Components
235 Industrial Drive, Wauconda, IL 60084
P: 847-487-1000 | Glenn.Starkey@procomps.com

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Newsletter Editor / Technical Program Chair (ANTEC 2015)
Cynthia Kustush
Progressive Components
P: 847-487-1000 | Cyndi.Kustush@procomps.com

Newsletter Sponsorship Chair
Jerry Fischer
425 South Main Street, Hobart, OK 73651
P: 580-726-5290 | Jerry@tntmold.com

National Councilor / Technical Program Chair (Mini-Tecs)
Membership Chair
Barbara J. Arnold-Feret
P: 817-222-0777 | ppsltd@airmail.net

ITQ Liaison
Currently Unassigned

Division Historian / Treasurer
Wayne Hertlein **
63 W. Brietmeyer Place, Mount Clemens, MI 48043
P: 734 429-5243 | whertlein@mmi-es.com

Secretary / House Committee Chair
Victor Baez
Rockwell Automation
1201 South Second Street, Milwaukee, WI 53204
P: 414-382-3241

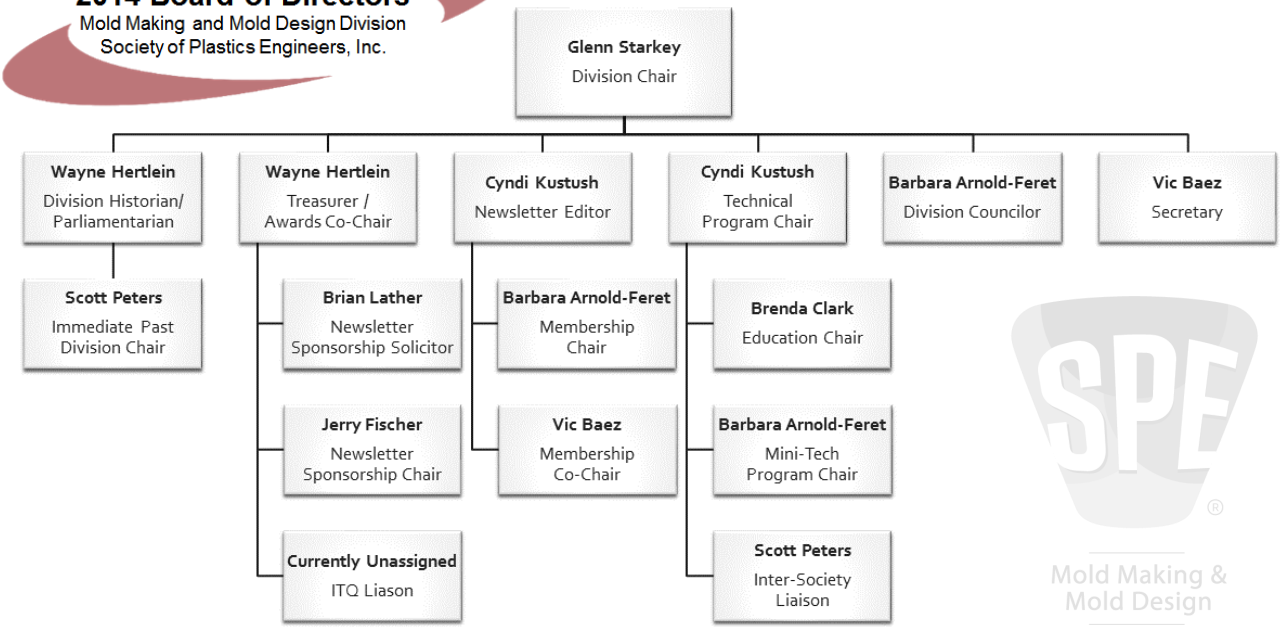
Public Interest Chair
Brian Lather
Husky Injection Molding Systems Inc.
288 North Road, Milton, VT 05468
P: 248-544-5016 | brian.lather@yahoo.com

Education Chair
Brenda Clark
270 Rutledge Road, Unit B, 28732 Fletcher Rd, NC
P: 828-650-2600 | BClark@hasco.com

*Note: ** Indicates Past Division Chair*

2014 Board of Directors

Mold Making and Mold Design Division
Society of Plastics Engineers, Inc.



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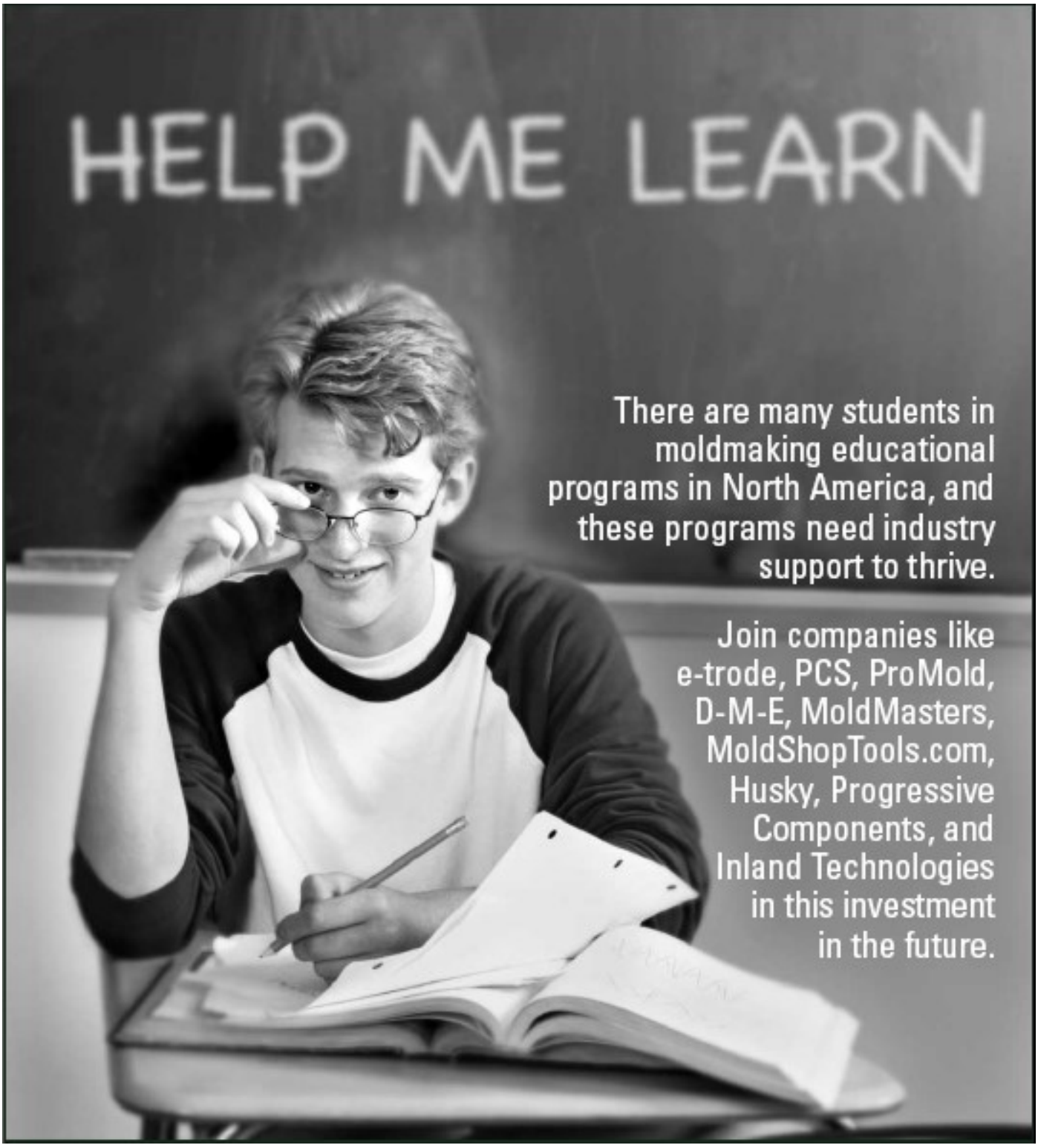
Mold Making & Mold Design



