AUTOMOTIVE PLASTICS News
A PUBLICATION OF THE AUTOMOTIVE DIVISION OF THE SOCIETY OF PLASTICS ENGINEERS
March 2008 - Volume 37, Issue 2

AUTOEPCON

Main Speakers named for "AutoEPCON 2008"

Two speakers have been named to frame automotive industry issues and opportunities for the increased use of engineering plastics at the SPE AutoEPCON conference, Tuesday, April 22, at the Best Western Sterling Inn, Sterling Heights, Mich. Greg Adams, Vice-President - Automotive, SABIC Innovative Plastics (formerly GE Plastics) will be the luncheon keynote speaker. And the conference will be kicked-off at 8:30 a.m. with plenary-session speaker, Casey Selecman of CSM Worldwide Inc. His topic will be "The CO_2 Business Case for Mass Reduction."

The third-annual Society of Plastics Engineers (SPE) AutoEPCON is a one-day technical conference and exhibition aimed at sharing trends and the latest technical advances in engineering materials for reducing weight, increasing performance and lowering costs in automotive applications. Conference co-chairs are Thomas Pickett of General Motors and Nippani Rao of Chrysler. L.L.C.

AutoEPCON technical program coordinator, Dr. Norm Kakarala, Senior Technical Fellow, Delphi Automotive Holdings Group, has selected over 30 presentations in four sessions: Materials Development, Metal to Plastics Conversions, Design & Applications Development and Process-Enabling Technologies.

"There is no more effective event to meet, network and gain updates on new technologies and applications with the most influential engineers involved with specifying, designing, and recommending engineering plastics," said Dr. Kakarala. "By networking in the breaks, lunch and after-glow reception, participants can fully capitalize on this opportunity to help their employers succeed in challenging times."

Mr. Pickett and Mr. Rao joined in this statement about the conference. "We're very excited about the SPE AutoEPCON Automotive Engineering Plastics Conference because it fills a unique niche in the educational efforts of both the Automotive Division and the Detroit Section in promoting the benefits of plastics to the automotive industry. With this being our third year, we anticipate a substantial increase in attendees. We already have more sponsors, exhibitors, and advertisers than last year's conference."

The 2008 AutoEPCON Automotive Engineering Plastics Conference will feature technical presentations on the newest advances in materials

Continued Page 4

Treasurer's Report

John Fialka

The SPE Automotive Division bank account balance is in good standing with $31K in checking and $27K in savings. The Composites Conference financial report is complete with income of $138,486 and expenses of $115,563 with net proceeds of $22,923. Commission checks were issued to SPE National $6,877 and to the Composite Division $8,023. The income reported to date for the awards event is $190K, expenses are $160K, with a few sponsors in arrears. A final report from the awards event is expected next month.

Automotive Division Meeting Schedule and Special-Events Calendar

Division Board of Directors Meeting APC, Troy, MI	March 17, 2008
AutoEPCON Best Western Sterling Inn Sterling Heights, MI	April 22, 2008
ANTEC 2008 Midwest Express Center & Milwaukee Hilton City Center Hotel Milwaukee, Wisconsin	May 4 -8, 2008
Division Board of Directors Meeting APC, Troy, MI	May 12, 2008
Automotive Division Golf Outing Location TBD	August 2008
Automotive Composites Conference & Exhibition (ACCE) MSU Management Education Center Troy, MI	September 16-18, 2008

Automotive Division Board of Directors meetings are open to all SPE members, and are usually held at the American Chemistry Council (ACC) in Troy, MI. Call Brian Grosser at (248) 941-9368 for more information.

Your company can help sponsor our newsletter!!!

Call Teri Chouinard for rates and information

(810) 797.7242

teri@intuitgroup.com

www.speautomotive.com

Chairman's Message

Brian Grosser

Greetings to all. As we trudge through another rough winter here in Metro Detroit, it is with warm regards that I can report that we are making great progress as a Society on our main objectives for the 2007-2008 year. Each of our key events - the Innovation Awards Competition & Gala, the Automotive Composites Conference & Exhibition (ACCE) and the Automotive Engineering Plastics Conference (AutoEPCON) – have made significant improvements.

The income generated by these events has enabled the Division to expand its educational outreach, giving us the chance to impact new and diverse school districts and increase our scholarship funding.

I want to sincerely thank the Board of Directors, Committee Chairs and all the volunteers who helped us with these key events. I hope you saw for yourself just how these events have evolved to the "Best in Class" events they all are today.

The Automotive Division website has recently undergone many new and exciting structural changes. The modifications enable us to directly edit the website's content ourselves, eliminating the need to use an outside supplier for simple text changes or to post updated flyers. As a result, we now can post more timely and effective updates to keep members and attendees of our events better informed. Special thanks to Peggy Malnati of Malnati & Associates and Monica Prokopyshen of Chrysler for leading this effort, which improves the dissemination of key information and interaction with Division members.

The next key event on the Automotive Division calendar is AutoEPCON, a one-day conference that focuses on advancements in engineering thermoplastics. It will be held on Tuesday April 22, 2008 at the Sterling Inn in Sterling Heights, MI. The technical paper tracks have really come together and this conference promises to build on the successes of the previous years.

Greg Adams, Vice-President - Automotive, SABIC Innovative Plastics (formerly GE Plastics) will be the luncheon keynote speaker. The conference will be kicked-off at 8:30 a.m. with plenary session speaker, Casey Selecman of CSM Worldwide Inc. His topic will be "The CO_2 Business Case for Mass Reduction." If you are interested in attending, please check out the AutoEPCON flyer within this newsletter.

In closing, I'd like to thank you for your membership in the Society of Plastics Engineers, and the Automotive Division. If you have any suggestions on how we can improve your membership experience or provide more relevant content at our events, please let us know.

And if you think we're doing a good job, we'd like to know that too. A key objective of the Automotive Division Board is to make your SPE membership experience positive and helpful. Please let us know if we're succeeding. You can send comments to us from our website using the link at www.speautomotive.com/cont.htm. Thanks and think Spring!

AutoEPCON 2008

Continued from page 1

technology, predictive engineering, process enhancements, and application developments for thermoplastic and thermoset engineering materials for the automotive industry. Tabletop exhibits will be on display throughout the event. A light lunch and an after-glow, plus several coffee breaks will also be provided throughout the conference to allow further networking opportunities for all who attend. The all-inclusive cost of attending the event is $125 USD for SPE members, $150 USD for non-SPE members, and $50 USD for students.

Members of the media are invited to attend the event at no charge. Pre-registration is recommended to speed entry into the conference. For media registration, contact Pat Levine, SPE Automotive Division, p.levine@yahoo.com or call 248-244-8993.

Below are the contacts you will need to position your company in developing and leading the advancement of automotive engineering plastics:

Sponsorship:
Nippani Rao, Chrysler LLC
248-576-7483 nr2@chrysler.com.
Dr. Gary Kogowski, Entec Polymers
248-615-9886 gkogowski@entecresins.com

Exhibits Sign Up:
Craig Dlugos, Ticona Engineering Polymers
248-377-6852 craig.dlugos@Ticona.com

Advertisement:
Pat Levine, SPE Automotive
248-244-8993 p.levine@yahoo.com

Conference Chairs:
Tom Picket, General Motors
586-492-2454 tomjpickett@yahoo.com,
Nippani Rao, Chrysler LLC
248-576-7483 nr2@chrysler.com

Reservations:
Registration will begin at 7:15 am at the Best Western Sterling Inn, Sterling Heights, MI. Pre-registrar for the conference by contacting Pat Levine, SPE 248-244-8993 p.levine@yahoo.com

Exhibits, Hotel Coordination:
Craig Bellissimo will be at the hotel at 7:00 am on April 22nd to help with your exhibit. Location: Best Western Sterling Inn 34911 Van Dyke, Sterling Heights, MI 48312.

