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Dr. Fred E. Schwab 1918 - 2009

Fred Schwab's service to the plastics industry is truly legendary. He was one of the co-founders of SPE in 1942. He was vice president, president, board member, and council member of the Detroit Section and was a Director Emeritus of both the Detroit Section and the Automotive Division at the time of his death on February 20, 2009. Fred served on many SPE ANTEC committees and the Automotive Division Board. He received his third Outstanding Member Award in 1969 and was honored as a Distinguished Member of SPE in 1980. He received the SPE Presidents Cup Award in 1984 and was co-founder of the SPE Section in Central Europe in 1986. Below is a reprint of his biography from the National Plastics Center and Museum.

The Germany of 1918 was a broken country, defeated in The Great War and stripped of much of its wealth while the Treaty of Versailles limited manufacturing and research. The year also marked the birth of the Weimar Republic under which a new constitution was drawn, attempting to organize Germany as a democratic republic. Initially, it was a time of great optimism for Germans, but in less than a decade that optimism grew more and more into frustration as the country faltered economically and despair opened the door to more radical thinking.

This was the Germany that Dr. Fredrick E. Schwab was born into on October 16, 1918, amidst one of the final air raids of World War I. His mother, Alice Schwab, was forced to go to a basement and seek cover while she was in labor. His parents saw promise for Germany and for their son's future. Living in the financial capital of Frankfurt am Maim, Herr Dr. Alfred William Schwab was a lawyer, held the title

of Judge, and he was a businessman, selling industrial and commercial rubber products throughout Germany. The Schwab family lived comfortably in cosmopolitan Frankfurt, a center of science and technology and also known for its pragmatism and tolerance. This was important to Jews, who in many other parts of Germany were targets of discrimination.



Fred had an older brother, Hank (Hans), who was born in 1914. Together they attended school in Frankfurt and worked hard. In fact, Hank went to work in his father's business, which by the mid-1930s had grown to a substantial size. Following school Fred became an apprentice at the rubber manufacturing firm of Gummiwerke Odenwald/ Metzler. It was here that he became technically interested in synthetic polymers and later gained a specific interest in acrylics. In fact, prior to his leaving Germany, Fred took a job in a dental laboratory working with acrylic polymers.

Fortunately for Fred, he was a mere step ahead of the Nazi soldiers when his family insisted that he leave Germany and go to New York City where he had an uncle, who had agreed to help him in getting settled in America. Fred left Germany on June 16, 1937 and joined his uncle in New York. Little did he know when he left what was about to happen to his family left in Nazi Germany.

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Treasurer's Report

John Fialka

The SPE Automotive Division is in a strong position due to successful year. The bank account balance is in good standing with \$122K in checking and \$27K in savings for a total balance of \$149K.

Primary expenses in the past 2 months were Education (\$14K), 2009 AutoEPCON (\$8K), the 2009 Automotive Composites Conference ACCE (\$8K), and the 2009 Innovation Awards Program (\$3K).

After 3 years, this is my last report as Treasurer. The Board will name a new treasurer for the 2009-10 fiscal year. It has been a pleasure serving the SPE Automotive Division board and SPE Automotive Division members.

Automotive Division Meeting Schedule and Special-Events Calendar

Division Planning Meeting American Chemistry Council-Troy	June 1, 2009
ANTEC 2009 McCormick Place West, Chicago	June 22 - 24, 2009
Automotive Division BOD meeting American Chemistry Council-Troy	August 3, 2009
9 th -Annual SPE Automotive Composites Conference & Exposition, MSU Management Education Center, Troy, MI	September 15-17, 2009
Automotive Division BOD meeting American Chemistry Council-Troy	October 12, 2009
39 th -Annual SPE Automotive Innovation Awards Program & Gala	November 2009

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 Maria Ciliberti at (248) 377-6851 for more information.

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Chairman's Message

Tom Pickett

2008-09 is turning out to be a successful year for our SPE Automotive Division. SPE International recently awarded our Automotive Division the 2008-09 SPE Pinnacle Award Gold Level. For those of you who may not be familiar with this award, the SPE Pinnacle Award Gold Level is the highest award that SPE International can bestow on an SPE division. It is a great accomplishment! To earn this award involves the efforts of many. I want to thank all our SPE Automotive Board Members, Committee Chairs and their team members for their hard work and dedication in organizing SPE events this year. Also, I want to thank each of you for being a member of our SPE Automotive Division and supporting our Automotive Division events this year. Congratulations!

I also learned that one of our Automotive Board Members, Monica Prokopyshen, has been awarded the SPE Honored Service Award for her many years of dedication and service to SPE. Congratulations Monica!

The 4th Annual AutoEPCON that will take place on Tuesday, April 28, 2009 at the Best Western Sterling Inn Sterling Heights, Michigan. It is a one



Marianne and Fred Schwab together at Fred's 80th birthday celebration.

day technical conference and exhibit on the latest in automotive engineering materials, design and processing. AutoEPCON is a joint conference between the SPE Automotive Division and the SPE Detroit Section. Nippani Rao is the 2009 AutoEPCON Conference Chair. Helping Nippani are dedicated SPE Board Members from the Automotive Division and the Detroit Section. AutoEPCON is a great event to attend for someone that wants to learn about the latest technology in automotive engineering materials, design and processing. At AutoEPCON, our Automotive Membership Chair, Johanne Wilson, is planning a job fair. In these uncertain economic times, it is important that one learns the latest technology and network. I hope to see you at the 2009 AutoEPCON on April 28th !

ANTEC 2009 is June 22-24, 2009 at the McCormick Place West Chicago, IL. It will collocate with the 2009 NPE (National Plastics Exhibit). Norm Kakarala and his Automotive ANTEC Committee organized the ANTEC Automotive Session on Tuesday, June 23. At the end of the Automotive Session, there will be the SPE Automotive business meeting.

On a sad note, Fred Schwab, Director Emeritus, recently passed away. Fred was one of the SPE founding members. Fred was well known in the plastics industry, and he will be missed.

I appreciate your support of SPE events. If you like to become involved in the Automotive Division, please contact either myself or one of our SPE Automotive Board Members. For a calendar of this year's event, please refer to the website www.speautomotive.com or call Tom Pickett at 586-492-2454.

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Dr. Fred E. Schwab 1918 - 2009

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Dr. Schwab was just the kind of businessman that Adolph Hitler wanted to eradicate from Germany, and in November 1938 Dr. Schwab was sent to Buchenwald, one of the notoriously harsh concentration camps operated by the Nazis. Immediately Hank left Berlin where he was living and working for his father. Soon after he arrived in Frankfurt he too was arrested by Nazi soldiers and sent to Buchenwald. Both were put to hard labor during their stay at Buchenwald.

Fearful of what might happen to them, Alice quickly contacted a cousin of hers that was living in England with Lady Knutsford, who had influential political contacts. Pleading their case, Lady Knutsford prepared legal documents that were delivered to the Nazi authorities demanding the Schwab family be deported from Germany and sent to live in England. Hank went on to marry and then moved to the United States and settled in Gary, Indiana.

At this point, Fred is 19 years old and living in New York. His Uncle Albert Ruthberg, a successful banker for the Halgarten Co. of New York, and an art collector, loaned Fred \$6,000 to get himself started in his new country. Fred told the Society of Plastics Engineers once, "(I) did the greatest sales job of my life. I convinced him to lend me \$6,000, which was a lot of money in those days, interest free to start my business."

It took Fred only a few months to find a partner, Jack Frank, who had some connections in Detroit, Michigan. The two decided to use Fred's experience with acrylics and begin manufacturing dentures out of acrylic polymer/monomer resins. They named their company Schwab & Frank, Inc. and developed a pink acrylic material sold under the name Crystalex. It was the first material of its type introduced into the U.S. market and it caught the attention of a lot of people, dentists, in particular.

The acrylic compound immediately caught the attention of Kerr Dental Laboratories, a manufacturer of dental supplies and searching for just the product and technology Schwab & Frank were developing. Kerr was located in Detroit and insisted that Schwab & Frank establish a plant in Detroit. They began supplying Kerr with materials, but more importantly, began developing new products. On a trip to Philadelphia, Fred met Otto Haas, founder of Rohm and Haas and one of the world's premier developers of acrylic resins. Fred also met with scientists at the DuPont Company, another major acrylic resin manufacturer at the time and they continued to improve Schwab & Frank products for their dental customers.