I.T. QUARNSTROM FOUNDATION

We are a non-profit working in cooperation with the SPE Mold Making and Mold Design Division. To become a sponsor, email us at info@itqfoundation or visit www.itqfoundation.org.

63 W. Breitmeyer Place | Mt. Clemens, Michigan 48043

Glenn Beall Awarded SPE's Excellence in Mentoring Award

During the 2014 ANTEC Awards Luncheon, SPE President, Jon Ratzlaff, surprised our Glenn Beall with the Society's EXCELLENCE IN MENTORING AWARD. This award recognizes a member's many years of advising, supporting, and encouraging less-experienced members as they pursue their and the Society's goals.

Glenn is a long-time member and a Past Chairman of SPE's Mold Making & Mold Design Division. Over the years he has mentored many newly elected members of our Board of Directors.

In accepting the award Glenn cited the long-lasting influence of George Ryan, an early mentor who advised him to join SPE, to attend the monthly Section meetings, and to get involved. Glenn said he did those things because George said to and that is the way things were done in those days.

He went on to say that it was never mentioned again, but George had to have been aware of the great opportunity he was providing. His recommendation made it possible for a young engineer buried deep inside a large corporation to break out and get to know and learn from, first the local SPE and the Chicago plastics industry, and later the National SPE and the whole national plastics industry.

Glenn believes that one recommendation had a profound effect on his career and quality of life.

"No man will ever make a great leader who wants to do it all by himself or to get all the credit for doing it."

Andrew Carnegie

SPE Mold Making and Mold Design Division February 21, 2014 Meeting Minutes

To: Board of Directors Mold Making and Mold Design Division SPE
From: Victor Baez – Secretary to the Board
Subject: Minutes of the Meeting of the Board of Directors on 21-Feburary-2014

The meeting was called to order by Division Chair – Scott Peters at 07:05 BJST (19:05 EDT US). Scott Peters Division Chair presided over the meeting while Victor Baez took the minutes as the Secretary. There were no representatives from SPE Headquarters present for the meeting.

The role was taken according to the leadership roster:

	Present	Absent		Present	Absent
Scott Peters	X		Brian Lather	X	
Fred Steil		X	Cyndi Kustush	X	
Bob Ellerman		X	Glenn Beall		X
Vic Baez	X		Glenn Starkey	X	
Wayne Hertlein	X		Brenda Clark		X
Barbara Arnold-Feret	X		Dick Cameron (guest)	X	
Jerry Fischer	X				

Minutes Review:
The minutes of the June 2nd meeting of the board were reviewed and approved by unanimous consent.
The minutes of the ANTEC Board meeting were again tabled for review at the next board meeting. The Secretary will make distribution to the board for review and comment prior to the next meeting.

Division Secretary Report – Victor Baez:
Barb motion, Wayne seconds, all approved previous BOD role changes from September 2013 email vote appointments.

Division Chair Report-Inter-Society Liaison Report – Scott Peters:
Submitted a written report for review by email to all BOD (see attached). Reviewed Cyndi's support for ANTEC, Joint session with the Injection Molding Division, Glenn's taking reign at ANTEC for next year Division Chair (Starting July 1, 2014).
Additionally it was announced that Barb will be stepping down as active council as her term is over. We need to replace her as this is a very important role – OUTSTANDING past support by Barb – thank you for the past 6 years.
Obtaining new members for the next BOD is everyone's job.
Dick Cameron – need youth on BOD so they can be trained while the veterans are still on BOD

Chair Elect Report – Glenn Starkey:
Must latch on to other industry events – organize key speakers is in our wheelhouse and can be applied to different events to help support joint partnerships in different venues.

Treasurers Report – Wayne Hertlein

Submitted a written report for review by email to all BOD.
ITQ Foundation: $39,947.47 (mostly in 5 year CD)
Checking balance: $48, 827.12
Investment accounts: $88,464.26 in 5 CD's (auto renewals)
MM & MD Division Net Worth: $117,265.85
Currently these CD's are making adequate and safely invested as is in current CD's.
Barb motioned to write $5000 appropriated by email balloting for SPI-Gardner Publications joint video project to come from general operating funds. Cyndi second, no discussion, all approved.

Technical Program Chair Report – Cyndi Kustush

April 29th keynote speaker set, papers are lined up. Report sent out on 2/12/2014 - Copy on request. Looks to be a great program, especially as combined with Injection Molding Division. March 1 price will go up $155 for conference fee. Book hotel and registration early – cut off date is 3/28/2014. Amerimold - SPE MM & MD will sponsor the Engineer Conference Program (Glenn and Cyndi driving) June 11, 2014 (1/2 day panel discussions) for good visibility of division. Western Moldmakers trade fair – initiate a conference program with their event. Gardner will sponsor by covering some costs. Barb questioned if this was same program that contacted us over a year ago? Scott acknowledge yes. This is a short 4 hr event with a similar conference program as the Amerimold program. Glenn and Cyndi are closely watching with SPI and Gardner team. Focus on a no-cost event for our division.

