A PUBLICATION OF THE AUTOMOTIVE DIVISION OF THE SOCIETY OF PLASTICS ENGINEERS

SPE AUTOMOTIVE

Automotive Plastics NEWS

MARCH 2016
VOLUME 45, ISSUE 3

2016 ACCE Update

Innovations in Automotive Composites: from Motor City to the World

Work is well underway for the 2016 SPE Automotive Composites Conference & Exhibition (ACCE). This year's show returns **September 7-9, 2016** to **The Diamond Banquet & Conference Center at the Suburban Collection Showplace** in Novi, Mich. in the Detroit area. Now in its sixteenth year, the ACCE is the *world's leading forum for automotive composites* and draws over 1,000 exhibitors, speakers, and attendees from 15 countries on five continents to the Detroit area, inspiring organizers to select this year's theme of "*Innovations in Automotive Composites: from Motor City to the World.*"

"Based on the continued growth of the SPE ACCE, it's an exciting time to be involved in automotive composites," notes 2016 SPE ACCE event chair, Rani Richardson, composites & additive manufacturing business experience consultant, Dassault Systèmes. "With less than a decade to go before really challenging emissions and fuel-economy standards kick in for automakers in some of the world's largest economies, the pressure's on to take mass as well as cost out of vehicles without compromising safety, functionality, aesthetics, and customer satisfaction. The ACCE is a great place to discover many of the innovations driving these changes and to network with those passionate about transportation composites."

Continued on Page 4

16th-Annual

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AUTOMOTIVE DIVISION MEETING SCHEDULE & SPECIAL EVENTS CALENDAR

SPE® AUTOMOTIVE

1st-Annual SPE Shanghai TPO Conference
Shanghai Marriott City Centre — ALL DAY
Shanghai, China — March 22-24, 2016

SPE Auto. Div. Board Meeting
American Chemistry Council - Auto. Ctr. — 5:30 - 7:30 p.m.
Troy, MI USA — April 11, 2016

11th-Annual SPE Automotive Engineering Plastics Conference (AutoEPCON)
Detroit-Troy Marriott — ALL DAY
Troy, MI USA — May 10, 2016

SPE ANTEC
JW Marriott Indianapolis — ALL DAY
Indianapolis, IN, USA — May 23-25, 2016

SPE Auto. Div. Board Meeting
American Chemistry Council - Auto. Ctr. — 5:30 - 7:30 p.m.
Troy, MI USA — June 13, 2016

SPE Auto. Div. Golf Outing
Fieldstone Golf Club — ALL DAY
Auburn Hills, MI USA — September 6, 2016

16th-Annual SPE Automotive Composites Conference & Exhibition (ACCE)
The Diamond Banquet & Conference Center
at the Suburban Collection Showplace — ALL DAY
Novi, MI USA — September 7-9, 2016

First Round - Automotive Innovation Awards Judging
Celanese Corp. — 8:00 a.m.- 5:00 p.m.
Auburn Hills, MI USA — September 29-30, 2016

18th-Annual SPE TPO Automotive Engineered Polyolefins Conference (TPO)
Detroit-Troy Marriott — ALL DAY
Troy, MI USA — October 2-5, 2016

Second Round / Blue Ribbon - Automotive Innovation Awards Judging
Celanese Corp. — 8:00 a.m.- 5:00 p.m.
Auburn Hills, MI USA — October 10, 2016

46th-Annual SPE Automotive Innovation Awards Gala
Burton Manor — 5:00-11:00 p.m.
Livonia, MI USA — November 9, 2016

Automotive Division Board of Directors meetings are open to all SPE members. All events are listed on our website at http: speautomotive.com/ec
EMail Steven VanLoozen at auto-div-chair@speautomotive.com for more information.

CHAIR'S MESSAGE

by Steven VanLoozen, SPE Automotive Division Chair

I would like to first thank everyone reading this for their ongoing support for SPE. Our industry is certainly in an extremely dynamic period of change and SPE continues to work to adapt to the changes. None of this would be possible without the support of our loyal members and contributors.

One of the key contributors over the past 23 years as a member of the Automotive Division Board has been Mr. David Reed. It is my privilege to announce that Dave was nominated and unanimously voted in as a Director *Emeritus* at our February 8, 2016 board meeting. Congratulations Dave.

This year's AutoEPCON returns to the Troy Marriott in Troy, Michigan, USA in the Detroit area on May 10, 2016. We have an excellent line up of keynote speakers from FCA US LLC and General Motors Co. There are still a few openings left for presentations. If interested in giving a 30-minute speech on some engineering thermoplastic topic, please submit abstracts as soon as possible to Sandra McClelland (sandra.mcclelland@solvay.com). Abstracts are due March 1, 2016. Final presentations are due on April 8, 2016.

The 16th-annual ACCE will be held September 7-9, 2016 in Novi, Michigan, USA in the Detroit area. This is an excellent opportunity to see the most recent automotive applications utilizing polymer composites and hybrid composite/metal constructions. SPE's Automotive and Composites Divisions co-organize this event, which is widely considered the world's leading automotive composites forum. The call for papers has been issued and abstracts are due March 31, 2016 (see details in ACCE cover story).

Our 46th-annual Automotive Innovations Awards Gala will be held again this year at Burton Manor in Livonia, Michigan, USA (also in the Detroit area) on November 9, 2016. As many of you know, this event is an excellent way to showcase commercial plastic/composite innovations, and allows the industry to congratulate the people who helped bring these ideas into reality. It's time to start thinking about submitting nominations. We hope this year's show will be our best yet.

The Automotive Division's board of directors would again like to extend our sincere gratitude to all of our members for their continued support. We hope all of you have an innovative and prosperous 2016.

Kind Regards,

Steven VanLoozen

Steven VanLoozen
SPE Automotive Division Chair

Call for Papers

Those interested in speaking at this year's event should go to **http://SubmitACCEpapers.com** and upload abstracts by **March 31, 2016** and full papers or non-commercial presentations by **May 31, 2016**. Authors who submit full papers (not presentations) in the proper format will be considered for the conference's *Dr. Jackie Rehkopf Best Paper Awards*, which are presented during the event's opening ceremony. Questions for the peer review committee may be addressed to **ACCEpapers@speautomotive.com**.

Call for Nominations for Conference Parts Competition

The committee also issued a call for nominations for its fifth-annual ACCE parts competition. Prizes for the *Most Innovative Composites Application* will be awarded in three categories — *Materials Innovation* and *Process Innovation* (selected by media and members of the SPE ACCE planning committee), and *People's Choice* (selected by conference attendees) — with winning teams receiving recognition and a trophy after lunch on the last day of the show.

There is no cost to enter the competition. Any registered conference participant (speaker, sponsor/exhibitor, or attendee) may nominate original equipment or aftermarket composite parts on passenger cars or light trucks from any geography. The only requirement is that parts must be on a vehicle available for commercial sale and that the vehicle producer must give permission. Nomination instructions are at **http://speautomotive.com/comp**. Preliminary descriptions and photos about the application's innovations are due **July 31, 2016** and should be eMailed to **ACCEpapers@speautomotive.com**. Physical parts must be brought to the SPE ACCE for final review by judges during a formal walk-through at the show.

Last year, the *Materials Innovation* award went to the nomination jointly submitted by Bright Lite Structures, LLC and Huntsman Polyurethanes for the carbon composite chassis system on the *Zenos E10* street-legal track car by automaker, Zenos Cars Ltd. The *Process Innovation* and *People's Choice* awards both went to the first composite coil spring on 2015 *Audi A6 Avant* 2.0-L TDI Ultra sedans by Audi AG nominated by Hexion Inc.