Call Craig Bellissimo for any special arrangements.
Craig Bellissimo, Ashland Polymers
248-541-3584 cebellissimo@ashland.com.

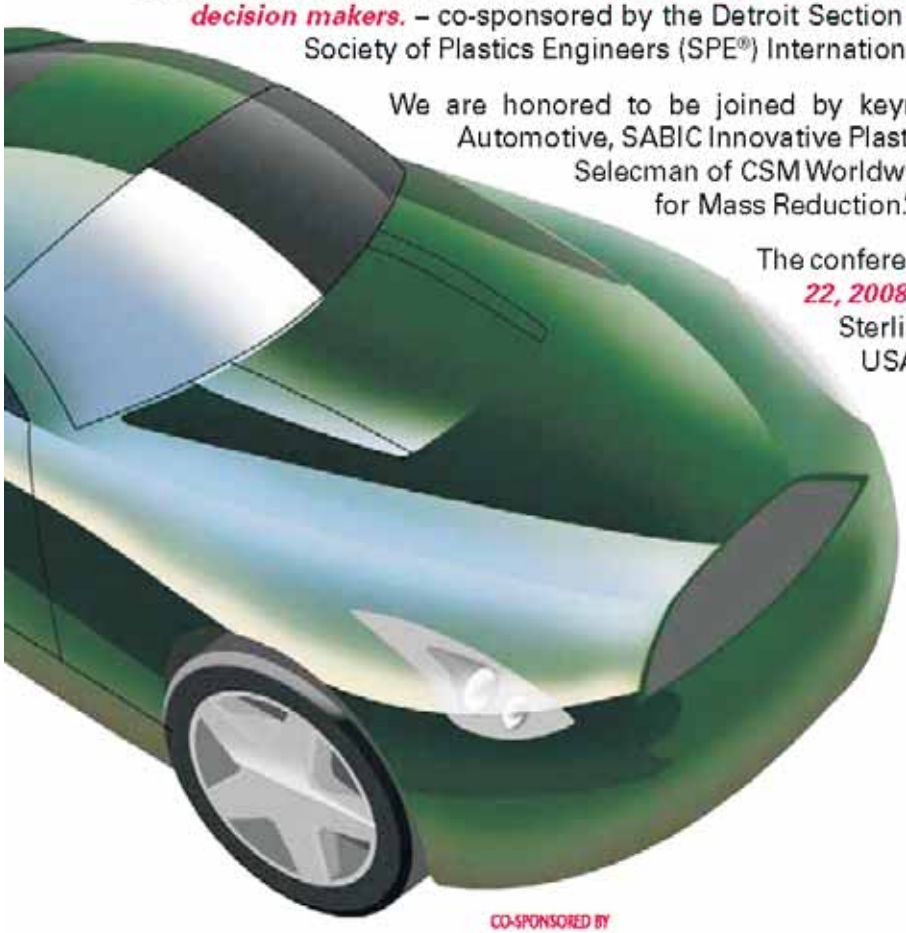
For more information about the SPE Automotive Engineering Plastics Conference, visit the Automotive Division's website at www.speautomotive.com, or the Detroit Section's website at www.spedetroit.com, or call either group at +1.248.244.8993, or write SPE, Attn: Pat Levine, 1800 Crooks Road, Suite A, Troy, MI 48084, USA.

Design & Development with Automotive Engineering Plastics

AUTOEPCON

Engineering Plastics offer an important and diverse portfolio of performance for Automotive Product Designers & Component Manufacturers in a wide variety of applications. A unique combination of design flexibility, mass reduction, parts consolidation, high aesthetics, plus excellent and cost-effective performance across a broad range of end-use environments characterizes engineering plastics.

Learn more about the latest advances with these versatile materials at a 1-day (over 30 papers) technical conference & exhibition – ***with 200 key automotive professionals and management decision makers.*** – co-sponsored by the Detroit Section and Automotive Division of the Society of Plastics Engineers (SPE®) International.



We are honored to be joined by keynote speaker Greg Adams, V.P. Automotive, SABIC Innovative Plastics. The plenary speaker is Casey Selecman of CSM Worldwide Inc. "The CO2 Business Case for Mass Reduction."

The conference will be held on ***Tuesday, April 22, 2008*** at the Best Western Sterling Inn, Sterling Heights (Detroit-area), MI, USA.

To register to attend, learn more about sponsorship opportunities, or to make a technical presentation, see ***www.speautomotive.com***, ***www.spedetroit.com*** or contact Patricia Levine, SPE Automotive Division, at +1.248.244.8993 or email ***p.levine@yahoo.com***

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Registration

WHEN: Tuesday, March 25, 2008
Optional next day free ½ day
Tour of the International Truck and Engine Plant

WHERE: The National Composite Center (NCC)
2000 Composite Drive
Dayton, Ohio 45420
937-297-9450

HOW MUCH: $150.00 SPE Member
$300.00 Non-SPE Member (Includes 1 year of SPE membership)

TO REGISTER FOR THIS IMPORTANT EVENT:

Complete this form and fax to:
Pat Levine
Fax Number: 248-244-8925

Please make checks payable to:
SPE Composites Division

Mail checks to:
SPE Composites Div.
C/O American Chemistry Council
1800 Crooks Road, Ste A
Troy, MI 48084
Attention: Pat Levine

For additional info, please call or e-mail:
810-797-7242 teri@intuitgroup.com

Registration includes continental breakfast, lunch, refreshments and a cocktail reception. Registered attendees will also receive the Conference Program Book, which contains abstracts of the presentations, AND a CD with papers or presentations. Registration is NOT confirmed until payment is received.

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New "Composites On The Move - 2008™" Conference & Expo

March 25-26, 2008

SPE® Composites Division, SPE Miami Valley Section, & National Composite Center Announce Conference & Expo on New Markets for Materials, Processes & Technologies

The SPE® Composites Division, SPE Miami Valley Section and National Composite Center are inviting speakers, sponsors, exhibitors, materials engineers, suppliers and composites and plastics industry professionals to participate in "Composites On The Move - 2008" conference and exposition on new markets and opportunities for composites. The event is scheduled for Tuesday, March 25, 2008 at the National Composite Center in Dayton, Ohio and includes an optional half-day tour of the International Truck & Engine Plant the following day. "Design flexibility, strength, corrosion resistance and lightweight benefits make composites the preferred material for an increasing number of applications in wind energy, commercial transportation, heavy truck, off-highway, building & construction, marine, and more," said Fred Deans, "Composites On The Move - 2008" Program Co-Chairman.