In the meantime, however, the winds of another world war were blowing and as Fred had received U.S. Citizenship in 1943, he was now eligible to serve in the armed forces. At age 25 Fred was called up to serve in the U.S. Army's Army Specialized Training Program (ASTP) where he was trained as an interrogator. The Army's interest in Fred was in his ability to speak German and French, later Italian and, of course, English. While in the Army, Fred served as a translator assigned to a unit managing prisoners of war. He served with the Army for three and one-half years, leaving the business to be run by his partner Jack Frank.

In 1939 Fred visited New York and had dinner with Marianne Rothschild. He knew Marianne from childhood growing up in Germany. They had a common cousin living in Frankfurt and both attended the cousin's birthday party when they were about 10 years of age. While, of course, they weren't romantically involved,

they became friends and remained in touch with each other after Fred left Germany.

Marianne left Germany in March 1939 and went to live in England for several months before coming to the U.S. to attend George Washington University. Following a short stay in New York she moved to Washington, D.C. where she lived with the Executive Officer of Walter Reed Hospital and worked part time as an au pair for a wealthy Washington family while she attended school.

Fred's duties, now as a Master Sergeant in the Army, found him spending time in Washington, D.C., where he visited with Marianne. Their relationship soon evolved from platonic to romantic and the two decided to marry. Fred and Marianne were married on September 2, 1945, V-J Day, the day Japan signed the surrender document aboard the USS Missouri. After being sent back again to Virginia for a brief period, Fred was discharged and he and Marianne moved to Detroit where Fred took over where he left off in running Schwab & Frank.

Prior to his military service, Fred and Jack Frank were actively pursuing new business in dental compounds. By chance, in a Detroit haberdashery where he was having some business suits fitted, Fred met the owner Jack Gould, whose nephew was a partner at Detroit Macoid with George Hendrie, Sr., one of the earlier inductees into the Plastics Hall of Fame (1982). Macoid was developing extrusion processes for thermoplastic materials for the automotive industry and pioneered numerous extrusion innovations, which influenced Schwab & Frank and led them to develop the first multi-color and double-durometer crosshead extrusion process that they called Spectro-Line. With it they developed lines for jewelry, decorative products and industrial applications that were of the highest quality. They also developed extruded coiling that was used to protect telephone lines. With AT&T anxious to develop international telephone communications, Schwab & Frank sold enough of the material to go around the world.

During this time, Fred had visited Dow Chemical on one of his business trips and they showed him some of the new things that were being done with its Styrofoam resins. Fred and Jack immediately purchased an extruder and began making blocks of Styrofoam polystyrene from which various shapes were cut for decorative products like Christmas tree decorations, floatation and other applications. Their polystyrene business was so strong that they needed to find a more efficient way to cut shapes from the blocks they were molding and Fred developed a hot-wire technique of cutting three-dimensional shapes out of foam blocks, and he also developed a pour-in-place method for molding polystyrene shapes. In the years of 1946 and 1947, Schwab & Frank became Dow Chemical's largest buyer of polystyrene resin.

Now Fred was anxious to get into fabricating other plastic parts. While away from the business he had conjured many ideas and he foresaw that following World War II there was going to be new opportunities for growth in the automotive industry. He was already driving a LaSalle and his interest in the auto industry was growing, fueled by where he had come to live, Detroit, the center of it all.

It's important to keep in mind that Fred, although only having spent a short period of time in Detroit with his Army service and busy as he was in starting up his business, already knew a lot of people. Many of these important introductions came from a new organization being organized called the Society of Plastics

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Star Trek Polymers - and Future Vehicles

Education Report - Monica Prokopysheh

How will future vehicles look? What material characteristics are required? Sponsors of the 2008 plastics design challenge were offered a view of the future by tomorrow's designers on December 12, 2008 at the College for Creative Studies.

Sixteen automotive design students unveiled 2015-2020 clay models to an industry audience from the American Chemistry Council (Plastics Division) and the SPE Automotive Division and Detroit Section.

Challenged by Jim Kolb of the American Chemistry Council to create exciting, polymer intensive vehicles for high density population centers, the designs were as diverse as the target audiences and cities chosen. Family, utility, urban professional, and industrial vehicles were designed for Cairo, Mumbai, New York City, Chongqing, and Moscow. Design constraints included maximum speed (35 mph), size (3500 mm x 1600 mm x 1550 mm), low emissions and low carbon footprint. Electric vehicles (hybrid, plug-in, solar-assisted), electrochromic greenhouses, passenger protection, and filtration of the incoming air were common themes.

CAIRO - Volkswagens with self-healing polymers responded to a market where stone and car accidents were common and elicited a comment on these Star Trek polymers. Young Kwon designed a vehicle inspired by donkey carts and camel travel, sure footed and suited for commerce. The sales delivery vehicle moonlighted as a tourist vehicle on weekends and featured a solar roof panel, electrochromic glazing, touch activated automatic doors and outward angled rear passenger seats for sightseeing.



Young Kwon explains the Cairo concept vehicle.

CHONGQING - The Manhattan of China averages 15 days of sunlight per year and has a rapidly expanding population of 38 million in a car market that has grown 500% over the past ten years. Anthony Meyer's ambulance with 4 wheel motors features polycarbonate glazing and a light weight SMC roof to lower the center of gravity. The patient can be accessed from the side in this narrow vehicle which features abundant storage beneath the patient.



Anthony Meyer highlights the features of the Chongqing (China) concept vehicle.

MOSCOW - Saab inspired designs addressed the challenges of a cold climate, low visibility, 5-6 hour commutes, collisions and huge traffic jams that could last up to 18 hours. Vehicles had secondary lighting or customizable side panel graphics to express style and reduce accidents by increasing the vehicle visibility after dark, in snow storms and during stoppages. The skateboard chassis design with drive by wire and 4 wheel motors was coupled with high belt lines to hide oppressive traffic views. Romain Diboine's vehicle was inspired by the Twingo EV, and the comfort of a living room. His asymmetric commuter vehicle with a driver's seat and passenger couch had ingress from the left hand side, tinted blue glass, a door that rotates around the wheel and soothing aquamarine displays to reduce stress on long commutes. The glazing looks like a wing from the rear view.

MUMBAI designs incorporated a three layer, intelligent, breathable plastic comprising organic, conductive, and protective layers. This self-healing plastic had one-way visibility from inside to outside. Another feature was a step molding to facilitate entry into a vehicle with higher road clearance to accommodate annual flooding in the city.

NEW YORK city designs were inspired by Dell computers, where customers configure PCs and select components through a web interface - the "SNAP" purchasing process. The fashion conscious customer chooses body panels that "snap" together. The rear seats of John Miller's vehicle are removable and store at roof level, a traditionally underutilized area. The common chassis can be customized for 2 to 4 passengers, from a choice of body panels.

Special thanks to Jim Kolb and the American Chemistry Council (Plastics Division) for championing this valuable learning exercise for future car designers and for inviting the Society of Plastics Engineers to support and mentor this activity.

Dr. Fred E. Schwab 1918 - 2009

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Engineers. Fred believed that such an organization was needed where technical people could exchange ideas and report on technology they had developed. He became a founding member of the organization in 1942 and has been one of its most avid advocates since then. Fred told *Plastics Ingenuity* in 1970, "We all can help each other and the buyers at G.M., Ford and Chrysler. Even though we were competitors, we got along very well. The SPE meetings got us together and enabled us to be educated together."

To be sure, Fred has been good for the SPE and the organization has recognized his achievements, his dedication, and enthusiasm for spearheading the use of plastics, not just in the automotive industry, but in a variety of industries.

In 1952 Fred bought out his partner and began concentrating harder on automotive and other industrial parts. This would become the focus of his new company Schwab Plastics. He was doing things with extrusion that no one had ever done before, and he pioneered processes for extruding interlocking tubing and for extruding multiple colors, even in two durometers. One of Fred's technical achievements was the development of the first all-plastic tension spring.

By this time his company had manufactured millions of polystyrene Christmas balls and various other decorations. He had developed a cellulose acetate butyrate steering wheel for the Army in 1941 and it became a model for steering wheels on millions of cars produced after the war in the 1940s and 1950s. In 1954 he scored with the development of molded bead foam components used for automotive insulation. He was doing work for Studebaker at the time, but many other automakers investigated and adapted similar technology.