In 2014, the *Body Exteriors* award went to Mitsubishi Rayon Co., Ltd., which nominated the carbon fiber-reinforced composite decklid made via the prepreg compression molding process on the *Nissan GT-R* supercar by Nissan Motor Co. Ltd. The event's new *People's Choice* award (chosen by conference attendees) went to then Momentive Specialty Chemicals Inc. (now Hexion Inc.) for its nomination of the lightweight carbon fiber-reinforced composite door structure with Class A appearance on the *Porsche 911 GT Cup supercar* produced by Porsche AG.

In 2013, Plasan Carbon Composites swept the competition in all three categories. The company's nomination of the hood for the *Corvette Stingray* sports car from General Motors Co., produced in carbon fiber-reinforced composites via Plasan's new out-of-autoclave pressure press technology, won the *Body Exterior* category. And Plasan won both *Body Interior* and *People's Choice* awards with its nomination of the engine X-brace on the *SRT Viper* from then Chrysler Group LLC (now FCA US LLC (Fiat Chrysler Automobiles)) produced in autoclave-cured carbon composites.

In 2012, the first year that the SPE ACCE featured a parts competition, Asahi Kasei North America won the *Best Part* award with its nomination of the twin-sheet thermoformed glass-reinforced polypropylene composite on the Ram Box assembly with lid on *Dodge Ram pickups* from then Chrysler Group LLC.

Dale Brosius (*left*), chief commercialization officer, Institute for Advanced Composites Manufacturing Innovation and 2015 SPE ACCE conference co-chair presents the Materials Innovation trophy to Antony Dodworth (*right*), chief technology and manufacturing officer at Bright Lite Structures.

Dale Brosius (*left*), presents the Process Innovation trophy to Cedric Ball (*right*), business development & global marketing-Automotive at Hexion.

Call for Student Scholarship Applications

Since supporting students is an important activity of SPE, conference organizers have issued an annual call for applications for three SPE ACCE scholarships and two awards from a new endowed scholarship still in the process of being funded in honor of the late Dr. Jackie Rekhopf, a long-time SPE Automotive Division board member, SPE ACCE volunteer, and automotive composites expert. Winners will be selected from a pool of qualified applicants and announced in July prior to the 2016 SPE ACCE show.

All three ACCE scholarships are in the amount of $2,000 USD. Two of the scholarships (given annually since 2007) are for full-time graduate students anywhere in the world who are pursuing degrees in Polymer Science, Composites, Plastics or a related Engineering discipline. A third ACCE scholarship is available for a graduate or junior or senior undergraduate student pursuing similar academic programs at a university or college in the US state of Michigan. In addition to a letter of recommendation from an advisor or mentor, students must provide a succinct 2-page essay explaining how their planned work will benefit polymer composites usage in the automotive or other ground-transportation industry. Winning students are required to submit a formal paper on the work by June the following year and are expected to present their results in person at that next year's SPE ACCE conference.

In just five months, the new Dr. Jackie Rehkopf scholarship is approximately half-way to its $100,000 USD goal to reach full endowment, but contributions from the SPE Automotive and Composites Divisions, who have co-organized the ACCE show since 2001 and provided seed money to get the endowed scholarship started, have agreed to contribute funds to allow two scholarships to be given in 2016. The scholarships are available to either full-time graduate or junior or senior undergraduate students anywhere in the world pursuing degrees in Polymer Science, Composites, Plastics or a related Engineering discipline, with preference given to female students, although the best candidates will be selected. Up to two $5,000 awards each will be awarded to qualified graduate students, or up to two $2,500 awards each will be awarded to qualified undergraduate students if no graduate applications are received, or a combination of one $5,000 graduate award and one $2,500 undergraduate award for the 2016-2017 academic year. As with the ACCE scholarships, a letter of recommendation from the student's advisor/mentor and a 2-page essay is required showing planned work and how it benefits composites usage in the automotive or other ground-transportation industry. Work supported by the scholarship must be formally written up and either presented at an SPE technical conference like the SPE ACCE or published in an SPE technical journal.

Applications for ACCE, Rehkopf, and many other SPE scholarships for the 2016-2017 academic year may be found on the SPE Foundation® website at **http://www.4spe.org/Foundation**. Deadline for submission is **May 1, 2016**.

Those interested in contributing to the Dr. Jackie Rehkopf endowed scholarship should send a check (made out to The SPE Foundation) to:

The SPE Foundation - Rehkopf Scholarship
Attn: Gene Havel
6 Berkshire Blvd, Suite 306
Bethel, CT 06801 USA

PLEASE mark in the Notes section of your check that the funds are for the Rehkopf Scholarship so they are applied to the correct fund. Then please send an eMail to **News@SPEAutomotive.com** and let us know how much you have contributed so we can keep track of the scholarship. For more information, call +1 203.740.5457 or email **foundation@4spe.org**. Donations made by U.S. citizens are tax deductible.

Call for Entries for ACCE Student Poster Competition

The ACCE team also issued an invitation for entries on innovative composites technologies for automotive and ground transportation for its eight-annual *student poster competition*. Judges made up of media, industry experts, and SPE board members will review all posters with student authors on the first day of the conference. First-, second-, and third-place awards will be presented to winners in graduate and undergraduate categories during a special ceremony after lunch on the event's second day.

Students and their posters will be ranked according to the following criteria:

- Content (student and poster demonstrate clarity of topic, objectives, and background);
- Motivation for research and technical relevance to conference theme;
- Methodology and approach to problem;
- Quality of proposed research results/findings;
- Conclusion are supported by information presented;
- Presentation (display aesthetics are pleasing and there is a logical flow between sections);
- Knowledgeable (presenter has a good grasp of the subject);
- Understandability (poster is effective even without student being present to explain it); and
- Overall rank vs. other posters and presenters.

Since 2008, the SPE ACCE poster competition has been organized annually by Dr. Uday Vaidya, chief technology officer, Institute for Advanced Composites Manufacturing Innovation (IACMI) and professor and governor's chair-Advanced Composites Manufacturing at University of Tennessee-Knoxville. He is supported by Dr. David Jack, professor, School of Engineering & Computer Science, Baylor University.

Students interested in participating in the 2015 competition should contact Vaidya at **ACCEposters@speautomotive.com.** Abstracts are due by **March 31, 2016** and digital copies of posters are due by **August 20, 2016**. Students will need to bring physical copies of their posters with them to the conference.

In 2015, the winning students in the Graduate category were Shatori Meadows from Tuskegee University (first place), Ermias Gebrekidan Koricho and David DR from Michigan State University (second place), and Christopher Boise from Baylor University (third place), who also is an SPE ACCE graduate scholarship award winner for 2015-2016. In the Undergraduate category, winning students included Ronald Koslakiewicz from University of Michigan-Dearborn (first place), Michael Biancaniello from University of Guelph (second place), and Josh Caudhill from Michigan State University (third place).

Shatori Meadows from Tuskegee University (left) accepts her plaque for the First Place Graduate Student category from Patrick (Pat) Szaroletta (right), president, Faurecia Automotive Exteriors North America, the 2015 student poster competition sponsor.

Ermias Gebrekidan Koricho from Michigan State University (*left*) receives his plaque for the Second Place Graduate Student category from Szaroletta (*right*).