"New applications for composites are developing in global markets," said Louis A. Luedtke, President and CEO of the National Composite Center and Conference Co-Chair. "This conference will highlight the technical advancements in composites applications and identify opportunities for growth." Composites On The Move - 2008 is conveniently held just before the Mid-America Trucking Show (MATS 2008), March 27 - 29, in Louisville, Kentucky, only 150 miles away, to give trucking industry professionals an opportunity to learn about the benefits of composites in truck manufacturing and more," said Josh Ulrich, Conference Committee Chairman and President of the SPE Miami Valley Section.

Composite materials enable numerous design, corrosive resistant, structural, and weight saving benefits to be achieved in many products in various industries. Yet, composites are only 1.5 % of the materials market. Education, promoting, recognizing and communicating the technical advantages and benefits of composites materials is the key to increasing the use of composites in more products. "Composites On the Move - 2008" is an important step toward industry change to an increased use of composites for improved quality products.

For more information contact:

Fred Deans at: fdeans@aol.com
248.760.7717
Lou Luedtke at NCC: lluedtke@compositecenter.org
937-297-9454
Teri Chouinard at Intuit Group: teri@intuitgroup.com
or 810.797.7242

SPE AUTOMOTIVE TPO GLOBAL CONFERENCE

OCTOBER 5TH THRU OCTOBER 8TH, 2008

Best Western Sterling Inn • Sterling Heights, MI

DETROIT TPO CONFERENCE 2008

CALL FOR PAPERS:

ABSTRACT DEADLINE ~ APRIL 21TH, 2008
COMPLETED PAPERS ~ SEPTEMBER 1ST, 2008

Be part of the 10th Anniversary SPE Automotive Global Convergence. This premier conference draws some of the world's most knoweldgeable decision makers and industry experts that share their perspective and ground breaking developments in one of the world's fastest growing polymers.

TPOs have become an essential part of the automotive industry's quest for versatile, economical, light weight materials that meet the increasing challenges of the automotive industry.

Last year's conference attracted over 410 professionals sharing leading edge polymer and application technologies. This year, the 10th annual conference is expected to be even larger and includes a thermoforming session reflecting it's increasing roll in the transportation industry.

The following sessions are planned. Please contact the session moderator no later than April 1st. Abstracts must be submitted no later than April 21st, 2008.

✔Automotive Applications Developments
- **Robert Eller** — Robert Eller Associates (330) 670-9566, bobeller@robertellerassoc.com
- **Thomas Pickett** — General Motors (586) 492-2454, tomjpickett@yahoo.com

✔Thermoforming
- **Ed Bearse** — Advanced Plastic Consultants (989) 588-0494, ebearse@advancedplasticconsultants.com
- **Bruce Denison** — Solvay Engineered Polymers (248) 391-9503, bruce.denison@solvay.com

✔Material Developments
- **Dave Okonski** — General Motors (586) 986-2767, david.a.okonski@gm.com
- **Michael Dammann** — Basell Polyolefins (517) 282-0462, michael.dammann@basell.com

✔Process Developments
- **Patti Tibbenham** — Ford Motor Company (313) 322-7158, ptibbenh@ford.com

✔Surface Enhancements
- **Duane Lewis** — ExxonMobil (248) 350-6539, duane.r.lewis@exxonmobile.com

✔Panel Discussion
- **Ron Price** — Global Polymers Solutions (248) 563-6343, rprice525@aol.com

www.auto-tpo.com

✔Conference Co-Chairs
- **Bill Windschief** — Flint Hills Resources (248) 375-5055, william.windscheif@fhr.com
- **Paula Fasulo** — General Motors (586) 986-1249, paula.d.fasulo@gm.com

✔Communications
- **Lisa Wujkowski** — Dow Automotive (989) 636-9956, llwujkowski@dow.com

✔Computer Support
- **Sanjay Patel** — Flint Hills Resources (734) 451-2072, sanjay.patel@fhr.com

✔Technical Program Chairman
- **Norm Kakarala** — Delphi Corporation (248) 655-8483, norm.kakarala@delphi.com

✔Hotels & Exhibitors/Budget & Finance
- **Tom Powers** — Consultant, Delta Polymers (248) 877-0689, tpowers@ejourney.com

✔Conference Registration
- **Pat Levine** — SPE Conference Liason (248) 244-8993, p.levine@yahoo.com

✔Reservations
- **Best Western Sterling Inn** — Sterling Heights 1-800-953-1400 or (586) 979-1400 Special Rate of $109.00 (Register under TPO Conference)

For Information and Registration call Pat at (248) 244-8993, p.levine@yahoo.com

A block of rooms have been reserved for the SPE Automotive TPO Global Conference

SPE® Announces Theme, Location, and Date for 8th-Annual Automotive Composites Conference & Exposition

Organizers Issue Call for Papers for Conference, Abstracts Due March 31 and Papers Due May 31

The organizing committee for the SPE Automotive Composites Conference & Exposition (ACCE) today announced the dates, theme, and location for this year's show. Now in its 8th year, the ACCE has become the world's leading forum for automotive composites and draws exhibitors, speakers, and attendees from Europe, the Middle East, and Asia / Pacific as well as North America. The event, sponsored jointly by the SPE Automotive and Composites Divisions, will be held September 16-18, 2008 at the MSU Management Education Center in Troy.

The 8th-annual SPE Automotive Composites Conference & Exposition (ACCE) returns September 16-18, 2008 at the MSU Management Education Center in Troy, Michigan, U.S.A. Now in its 8th year, the ACCE has become the world's leading forum for automotive composites and draws exhibitors, speakers, and attendees from Europe, the Middle East, and Asia / Pacific as well as North America. This year's conference theme is "The Road to Lightweight Performance," and reflects the progress transportation OEMs, tier suppliers, and composites producers have made in taking weight out and improving performance of vehicles by replacing metal and glass with lightweight, impact and corrosion resistant, polymer composites.

"Sustained high fuel prices are convincing consumers to seek more energy-efficient vehicles, but they would prefer not to sacrifice safety, comfort, and performance as part of the bargain," says Dale Brosius, chief-operating officer of Quickstep Technologies and returning chair of the 2007 ACCE event. "With the added pressure of increasing fuel-economy standards, advancements in engine technology and alternative powertrains like hybrids and fuel cells can only go so far. Making vehicles lighter by using composites deserves equal consideration in closing the gap."

Last year's ACCE conference again drew over 400 attendees from 14 countries on 4 continents thanks to a continuously expanding program of technical papers, keynote speakers, networking receptions, and exhibit space. Once again, nearly half of conference attendees identified themselves as working for transportation OEMs or Tier suppliers - extremely desirable numbers for a show like this.

Dale Brosius, executive director and chief-operating officer for Quickstep Technologies Pty. Ltd., and immediate past chair of SPE's Thermoset Division, is returning as ACCE program chair in 2007. He said, "This year's conference theme is 'The Road to Lightweight Performance,' which reflects the challenges facing automakers and the supply community. Consumers continue to demand higher performance in their vehicles - faster acceleration, better style and comfort, higher electronics content, and improved fuel economy - yet remain unwilling to sacrifice features like cost, safety, and vehicle size. Fortunately, the low mass, energy management, and design freedom of composites can help OEMs achieve these often conflicting objectives. The supply community is working hard to address issues like global competitiveness and cost pressures facing the OEMs, as many of the displays, papers, and keynote addresses presented at the ACCE each year demonstrate."