This, of course, was an exciting time for the U.S. automotive industry. As automakers went back to work at the business of building cars after World War II, there was renewed excitement and a drive to develop cars with V-8 engines, automatic transmissions, even the first plastic-bodied sports car, the Chevrolet Corvette. The Automotive Division of the Society of Plastics Engineers created a forum, the first really, where people with these diverse backgrounds and talents could get together and share their ideas all toward a common goal of advancing the automotive industry. It was during this time that Ford constructed a new Research and Engineering Center with unprecedented emphasis on the use of new materials, including plastics.

In February 1963 he broke new ground by establishing an adult education course at Highland Park entitled "Fundamentals in Plastics." That same year he was elected president of the Detroit Section of the SPE and later that same year he became one of the first members of the Plastics Pioneers Association. By now the SPE even trusted Fred with their money and he was elected Chairman of the Finance Committee of the SPE at the organization's Silver ANTEC Anniversary.

Through his company, Group Four Associates, Fred stayed involved in numerous projects and programs. He was instrumental in getting numerous automotive plastics programs started and once they were started, he never relented. The ambassador of plastics would keep tabs on progress, he would find ways to smooth rough roads, and he would find the right people and technology to make projects successful. There was no doubting

this man's vision when in 1969 he was named "Plastics Man of the Year" by the Detroit Section of the SPE.

An example of his relentless pursuit of excellence was work he performed with Crane Plastics, a long-time supplier to the automotive industry. Fred received an award from Crane Plastics on work he did on extrusions for Ford Motor Co. And it was at about this point that Fred saw the globalization of the automotive industry and the plastics industry and he began to realize that old tactics would not work in the future. By this time there were Japanese and European companies making vehicles in the U.S., often referred to as transplants.

It was with one of those early transplants, Volkswagen of America, that Fred began working as a consultant on the use of plastics in their cars. He was one of the early thinkers about recycling automotive plastics and became instrumental in developing a recyclable nylon resin, and then went on to convince General Motors and Ford Motor to modify their specifications for nylon to resins.

In 1980, Fred was named a "Distinguished Member" of the SPE at its annual ANTEC conference and two years later it was Fred Schwab who was lauded with the Chairmanship of the Detroit Section's 40th Anniversary activities. In 1983, Fred was honored again when he was appointed a trustee for the Plastics Center and Museum and a year later he was on the podium again at the ANTEC receiving the organization's prestigious "President's Cup."

By this time, SPE was looking to increase its membership and establish a section for Western Europe. Just as he was called to serve his country because of his insights and linguistic skills, SPE turned to Fred. He became the co-founder of the European Section of SPE. It's hard to imagine where Fred got his energy and enthusiasm. Even at age 70, he remained active with Group Four Associates. He attended auto industry conferences and he was still networking, using his skills, knowledge and vast contacts to advance the use of plastics in the automotive industry. He also still had the energy to promote something he felt strongly about for many years, the revival of the Plastics Hall of Fame. He became the co-founder of the Plastics Academy, which is the organization that cares for the Hall of Fame. Four year's later Fred would be inducted into that Hall of Fame, this after being honored by the SPE Detroit Section for his 50th year in the plastics industry. There were not many competitors for the award. In that same year, 1987, Fred was asked to perform the dedication of a 10-foot acrylic sculpture at the Ferris State Plastics Building.

While Fred spent most of his life in the United States, he never forgot that he was German by birth, and Germany never forgot him. In 1995 Fred was awarded the Order of Merit First Class by President Roman Herzog, Federal Republic of Germany. It was a treasured moment for Fred and Marianne, who celebrating their 50th wedding anniversary in September of that same year, realized how far they had come in what seemed like a very short period of time.

In 1996, Fred was presented with an Honorary Doctorate of Humane Letters from Ferris State University in Michigan. Dr. Fred Schwab dissolved his business Group Four Associates in December 2002, after having been actively involved in the plastics industry for 65 years.

Dr. Fred E. Schwab was a true pioneer of the plastics industry, and his personal and professional contributions will always be remembered.

SPE® Announces Automotive Composites Conference Details

The organizing committee for the SPE Automotive Composites Conference & Exhibition (ACCE) today announced the dates, theme, and location for this year's show and issued its annual Call for Papers. Now in its ninth 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 returns September 15-17, 2009 at the MSU Management Education Center in Troy, Mich., U.S.A.

"With all the interest we saw last year in improving fuel economy, reducing dependency on petroleum fuels, and providing cleaner, greener transportation options," said Cedric Ball, marketing projects leader, Ashland Performance Materials and the 2009 SPE ACCE event chair, "we felt this year's ACCE should highlight the tremendous benefits composites can offer for reducing mass and creating more aerodynamic styling, while also lowering cost, improving aesthetics, and maintaining safety. To help underline these benefits, we selected **Plug in to Composites** as the theme for this year's show."

"To that end," added 2009 ACCE technical program chair, Fred Buck, "We're actively seeking keynote addresses and session presentations on the use of composites in fuel cells and advanced batteries, and for mass reduction. We're very excited to announce that Michael Donoughe, executive-VP, Vehicle Engineering and Manufacturing, at Tesla Motors will speak on the company's composites-intensive, high-performance plug-in-electric Roadster at this year's show."

Those interested in speaking at this year's event should

submit abstracts by April 27, 2009 to the review committee via ACCEpapers@speautomotive.com. Full papers or presentations are due May 29, 2009. Authors who submit papers (not presentations) in the proper format by the due date will automatically be eligible for consideration for the conference's Best Paper Awards, which will be presented during the event's opening ceremony.

The ACCE typically draws over 400 speakers, exhibitors, sponsors, and attendees from 14 countries on 4 continents with fully one-third indicating they work for an OEM involved in ground transportation or aerospace/aviation. Interestingly, over the past few years, the types of transportation OEMs represented at the show have continued to broaden beyond traditional automotive and light truck, to include agriculture, truck & bus, heavy truck, and aviation. This trend may indicate greater interest in technology sharing among transportation OEMs and suppliers.

Held annually in suburban Detroit, the ACCE provides an environment dedicated solely to discussion and networking about advances in the automotive composites industry. Its global appeal is evident in the diversity of exhibitors, speakers, and attendees who come to the conference from Europe, the Middle East, and Asia / Pacific as well as North America and who represent transportation OEMs and tier suppliers; composite materials, processing equipment, additives, and reinforcement suppliers; trade associations, consultants, university and government labs; media; and investment bankers. The show is sponsored jointly by the SPE Automotive and Composites Divisions. For more information, visit the Automotive Division's website at www.speautomotive.com/comp.htm.

SPE® Issues Call for Scholarship Applications for Graduate-Level Research in Automotive Composites

The organizing committee for the SPE Automotive Composites Conference & Exhibition (SPE ACCE) announced today that it will again bestow two \$2,000 USD scholarships for graduate-level research in polymer composites that has impact on ground transportation. Students interested in applying will find a Scholarship Application form available for downloading at www.speautomotive.com/comp.htm; applications should be submitted electronically to ACCEpapers@speautomotive.com by June 30, 2009 for awards to be announced in early August. Shares of the proceeds from last year's SPE ACCE show are funding this year's scholarships.

Winners will be selected from the pool of qualified applicants by SPE ACCE committee members and representatives from General Motors, Ford Motor Company, and Chrysler LLC. Winning students will be required to report on the results of their findings during the tenth-annual SPE ACCE, which takes place in September 2010.

This is the third year conference organizers have offered

scholarships. In 2007, two awards were made in honor of journalist and composites-industry insider, Steve Loud who passed away in 2006. The recipients were Roston Elwell from Texas A&M University (College Station, Texas) for research on the Use of Active-Core Composite Sandwich Panels for Improved Automotive Safety; and Alejandro Londono-Hurtado from University of Wisconsin-Madison (Madison, Wisc.) whose work involved Simulation and Numerical Modeling of Fiber Orientation and Density Distribution During Molding of Fiber-Reinforced Automotive Parts.

In 2008, two new winners were selected: Uday Sharma of University of Michigan-Dearborn (Dearborn, Mich.) has been researching Analysis of Thermoplastic Woven Composites at High-Strain Rates, while Tobias Potyra of Fraunhofer Institute of Chemical Technology (Pfinztal, Germany) worked on New Direct Processing Technology for the Manufacture of SMC Parts (Direct-SMC). Both students will present the results of their work at the 2009 SPE ACCE conference, September 15-17, 2009.



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Attend the World's Leading Automotive Composites Forum

The Automotive and Composites Divisions of the Society of Plastics Engineers (SPE) International invite you to attend the 9th-annual *SPE Automotive Composites Conference and Exhibition (ACCE)*, September 15-17, 2009. The show – which has become the world's leading automotive composites forum – will feature technical paper sessions, panel discussions, keynote speakers, networking receptions, & exhibits highlighting advances in materials, processes, and applications technologies for both thermoset and thermoplastic composites in a wide variety of ground-transportation applications.