Division Councilor Report – Barbara Arnold-Feret

Submitted a written report for review by email to all BOD.
Top-Con policy change to make sure SPE headquarters gets fair cut and same standards are used for ALL SPE divisions / sections. Focus is on fairness. Headquarters cut to come out of gross – not really fair so needs to be relooked at. Dick Cameron – two other areas this new policy needs to address. (1) real dollars based on gross because use of resources which are scarce from headquarters, (2) new registration system is helping Top Cons instead of paying third party registration. Starts in June of 2014. Mini-Tec: no report at this time. North Texas section did a plant tour for 3D printing.

Sponsorship Chair Report – Jerry Fischer:

Collected $5165 for year so far, expect approx. $1975 more. Gained a new sponsor – see spread sheet sent out.

Newsletter Editor Report – Cyndi Kustush

Working with Tammy Alongi at Progressive to have set up and ready by end of the month. Hats off to Glenn and Cyndi.

Intersociety Liaison Report – Scott Peters:

Scott – a copy of report was sent out. Speakers and focus for publishing ANTEC release shown

Membership Chair – Barbara Arnold-Feret:

Automated membership report working much better – real time reporting.

Membership – push for new, young blood. SPE LinkedIn well over 20,000 members but no revenue. E-memberships? TBD.

Awards Chair Report – Wayne Hertlein:

Mold Maker (Manfred Hoffman) and Mold Designer (Steve Johnson) of the year – one nomination for each.

Wayne will distribute for vote.

Wayne will make certificates for ANTEC speakers (use new SPE logo)

Education Chair Report – Brenda Clark:

No new report. We have money, need programs to support.

Need to bring in schools and universities.

Old Business:

There was no old business to review at this meeting.

New Business:

ANTEC BOD division BOD meeting, April meeting will have Glenn chair for Scott due to time zone difference. Board to pay for meal for attendees. Need candidates for division counselor – need candidates and election by division members. Send candidates to Vic for collection and notice (Bio's). Barb will help support process and on-boarding.

Motion to adjourn by Glenn, second by Barb. The meeting adjourned at 09:30 AM BJST (21:30 EDT US).

Respectfully submitted,

Victor C. Baez, Secretary to the Board Division Chair

"A good leader is not the person who does things right, but the person who finds the right things to do.."

Anthony T. Dadavano

Industry Event Calendar Listing

Flexible Packaging Conference
October 19-22—Myrtle Beach, SC

Vinyltec
October 20-22—Indianapolis, IN

Fundamentals of Blow Molding
October 20-21—Decatur, AL

eLive: Injection Molding 3-Part Series
Oct. 22, 25 & Nov. 5—Webinar

IPF Japan 2014
Oct 28 - Nov. 1—Tokyo, Japan

MD&M Minneapolis
October 29 – 30—Minneapolis, MN

Pack Expo 2014
November 02 – 05—Chicago, IL

VietnamPlas 2014
Nov. 5-8—Ho Chi Minh City, Vietnam

Medical Plastics Minitec
November 6—Philadelphia, PA

Mike Koebel Western Moldmakers Trade Fair & Conference
November 11—Pomona, CA

PLASTIMAGEN
November 18-21—Mexico City

Expoplast 2014
November 19-20—Montreal, Quebec

SPE ASEAN Section Seminar
November 21—SIM University

Euromold 2014
November 25 – 28—Frankfurt, Germany

Plast Eurasia
December 4-7—Istanbul, Turkey

SPE Mold Making and Mold Design Division April 29, 2014 Meeting Minutes

To: Board of Directors Mold Making and Mold Design Division SPE
From: Victor Baez – Secretary to the Board
Subject: Minutes of the Meeting of the Board of Directors on 29-April-2014

The meeting was called to order by Division Chair – Scott Peters at 08:00 BJST (20:05 EDT US). Scott Peters Division Chair presided over the meeting - Victor Baez took the recorded minutes as the Secretary. There were no representatives from SPE Headquarters present for the meeting.

The role was taken according to the leadership roster:

	Present	Absent		Present	Absent
Scott Peters	X		**Brian Lather**	X	
Glenn Starkey	X		**Cyndi Kustush**	X	
Wayne Hertlein	X		**Brenda Clark**	X	
Vic Baez		X	**Christine Fuges (BOD elect)**	X	
Jerry Fischer	X		**Rita Baranowski (BOD elect)**	X	
Barbara Arnold-Feret	X		**Claire Goldsberry (BOD elect)**		X
			Pete Kambouris (BOD elect)		X

Minutes Review:
The minutes of the February 2014 Board meeting were tabled for review at the next board meeting. The Secretary will make distribution to the board for review and comment prior to the next meeting.

Division Secretary Report – Victor Baez:
Recorded minutes to be distributed after ANTEC

Division Chair Report-Inter-Society Liaison Report – Scott Peters:
Scott provided general introductions of BOD including newly elected members: Christina Fuges, Claire Goldsberry, Pete Kambouris, Rita Baranowski.
General report from Scott on history of division. Will send us notes along with his report for review.

Chair Elect Report – Glenn Starkey:
Inspiration from MAPP – Troy Nix, and other industry leaders. No real voice from injection mold builders.
Form a group through our division to attach to other events and add additional support through integration in their events (Navy Seal team so to speak of heavy hitter speakers).
Do this through RE-TEC, MINI-TEC, TPC, and plant tour type events where technical minded individuals can see and share a value of the industry.

Treasurers Report – Wayne Hertlein:

Submitted a written report for review by email to all BOD.
ITQ Foundation: $38,954.52 (mostly in 5 year CD)
Checking balance: $43,822.12 (+ $699.38 rebate check to be deposited)
Investment accounts: $88,464.26 in 5 CD's (auto renewals)
MM & MD Division Net Worth: $132,286.24
Currently these CD's are making adequate income and are safely invested as is in current CD's. Barb motioned to write $5000 appropriated by email balloting for SPI-Gardner Publications joint video project to come from general operating funds. Cyndi second, no discussion, all approved. Wayne suggested that we get a second signing authority to safe guard monies. Glenn should be a signer as Division Chair.