About the SPE ACCE

Held annually in suburban Detroit, the ACCE draws over 1,000 speakers, exhibitors, sponsors, and attendees and provides an environment dedicated solely to discussion and networking about advances in transportation composites. Its global appeal is evident in the diversity of exhibitors, speakers, and attendees who come to the conference from Europe, the Middle East, Africa, and Asia / Pacific as well as North America. Fully one-third of attendees indicate they work for automotive and light truck, agriculture, truck & bus, or aviation OEMs, and another 25% represent tier suppliers. Attendees also work for composite materials, processing equipment, additives, or reinforcement suppliers; trade associations, consultants, university and government labs; media; and investment bankers. The show has been jointly sponsored by the SPE Automotive and Composites Divisions since 2001.

Learn more at: **http://speautomotive.com/comp.htm** or **http://specomposites.com**.

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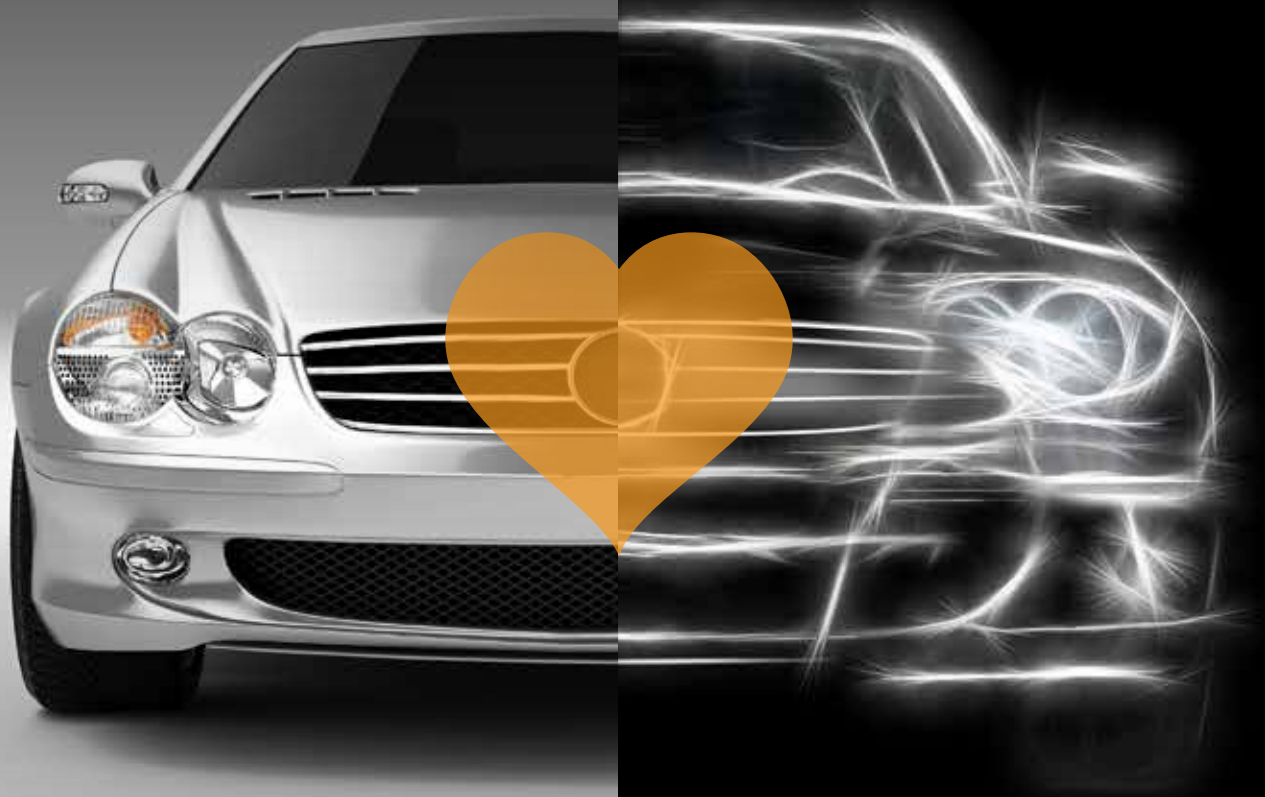

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ANTEC® REPORT

by Anthony Gasbarro, SPE Automotive Div. ANTEC Session Chair

The SPE Automotive Division has once again organized a half-day session at this year's SPE Annual Technical Conference (ANTEC), which will be held at the JW Marriott Indianapolis in Indianapolis, Indiana, USA, May 23-25, 2016.

The Automotive Plastics session will be held on Wednesday, May 25. Start times and the exact order of speakers have not yet been finalized by headquarters. The session features five topics at the present time:

- **Zohir Benrabah,** *National Research Council Canada (NRCC):* ***Contribution to Warpage and Shrinkage Analysis Using BlowView Software;***
- **Ayse Ademuwagun,** *Varroc Lighting Systems:* ***Biobased Headlamp Housing for Automotive Lighting;***
- **Yuying Dong,** *Key Laboratory of Textile Science & Technology, Ministry of Education, College of Textiles, Donghua University (China):* ***Fabrication of Glass mat Thermoplastic Composite by Needling Punching Process;***
- **Harindranath Sharma,** *SABIC:* ***Automotive Glazing – Polymeric Systems Providing Enhanced Design Freedom and Functionality***; and
- **Dhanendra Nagwanshi,** *SABIC:* ***Vehicle Lightweighting and Improved Crashworthiness – Plastic/Metal Hybrid Solutions for BIW.***

Additionally, the Automotive Division's own Dr. Jeffrey Helms, Celanese Corp., will give a plenary talk during the session on the Automotive Division's annual Automotive Innovation Awards Parts Competition & Gala, now in its 46th year.

Finally, our team helped secure a keynote speaker who will address the entire ANTEC audience on Wednesday. Antony Dodworth of Bright Lite Structures, LLC will speak on the topic *A Platform for Novel Lightweight Automotive Composite Structural Design.*

Look for updates on the evolving technical program from SPE International. We hope to see many of our members at the event. We also will have our annual Automotive Division business meeting immediately after the session ends, so we invite our members to join us for a short meeting and networking opportunity.

Visit the main Society of Plastics Engineers' website for up-to-date information on training, seminars, and other career- enhancing information.