Present Before an Engaged, Global Audience

The *SPE ACCE* typically draws over 400 attendees from 14 countries on 4 continents who are interested in learning about the latest composites technologies. Fully a third of attendees work for an automotive, heavy truck, agricultural / off-road equipment, or aerospace OEM, and roughly a fifth work for a tier integrator. Few conferences of any size can put you before such an engaged, global audience vitally interested in hearing the latest composites advances. Interested in presenting your latest research? Abstracts are due *no later than March 27, 2009* and Papers *no later than May 29, 2009* to allow time for peer review. Email abstracts or papers to ACCEpapers@speautomotive.com. Approved papers will be distributed on a CD to conference attendees and posted on our website after the event.

Showcase Your Products & Services with Exhibit & Sponsorship Opportunities

A variety of sponsorship packages – including displays, conference giveaways, advertising and publicity, signage, tickets, and networking receptions – are available. Companies interested in showcasing their products and/or services at the *SPE ACCE* should contact Teri Chouinard of Intuit Group at teri@intuitgroup.com.

Call for Papers

Exhibit & Sponsorship Opportunities

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 an e-mail to acce-registration@speautomotive.com; or write SPE Automotive Division, 1800 Crooks Road, Suite A, Troy MI 48084, USA.

MSU Management Education Center
811 W. Square Lake Rd., Troy, MI USA



Green Cars... Blue Skies...



SPE® Announces Call for Part Nominations for the 39th Automotive Innovation Awards Competition

The Automotive Division of the Society of Plastics Engineers (SPE®) International today issued a Call for Part Nominations for its 39th-annual **Automotive Innovation Awards Competition & Gala**. For almost four decades, this event has honored the "Most Innovative Use of Plastics" in automotive applications, becoming the largest competition of its kind in the world and the oldest and largest recognition event in the automotive and plastics industries. The part nomination form and competition rules are available at www.speautomotive.com/inno.htm. Nominations are due September 1, 2009 for applications that will appear on vehicles in commercial production no later than by November 1, 2009.

During the competition phase of the event, dozens of teams made up of OEMs, tier suppliers, consultants, and polymer producers work for months to hone submission forms and presentations describing their part, system, or complete vehicle module and why it merits the claim as the year's "Most Innovative Use of Plastics." To win, teams must survive a pre-competition review and two rounds of presentations before industry and media judges. Winners are announced at the Automotive Innovation Awards Gala, an annual event that typically draws 600-800 OEM engineers, automotive- and plastics-industry executives, and media. This glittering evening of celebration honors innovation and the hardworking teams that bring it to market.

Since 1970, the SPE Automotive Innovation Awards Competition has highlighted the positive changes that polymeric materials have brought to the automotive industry, such as weight reduction, parts consolidation, and enhanced aesthetics and design freedom. At the time the competition started, many OEM designers and engineers thought of plastics as inexpensive replacements for more "traditional" materials. To help communicate that plastics were capable of far more functionality than their typical use as decorative knobs and ashtrays indicated, members of SPE's Automotive Division Board of Directors created the Automotive Innovation Awards Competition to recognize

successful and innovative plastics applications and to communicate their benefits to OEMs, media, and the public. Over the years, the competition has drawn attention to plastics as an underutilized design tool and made industry aware of more progressive ways of designing, engineering, and manufacturing automotive components.

From its humble beginnings, the competition has grown to be one of the most fiercely contested recognition events in the plastics and automotive industries. Today, polymeric materials are no longer substitutes for more expensive materials, but rather are the materials of choice in hundreds of different applications throughout the vehicle. Without plastics, many of the auto industry's most common comfort, control, and safety applications would not be possible.

Current competition categories include:

Body Exterior,
Body Interior,
Chassis / Hardware,
Environmental,
Hall of Fame,
Materials,
Performance & Customization (Automotive Aftermarket),
Process / Assembly / Enabling Technologies,
Powertrain, and
Safety.

For more information about the Automotive Innovation Awards Competition and Gala or to download nomination forms and rules, visit the SPE Automotive Division's website at www.speautomotive.com/inno.htm.

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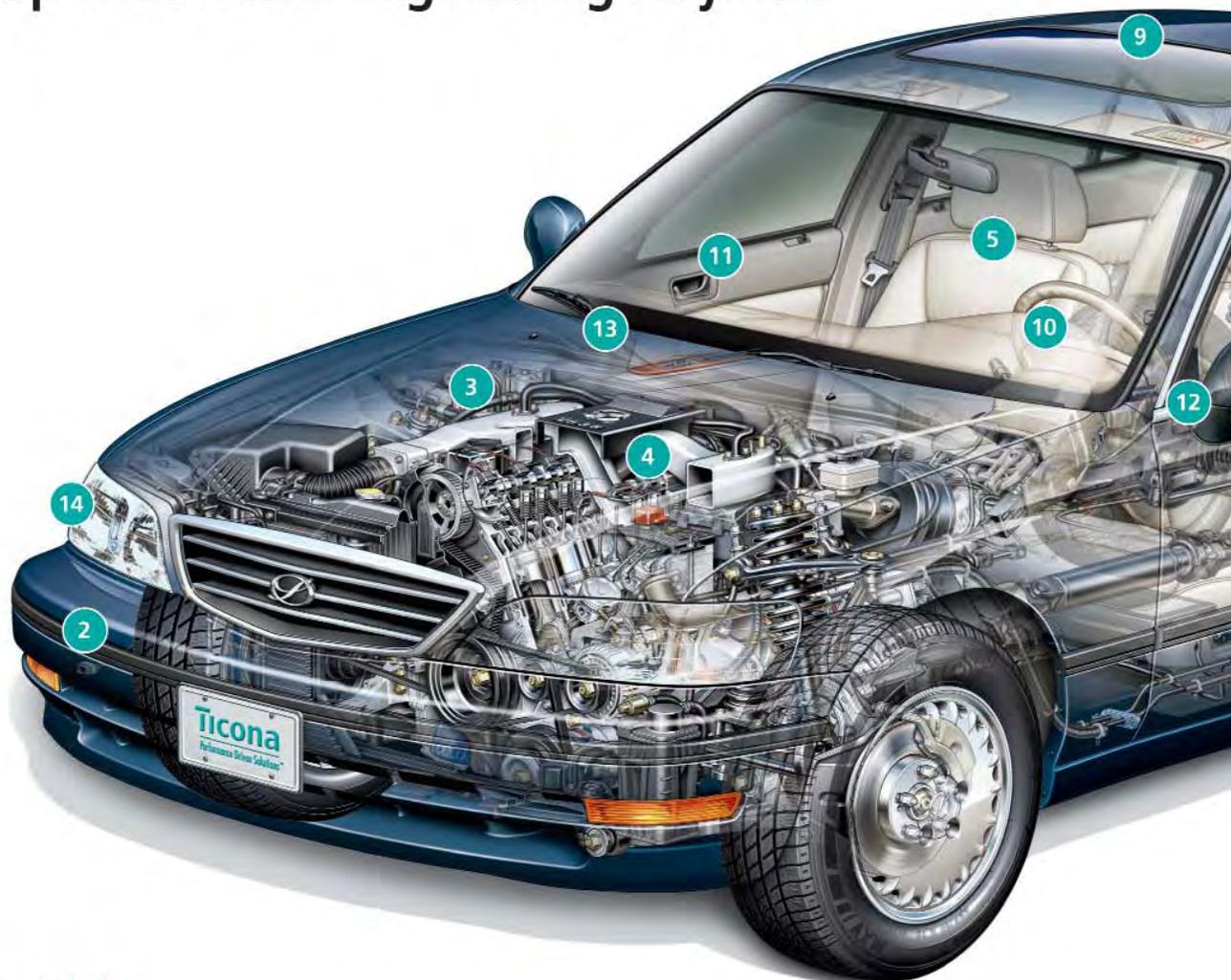