Mini Tech Report – Barbara Arnold-Feret:

Presented by Cyndi: Good support from MM & MD BOD to support Amerimold. Speakers lined up and presentations prepped to go. Four sessions. Looking for support in the SPE booth at Amerimold. Mold Maker and Mold Designer of the year awards will be presented. Scott to send out reminder to recipients to be informed of nomination and receipt of this award. Not a lot has been done with the Mike Koebel Western Mold Maker Trade Fair yet (soon).

TPC Report – Cyndi Kustush:

At ANTEC – all speakers lined up for joint session (Injection Molding Division). Pretty much under control.

Division Councilor Report – Barbara Arnold-Feret:

Submitted a written report for review by email to all BOD. Scott reviewed Barb's report – thankless job at times, we owe Barb a debt of gratitude. Note: SPE still has outstanding debt of $385,000 (still over 2 yrs away from closing out). Membership update: branding focus to combine all SPE websites onto SPE main one – this will cost each website owner considerable money ($5000 +). No impact to the division yet but may as it controls content in the future.

Membership Chair – Barbara Arnold-Feret:

Report emailed to Scott to read – membership as of April was 835 with 11 new members. All BOD members can access intranet and pull down reports.

Sponsorship Chair Report – Jerry Fischer:

Jerry emailed report to BOD. Collected $5790 for year so far. Husky submitted their art work and will be getting free ½ page ad (from amerimold) for the next year. Dates for newsletter are important to sponsors so please keep on track. Jerry is happy to pass the baton – need new blood to support this with Jerry as reference.

Newsletter Sponsorship Report – Cyndi Kustush:

Working with Tammy Alongi at Progressive to have set up and ready soon to be out in June as scheduled. Please send Cyndi any material that you want included, including committee chair reports, etc. by end of May.

Intersociety Liaison Report – Scott Peters:

Scott – a copy of report was sent out. Dave from NTMA (regional group in Akron, OH) and Jim from NIMS (metal working skills training) all help to keep us posted on industry activity. NIMS has a robust skills based apprenticeship (with testing) program.

Awards Chair Report – Wayne Hertlein:

Wayne will make certificates for ANTEC speakers (use new SPE logo) – all ordered and shipped to Cyndi at ANTEC. Mold Maker and Mold Design awards will be brought to Amerimold by Wayne. Will be using custom made certificates for presenters with nice velvet bag for transport. Wayne will send a picture out to BOD to see what they look like.

Education Chair Report – Brenda Clark:

As we receive requests from universities we review and also help to get "in-kind" support from our industry contacts. We need to re-initiate (locate) our request from and establish a list of schools that we contribute. Email contact with grant form could be sent out. Wayne to find existing form for review. ITQ should be working very closely with this Education Chair. They raise the money, MM & MD release the money. SPI / Gardner video is under way. Christina helping on but video has been pushed back till August due to NYPRO and video schedule coordination. Education essay paper discussion reviewed based on past support of this. Brenda to look into and report back.

Old Business:

There was no old business to review at this meeting.

New Business:

Minutes are behind. Vic has been distracted but will follow up on the recordings for distribute. Scott has taped meeting for transcribing and submitting. Glenn will review if separate committee report is needed. Glenn is looking forward to tapping into the technical knowledge of our division and leveraging it for new ideas and growth. Glenn discussed the idea of changing the division name and logo. Need to look into any resistance but response so far has been positive. Want to expand focus beyond mold makers – more inclusive to attract new members. Mold Technology Division (MTD) or Plastic Tooling Division? Glenn to work on any legal issues or obstructions with International SPE. Glenn to forward email string discussion to BOD for review and vote in the new year. Scott mentioned possible name conflict with MTD tool shop and lawn mowers. Need to update current BOD roster. Scott to send to Glenn and Cyndi for updates.

Motion to adjourn by Glenn, second by Wayne. The meeting adjourned at 09:09 AM BJST (21:09 EDT US).

Respectfully submitted,
Victor C. Baez, Secretary to the Board, Division Chair

AMBA Announces Mold Builder and Chapter of the Year Award Recipients

The American Mold Builders Association (AMBA), Rolling Meadows, IL, proudly presented Don Snow, CS Tool Engineering, Inc., Cedar Springs, MI, with the 2014 Mold Builder of the Year Award during the AMBA's Annual Conference, May 14-16, 2014, in Milwaukee, WI. The Chapter of the Year Award went to AMBA's West Michigan Chapter. The awards, sponsored by Progressive Components, include a $5,000 endowment to each for continuing education in moldmaking, to be presented to the educational institution of the recipient's choice.

During the awards ceremony, Don Snow was recognized for his long-term commitment to the industry, to the AMBA and to the development of an in-house apprenticeship program, in which he takes an active part in conducting training sessions. Working with Ferris State University, the Kent Career Technical Center, Grand Rapids Community College and the Whitehall Township Tooling Coalition, Snow continues to promote the industry and keep the training facilities aware of the need for skilled workers. He also has worked extensively with the Michigan Economic Development Committee to create more advertising for the tool and die trade on the state's own website.

AMBA's West Michigan Chapter was commended for its promotion of education through strong scholarship programs – awarding $15,000 in scholarships to talented students in 2013 and $16,000 in 2014. Chapter members continue to invest in the future by hiring new apprentices, improving their apprenticeship programs and investing in technology. In the past year, members collectively hired more than 33 new apprentices. Additionally, the chapter recently approved a Tooling for Apprentice's Program (TAP), which will give current member apprentices the opportunity to apply for a gift card drawing, used exclusively to purchase precision tools that will last a lifetime in the hands of a moldmaker.

2014 Chapter of the year…
Western Michigan AMBA Chapter

2014 AMBA Mold Builder of the Year—Don Snow, CS Tool Engineering and his wife, pictured with Glenn Starkey and Cynthia Kustush of Progressive Components.