Despite continuing challenges for automakers selling into the North American market, last year's ACCE conference drew over 400 attendees for the second year in a row. The event featured its largest technical program to date and a larger display area, as well as two panel discussions, two evening networking receptions, and a number of interesting keynote addresses. Nearly half of all attendees at the conference continue to be automakers or other transportation OEMs (e.g. heavy truck, agriculture, and aviation) and their tier suppliers.

Attendees came not only from the United States and Canada, but also from Australia, Germany, India, Italy, Japan, Korea, New Zealand, the Netherlands, and the United Kingdom. Brosius concludes that "We will continue to pursue an even stronger international flavor in 2007, as good automotive composites ideas are being developed all over the world, and we feel Detroit is still the best place to present them to the global automotive industry."

For more information about the SPE Automotive Composites Conference, visit the Composites' Division website at www.4spe.org/communities/divisions/d39.php, or the Automotive Division's website at www.speautomotive.com/comp.htm

EXHIBIT & SPONSORSHIP OPPORTUNITIES

CALL FOR PAPERS

ATTENDANCE

The Automotive and Composites Divisions of the Society of Plastics Engineers (SPE) International invite you to attend the 8th-Annual SPE *Automotive Composites Conference and Exhibition*, September 16-18, 2008. The conference will feature technical paper sessions, panel discussions, keynote speakers, & exhibits highlighting advances in materials, processes, and applications technologies for both thermoset and thermoplastic composites. Sessions currently planned include:

- Advances in Thermoset Composites
- Advances in Thermoplastic Composites
- Bio & Natural Fiber Composites, Plus Recycling Composites
- Bonding, Joining, & Finishing of Composites
- Composites in Trucks
- Enabling Technologies
- Nanocomposites
- New Composite Materials & Processing
- Structural Composite Applications
- VIP Panel Discussions
- Virtual Prototyping & Testing of Composites

PAPER SUBMISSION

Individuals or organizations interested in presenting at the conference should submit **Abstracts** *no later than* **March 28, 2008** and **Papers** *no later than* **May 30, 2008** to allow time for peer review. E-mail abstracts or papers to **ACCEpapers@speautomotive.com**. Approved papers will be distributed on a CD to conference attendees.

EXHIBITION/SPONSORSHIP

A variety of sponsorship packages, including tabletop displays, advertising and publicity, tickets, and other promotional opportunities are available. Companies interested in exhibiting at or sponsoring the event should contact Teri Chouinard of Intuit Group at **teri@intuitgroup.com** or Dale Brosius of Quickstep Technologies at **dbrosius@comcast.net**.

FOR MORE INFORMATION

For more information on the Automotive Composites Conference, or to register for this important event, visit the SPE Automotive Division website at **www.speautomotive.com**; or contact Pat Levine at +1.248.244.8993; or send a fax to +1.248.244.8925; or send an e-mail to **spe_automotive_detroit@yahoo.com**; or write SPE Automotive Division, 1800 Crooks Road, Suite A, Troy MI 48084, USA.

FAX REGISTRATION TO+1.248.244.8925

NAME:

COMPANY: _____

ADDRESS:

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CREDIT CARD NO: _____ EXP: _____

❍ SPE MEMBER – $375

❍ SPE RENEWING MEMBER $475
(INCLUDES 1-YR MEMBERSHIP RENEWAL AT $18 DISCOUNT)

❍ NON SPE MEMBER – $475 (INCLUDES 1 YR MEMBERSHIP TO SPE)

NO CHARGE FOR: ❍ SPEAKER ❍ CONFERENCE ORGANIZER ❍ MEDIA

❍ PLEASE CONTACT ME ABOUT EXHIBITION/SPONSORSHIP OPTIONS

I PLAN TO ATTEND: ❍ TUESDAY ❍ WEDNESDAY ❍ THURSDAY

❍ PLEASE RESERVE A VEGETARIAN MEAL FOR ME EACH DAY

MSU MANAGEMENT EDUCATION CENTER 811 W SQUARE LAKE ROAD, TROY, MI USA

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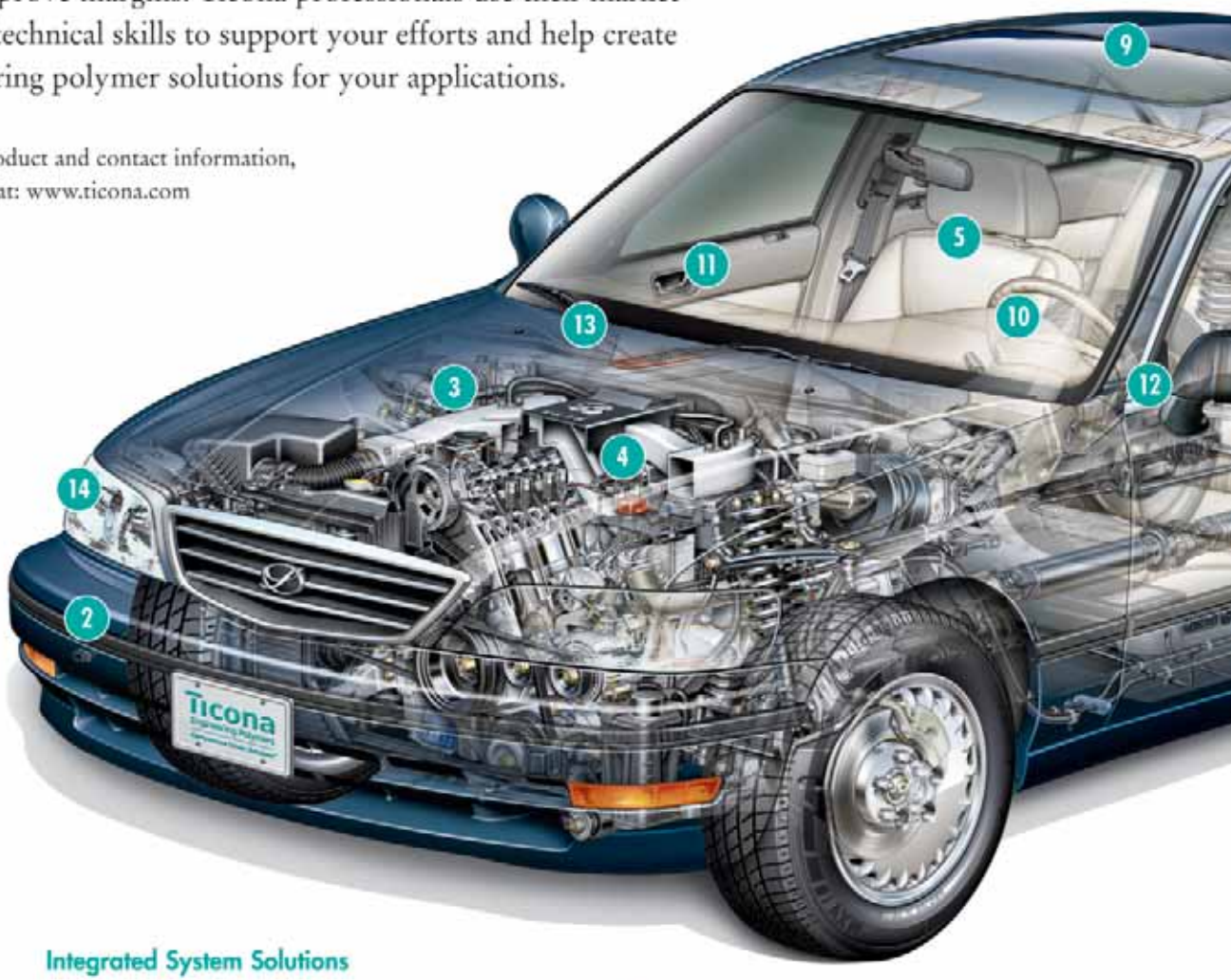