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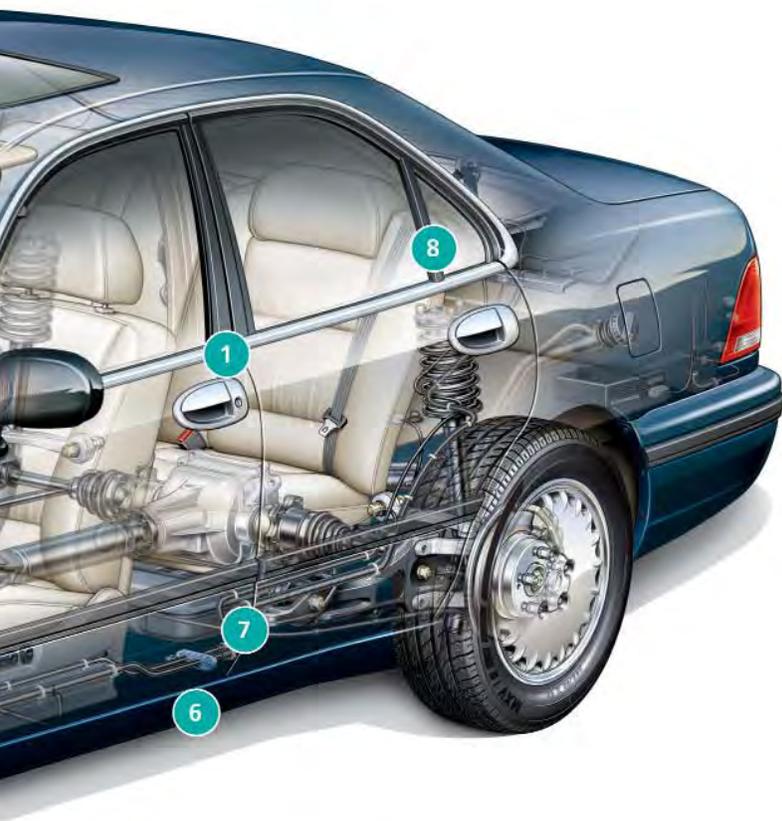
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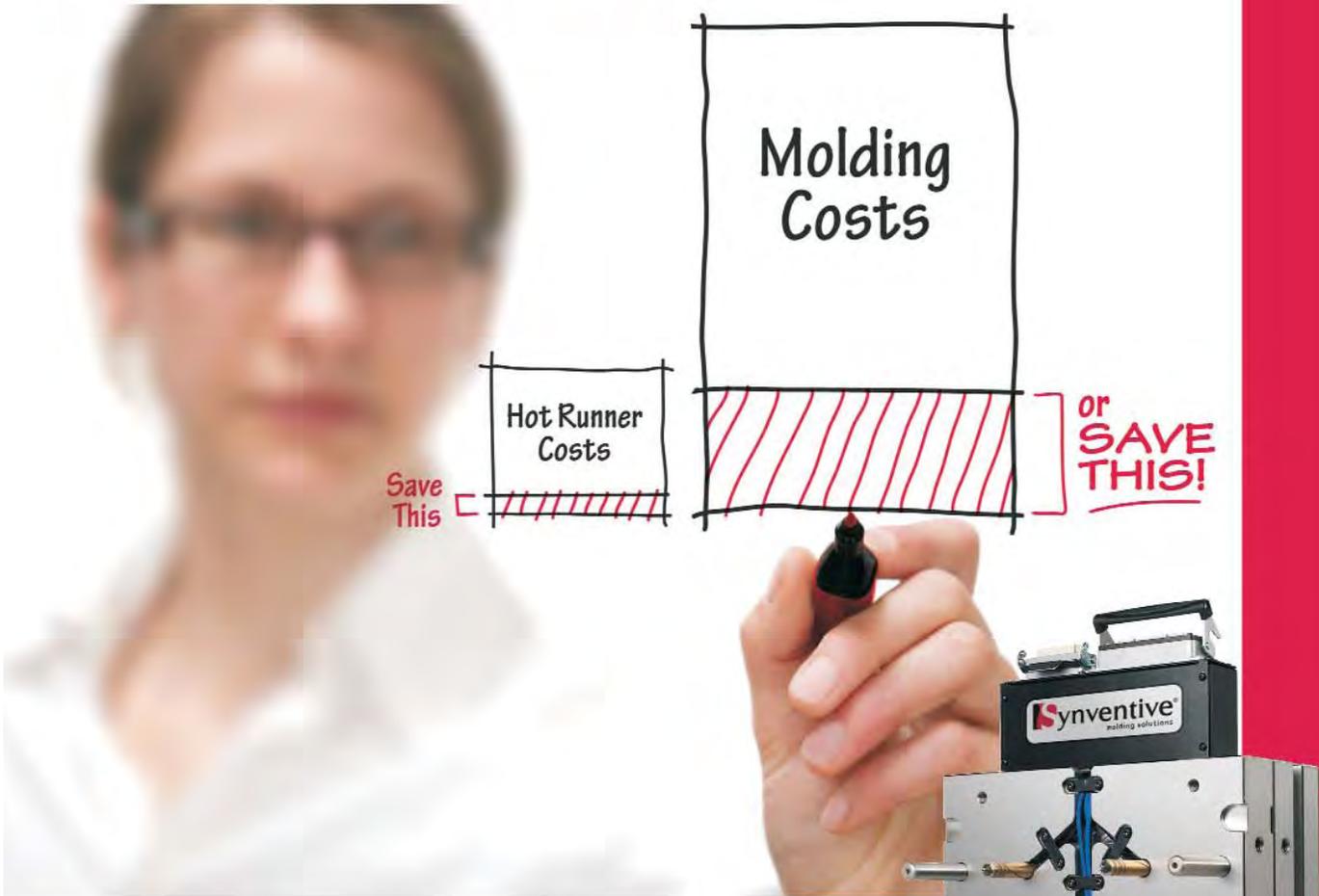
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SPE® Announces Call for Executive Nominations for the 39th Automotive Innovation Awards Competition

The Automotive Division of the Society of Plastics Engineers (SPE®) International today issued a Call for Executive Nominations for its 39th-annual Automotive Innovation Awards Competition & Gala. These prestigious awards recognize outstanding leadership among automotive and plastics industry executives. Executives may self-nominate or be nominated by peers or members of their organizations. They must agree to accept the award in person at SPE's Innovation Awards Gala, which is held one evening during the first two weeks of November.

Deadline for nominations is June 1, 2009 and the executive awards submission form can be downloaded at www.speautomotive.com/inno.htm. Nominations are currently being sought for the following award categories:

The **Lifetime Achievement Award** recognizes the technical achievements of automotive industry executives whose work (in research, design, and engineering, etc.) has led to significant integration of polymeric materials in vehicles.

Bestowed since 2000, past winners include:

- ◆ J.T. Battenberg III, former chairman and chief-executive officer of Delphi;
- ◆ Bernard Robertson, executive vice-president of DaimlerChrysler;
- ◆ Robert Schaad, chairman of Husky;
- ◆ Tom Moore, retired vice-president, Liberty and Technical Affairs at DaimlerChrysler;
- ◆ Mr. Shigeki Suzuki, general manager - Materials Division at Toyota Motor Company;
- ◆ Barbara A. Sanders, director - Advanced Development & Engineering Processes at Delphi Thermal Systems;
- ◆ Josh Madden, retired executive from General Motors Corp. & Volkswagen of America, SPE Emeritus, and automotive plastics pioneer; and
- ◆ Frank Macher, retired executive from Ford Motor Co., Collins & Aikman Corp., and Federal Mogul Corp.

The **Executive Leadership Award** was first given in 2004 and honors automotive executives who have demonstrated leadership in integrating polymeric materials on global vehicle platforms and who have been recognized both within the industry as well as in their community as leaders. While this award's recipient may not have been directly involved in fostering technical advances with polymers - as a recipient of SPE's Lifetime Achievement Award will have done - the honoree will have led his/her company to profitability, increased marketshare, and been at the helm of new vehicle launches that were considered a commercial success.

The award's past recipients include:

- ◆ James Padilla, chief-operating officer and president - Global Automotive Operations, Ford Motor Company;
- ◆ Tom Edson, retired director - Applied Material and Manufacturing Technology, Advanced Vehicle Engineering at DaimlerChrysler;
- ◆ James McCaslin, president and chief-operating officer at Harley-Davidson Motor Company; and
- ◆ James Queen, group vice-president for Global Engineering at General Motors Corp.

The **Special Recognition Award** acknowledges a person or team that has made important contributions in the automotive plastics arena. The winner may be an individual contributor or may have led a team, and be employed in industry or academics. The area of contribution may be research, education, or engineering. A team may have developed and launched a vehicle of particular interest or a unique new technology.

For more information about the Automotive Innovation Awards Competition and Gala or to download nomination forms and rules, visit the SPE Automotive Division's website at www.speautomotive.com/inno.htm.