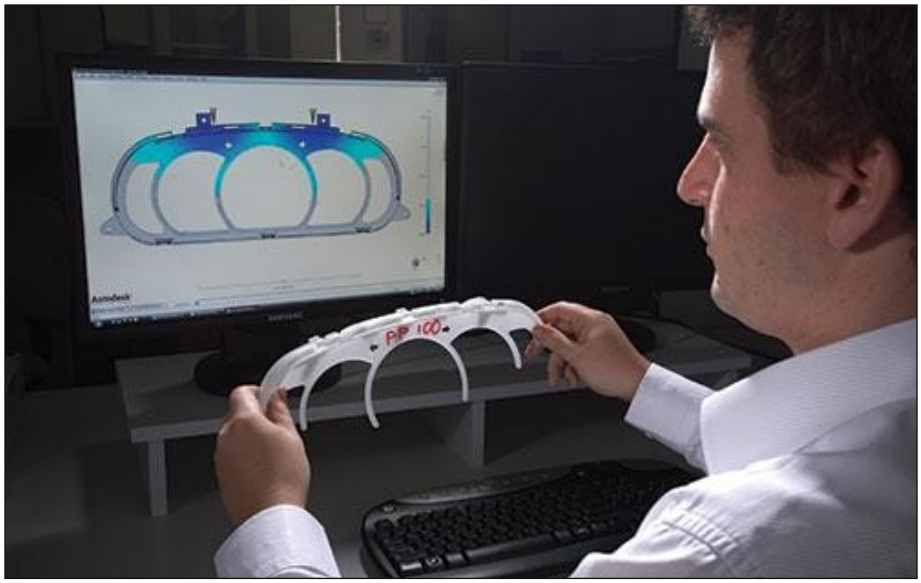
For more details on the AMBA Mold Builder of the Year and Chapter of the Year Awards, call the American Mold Builders Association at 847.222.9402. Additional information also will be provided in the summer issue of *The American Mold Builder* and on the AMBA website at www.amba.org.

Sharing Best Practices

Benchmark Your Injection Molding Simulation

Use benchmarking to gain confidence in your modeling, material and simulation capability, then use the simulation results to guide future design.

The use of CAE for injection molding simulation has progressed from flow-front prediction in the late '70s to full simulation of the injection molding process, its variants and associated processes. Injection molding simulation benchmarking is the comparison of predicted and actual process parameters. Typically, an extensive study is carried out on a mold, machine and material combination, where filling pattern, injection pressures and part warpage are reviewed. Best practice requires that the inputs and outputs from an injection molding simulation agree as closely as possible to the actual conditions of a real-life molding machine.



Comparing physical testing with digital simulation. An important reason for benchmarking is to confirm simulation results when users are first introduced to injection molding simulation applications. Images courtesy of Autodesk.

Injection molding is continually demanding more from designers, as mold design changes after the mold is already built are expensive. Injection molding simulation is cost-effective compared to manufacturing physical prototypes and offers great benefits to those using it early in the manufacturing process.

Simulation of injection molding has a higher return on investment than simulation of other plastic manufacturing processes. The objective of benchmarking is to gain confidence and experience in modeling, material and simulation capability, and to then use simulation results to guide future design. An important reason for benchmarking is to confirm simulation results when users are first introduced to injection molding simulation applications.

Simulation Accuracy

The accuracy of injection molding simulation is influenced by many factors. For example, predicted filling patterns, the location of weld lines and hesitation marks. Modeling of wall thickness is important and needs to include changes made towards the end of the design cycle. If it does not, the CAD model used as a basis for the simulation model may differ significantly from the actual mold.

Predicting the pressure required to fill a mold (assisting with machine selection)

requires modeling of the runner, sprue and gating design. In addition, if simulated injection pressure is compared to a measured nozzle pressure, then the pressure drop in the nozzle and the contraction into the nozzle tip must be accounted for. This can be done either by including the nozzle body and contraction in the simulation model (assigning a property similar to hot runners) or by performing an air-shot experiment. In an air-shot experiment, the molding machine injection unit is retracted away from the mold and an injection shot is performed at typical injection speed, but with polymer extruding freely out of the nozzle tip rather than flowing into the sprue or hot runner.

Material testing lab. Best practice requires that the inputs and outputs from an injection molding simulation agree as closely as possible to the actual conditions of a real-life molding machine.

Predicting the ejected part's final warped shape requires an accurate reflection of the process settings in the simulation: in particular, packing time and packing pressure (or pressure profile), cooling time, and any relative difference in coolant temperatures. These factors have a strong influence on shrinkage and warpage. The discretization of the geometry into finite difference grids, finite elements or finite volume cells also plays a key role in simulation accuracy. The mesh size must also be considered with respect to the type of numerical solution being used.

Simulation inaccuracies can arise due to errors in:

- Software: incorrect coding of a mathematical expression and/or its associated boundary conditions.
- Geometry: the real part is not reflected in the import of geometry and the subsequent discretization used to define the computational domain.
- Material data: inappropriate data for the materials used to produce the part.
- Input data: processing conditions used in the simulation differ from those used in the manufacturing process.
- Post processing: manipulation of calculated data for post processing.
- Experimental data: poor experimental technique, poor instrumentation or transducers.

Experimental Accuracy

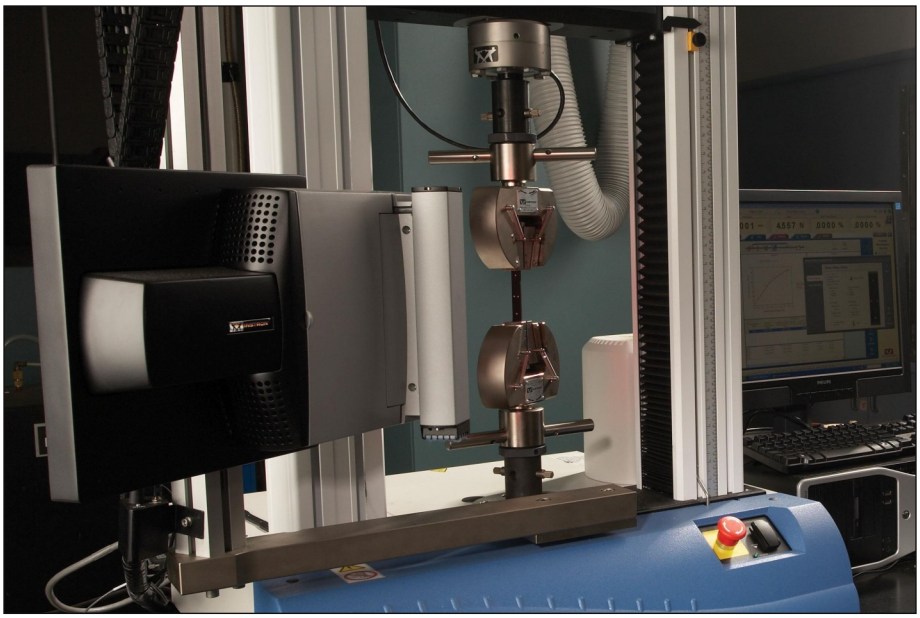
Molding machines are continually advancing, and a wide range of machines is available. It is important to understand both injection molding machine fundamentals and the actual machine being used, including its capability, screw movements, check-ring valve performance, material preparation (drying), nozzle pressure (or hydraulic injection pressure multiplied by the screw intensification ratio) or cavity pressure, shot-to-shot variations, venting, sensor types, and reliability.