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Celanex, Celstran

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14 Lighting Housings
Celanex, Vectra, Fortron

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Impet® Thermoplastic Polyester
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- Superior thermal and chemical resistance
- Toughness
- Rigidity
- Dimensional stability
- Wide temperature use range

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- Outstanding chemical resistance
- Good low temperature impact
- Wide temperature use range

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- High impact strength at low temperatures

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- Excellent electrical properties
- Inherent flame resistance

Ticona
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ANTEC 2008
Annual Technical Conference Milwaukee, WI May 4-8

The SPE Annual Technical Conference (ANTEC) will take place in Milwaukee, Wisconsin from May 4-8, 2008. SPE will collocate the Plastics News' Plastics Encounter trade show with ANTEC. The ANTEC Automotive Session is Tuesday afternoon May 6th. The Automotive Session will have 8 presentations in areas of automotive plastic materials, testing, tooling and processing. There will also be 1 interactive paper. The Automotive Division Business Meeting will take place Tuesday afternoon May 6th at 5:30pm following the last technical presentation.

If you want to learn about the latest developments in automotive plastics, plan to attend the Automotive Division Session of ANTEC. This year Chair of the ANTEC Automotive Division Session is Tom Pickett. Helping Tom organize the session are Norm Kakarala, Jay Raisoni, Suresh Shah, and Michael Shoemaker. Norm Kakarala is the moderator of the session.

For more information about ANTEC, visit the SPE website: www.4spe.org

AutoEPCON

Third-Annual Conference Announced

The Detroit Section and Automotive Division have again teamed up to host a special one-day technical conference and exhibition on advances in engineering plastics for the automotive industry. Called Design & Developments with Automotive Engineering Plastics (or AutoEPCON for short), the event will be held April 22, 2008 at the Best Western Sterling Inn, Sterling Heights, MI.

Last year's AutoEPCON was successful with great attendance from OEMs and tier suppliers. The 2008 AutoEPCON will feature technical presentations on the newest advances in materials technology & design, process enhancements, and application developments for thermoplastic and thermoset engineering materials for the automotive industry. Tabletop exhibits will be on display throughout the event. A lunch and an after-glow, plus several coffee breaks will also be provided throughout the conference to allow further networking opportunities for all who attend.

For more information on this program, contact Pat Levine, SPE Automotive Division, p.levine@yahoo.com or call +1.248.244.8993.

Design and Development with Automotive Engineering Plastics

AUTO EPCON

One Day Technical Conference & Exhibition

Date of Conference: Tuesday April 22, 2008

Best Western Sterling Inn, Sterling Heights, MI

Call for Technical Presentations

Deadline for Presentations

April 4, 2008

No Paper Required

Contact Information:

Technical Presentations:

Dr. Norm Kakarala, Delphi Corp.
248-655-8483
norm.kakarala@delphi.com

Sponsorship:

Nippani Rao, Chrysler LLC
248-576-7483
nr2@chrysler.com

Gary Kogowski, ENTEC Polymers
248-797-7433
gkogowski@entecresins.com

Registration:

Pat Levine, SPE
248-244-8993
p.levine@yahoo.com
Fax: 248-244-8925

Program Co-Chairs:

Tom Pickett, General Motors
586-492-2454
tomjpickett@yahoo.com

Nippani Rao, Chrysler LLC

Program Scope:

The **Automotive Division** and **Detroit Section** of the Society of Plastics Engineers (SPE®) International invite you to attend a 1-day technical conference & exhibition showcasing innovative developments in the *Design, Materials, Processing, & Use* of Engineering Plastics for the Global Automotive Industry.

Who Should Attend:

This conference is specifically designed to inform, update and educate the OEM & supplier communities about advances in both thermoset & thermoplastic engineering polymers. Learn how these widely-used materials can help improve performance & productivity, while reducing cost and mass.

Presentations:

Hear Technical Presentations on the Newest Advances in Engineering Materials related to:

> Design Engineering
> Materials Development
> Processing & Enabling Technologies
> New Applications & More

Exhibits:

See Exhibits from Engineering Plastics Suppliers, Molders, Compounders, Additives & Reinforcement Suppliers, Design & Engineering Firms, & Machinery Suppliers. Experts will show you how to apply the latest technologies to your next program.

Conference Includes:

Full Day of Technical Presentations, Plenary & Keynote Presentations on Automotive Business Trends, Lunch & Coffee Breaks, Exhibits of Advanced Technologies.

Pedestrian Safety Validation of a High Performance Thermoplastic Composite Hood

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SABIC Innovative Plastics

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Background

As OEM's continue to develop solutions to today's pressing environmental challenges, they are continually investigating methods and materials which will enable the production of lighter vehicles which are more fuel efficient and produce lower quantities of CO2 per km driven. SABIC Innovative Plastics pioneered the development of injection-molded thermoplastics for online-painted lightweight exterior body panels in vertical locations with the Noryl GTX* PPO/PA conductive resin family, and have more recently been focused on the development of a composite thermoplastic material that will be suitable for horizontal locations (such as the hood, roof and trunk lid).

The development of IXIS (formerly known as HPPC, or High Performance thermoPlastic Composite) technology is being carried out jointly by SABIC Innovative Plastics and AZDEL Inc. (a division of Hanwha L&C) with the aim of achieving class-A painted parts with part weight, part stiffness and dimensional stability similar to aluminum and a total cost comparable to current solutions.

IXIS is a multi-layer composite material, comprised of a low-density core sandwiched between high-strength skins. AZDEL's SuperLite® chopped-fibre reinforced low-density thermoplastic sheet is used as the core. Figure 1a shows the layered construction of the product, and Figure 1b shows a cross-section through the layers.

The challenge of developing a thermoplastic solution for horizontal body panels has focused the attention of material suppliers for many years. An early attempt by SABIC Innovative Plastics was the demonstrated on the Vector II concept car of 1987, using a compression molded glass-mat thermoplastic inner frame bonded to an injection molded thermoplastic outer skin. This solution met the mechanical and crash requirements for a hood, but needed improvement on dimensional tolerances and offered little weight saving compared with a steel hood. Hence the IXIS development effort is focused around the concept of a sandwich material that can offer the benefit of high stiffness plus weight reduction.