Engineering Society of Detroit recognizes SPE leader, Shah



The Engineering Society of Detroit (ESD) and its Affiliate Council (consisting of 77 Societies) recognized Dr. Suresh Shah, senior technical fellow, Delphi Thermal Systems, on February 19 with the Engineering Society's 38th Gold Award. The Gold Award recognizes an engineer or scientist who exhibits achievement in their field or profession and demonstrates involvement in community activities. The award was presented during the Gold Award Banquet at Rock Financial Center in Novi, Michigan.

At the award ceremony, Shah gave a presentation on "Innovation - A Key Driver to the Survival of the Automotive Industry". Shah also received honors from the City of Troy (residence) and the Michigan state government on behalf of the governor, state representatives and city councilmen for his Gold Award. Both state and city councils recognized his contributions to the engineering and scientific community.

The Society of Plastics Engineers (Detroit section) was Shah's nominating society. Shah served as a Chairman from 1999-2000 for the SPE's Automotive Division and has

been on the board since 1991. In 2001, he received the "Fellow of the Society", the highest technical honor in the plastics industry. Based on his innovative work for interior, exterior, safety, lighting and seat systems and several other achievements and awards, SPE selected Shah as their engineer of the year nominee.

During his 23 years with General Motors and Delphi, Dr. Shah has earned 24 US patents, 10 defensive publications, 10 trade secrets and written 87 published articles, in the areas of plastics materials, processing and tooling. He has held several positions as a technical fellow, senior staff research scientist and senior development engineer. During his tenure, he's received several honors including the SPE Honored Service member in 2003, International SPE Innovation Award in 2000 and induction into Delphi's Intellectual Property Hall of Fame. And his team's innovations were nominated twice for the Boss Kettering Award. Throughout his career, Shah has also developed innovative plastic materials and process technologies to save energy and reduce costs.

Dr. Shah lives in Troy, Michigan with his wife Bina and children Nidhi and Ankur.



The SPE Annual Technical Conference (ANTEC) will take place at McCormick Place West Chicago, IL from June 22 - 24, 2009. It will co-locate with the 2009 NPE (National Plastics Exhibition).

Automotive Material Developments

- 9:00 AM ABS-PA Innovation For Automotive Interiors
Robert Hooker, BASF Corporation
- 9:30 AM Weathering Performance Advantages Of Mold-In-Color PMMA Acrylic Versus Coated Plastics For Exterior Trim Applications
Reid Banyay, Altuglas International
- 10:00 AM Breakthrough Material For Low Gloss And Abrasion Resistance With Molded-In-Color Automotive Interior Components
Steve Rogers, Dow Automotive
- 10:30 AM Surface Enhancement of TPO Polymers With Improved Flow And Scratch Properties
Ashutosh Sharma, Axel Plastics
- 11:00 AM High Flow PP/EPR Blends For The Automotive Industry: Basic Correlations Between EPR Composition And Application Properties
Georg Grestenberger, Borealis Polyolefine
- 11:30 AM Integrating Thin Wall Bumper Moulding Into Resin Properties: Effect Of Impact-Stiffness-Tensile Balance
Santanu Dutta, Machino Polymers Limited

Two Automotive Sessions are scheduled on Tuesday, June 23rd morning and afternoon. The Materials Session has six presentations and the Applications Session has five presentations. The Automotive Division Business meeting will be held after the last presentation at 4 PM. Here are the details of the presentations:

Automotive Application Development

- 1:30 PM At-Press TPO Technology
Parvinder Walia, The Dow Chemical Company
- 2:00 PM Most Critical Steps For Replacing Metal with High Performance Engineering Polymers For Under-Hood Applications
Kirit Desai, Solvay Advanced Polymers
- 2:30 PM Challenges And Value Of Engineering Thermo Plastics In Heavy Commercial Vehicle's Body Panel Market Space
Venkatesha N, GE India Tech Centre
- 3:00 PM Direct Part Laser Marking Of Plastics
Jake Wieloch, Rofin
- 3:30 PM Surface Enhancement of TPO Polymer With Improved Flow And Scratch Properties
Ashutosh Sharma, Axel Plastics
- 4:00 PM Automotive Division Membership & Board Meeting

Introducing SPE Automotive Division Membership Chair



Hi, I'm Johanne Wilson of Ciba and I'm the SPE Automotive Division's New Membership Chair. As the most recent addition to the SPE Automotive Division board of directors, I want to take this opportunity to introduce myself. I have worked in the automotive industry for many years, both as an engineer and as a marketing manager for plastic components and additives. I admit,

this is a challenging time to hold the position of membership chair, but at the same time it promises to be a personally rewarding. Why? Because this is precisely the time when the benefits that SPE can offer new and current members are most important. So I look forward to playing an active role in increasing our membership.

In an economic downturn such as we are in, it is especially important that engineers and managers alike keep up to date on the latest technologies and trends - and spend as little money as possible doing so! SPE members have free access to thousands of technical papers from past conference proceedings, which is a great value!

SPE members also get a discount off our own society's conferences and webinars, as well as with other engineering societies. In fact, if you have not yet attended an SPE webinar - now is the time to do so. Webinars are excellent means to increase your knowledge, complete with the ability to ask the lecturer questions, without incurring the expense of travel or in fact even leaving your desk.

Just like training, the value of networking cannot be overstated. SPE hosts forums on the international website, as well as on LinkedIn and Facebook at the SPE groups. These forums are places where you can ask for advice, or get connected to professionals in other areas. I use the SPE network to meet technical professionals in areas where I am doing research. I have known others to get important business leads through the SPE network. In short networking saves you and your employees time when looking for a service, a supplier or a new lead. SPE Automotive conferences are of course especially efficient networking venues because of their targeted audience.

Whether you are employed and looking to advance your

career, or actually looking for a job, SPE members also can take advantage of the SPE Career Solutions. Did you know that if you were an SPE member when you lost your job you can retain membership at no cost for up to two years? SPE Career Solutions is accessed through the international (www.4spe.org) website and you can post your resume or search for jobs. Right now there are 28 jobs posted - 8 of them were posted since January. You can also access useful career development tools through the website.

You will also find that recruiters and hiring companies post jobs at the LinkedIn SPE group. This gives them an advantage over posting on other sites by being able to target plastics professionals - like you. Only SPE members can join the LinkedIn SPE group.

So these are all good reasons for you to join or to renew your SPE membership, and for you to encourage your employees or colleagues to join the SPE Automotive Division. More information can be found at our website (www.speautomotive.com). Also, we are always looking for ways to increase the value of your membership so if you have any ideas please forward them to me at membership@speautomotive.com.

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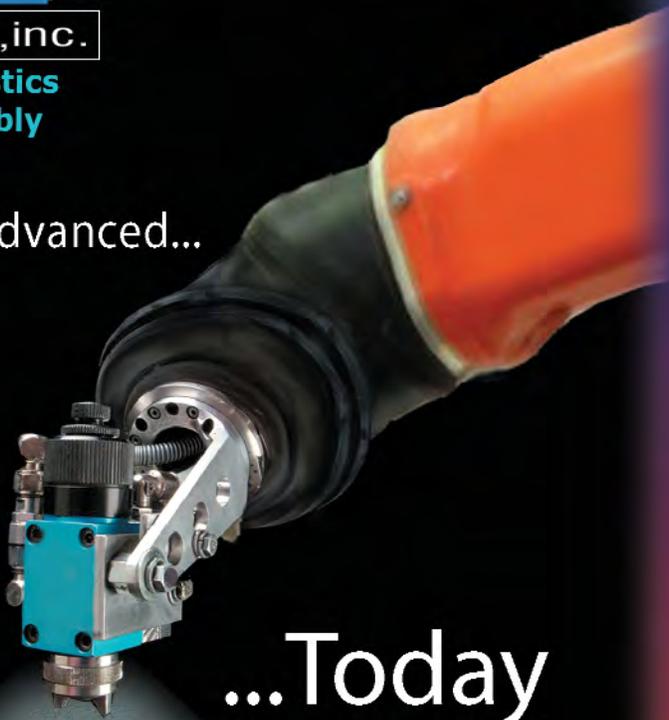


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Board of Directors Meeting Minutes

Jay Raisoni

Minutes from the February 2nd, 2009 SPE - Automotive Division Board Meeting

Attendance: Gary Kogowski, Jay Raisoni, Dave Reed, Nippani Rao, Mike Masserant & Jackie Rehkopf (over phone), Brian Grosser, Tom Pickett, Peggy Malnati, Maria Ciliberti, Ed Garnham, Johanne Wilson, Suresh Shah, Kevin Pageau, Monica Prokopyshen, Shane Ferguson (Guest), Gus Chen, Fred Deans

1. Meeting Called to Order: Chairman Tom Pickett called the meeting to order at 5:30 PM following social and dinner.

2. Chairman's Message: Tom Pickett welcomed everyone and announced the meeting's agenda. Tom reviewed the chair's goals / objectives. Tom's objectives are to run concise & organized BOD meetings. Tom will seek representations from more companies. Tom reviewed the goal of continued improvement of key events specifically Composites Conference, Innovation Awards, and Engineering Plastics Conference. Other goals are to grow membership, to win the Pinnacle Award and to have fun.