To help detect machine problems, movement and check-ring valve performance, process monitoring, and machine performance should always be reviewed prior to the start of a benchmark. Material drying can cause process stability issues and melt viscosity differences. The ideal relationship between nozzle melt pressure and hydraulic injection pressure is the ratio of piston to screw area. This is referred to as the screw intensification ratio or gain, and is typically equal to 10. It may vary

considerably depending on screw and piston geometries, however. The apparent screw intensification ratio also may vary due to temperature changes compressing the hydraulic oil, frictional effects between the screw and barrel, and the influence of polymer melt compressibility during the filling process.

Benchmarking

Injection molding simulation bench-marking requires an appreciation of simulation technology and knowledge of the assumptions made in the simulation:



This lab is fully equipped to mold and machine mechanical plaques for the manufacture of tensile test samples. It has made measured mechanical data more readily available through the use of both optical (for longitudinal direction) and contact extensometers (for transverse and thickness directions).

Filling inputs. The most important input that influences filling pattern is mold geometry, so an accurate representation is essential. The most important influences on injection pressure are geometry, switch-over from velocity- to pressure-control stages, material viscosity and injection speed (profile or constant).

Geometry. Time is often spent analyzing the results of simulation of an intricate feature only to find that the feature was not modeled correctly. An actual molded part should be reviewed for obvious errors. Tool life also should be considered, since several modifications may have been made. The model used for the injection molding simulation may be from the part design, so the moldmaker's shrinkage allowance will not be included in any dimensions. Nozzle, runner and gate geometries also are not always included in a simulation model, and these features can have a considerable effect on simulation results, particularly pressure to fill.

Velocity to pressure control transfer. Switch-over from velocity to pressure control is set by screw position or time. The full geometry must be modeled accurately or percent volume filled or automatic options selected. Molding simulation often uses the latter, so it is essential to verify that this is a reasonable approximation of the molding machine's settings.

Viscosity. When a material is not present in the materials database, it is common practice to choose a material with a similar melt flow index (MFI) or viscosity, from the same polymer family, with similar filler levels, or from the same manufact-urer. A 10-percent difference in filler weight can be expected to yield a 10-percent difference in pressure prediction. However, as much as a 40-percent difference in pressure can be expected with material data from a different manufacturer, because viscosity is also indirectly affected by the material's thermal properties.

Injection velocity. The correct injection velocity (flow rate profile) also is important. The flow rate used in the simulation can be determined from readings on two cavity pressure sensors. The difference in position between the sensors and the difference in time for the flow to reach each of the

sensors is used to determine an injection speed for the simulation. However, injection speed calculated in this way will show poor agreement with measured pressures.

Packing/holding pressure. There are many built-in features to ease injection molding simulation, such as a default automatic packing/holding pressure profile that uses 80 percent of the maximum injection pressure for 10 seconds. The actual pressure profile is often overlooked.

Summary

Benchmarking of injection molding simulation requires a systematic approach to eliminating problems after comparing simulation with molding practice. Therefore, when comparing simulation results to those obtained on the molding machine, it's essential to pay attention to the factors that may cause errors: machine capabilities and response time; material preparation, characterization and stability; measurement methods (pressure or deflection); geometry inaccuracies; process setting variations; and inputs to simulation software.

Even without perfect agreement, simulation can provide great insight into performance sensitivities to process, geometry and material that can then be used by engineers to improve product design and process settings for actual production.

**This article reprinted with permission from MoldMaking Technology August 2014 Issue.*

Tomorrow's Toolmaker

Tapping into Talent

Seven North Carolina manufacturers—including one moldmaker—hope to build their future workforces through European-style apprenticeships.

As this article began to take shape, Superior Tooling opened its doors to six local high school students who could very well be the first in a long line of prospective new hires. For a few days after school during the week of March 17, these kids had the opportunity to experience the moldmaking trade firsthand. Closely monitored by Superior's most seasoned personnel, these sessions weren't just about spreading the gospel of manufacturing. Much of that work had already been done. By that point, these kids had expressed serious interest in building a long-term career by working with their hands, as had a number of others who didn't make it that far. At best, only two of the six will get a chance to pursue that opportunity this summer, and they'll still have a long way to go before the shop's potentially substantial investment in their training pays off.

A few of Superior Tooling's prospective apprentices get an introduction to turning from Jay Fuhr, shop manager (left), and Zac Segar, director of manufacturing operations at CaptiveAire (second from left). CaptiveAire is a fellow NCTAP partner that hosted the same students later in their orientation week. Offering students options as to where to pursue their careers is among the key strengths of NCTAP, says Vice Chairman Kent Misegades. Images courtesy of Superior Tooling Inc.

Nonetheless, company President Robbie Earnhardt says he is convinced that the time and cost will be more than worth it. After all, the organization that attracted the students in the first place, the North Carolina Triangle Apprenticeship Program (NCTAP), is based on a proven model that has been delivering results in another portion of that state for nearly 20 years. That model, in turn, traces its roots to places like Germany and Switzerland, where apprenticeship has played an outsized role in ensuring a bountiful pool of skilled labor since the Middle Ages.

Earnhardt also believes in the program for a more personal reason: He got his own start as a teenaged apprentice in a small job shop. Like many of the aspiring NCTAP students, he'd decided a four-year university degree just wasn't for him. Apprenticeship provided a viable, alternative outlet for launching a successful career, one that would eventually lead him to found Superior Tooling in Wake Forest, N.C., in 1985. He fully expects NCTAP to provide a similar outlet for local students today. However, he says their experience will be much different from his own—and potentially much more rewarding.