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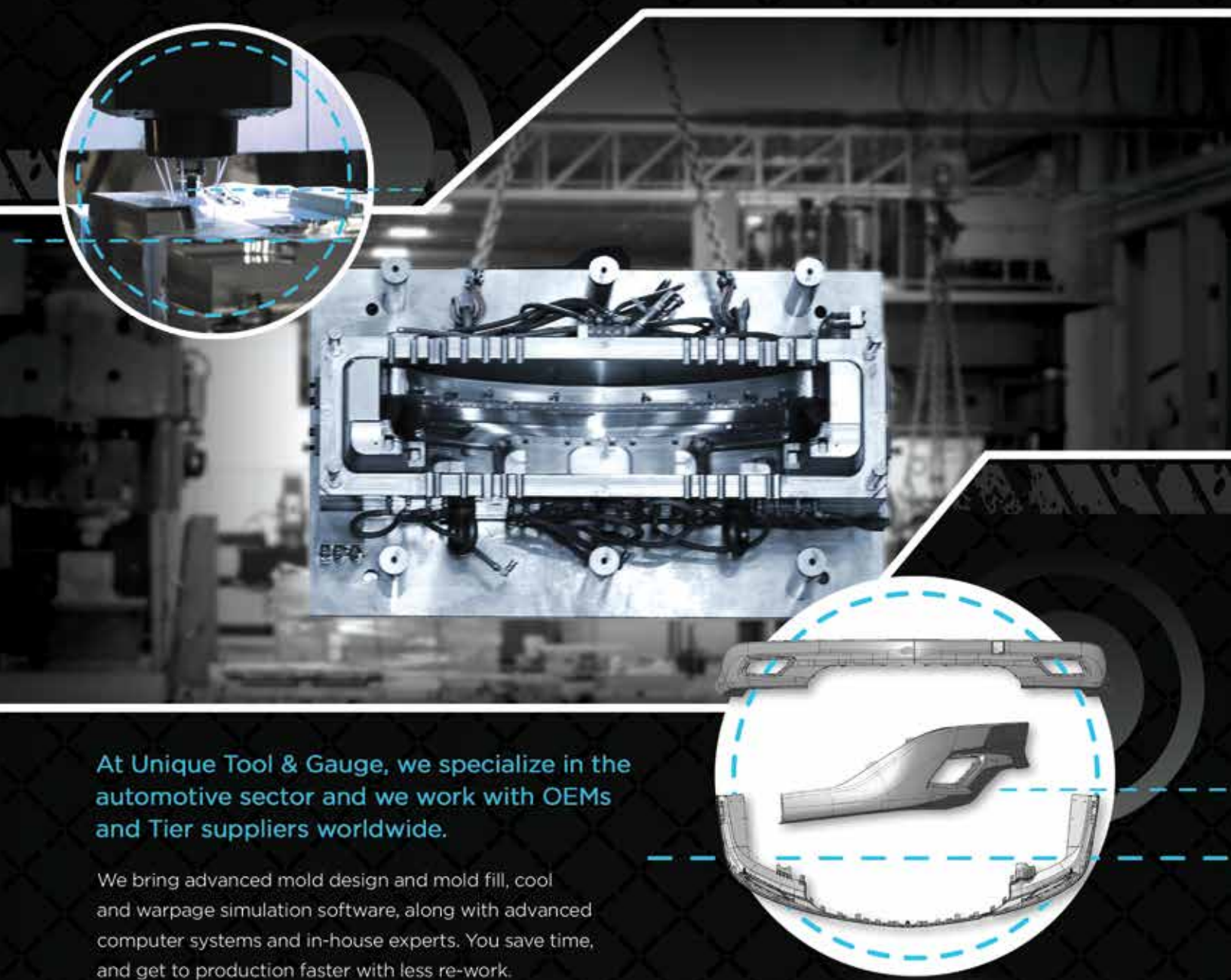

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Batter's Box: Achieving Innovation Success

by Roy Sjöberg, Chrysler Corp.-retired and 2013 SPE Automotive Div. Lifetime Achievement Award winner

Following is a transcription of the much-requested acceptance speech given at the 2013 SPE Automotive Innovation Awards Gala by Lifetime Achievement Award winner, Roy Sjöberg.

Innovation is much like the birthing process. You must find the correct environment and the right participants. Without the knowledge and experience in the field of venture, the process will stall due to the inability to move forward. Success is the culmination of the correct ingredients and participants who are willing to risk the unknown and challenge the supposed 'known' (existing paradigm).

The existing bureaucracy will counter the innovative efforts as: too costly, unavailable personnel, improper use of company resources, or not 'achievable'. Success requires management support, without undue interference – the key is to have a 'mentor' who is recognized by the bureaucracy for being involved and supportive. This minimizes normal burdens that the system will try to impose.

Usually an off-site location is helpful. In the case of the Viper development, we relocated the volunteer team to a former warehouse at Jeep Truck (recently acquired by Chrysler) and our mentor was the then Chairman of Chrysler.

It is important to define success early on, so the team knows the direction and can identify and envision the desired results. Coordination of individual efforts is essential, so delayed/altered results can be 'shared' and deliverables modified as required. Tracking team timing is critical, so all members know where, and concur with, the program progress.

General MacArthur made famous the following refrain in his closing speech to Congress: "Old soldiers never die; they just fade away." The difficulty is that long-term corporate transition does not promote "skunk works;" as with generals, they will fade away rather than being supported.

There are 7 Keys to successful innovation. To illustrate these 7 Keys, I designed the Heptagon Tower (US copyrighted) utilizing the 3D printing process to produce 50 prototypes of various sizes. This process can rapidly produce one-off, test samples, and limited production components with complex configurations.

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The first Key is to establish a "**Network**" that will provide guidance and support for the development of the concept.

Most new ideas have a historical basis and it is critical to not 'reinvent' the wheel. I'm reminded of a car company that thought it had invented a front-wheel-drive torque steer control that in fact had been designed and patented by the Cord Automobile Company in the early 1930s.

It is critical to benchmark your designs and develop teamwork among all participants. In our initial team facility, we were all in one large room with no internal dividers for anyone. At first, most participants faced their closest exterior wall, but after 6 weeks my administrative assistant noticed that the last desk had turned around so that we all faced each other. That's when the team interfacing/ communications really flew.

The second Key is to "**Integrate**," assuring that the individual designs, materials, tooling, and processes are compatible and have controls to achieve the desired end result. Many times these efforts actually enhance the end product and serviceability.

For example, designing for automation requires designs/processes that are thought out, efficient, and utilize gravity and linear motions. In one case, designing the assembly of an instrument panel assembly for robots actually reduced the required manpower by 1/3 and robots were not required.

The third Key is "**Timing**" or recognizing it's a 4D, dimensional design, world. The 'perfect' product, which is too late for the marketplace, will be a financial loss and soon forgotten – like the Henry J or the Edsel (which became a "collectable"). Another example is the Chrysler gas turbine of the early 1960s, a technology 'before' its time.

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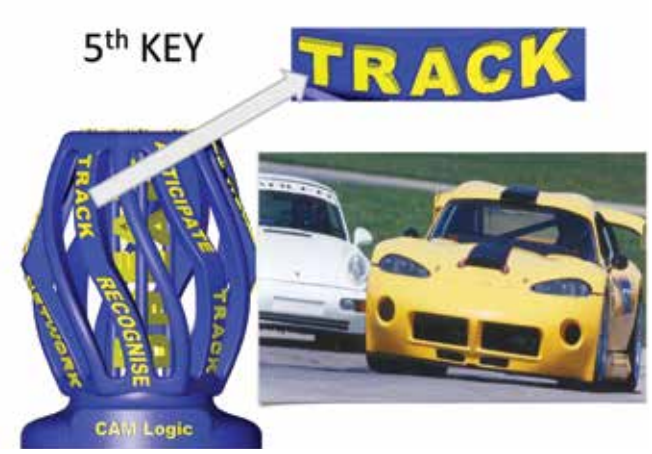
The fourth Key is to "**Anticipate**" using design failure mode analysis (DFMA). How will your product be used? And sometimes more importantly, how might it be misused? Failure just doesn't happen – where are the weak points? Don't take that professional leap unless you know the environment, have team consensus, and evaluate the potential outcomes. This means design for no surprises, or at least have designs/processes that minimize them.

A life example is the battle at Normandy during World War II. American generals didn't comprehend the nature of the Normandy beach (the Belgian block sea wall) and the Germans thought World War I French artillery guns would be adequate, even though they couldn't de-elevate to cover the beach area. Consequently, the guns were abandoned, even though Allied bombing and naval bombardment didn't affect the German pillboxes (above picture 70 years later).