3. New Items: The Board applauded Dr. Suresh Shah for his recognition as a Gold Member by ESD. Jay Raisoni sponsored a motion, Fred Deans seconded and the motion was carried to have SPE AD buy up to a table of 10 for \$450 to allow SPE Board members to join in felicitating Suresh Shah at the ESD banquet on February 19th at Rock Financial Show Place in Novi. Suresh is to send a list of invitees to Tom Pickett and Jim Keeler. Detroit section is already buying a Table and the list is to help decide how many additional tickets AD (up to ten) need to purchase.

Kevin Pageau sponsored and the motion was carried to contract Malnati & Associates for 2008 IAG summary at a \$1,550 savings over LightSpeed.

Tom Pickett informed the group of signing with ACC for holding meeting there as needed and to house Pat Levine for SPE activities.

4. Treasurer's Report: John Fialka, Treasurer sent in his resignation as the Treasurer due to personal and professional commitments. He has graciously agreed to stay on to train the new person and until the new AD committee takes over. BOD members interested in the post should contact Maria Ciliberti, incoming Chairwoman. The board thanked John for his integrity and work.

- ◆ Checking \$134K; Savings \$27K - Total \$161K
- ◆ 2008 ACCE net proceeds \$ 28,700
- ◆ 2008 Innovation Awards revenues of \$165,000 - Expenses \$156,000 = Proceeds \$9,000

The Audit Committee has asked John to present detailed highlights of income and expenses using Quicken format like Detroit Section financial report.

5. 2008 Innovations Award Gala Review: Maria Ciliberti, Chair for the event mentioned she got Burton Manor to discount their bill by 10% to make up for shortcomings in their service and will review the expenses to see if it is reflected. Maria is trying for stronger participation from all OEMs, particularly transplants.

6. Technical Program Chairman's Report: Nippani Rao, Chair for the 4th Annual Auto EPCON Apr. 28, 2009 - Best Western Sterling Inn updated the group the event already has \$11,600 sponsorship commitment and the committee is working to limit the expenses to under \$15,000.

- ◆ Peggy has planned the publicity for the 9th Annual ACCE Sept. 15-17, 2009
- ◆ 11th Annual TPO Conference Oct. 4-7, 2009
- ◆ SPE ANTEC 2009 with NPE in Chicago, IL June 22-26, 2009 - two Sessions. Norm Kakarala has Jay Raisoni moderating a session.

7. Newsletter Report : Kevin Pageau would inform the group of the next publication date. Peggy Malnati and Kevin both urged the members to submit their reports for publication in time.

8. Marcom Update: Peggy Malnati, Chair - Communications updated the group how media ads swap has helped AD get \$350,000 in publicity/ ads at no cost. She will have all events Chairs to help co-ordinate the media blitz. She also said SPE had revised their logo to more 3 D style and AD was the first Division to adopt it. Peggy mentioned to the group that the AD web site has a new look and for past 4 months in a row the AD web site had more than 10,000 clicks per month. Peggy will glean information from SPE National how this compares to other Divisions' sites.

9. Membership report: Johanne Wilson, Chair for the Membership Committee discussed various ideas to increase membership. She will arrange a jobs fair at the upcoming EPCON in April allowing the companies, recruiters and members to attend free near the end of the conference day. She had extracted information on membership that showed a steady loss of membership in 2008, more than offsetting the new membership. Peggy suggested use of the SurveyMonkey to look at the reasons for loss in membership. Johanne and Peggy would work to get common SPE cards for BOD members.

10. Education Report : Monica Prokopyshen got appreciation certificates for Ferris State student volunteers for their extra efforts at IAG.

11. Councilor's Report -Nippani Rao, Councilor mentioned that there was no recent meeting and therefore nothing new to report.

12. Intersociety Report: Jackie Rehkopf said ESD has agreed to more cooperation with AD. Peggy Malnati also shared that after years of trying SAE also has agreed to trade ads. There was a discussion of SPE AD arranging webinars and looking for speakers and topics.

13. Meeting Adjourned - Tom Pickett concluded the meeting by thanking everyone for coming. Meeting adjourned at 7:35 pm.

14. Next Meeting. April, 2009; Tom Pickett, President will send out the reminder.

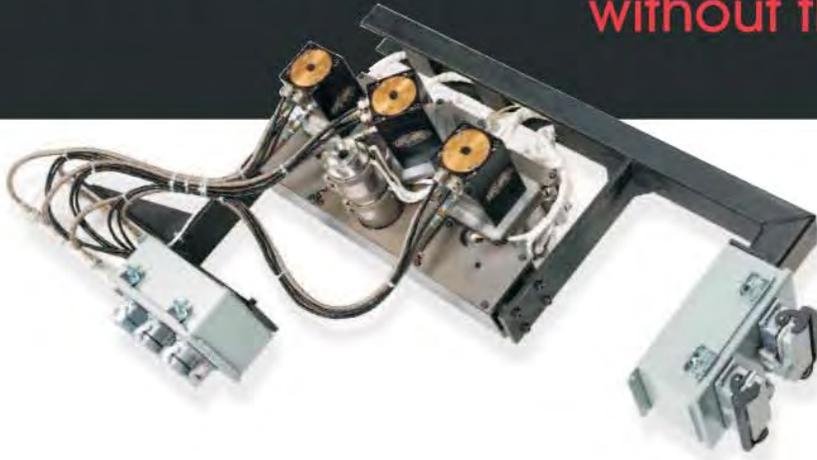
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Case Study: Tough Low Mass SMC

Edward Zenk, Navistar, Inc.
David Hearn, Core Molding Technologies
Kevin Dinan, Robert Seats, Cedric Ball, Ashland Inc.

Abstract

Fuel is one of the single largest expenses for a fleet owner accounting for nearly 50% of the cost to operate a truck. With rising fuel prices, lowering vehicle weight in the trucking industry is a pressing need. A unique collaboration amongst a commercial fleet owner, heavy truck manufacturer and their suppliers achieved significant weight savings, cost-effectively, through the use of tough low mass Class A sheet molding compound (SMC). This paper/presentation describes the customer's objectives, issues encountered and commercial results achieved with the new technology.

Introduction

Ashland Distribution and Valvoline, divisions of Ashland, Inc., recently purchased 40 new Navistar TranStar® Series regional haul tractors featuring hood assemblies made from Ashland's tough low mass SMC technology. The tough low mass resin system uses patented technology and saved approximately 21 pounds when compared to the standard composite truck hoods. The reduction in weight leads to potential fuel savings or additional capacity for the trucks.

Fleet owners indicate that any weight the manufacturer takes off of the truck is a step toward overall weight reduction and better fuel efficiency. While the increased payload capability may be incremental, all efforts at mass reduction come together to reduce the delivery cost.

Background

The heavy truck industry has always been concerned with weight. The weight of the vehicle directly impacts the hauling capacity and fuel consumption. Models used by Ashland fleet management show that at current diesel fuel prices and typical heavy truck consumption rates, fuel costs can account for up to \$0.80 per mile traveled.

Combined with many other benefits, many heavy truck companies have moved to thermoset composites for the body panels on their cabs, roofs, and air deflectors. With today's regulations and fuel prices, additional ways to reduce weight are being considered.

Recognizing the need for lightweight composites, Ashland, Inc. embarked on development activities utilizing nano composite technology combined with polyester resin and low profile expertise. This development resulted in three patents and a family of products and formulations suited for both the reinforcement and Class A parts required of composite assemblies.

Core Molding Technologies is a leader in manufacturing composite assemblies for the transportation and other related industries. As a long time supplier to Navistar, CORE provided the equipment and expertise in compounding, molding, and assembling the hood components. CORE and Ashland have conducted extensive development activities on low mass SMC for several years. CORE holds the trade name Nano-Lite™ which represents the low mass compounds manufactured by CORE.