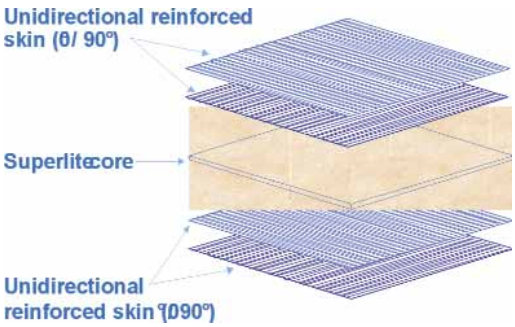


Figure 1a. The multi-layered structure of IXIS showing the 2 skin plies on each side of the Superlite® core

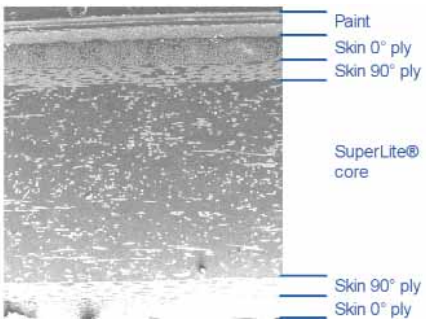


Figure 1b. Cross-section through IXIS structure showing the 0° and 90° oriented layers of continuous glass fibres on each surface of the low-density SuperLite® core

Pedestrian safety validation of an IXIS hood

In order to validate the pedestrian protection performance of IXIS technology in full-size vehicle hood, it was decided to produce and test prototype hoods for the Hyundai HED-4 QarmaQ advanced technology demonstration vehicle using this new material. The development of the QarmaQ (Figure 2) is a joint project by Hyundai Motor Corporation and SABIC Innovative Plastics with 3 key goals: to demonstrate technologies that can lead to lower weight, to demonstrate a pedestrian friendly CUV design with the "Elastic Front" passive pedestrian protection concept, and to enable design and styling freedom through the use of innovative plastic materials.

The front end of the QarmaQ is engineered to meet several different pedestrian safety requirements, including EEVC WG17 Phase 2, Euro-NCAP and Japan-NCAP.

Figure 2: The Hyundai HED-4 QarmaQ advanced technology demonstration vehicle features a prototype hood made using IXIS thermoplastic composite technology.

Pedestrian protection legislation

In order to reduce the number of pedestrian injuries and fatalities in highly urbanized Europe and Japan, legislators have introduced vehicle-testing rules intended to reduce the risk of serious injuries if a pedestrian comes into contact with the front-end of a moving vehicle. The head impact test requirements for both the European and Japanese regulations are similar, with 2 tests covering child head and adult head impacts. The European test requirements include 2 additional tests covering lower leg and upper leg impacts. At present the upper leg impact results are for monitoring only, and are not critical for vehicle homologation, however they are included in consumer-oriented Euro-NCAP ratings. The tests are summarized in Figure 3. For the developmental IXIS hood described, only head impacts need to be considered.

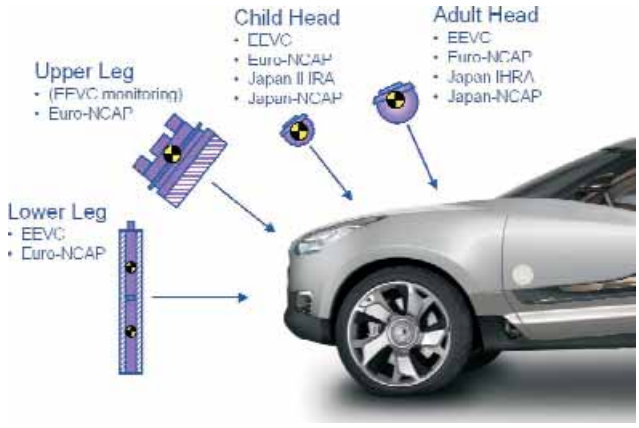


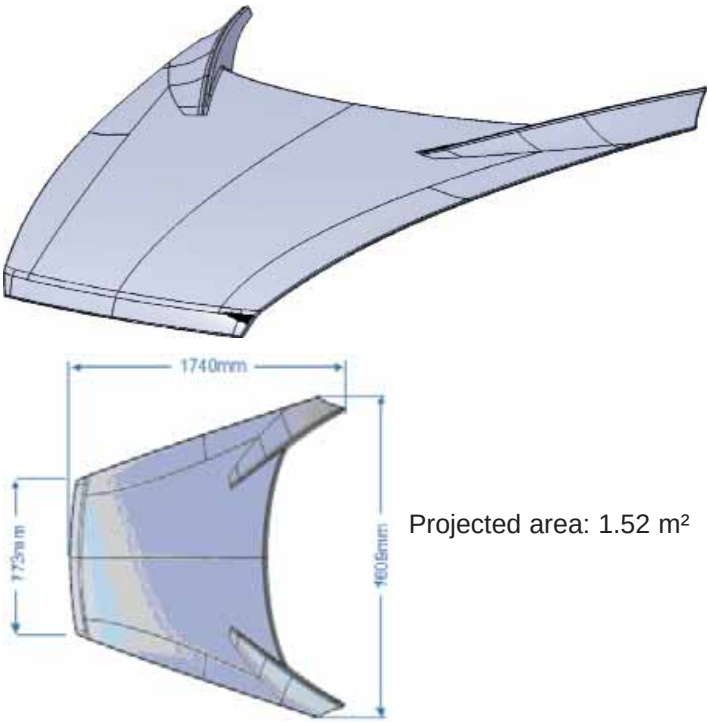
Figure 3. Graphical summary of the impact tests required under pedestrian protection legislation and consumer testing in Japan and Europe.

In order to determine if a particular design performs with an acceptable level of injury risk, acceleration measurements are taken from tests and then a numerical Head Performance Criteria (HPC) is calculated. Allowable limits for HPC (which have been correlated to levels of injury risk) and methods for assessing each design are specified in the regulations.

Hood design for pedestrian protection

Since IXIS is a new type of sandwich composite material, the first step in creating a hood design for pedestrian protection was to generate an initial set of material data. The properties of the AZDEL SuperLite® core have previously been characterized and this allowed the semi-empirical estimation of properties for the skin layers to be developed based on testing of the complete sandwich.

The design goal was to keep the predicted HPC values below 1000 for 2/3 of the surface area of the hood, and below 2000 for the remaining 1/3 of the hood surface. Following the design freeze on the clay models and completion of the surfacing and panel split-up by Hyundai Europe Design the general layout and dimensions of the hood outer skin are shown in Figure 4.



Projected area: 1.52 m²

Figure 4: General layout and dimensions of the QarmaQ hood outer skin

To meet the pedestrian protection requirements, a middle ground must be found between stiffness and deflection. The hood must be "soft" enough to deflect and absorb the energy of the impact without subjecting the head-form to excessive acceleration, but it should be stiff enough to minimize deflection or intrusion into the engine bay. Excessive intrusion would require an increase in the packaging space between the inner surface of the hood and hard-points in the engine bay such as the shock absorber mounts or engine components, and this is not preferred since it requires a more voluminous front end.

As well as meeting these pedestrian protection requirements, the hood design should also meet all functional requirements such as bending stiffness, torsional stiffness, centre point loading stiffness, hood slam durability, dent resistance, flutter under aerodynamic loads, hinge stiffness and offset barrier crash, as well as low-speed insurance classification tests. These load cases and test requirements are not covered in this paper.

Based on the final surface for the hood and the overall vehicle design, a number of impact locations were selected for modeling and subsequent testing. A total of seven locations were selected as points of interest (Figure 5), however a larger number of impact locations would be explored for actual vehicle homologation tests.