The fifth Key is to "**Track**." Just like a good race-car driver, always walk the track and learn the surface foibles that will affect speed and tire adhesion ("go to the front lines" – don't sit behind your desk). The interaction of changes/delays affects all elements of the development. Your mantra for team problems: "Tell me **true** and tell me **fast**." A classic example was a car president who called a meeting to establish a world car, but failed to ever get the management back together to track how they were doing – **accountability was missing**. The result was no world car, not even global design compatibility, and a missed opportunity for a global market.

The sixth Key is to "**Recognise**" (spelling from my *Canadien* upbringing). This means team and individual recognition — you didn't get here by yourself. Yes, money is important, but think about how many times personal recognition spurs unique effort and results. Typically, less than 20% of results are acknowledged by management, so think what a difference that could mean in your organization and your results.

Even after 25 years, the Viper Team still gets together and continues to be amazed at what they accomplished (as do our customers). Team members continue to enjoy great times and camaraderie.

The seventh Key and the core of a successful innovation is to "**DREAM**." Have you envisioned where you want the end product to be and what the team needs to achieve?

So you've seen the trees in the forest, but what will replace them and will that meet the expectations of the potential customer? Don't let life be your windshield, look down the road, beyond the next life events. Work through the disappointments – i.e. learn from your mistakes. Life is good.

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THANKS FOR MAKING MY DREAM

Corporate support, Viper Team, and suppliers helped make my dream come true. Stop trying to dig the hole alone and find your network. (They might just save you effort.) Then get to work and create a **SUCCESS**!

Note: Retirees can bring expertise, ability to mentor younger team members, and an appropriate amount of disrespect for the system. I recruited a retired General Motors structural engineer who mentored one young Chrysler engineer. The suppliers wanted to know how the young engineer had gained so much practical knowledge.

ABOUT ROY SJÖBERG

Roy Sjöberg spent 25 years at General Motors Corp. (GM), beginning as a designer and engineer and later moving on to the position of vehicle development manager for then-Corvette chief engineer, Zora Arkus-Duntov. He worked on several areas of the *Chevrolet Corvette*, including its innovative fiberglass composite body panels. Sjöberg also was instrumental in developing the 1975 *Chevrolet Monza* bumper fascia in polyurethane reaction-injection molding (PURRIM) — the first high-volume application of that material/process, which incidentally won an SPE Automotive Innovation Awards Competition Grand Award — as well as the *Monza* front end in glass-mat thermoplastic (GMT) composite. Furthermore, he was involved in development of molded-in-color (MIC) polyethylene front filler panels on *Chevrolet Camaro* and *Monza* vehicles, as well as the first MIC blow molded rear spoiler for the *Chevrolet Cavalier* sedan.

Joining Chrysler Corp. in 1985, Sjöberg spent the next 12 years of his career there. Initially he was chief engineer on the Composite Intensive Vehicle Program working on resin-transfer molding (RTM) for structural bodies. From 1987 to 1988, he and top composites leaders from GM (Irv Poston) and Ford Motor Co. (Peter Beardmore) championed the formation of the Automotive Composites Consortium (ACC), which is a joint-development effort of the Big Three US automakers in precompetitive areas — in this case, for structural composites. Success of the ACC led to creation of 17 other consortia on various automotive topics, as well formation of an umbrella organization that today is known as the United States Council for Automotive Research (USCAR), an organization that is still actively contributing to the success of automotive research. Sjöberg also became chief engineer-Materials Engineering, and later was named executive engineer-Viper Project, where he was responsible for designing, developing, prototyping, testing, and eventually manufacturing one of the most exciting sports cars Chrysler ever built: the *Dodge Viper*. While working on that program, Sjöberg was involved in numerous technology innovations, including the RTM body panels, the all-composite instrument panel surround, the composite roof, the composite door surround, and the composite spare-tire underbody rear clip, to name a few. In 1992, the *Viper* sports car won the SPI Composite Institute's Counterpoise Grand Design award for highest achievement in the use of composite materials. Sjöberg and the Viper team won many national and international racing championship awards including the FIA Championships, the American LeMans Series, and the 2003 VGX. And the "Platform Team Concept" developed during the Viper Project under Sjöberg's leadership became the company-wide "mantra" in later years at Chrysler.

Since retiring from Chrysler, Sjöberg has kept active. Under the name Team R-Squared S LLP, he has consulted with the US Defense Advanced Research Projects Agency (DARPA) on a low-cost airframe project, and he has consulted for Ferrari S.p.A. on the Maserati program for homologation / vehicle development for US sales. He also is a notable keynote speaker on engineering, team building, and leadership topics to such organizations as SAE International® (founded as the Society of Automotive Engineers), the Society of Manufacturing Engineers (SME), ASME (founded as the American Society of Mechanical Engineers), the American Society for Quality (ASQ), and SPE. He has served as a Blue Ribbon judge for the SPE Automotive Innovation Awards Competition for over a decade, and still is very active as a judge at the Concourse D'Elegance for the Amelia Island Concours, Glenmoor Gathering, & St. Ignace car shows, and many more. Further, Sjöberg is a Sloan (School) senior executive alumnus from the Massachusetts Institute of Technology (MIT) and earned BSME and MBA degrees from the University of Michigan. He holds six US and international patents — three in the area of plastic parts. He is a lifelong supporter of vehicle development, innovation, and ingenuity and American leadership in the global automotive industry. He is married, has four grown children and eight grandchildren, and formed as well as is a current board member of the Friends of Inland Lakes Schools Inc., a community foundation promoting educational opportunities for local students.

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SECRETARY'S REPORT

SPE Automotive Division Board Dec. 7, 2015 Minutes

Next BOD Meeting Feb. 8, 2016
at American Chemistry Council (ACC) office

ATTENDEES

Peter Bejin
Bonnie Bennyhoff
Teri Chouinard
Matt Carroll
Fred Deans
Umesh Gandhi
Norm Kakarala
Ed Luibrand
Peggy Malnati
Yvonne Merritt
Al Murray
Tom Pickett
Monica Prokopyshen
Suresh Shah
Dawn Stephens
Steve VanLoozen
Mike Whitens

Guest: Maggie Baumann, Pinfa NA (Phosphorus, Inorganic and Nitrogen Flame Retardants Association – North American)

Meeting was held at the ACC in Troy, 5:30 p.m. – 7:13 p.m.

AUTOEPCON – STEVE VANLOOZEN

Steve VanLoozen reported that he, Fred, Suresh, and Umesh have been accepted by this year's conference chair as SPEAD volunteers for this conference. Not all SPE AD volunteers were accepted. Monthly meetings are held from 11:30 a.m. – 1 p.m. on a Friday.

PINFA-NA PRESENTATION

Pinfa-NA was established in 2012 as an extension of Pinfa (2009). Pinfa is comprised of 24 European companies, 27 including both North American and European organizations. Maggie Baumann gave an overview of the organization and its purpose is to advance the use of halogen-free flame retardants through education of stakeholders. A key activity is 1 to 1.5 day industry-focused workshops that bring academic, non-governmental organizations, regulatory, and industry stakeholders together to learn about types of flame retardants; and safety, health, and environmental aspects. Conferences seek to attract stakeholders from the entire supply chain and include presentations, panel discussions and *influentials*.