Navistar is a leading producer of medium, heavy, and severe service vehicles. As a major supplier of vehicles to Ashland, Inc., Navistar was ready to manufacture and deliver the 40 trucks based on the low mass technology with the same quality and service represented by all of their products. The hood assemblies were shipped to Navistar's Garland, TX facility for the building of the TranStar® Series trucks. With the assistance of Navistar, Ashland will document the performance of the low mass parts on the 40 trucks and provide this information back to Navistar. Over an 18 month inspection period the performance and durability of the truck hoods will be determined.

Low Mass SMC Technology

The concept and practice of low density SMC is not new to the transportation industry. The use of hollow glass microspheres to lower compound density is used in many applications. Issues with keeping the micro-spheres in suspension during the SMC compounding process along with lower mechanical properties in the final molded product have limited the use of this approach. Additionally, SMC using these micro-spheres is not suitable for Class A applications due to the ease of breakage at the surface and the resulting increase in porosity.

The technology of the Tough Low Mass SMC is outlined in several technical papers published and presented at industry conferences and conventions. Along with the use of nanoclay products, technology in resin and low profile additives is utilized to obtain the performance characteristics of the SMC. Tough SMC technology as practiced in standard density SMC is used to significantly reduce paint defects that are typically seen in assembly plant paint facilities. Table I shows the formulation for the Class A SMC that was used on the outer body panels.

Materials	pts. by wt.
TLM Class A Resin System	70
TLM Class A LPA	30
Divinyl benzene (63%)	6
5% pBQ solution	0.2
t-butyl perbenzoate	1.5
t-butyl peroxoate (50%)	0.27
Zinc Stearate	4.5
Nano Clay Based Filler	15
Mineral Filler	10
Clay Filler	34
B-Side	5
Fiberglass Roving, 1" Chopped (weight %)	91
	34%

Table I: Tough Low Mass Class A SMC Formulation

Technical Article - Case Study: Tough Low Mass SMC

Continued from Page 21

This formulation was compounded on CORE's existing equipment with no modifications necessary. Conventional A and B paste mixing equipment and in-line metering and delivery systems were used. Table II shows the typical mechanical properties of the Class A formulation and compares them to the Navistar CEMS D-22 material specification.

Property	Navistar CEMS D-22		
		Type II Grade B	Type II Grade C
Tensile Strength (MPa)	85	55.2 min.	72.4 min.
Tensile Modulus (GPa)	9.2	8.3 min.	10.3 min.
Elongation	1.25		
Flex Strength (MPa)	180	137.9 min.	165.5 min.
Flex Modulus (GPa)	8.9	8.27 min.	9.65 min.
HDT °C	296		
InPlane Shear, Mpa	15.7		
Notched Izod Impact @ 23C, J/m	750		
24 hr. water absorption	0.8	0.5 max.	0.5 max.
CLTE (-30C to 30C), 1/C	2.36E-05		
Shear modulus, Gpa	4.1		
ALSA Index ¹	58	100 max ²	100 max ²
Mold Shrinkage ³ , %	0.09		
Glass Content, wt. %	34.5		
Specific Gravity	1.55	2 max.	2 max.
¹ - Advanced Laser Surface Analyzer			
² - Navistar TMS-9523			
³ - expansion			

Table II: Tough Low Mass Class A SMC Formulation

With the exception of water absorption, all Type II Grade B requirements can be met. The ALSA Index of 58 demonstrates that a Class A surface can be obtained with this technology. Table III shows the formulation for the structural SMC that was used for the reinforcement panels on the hood assemblies.

Materials	pts. by wt.
TLM Structural Resin/LPA System	100.5
Polyethylene Powder	2.05
Zinc Stearate	4.5
t-butyl peroxide (50%)	0.25
t-butyl perbenzoate	1.45
Black Pigment Disp.	5
Mineral Filler	20
Nano Clay Filler	3.45
B-Side	6
Fiberglass Roving, 1" Chopped (weight %)	91
	39%

Table III: Tough Low Mass Class A SMC Formulation

Again this formulation was compounded on conventional SMC equipment using typical compounding methods. Table IV shows the physical properties of the low mass structural SMC and compares the properties to the Navistar CEMS D-22 material specification.

Property	Navistar CEMS D-22		
		Type II Grade B	Type II Grade C
Tensile Strength (MPa)	105	55.2 min.	72.4 min.
Tensile Modulus (GPa)	15	8.3 min.	10.3 min.
Flex Strength (MPa)	245	137.9 min.	165.5 min.
Flex Modulus (GPa)	12	8.27 min.	9.65 min.
HDT °C	>235		
Notched Izod Impact @ 23C, J/m	950		
24 hr. water absorption	0.3	0.5 max.	0.5 max.
Mold Shrinkage ³ , %	0.008		
Glass Content, wt. %	39		
Specific Gravity	1.48	2 max.	2 max.

Table IV: Tough Low Mass Class A SMC Formulation

This compound easily meets and exceeds the Type II Grades B and C requirements. Following a typical maturation period, the SMC was molded using traditional molding techniques and procedures. Scrap rates were comparable to the individual production parts. In general the compounding and molding of the tough low mass SMC was transparent to the typical production process at CORE.

Hood Assembly

During the build of the TranStar® hood for Navistar at Core Molding Technologies, a total of 8 fiberglass pieces and approximately 10 metal stampings were brought together to produce the completed hood unit. The units were shipped to Navistar's Garland, Texas facility for final assembly. As production was shifted into the special build of Nano-Lite™ SMC components for this order, part tolerances as well as the bonding performance were monitored closely and no changes from standard materials were observed in bonding, appearance, and part dimensions. The mechanical strength of the bonded assembly was verified by tearing down a completed unit with air hammers and crow-bars as shown in figures 1 and 2.

The pictures of the tear down show the deep fiber tear that is seen in composite assembly and typical in performing these process audits. All in all, the assembly process was a totally transparent event in the manufacturing facility. The only difference observed in the process was the enthusiasm



Figure 1: Hood Assembly Tear Down



Figure 2: Hood Assembly Tear Down

from the associates who remarked on the significantly lower weight of the components (except the metal parts) and support to shift all the production to these new lighter weight materials.

Truck Assembly

Assembly of the TranStar® units with the Tough Low Mass SMC hoods was no different than other production units. The hoods were received, inspected, tacked and put through the paint ovens, where a 1-K basecoat and 2-K clearcoat, both from Akzo-Nobel Coatings, were applied. The hoods were baked at 230°F for thirty minutes and inspected at the end of the paint ovens prior to reloading on carriers to be staged for installation on the trucks. Four of the thirty nine initial units built needed some kind of repair after topcoat application for handling or processing issues. None of these were due to the switch in molding compounds but were typical of hoods received in production material. All four of the repaired units passed the inspection after paint the second time and were used on sellable vehicles to Ashland.

Vehicle Inspection and Performance

Upon receiving the order to purchase the vehicles with the Tough Low Mass SMC hoods, Ashland and Navistar agreed to a plan whereby Ashland would periodically inspect the hoods for issues with performance based upon a summary of a shaker test done for this model hood prior to introduction of the truck in 2003. The table below summarizes a shaker analysis of hood performance and was given to Ashland as a tool to guide them in inspection of the hoods.

The slight amount of damage that occurred during the test was not considered detrimental to the function of the hood. The hood achieved 800,000 equivalent miles in the regional haul vocation. Going forward, Ashland is conducting regular inspections on a quarterly or 15,000 mile basis to document how the hood is performing and note any issues related to the change in material. To date, no material issues have been documented.

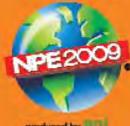
Table : Shaker Analysis Summary

Test duration	Test Incident
16%	Adjusted hood
60%	Some surface cracking seen under the washer of the hood mounted mirror
70%	Hood appears to be debonding at lower right side
100%	Test complete-no further hood incidences recorded

Conclusions

Composite hood components based on low mass sheet molding compound technology were manufactured and assembled on forty Navistar TranStar® units. The low mass hood assemblies saved approximately 21 pounds when compared to the standard composite truck hoods. The reduction in weight leads to potential fuel savings or additional hauling capacity for the trucks. The processing of the low mass materials throughout the entire process was transparent. Physical properties along with durability testing of the low mass composites show equal performance as compared to traditional SMC. Regular inspections will be conducted to document how the hood is performing and note any issues related to the change in material. To date, no material issues have been documented.

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