ABAQUS software was used to carry out dynamic simulations of the various impacts that were considered, and HPC values were calculated from these simulations. Several iterations were carried out on a number of different

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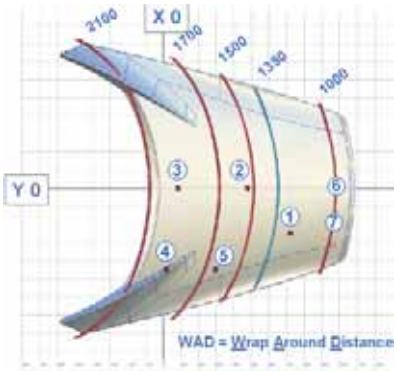

Figure 5a. Plan view of impact locations showing coordinates and Wrap-Around Distance lines.

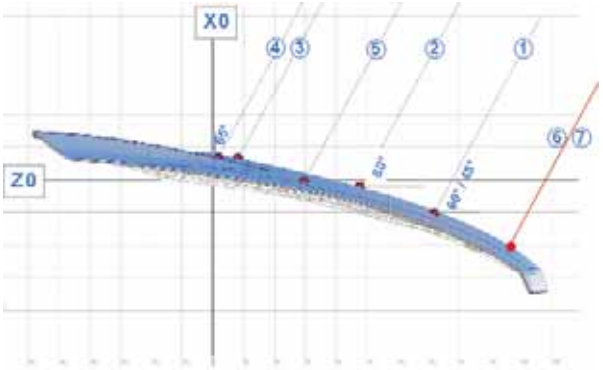

Figure 5b. Side view of impact locations showing impact angles.

design concepts in order to explore the effect of different energy-absorbing shapes for the inner frame on the calculated HPC. As the material properties were only preliminary and not determined from dynamic testing, the calculated HPC values and deflections were not expected to be accurate in the absolute sense, however they were useful for determining which design alternatives offered better performance. The most promising design was selected for prototyping and testing. The CAD data from the proposed designs was transferred to RangerPlast in Italy who milled matched tools for the outer skin and the inner frame from aluminum.

Prototype hood fabrication

The first step in fabricating the prototype hoods was to hand-fabricate sheets of online-paintable IXIS material by spot-welding two plies of continuous glass-fibre reinforced PC/PBT tapes to both sides of a PBT SuperLite® sheet. Two plies were spot-welded in place, at 0° and 90° orientation to the machine direction of the SuperLite® sheet. The hand-laminated IXIS sheets were pre-heated at temperatures ranging from 265°C to 285°C for between 240s and 300s. The pre-heated sheet was then transferred manually to the press where the tool (pre-heated to 150°C) was closed and clamping pressure applied. Clamping pressures between 1000T and 3000T were tried in combination with holding times between 20s and 300s.

The formed parts were then trimmed to size and metal inserts were bonded into place on the top surface of the inner frame using Betamate™ 2810/1S to reinforce the attachment points for hinges, gas-struts and latch. Dow Betaprime™ 5404 primer was applied to the areas to be bonded to activate the PC/PBT surface. Once the inserts were cured the outer skin was bonded to the inner frame using the same primer with Dow Betamate™ 2810MV. The parts were clamped together and heated to a temperature of approximately 60°C for a curing time of around 20 minutes. The completed hood assemblies were then painted by hand in a spray-booth using a two-layer paint system. A matt black topcoat was applied, the matt finish ensuring that reflections were not apparent in the high-speed video images of the part testing.

Pedestrian protection testing - Head impact testing

Tests were carried out at the pedestrian protection testing laboratory of IAV GmbH in Gifhorn, Germany. A stiff support frame was designed and constructed to simulate the attachment points on the QarmaQ body. Standard hinges and latches from the Hyundai Tucson were used for testing purposes. The testing set-up is shown in Figure 6.

Figure 6a. Overall view of the impact testing set-up showing the hood assembly mounted on the support frame, impactor launcher and laser measurement device.

Figure 6b. Close-up detail of hinge attachment to support frame.

Figure 6c. Close-up detail showing the laser distance-measurement apparatus positioned under the hood to measure intrusion into the engine bay.

A series of 24 impact tests were carried out to measure the HPC value at each impact location. For each test the impact speed, impact angle and impact location were set according to the specific test method to be performed (Euro NCAP or Japan NCAP). The measured HPC values for each impact location tested under Euro-NCAP conditions are shown in figure 7 (averaged if more than one test was carried out at the location and normalized to account for minor impact speed variations).

The first observation made during the testing was that the IXIS hoods as designed for the QarmaQ can withstand these pedestrian safety tests with very little obvious damage. The amount of local strain that the material experiences appears to be well within the elastic limit for this material.

The second observation was that the target of achieving HPC values below 1000 for 2/3 of the hood surface area was achievable. Most measured HPC values were between 300 (minimum 201) and 800 (maximum 810) for the "soft"

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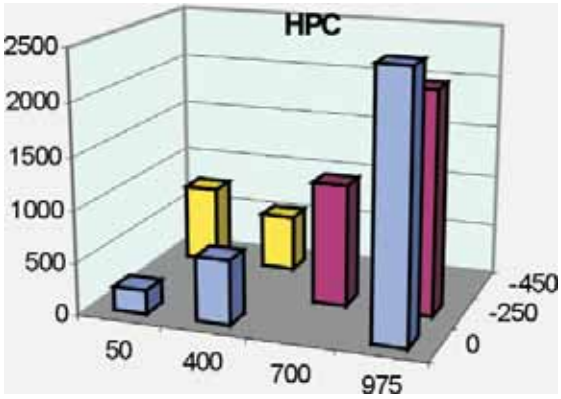

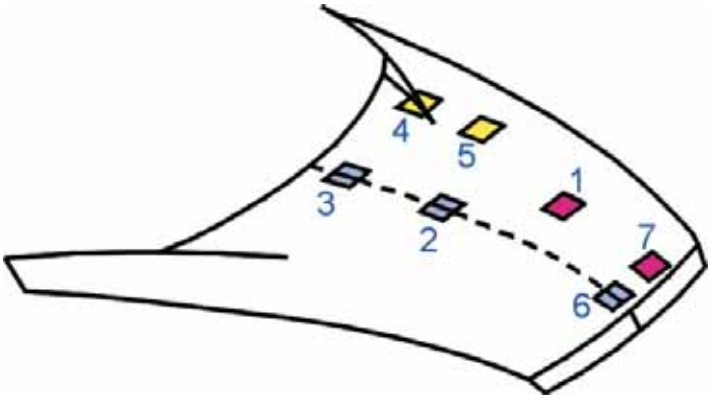

Figure 7. Measured HPC values for Euro-NCAP tests

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areas of the hood (locations 1, 2 and 3), with deflections between 44mm and 100mm. As expected the HPC values for the "stiff" areas of the hood over the latch and near the bump-stop (locations 6 and 7) were quite high (2600 and 2100). In an actual vehicle, we expect it would be possible to reduce these values by using deformable latch and bump-stop mounting points, since in the testing these were attached directly to the support frame.

The effect of including a hard-point under the centre of the hood at location 2 was also investigated, by placing a steel beam across the width of the test frame at this point. Three tests were carried out, with differing distances between the beam and the inner surface of the hood. It was only when the hard-point was located 60mm below the surface of the hood that the HPC value went above the limit of 1000, indicating that a deformation distance of approximately 70mm might result in an acceptable HPC value.