The association does a session at ANTEC and has a market focus:

- 2012 Electrical/Electronics
- 2013 Transportation-Aviation
- 2015 Building Construction
- 2016 Surface Transportation (Montreal, April 26-27, Intercontinental Hotel)

Bombardier is a 2016 sponsor and Pinfa-NA would like the SPE AD to co-sponsor. The focus is the emerging role of electric and hybrid vehicles and the increased focus on fire safety. The SPE role would involve ad and speaker swaps.

Fred suggested that Pinfa look into material handling applications as this industry also uses many plastics.

EDUCATION – Monica Prokopyshen / Fred Deans

The education summary for the Pinnacle report will be circulated for additions/review. The Pinnacle report is due in Feb. 2016. The Michigan Economic Development Corp. (MEDC) sponsored the student program at the SPE Automotive Division Innovation Awards Gala on Nov. 11, 2015. Students from the following universities participated: University of Michigan, Michigan State University, Ferris State University, and Lawrence Technological University as well as faculty from Ferris State and Lawrence Tech. Special thanks as well to SPE AD members Teri Chouinard, Peggy Malnati, Gordie Miesel, Dave Reed, and Dawn Stephens for both onsite and behind the scenes support. For the full report, refer to the Dec. 2015 SPE AD newsletter.

SOCIAL MEETING – Teri Chouinard

Ideas for future networking events were proposed:

- a College for Creative Studies/Wayne State event in March 2016, perhaps at the Science Center
- another Rouge Plant Tour, since it was very popular
- an event at BASF with dinner and a tour (June time frame)

MEMBERSHIP – Steven VanLoozen

The Membership committee is being transitioned to Fred and Teri for the 2015-2016 fiscal year. A question was raised on whether the free membership program for students is being extended?

TREASURER'S REPORT – Dawn Stephens

The fiscal year is July 1 to June 30. As at Dec. 7, 2015 the account balances were:

Checking:	$61,665.83
Savings:	$27,439.86
PayPal®:	0
Undeposited Funds	$ 9,625.00
Total	$98,417.95

The current financial position for the division (Total Liabilities and Equity) is $98,417.95. The largest expenditures this quarter were for the Automotive Composites Conference & Exhibition, and the Innovation Awards Gala.

COUNCILOR'S REPORT – Tom Pickett

Pittsburgh, Pennsylvania, USA: Oct. 9-11 Councilor Meeting involved a team-building exercise and two breakout sessions. The focus was on more engagement, more action in councilor meetings, and bringing more value to SPE members (TopCon focus). CEO Wim De Vos discussed the new SPE business model. For further details please refer to the Dec. 7, SPE AD Newsletter, Councilor's Report.

ANTEC 2015 – Suresh Shah

Suresh Shah and Matt Carroll volunteered to act as technical program chairs for next year's Automotive Division session.

IAG – Jeff Helms

Nov. 11, 2015, Burton Manor, Livonia. Theme: *The Future Looks Light.* 72 tables were reserved to accommodate 720 attendees.

SECRETARY'S REPORT
Dec. 7, 2015 Minutes CONTINUED FROM PAGE 17

MARCOM – Peggy Malnati

ACCE 2015: Sept. 9-11, 2015 at the Diamond Center in Novi. Theme: *Composites — The Next Generation of Lightweighting.* New milestones were achieved: record attendance (804 attendees), and sponsorship (85 sponsors). SPE HQ allowed the total ACCE student expense deduction of $14,551 prior to calculating the revenue sharing.

ACCE 2016: Sept. 7-9, 2016: The call for papers flyers was printed.

IAG 2015: Five press releases were distributed. The awards module was loaded the night of the event. The program guide size was reduced to save costs.

SPE AD Online: Four of the highest traffic months on record have been the most recent four consecutive months. August holds the all-time record at 66,771 unique hits. SPEAD doesn't pay for position.

Automotive Plastics News: The 28-page Dec. issue features the IAG winners. The digital copy has been posted to the website and the print copies will be mailed this week.

Jackie Rehkopf Scholarship: The Composites Div. will fund the scholarship at $10K / year so that 2 scholarships can be given in 2016. A total of $23K has been collected to date including $10K from the SPE AD. The Composites Division has offered to take over the management of this scholarship. If the SPE AD has sufficient budget in 2016-2017, then we will contribute again.

NEW BUSINESS

- A question was raised as to what it would entail to migrate the 15 years of SPE AD data (30 GB) on the website to another site. The website is one component of an integrated marketing communications program (website, tweets, blog, eblasts and newsletters).
- Next Meeting Feb. 8th
- Pinnacle Report due Feb. 15th
- A motion was passed to register the SPE AD (physically operating and located in Michigan) as a 501(c)3 non-profit in the State of Michigan. This will cost about $3,000 state tax annually and take several weeks to change the paperwork. Currently the division is chartered under the SPE HQ in Connecticut.
- Bonnie Bennyhoff was unanimously confirmed Treasurer of the SPE AD.

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COUNCILOR'S REPORT

February 5, 2016 Council Meeting Minutes Fully Remote

by Tom Pickett, SPE Automotive Div. Councilor

Highlights from the February 5, 2016 Councilor Meeting (fully remote).

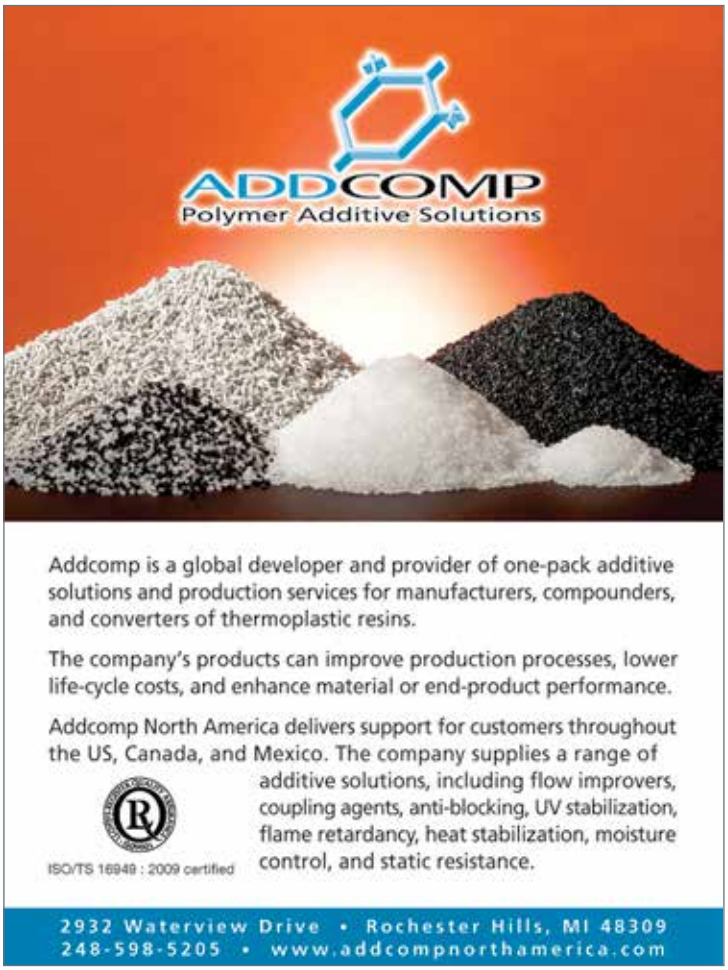
- Financial Update: Wim De Vos, SPE CEO, presented the financial update. The cash was well managed and 2015 had $3.3-million USD in total revenue. Membership revenue was lower in 2015 compared to 2014. Advertisement and sponsorship revenue was up 30% over the previous year. Operational expenses increased 6% in 2015. SPE International will be audited in March. De Vos to post the presentation on The Chain.
- Governance Reform: Scott Owens, SPE President Elect provided an update on the Governance Body (GB). The GB will have representation from sections, divisions, SIGs, and young professionals. The GB will be able to make more timely decisions.
- Virtual Elections: Wim De Vos discussed the move to virtual elections. The electronic election will start Monday, April 4, 2016 at 10:00 am and end Monday, April 11, 2016.