Two of the six local students invited to orientation week at Superior Tooling test their basic measurement skills with calipers.

A Proven Model

That's primarily because NCTAP offers something Earnhardt's own apprenticeship lacked: structure. Beginning this fall, the two high school seniors whom Superior Tooling expects to formally accept as apprentices will split their time between the classroom and paid work at the shop, just as he did as a teenager. The difference is that these students' training won't be limited to the shop floor, nor to skills specific to mold-making. After graduating high school, they'll continue their formal education at Wake Technical Community College. For the next three years, they'll spend one day a week taking courses in electronics, hydraulics and other general disciplines. On the other four weekdays, they'll be at the shop following a pre-set training plan with measurable outcomes—a stark contrast to the informal mentoring that characterized Earnhardt's experience.

The principle players of NCTAP began to come together in early 2013, says Vice Chairman Kent Misegades. That's a quick start for a program as involved as this one, he says. However, he's quick to emphasize that much of the groundwork had already been laid. For that, he credits Apprenticeship 2000, a similar initiative that has been providing European-style apprenticeships combining practical and classroom education since 1996. Since then, this Charlotte-area program has graduated 72.5 percent of its apprentices, says Walter Siegenthaler, co-founder. In contrast, the University of North Carolina's 16 campuses had a four-year graduation rate of 40.4 percent in 2008, according to the university's website. Given the relative success rate of Apprenticeship 2000, Misegades says the initiative provided an ideal model to replicate in the Triangle Region (the area bounded by Raleigh, Durham and Chapel Hill).

A Selective Selection Process

Apprenticeship 2000 continues to serve in an advisory capacity as NCTAP program members prepare to take on their first apprentices. The selection process started late last year, when representatives from Superior Tooling and the seven other NCTAP partners hosted a complimentary luncheon to explain the benefits of apprenticeship to local high school guidance counselors. More than 20 schools expressed interest and invited the partners to visit and spread the word directly to their students. Shortly thereafter, a select group of 50 students and their parents toured partners' facilities for a first-hand look at operations ranging from manufacturing of industrial kitchen equipment to automation systems integration.

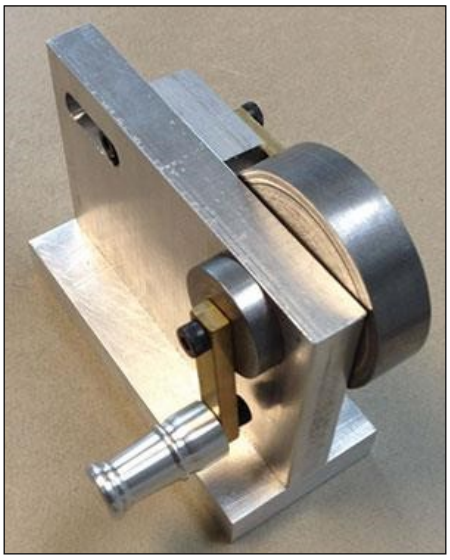
The next phase began in March, when partners invited about half of those 50 students to attend a week of hands-on, after-school orientation sessions at the company of their choosing. With only serious candidates remaining at that point, the industry partners could begin evaluating prospects based on aptitude rather than just interest. For example, the six students attending Superior Tooling's orientation completed a test project involving basic machining, inspection and assembly skills. Based on their performance, ability to follow directions, enthusiasm, general comfort level with the work and other factors, Earnhardt says he and his team plan to offer summer internships to two of these students. Those three months of paid, full-time work provide a final opportunity for evaluation before formally accepting the students as apprentices this fall—an outcome that is by no means guaranteed.

Still, Misegades says he doesn't expect any of the partners to reject all candidates. For one, these companies understand that new, inexperienced hires can't start adding value immediately. The four-year-long NCTAP program reflects that reality. Furthermore, stringent application requirements limit participation in NCTAP to only the best and brightest. Prospective apprentices must have a minimum 2.8 GPA and have completed a certain level of math instruction. Courses in physics and foreign language are also highly encouraged. Such requirements boost partners' confidence that the roughly $150,000 investment in each apprentices' salary and tuition will be worth it. "This is a program for mature, highly motivated young people," he says. "It's just as hard to get into as any engineering school."

In the second year after formal acceptance into the program, apprentices will take the first courses in Wake Tech's new mechatronics curriculum. With the community college taking care of the basic knowledge needed to succeed in any manufacturing career, the NCTAP partners can focus solely on imparting job-specific skills. Misegades notes that the college adopted this new curriculum in part due to prompting from NCTAP. As was the case for Apprenticeship 2000 (which uses a similar curriculum), the seven NCTAP companies' combined demand for fresh talent lent the group much more influence in this respect than any single partner could have mustered by itself.

A Win-Win Scenario

In all, this rigorous, four-year program amounts to 8,000 hours of combined classroom and shopfloor instruction for each student. Yet the apprentices reap a substantial reward for their efforts. They graduate from Wake Tech with an associate's degree in mechatronics engineering (which can serve as a start on a four-year degree later, if they choose to pursue one); an apprenticeship certification from the North Carolina Department of Commerce and U.S. Department of Labor; and a guaranteed job—all without spending a dime or incurring any debt. Not to mention that by the end of the process they'll have collected four years of both real-world experience and competitive pay.



The students also had to complete a "project" to test their aptitude for machining, assembly and other work.

Of course, the NCTAP partners get a bargain as well. "We need new hires who are smart, trainable, mechanically minded and interested in working with their hands," Earnhardt says. "I think that describes a lot of kids out there who don't necessarily want to go to a four-year college or can't afford to. Many of them haven't been exposed to anything like this."

This article reprinted with permission from MoldMaking Technology May 2014 Issue.

"No institution can possibly survive if it needs geniuses or supermen to manage it. It must be organized in such a way as to be able to get along under a leadership composed of average human beings."

Peter Drucker

Can Mold Manufacturers Benefit from 3D Printing:
Incorporation of Additive Process in a Subtractive World

By Clare Goldsberry, owner ProWrite Communications and Contributing Editor for PlasticsToday.com

The week of June 9 this summer was a busy one. The first two days of that week I attended RAPID 2014, always an exciting event filled with the most amazing innovations and technology in the 'Brave New World' of 3D printing, aka Additive Manufacturing (AM). While I have rarely seen many mold makers attending this event, this year I noticed from reading badges, that there were quite a few walking the show floor. And they were wise to do so.