Conclusion

The prototyping and testing of the QarmaQ hood in IXIS material has successfully indicated that this new material offers the potential for production of composite automotive hoods that are required to meet the pedestrian safety regulations in Europe and Japan. As it stands, the hood design that was selected could be considered as over-designed, due to the absence of non-elastic deformation or local failure of the hood.

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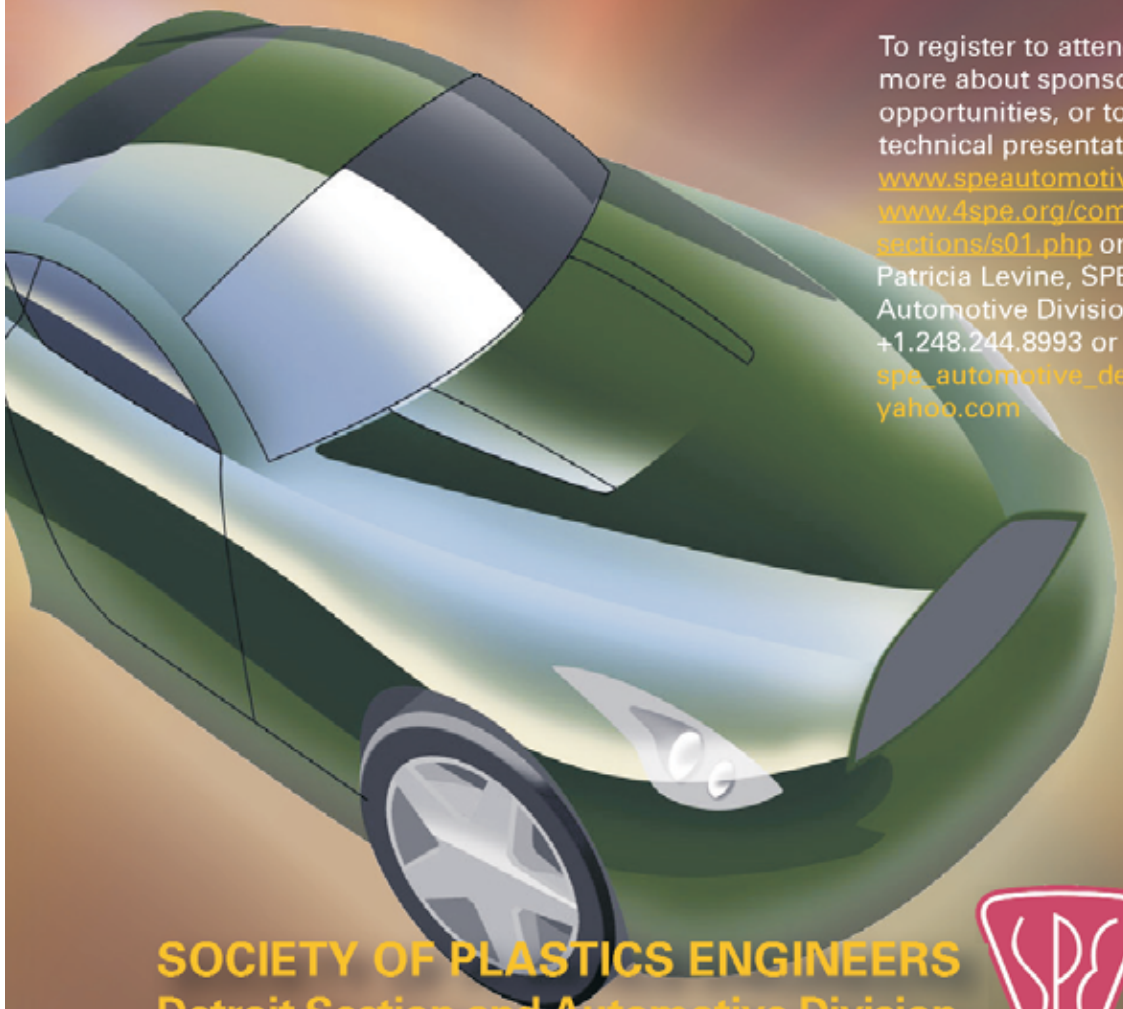
The conference will be held on **Tuesday, April 22, 2008** at the Best Western Sterling Inn, Sterling Heights (Detroit-area), MI, USA.



To register to attend, learn more about sponsorship opportunities, or to make a technical presentation, see www.speautomotive.com or www.4spe.org/communities/sections/s01.php or contact Patricia Levine, SPE Automotive Division, at +1.248.244.8993 or email spe_automotive_detroit@yahoo.com

SOCIETY OF PLASTICS ENGINEERS
Detroit Section and Automotive Division

Councilor's Report

Nippani Rao

I attended the SPE International Council Meeting, held at Savannah, Georgia, January 26, 2008

Elections

New President Elect:	Paul Anderson
New Sr. V.P:	Ken Braney
New V.P Int.	Jon Ratzlaff
New Council-of-the-Whole Chair:	Brent Strong

Treasury Report

- SPE lost 250K in 2007
- Plastics Engineering losses 710K
- Fired the AD manager involved with PE
- Books/Conferences/Journals/Seminars brought in 720K
- John Wiley is being brought in to take over PE
- There will be only 10 issues in 2008
- Advertisers will not pay for electronic PE
- SPE HQ is losing 3 people. Will not be replaced.
- Polyolefins Top-Con is a point of concern

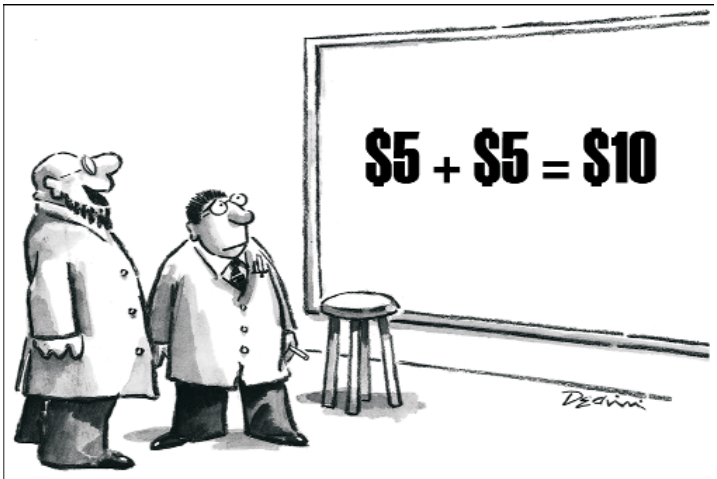
ANTEC & NPE in Chicago

- The combined event is on for 2009
- Negotiating with San Antonio regarding future SPE and SPI meetings.

Miscellaneous Information

- International Committee will become strategic Growth Committee covering worldwide events
- India hosted Autoplast in December, Raised $20K
- China hollow plastics conference, at Chinaplas April 13-16, 2008
- EuroTec is coming in Barcelona, Spain 2009
- Good K-Show with excellent Seminar training
- Australia is doing well
- Developing 4 Sections in Scandinavia
- Mexico is not doing well
- Additional focus on developing SPE in Brazil
- Thermoforming Division contributed $56K from their show with over 900 attendees

Membership Matters



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