TREASURER'S REPORT

by Bonnie Bennyhoff, SPE Auto. Div. Treasurer

As of February 19, 2016, the division's account balances were:

Checking:	$164,090.69 USD
Savings:	$ 27,441.72 USD
Total:	$191,532.41 USD



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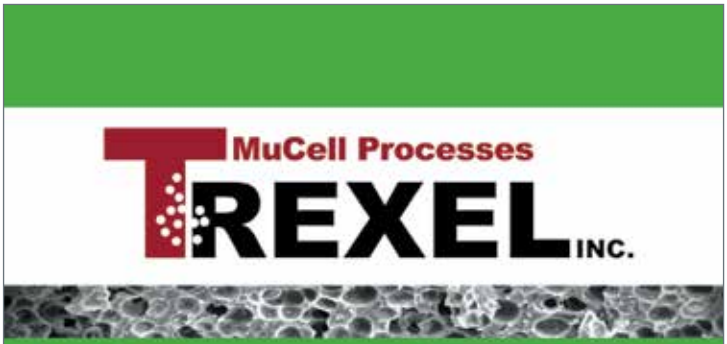

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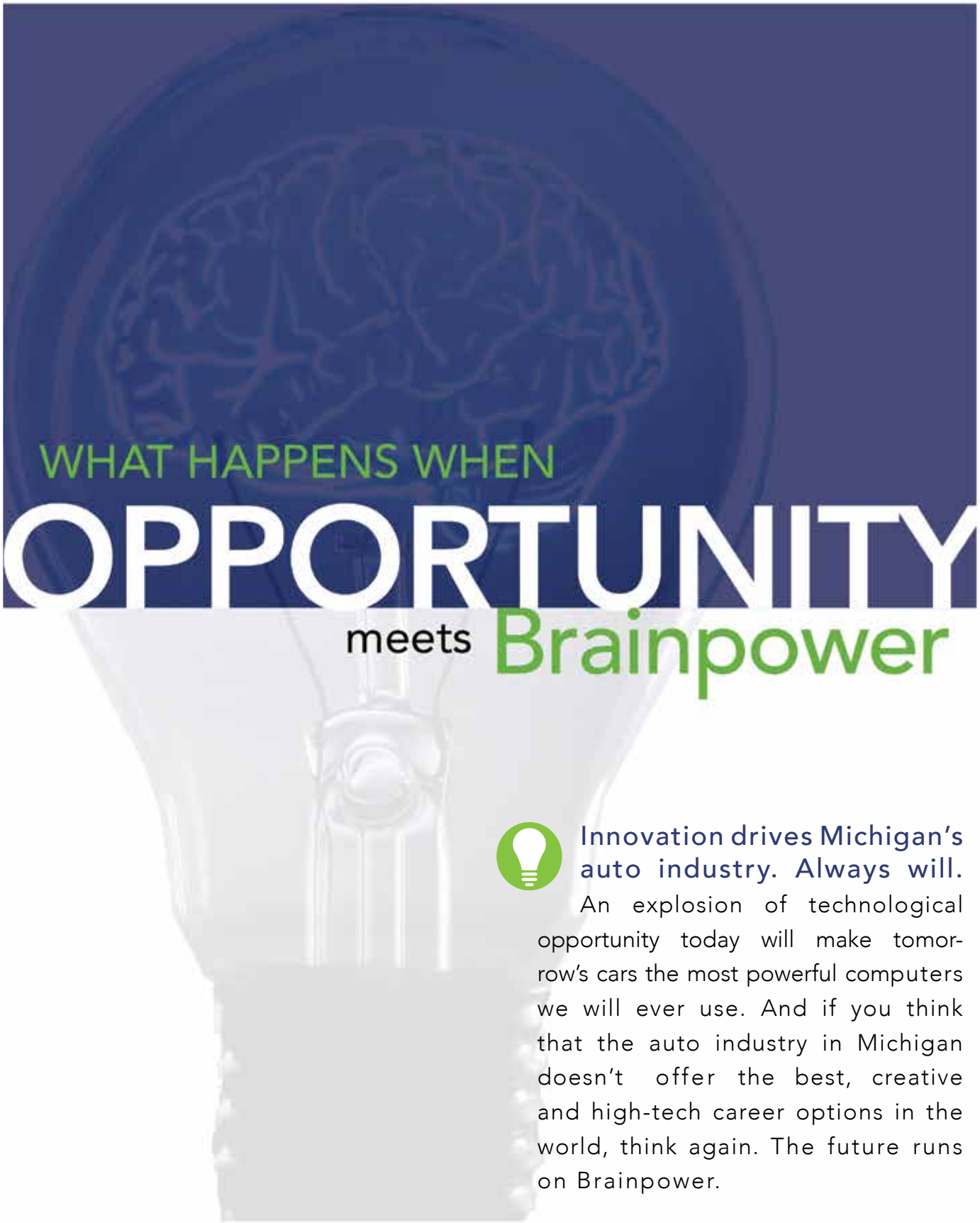

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SOCIAL & MEMBERSHIP REPORTS

by Teri Chouinard, SPE Automotive Div. Social Chair, Membership Chair

Golf Outing

The SPE Automotive Div. Golf Outing, held annually in early September the day before the SPE Automotive Composites Conference & Exhibition (ACCE), is the division's premier golfing event of the year. Over 100 plastics-industry professionals enjoy a day of fresh air and camaraderie at the award-winning Fieldstone Golf Club in Auburn Hills, Michigan, USA. The scramble format makes it fun for all and trophies for first, second, and third place teams and contest holes make it competitive for lucky golfers. The team from Plastic Engineering & Technical Services, Inc. (PETS) won first place at last year's outing. The Neutrex/Purgex team was awarded second place, and the Mitsui Plastics team won third. Please join us on **Tuesday, September 6, 2016** for this year's 21st-annual Automotive Div. golf outing. Proceeds benefit SPE student chapters.

From left to right: Martino Lamacchia - Cannon, Howard Klaassen - Evertread, Craig Woolheater- Cannon and Allan James - Dow Automotive celebrating an eagle on Hole #3.

Student Membership

SPE is offering students free membership for one year. This is a great way to enable greater youth participation in our industry. To encourage student participation in the Automotive Division, we are inviting students to be our guests at social events. This is an opportunity for them to network with other young professionals and gain valuable insight from industry veterans.

Ermanno Ruccolo, Mitsui Plastics, enjoyed the SPE Automotive Div. Golf Outing.

2016 Social Events

Stay tuned for more details on a Ford Rouge Truck Plant Tour, ACCE Welcome Reception/ Sponsor Appreciation Soirée, and other 2016 events being planned. The purpose of the SPE Automotive Div. Social events is to nurture networking, have fun, and build membership. If you have an idea for a social event, which may include a tour of your facility or other educational and fun ideas that will interest our existing membership and draw new members, please email **teri@intuitgroup.com** or call 1.810.797.7242

SPE Automotive Div. Membership

The SPE Automotive Division currently has 1,114 members in good standing. This is a strong base of loyal OEMs, tier suppliers, material suppliers, tooling suppliers, and other automotive plastics professionals dedicated to advancing the industry. By joining us for our social events and conferences throughout the year, you gain access to this targeted group of decision makers. We hope to see you soon.