While there are a few mold manufacturing companies that have adopted 3D printing to broaden the scope of their value-add offerings, the mold making industry as a whole has failed to embrace AM as a significant component of their business model. I have never really under-stood this reluctance to adopt 3D technology, except that mold makers are used to the subtractive process, and somehow the additive process just doesn't seem to fit.

That may be changing however. At this year's RAPID, I was absolutely enamored with the new "hybrid" machines: multi-axis CNC milling machines with built-in 3D printing capability. Basically this means you can add and subtract in the same machine. This hybridizing of CNC machines might bring new appeal for AM technology to mold manufacturers, while offering opportunities to provide better solutions for their customers.

"This hybridizing of CNC machines might bring new appeal for AM technology to mold manufacturers, while offering opportunities to provide better solutions for their customers.

In 2012, Jason Jones and Peter Coates co-founded Hybrid Manufacturing Technologies from a collaborative R&D project in the UK. In a paper they published that year about the hybrid CNC/AM machine technology, they acknowledged that "CNC milling has largely been a spectator on the sidelines to the advancements of AM in metals during the last decade."

However, according to Jones, "the two processes aren't mutually exclusive and hybridizing leverages the synergies of both technologies in optimal proportions as needed." These CNC milling machines equipped with laser cladding capabilities offer a number of benefits including:

- High-value part repair, refurbishment and modifications
- In-process finishing of metal AM parts
- "Interweaving material deposition and milling enables the creation of unique hybrid parts which are not achievable using either technology independently."

Hybrid Manufacturing Technologies has developed an award-winning patent pending series of docking systems and heads which allow CNC machines (and robotic platforms) to use non-traditional processing heads in the spindle and conveniently change between them. "Change-over is completely automated and only takes 10-25 seconds, Jones claims. "Changing from adding metal to cutting it simply requires a tool change." [see a video of the process by visiting www.hybridmanutech.com]

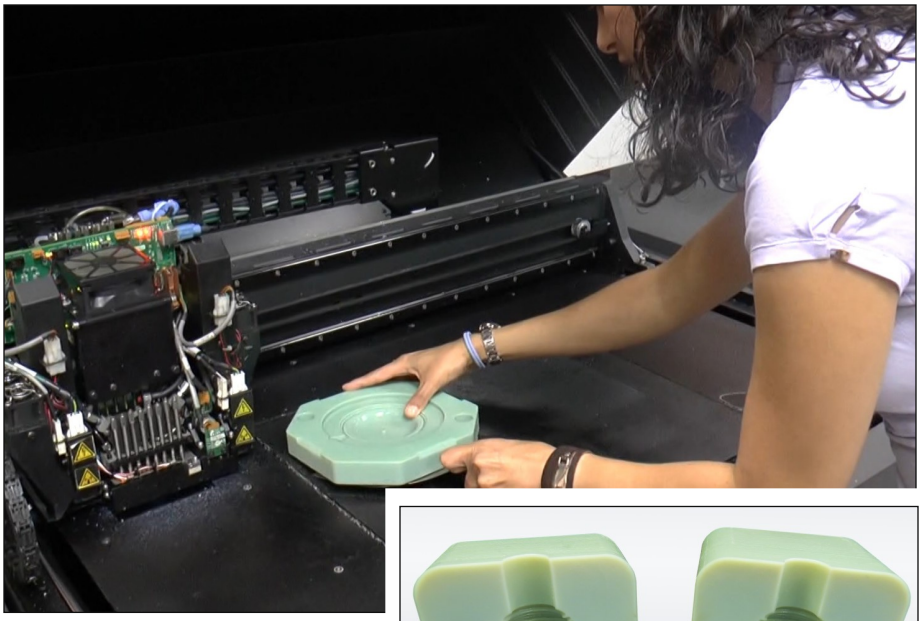
However, that's not the only company combining subtractive and additive processes. DMG Mori (www.dmgmori.com) has its LaserTec 65 which uses a 5-axis milling platform with laser cladding for bulk deposition of material. This offers increased

throughput, and like near-net machining. Optomec's LENS® Print Engine (www.optomec.com) provides an "industry proven metal 3D printing technology in a modular form." It's available for integration with other metal-working platforms such as mills, lathes, robots, etc. That means if you own a 4- or 5-axis milling machine you can buy the laser cladding tool, so that metal deposition and machining can be performed in the same system.

Will AM become an increasingly disruptive technology for mold making? That's a possibility given that the drive forward in 3D printing is for faster printing (for production that can truly compete with injection molding), higher quality (especially in the area of metal printing that requires secondary operations to improve the finish), and large build beds to accommodate large-part production.

Additionally, materials development is coming on strong. Both ExOne (www.exone.com) and ARCAM (www.arcam.com) have developed Inconel: ARCAM's Inconel 718 was developed for Electron Beam Melting; ExOne's Inconel 625 has a 99% density, making it ideal for end-use parts.

It's not just end-use parts that – in both metal and plastics – that are coming on strong. For a number of years, AM service bureaus have been experimenting with creating mold cores and cavities from which to injection mold parts. Stratasys has developed an ABS material from which some OEMs are actually 3D printing cores and cavities, then molding parts – in some cases up to 100 parts depending on the type of polymer used.



Pictured above is a 3D printed injection mold for a diaphragm being removed from the Stratasys Objet350 Connex Multi-material 3D Printer. To the right is a 3D printed prototype.

Direct Metal Laser Sintering (DMLS) from EOS (www.eos.info) and Selective Laser Melting (SLM) are making headway, not only in production parts for end-use applications but also in core/cavity builds as well. With finishing operations, they can get some really good surfaces on these for higher quality parts.

Warning: Many OEMs were walking the floor at RAPID and their interest in 3D printing is high. Ford has already installed a 3D printing laboratory for making prototype parts and more. They are looking to reduce their development costs, which could result in a reduction in front-end prototype tooling or bridge tooling.

So, AM will only be disruptive if mold makers allow it. You can use this innovative technology to expand your business model and create new opportunities for your company, or you can ignore it at the cost of new-business opportunities.

"Effective leadership is putting first things first. Effective management is discipline, carrying it out."

Stephen R. Covey

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Mold Making & Mold Design

Division of Society of Plastics Engineers

Volume 36, Issue 2, Summer/Fall 2014

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Mold Making & Mold Design

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