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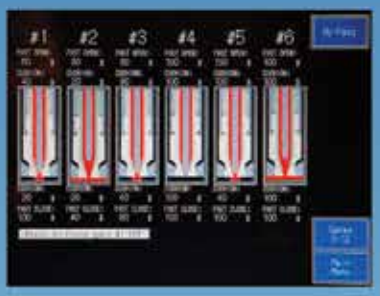

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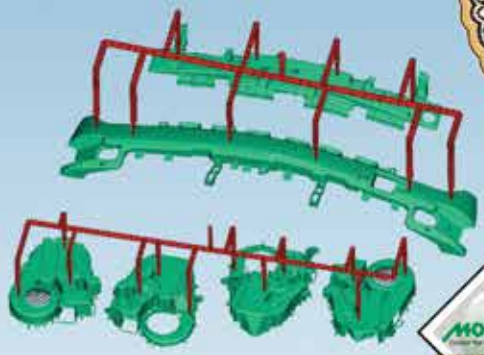

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Technical Report

Effect of Processing Technique on the Mechanical Performance of Glass Fiber Reinforced Thermoplastics

Jacob P. Anderson, Ryan P. Emerson

PPG Fiber Glass Reinforcement Technology Center
940 Washburn Switch Road, Shelby NC 28150

Abstract

Glass fiber reinforced thermoplastic composites are becoming more common and, as such, a wide array of fabrication techniques is currently available. While the most widespread process is injection molding of granulated long fiber thermoplastic pellets (GLFT), the placement and overmolding of continuous fiber reinforced thermoplastic tape (CFRT) is increasing because the stiffness and strength of CFRT is 200-300% higher than GLFT. Unfortunately, this higher-performing material incurs more manufacturing complexity. An easily-processable material with mechanical performance between that of GLFT and CFRT would therefore have value. In the present work, thermoplastic bulk molding compound (BMC) is investigated to determine if it could fill the identified performance gap. This is achieved by using injection and compression molding to fabricate thermoplastic composite parts with granulated long fiber thermoplastic pellets (GLFT), continuous fiber reinforced thermoplastic tape (CFRT), and thermoplastic bulk molding compound (BMC). BMC was shown to exhibit improvements in flex and impact performance of 100% and 20%, respectively, thereby filling the gap between GLFT and CFRT.

ABOUT JACOB ANDERSON

Dr. Jacob Anderson, senior research & development engineer at the PPG Fiber Glass Science and Technology Center (http://www.ppgfiberglass.com/Home.aspx; Shelby, North Carolina, USA) was named a winner of the *Dr. Jackie Rehkopf Best Paper Award* by the peer-review committee for the 2015 SPE® Automotive Composites Conference & Exhibition (ACCE). Anderson was lead author along with Dr. Ryan P. Emerson (also from PPG) on a paper entitled Effect of Processing Technique on the Mechanical Performance of Glass Fiber Reinforced Thermoplastics that was presented on September 10, 2015 in the Advances in Thermoplastic Composites session. In his current role, Anderson is a project leader in the Applications Development Group at PPG and focuses on the processing and evaluation of long-fiber-thermoplastic composites.

Describing his topic, Anderson explained "In the present work, thermoplastic bulk molding compound (BMC) was investigated to determine its mechanical performance relative to granulated long-fiber thermoplastic (GLFT) and continuous fiber-reinforced thermoplastic tape (CFRT). This was achieved by using injection and compression molding to fabricate thermoplastic composite parts from GLFT, CFRT, and BMC. Versus the GLFT specimen, the BMC material was shown to exhibit improvements in flexural and impact performance of 100% and 20%, respectively, results of which will be described during the presentation."

Introduction

The use of glass fiber reinforced thermoplastic (GFRT) parts in semi-structural applications by the automotive industry has been increasing in the last several decades [1]. This increase in usage can be attributed to GFRT's combination of an intrinsically high specific strength/stiffness, low cost, and the ability to process parts quickly. There are a large number of techniques available to fabricate thermoplastic composites, with the most common in the automotive industry currently being the injection molding of long fiber thermoplastics (GLFT). The advantages of this process are: (i) high production rate (cycle time < 1min); (ii) geometric complexity/repeatability; (iii) improved mechanical performance. However, one significant drawback is the reduction of fiber length caused by breakage during the molding cycle, which can cause a reduction in part performance [2-4]. This breakage, which is particularly troublesome for GLFT, is caused by fiber contact with the injection screw and the fibers undergoing shearing and bending during mold filling [5]. To improve part performance, industry has begun using continuous fiber reinforced thermoplastic tape (CFRT) which is strategically placed in areas requiring performance measures yet to be reached by GLFT. The resulting improvement in localized part performance (i.e. 200-300%) has increased the viability of thermoplastic composites for many applications but has come with an increase in manufacturing cost and complexity. For some cases (e.g. engine manifold, impact beams, airbag housings, etc.), these disadvantages have been judged to be acceptable, however, for parts requiring marginal performance increases (i.e. 20-80%) growth in process cost and complexity is undesirable. Thus, a reinforced thermoplastic material performance gap exists between GLFT and CFRT. The characteristics of a material to fill this gap are: (i) easily manufactured; (ii) capable of high geometric repeatability; (iii) formable into complex shapes; (iv) performance greater than GLFT.

The solution for the identified gap maybe in the form of a thermoplastic bulk molding compound (BMC) as recently described by Dewayne and Fukumoto [6]. This material is processed via compression molding and is capable of forming very complex shapes without suffering mechanical property degradation due to fiber breakage or increased manufacturing complexity. However, these potential advantages over GLFT and CFRT may be offset by slower production rates. Therefore, the objectives of this study are to determine the mechanical performance of parts manufactured from either glass fiber reinforced GLFT, CFRT, or BMC material to allow for the potential benefits of BMC to be established.

Materials and Methods

A 2400 tex silane sized E-glass roving (TufRov™ 4599) with a density of 2.63 g/cm^3 obtained from PPG Industries was used as the fiber reinforcement throughout the study. This particular sizing/glass combination is marketed to be compatible with a polypropylene matrix. As such, polypropylene (PP) homopolymer 3860X obtained from Total Petrochemicals USA and compounded with 2 wt.% of a maleic anhydride coupling agent (BondyRam 1001), was used as the matrix for all of the specimen in this study.

Composite Compounding and Molding

A Coperion ZSK co-rotating twin screw extruder with a screw diameter of 44 mm and an L/D ratio of 40:1 was used to extrude the resin melt into a cross head pultrusion die. The extruder settings used to compound the GLFT, CFRT, and BMC in this work is outlined in Table I. Due to the geometric differences between the GLFT and CFRT/BMC materials (i.e. pellets vs tape), two different exit die heads were used.

Table I: Injection molding parameters used to fabricate the GLFT specimen

Screw Speed (RPM)	
300	
Zone #	Temperature (°C)
1	220
2	230
3	240
4	250
5	260

EDITOR'S NOTE: Read the rest of this award-winning paper in the SPE ACCE Archives at: http://speautomotive.com/SPEA_CD/SPEA2015/pdf/TP/TP4.pdf

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