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SOCIETY OF PLASTICS ENGINEERS

Automotive & Composites Divisions



5th-Annual

SPE AUTOMOTIVE COMPOSITES
CONFERENCE



Composites

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Sept 12-14, 2005

MSU Management Education Center

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COMPOSITES TECHNOLOGY

Each issue of *Composites Technology* features the latest information on the use of composites in civil infrastructure, industrial, automotive, marine and other markets, including specific case studies and detailed explanations of materials, manufacturing and installation methods. Our mission is to promote the use of composite materials for new applications around the world by dispensing timely and useful technical information. *Composites Technology's* editorial takes a hands-on approach, with emphasis on engineering, design and manufacturing solutions for traditional and emerging high-volume applications for composites. Our expert editors and writers are well-qualified to inform composites manufacturers as well as design engineers and specifiers about latest technologies.



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David, Corporate Strategy
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TMMNA – Erlanger, Kentucky



**"EVERYDAY
BRINGS A POSITIVE
CHALLENGE."**

Toyota Motor Manufacturing in Erlanger, Kentucky, is committed to promoting personal growth and individual learning for its Team Members both outside and inside the company. "I've finished my Master's degree in Industrial Engineering here and now I'm working on my Ph.D.," says David. Leslie mentions the excellent growth and educational opportunities through rotational assignments. Stephanie sums up the sense of optimism that Team Members feel in this encouraging environment. "Enthusiasm comes naturally knowing that the future looks so bright."

Within Toyota more than 30,000 team members design and build exceptional vehicles for a world made up of communities that are richly diverse yet have much in common. Appropriately, we have created a corporate culture that reflects those commonalities and unique characteristics. On virtually any road, anywhere on the planet, you'll see the Toyota philosophy of continuous improvement come full circle. Ten million vehicles, 30,000 people, one exceptional team.

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WELCOME FROM THE 2005 ACCE CHAIR



Welcome to the 5th Automotive Composites Conference and Exhibition. The Automotive and Composites Divisions of the Society of Plastics Engineers have teamed up again to provide you with a program that highlights a variety of technologies used in automotive composites. The title of this year's conference is *"Composites: Providing Global Vehicle Solutions."* This theme was selected to remind all of us that composites are providing real engineering solutions in the global transportation industry every day. The use of composites solutions on passenger cars, light trucks, and mass-transit applications has increased dramatically over the last few years, reaching a new technology breakthrough with the realization of hybrid solutions that could not be done with composites or metals on their own.

SPE has designed this program to offer you the best automotive composites conference in the world, featuring a program that is driven from real-world solutions.

What's new about this year's conference?

- ~ It will last 3 days to provide extra time for papers, keynote talks, panel discussions, and networking.
- ~ The successful OEM panel discussion is back. An additional panel discussion will target the growing activity associated with specialty vehicles.
- ~ A session on aesthetics is designed to provide insight into film technologies, in-mold decoration, and Class-A parts.
- ~ Biocomposites and natural-fiber composites will be highlighted.

Other sessions for this year's conference include:

- ~ New Composite Materials,
- ~ New Composite Processes,
- ~ New Composite Applications,
- ~ Enabling Technologies for Composites,
- ~ Structural Composite Applications,
- ~ Hybrid Technologies,
- ~ Nanocomposites, and
- ~ Advances in Long-Fiber Reinforced Thermoplastics (LFT or LFRT).

Keynote speakers will provide additional real-world experience in the area of crash structures, composite car development, protecting intellectual property, technologies for exterior parts, innovations and their market introduction, as well as an overview of the composites industry.

This year's conference once again will have a broad offering of exhibits from industry leaders in North America, Europe, and Asia. You will have the opportunity to talk with all of them, one-on-one. Don't miss Tuesday evening's cocktail reception for networking.

This conference would not be possible without the exceptional support provided by our sponsors, exhibitors, and speakers. To all of them, we owe a great deal. A special thanks goes to all the volunteers who helped to put this program together. I personally want to thank you for a job well done.

We appreciate your participation and wish you a successful conference. Feel free to contact any one of our committee members for assistance, feedback for improvement, or any other question you might have.

Best regards,

Klaus F. Gleich
2005 SPE Automotive Composites Conference Chair
Johns Manville



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Agenda

MONDAY, SEPT. 12, 2005

AUDITORIUM

AMPITHEATRE 101

8:00-9:00

REGISTRATION – COFFEE IN MEZZANINE

9:00-10:00

RIBBON-CUTTING CEREMONY; EXHIBITS OPEN;

CONTINENTAL BREAKFAST SERVED (*sponsored by Bayer MaterialScience LLC*) - EXHIBITION AREA

10:00-10:15

INTRODUCTION & GREETINGS - Klaus Gleich, '05 SPE Composites Conference Program Chair

10:15-11:00

KEYNOTE SPEAKER - Richard Morrison, MFG Companies - AUDITORIUM
Thoughts on the Composites Industry

ADVANCES IN LONG-GLASS-FIBER-
REINFORCED THERMOPLASTICS -PART 1

NEW COMPOSITE APPLICATIONS -
PART 1

11:00-11:30

Stephan Bowen
PlastiComp, LLC
PushtrusionSM Direct In-Line Compounding

Jesse Hipwell
Azdel, Inc.
*Low Cost, Light Weight, Single
Material Solution for Soft Touch
Vehicle Interior Substrates*

11:30-12:00

Daniel Schwendemann
Coperion Werner & Pfeleiderer GmbH & Co. KG
*Use of Co-Rotating Twin Screw Extruders
in the Automotive Sector for Composite
and In-Line Process Applications*

Richard Blunk
General Motors
*Automotive Composite Fuel Cell
Bipolar Plates: Hydrogen
Permeation Concerns*

12:00-12:30

Darin Grinsteiner
Composite Products Inc.
*Introduction of Corn By-Products to
Composites for Use in In-Line
Compounding*

Ralph Funck
Comat Composite Materials GmbH
*Thermoplastic Pressure Vessels
for Automotive Applications*

12:30-1:30

LUNCH (*Sponsored by Chisso America, Inc.*) & EXHIBITS - LOBBY & MEZZANINE/DINING ROOM

1:30-2:15

KEYNOTE SPEAKER - Matthew Zaluzec, Ford Motor Company - AUDITORIUM
Materials & Advanced Engineering of the 2005 Ford GT High Performance Sports Car

ADVANCES IN LONG-GLASS-FIBER-
REINFORCED THERMOPLASTICS -PART 2

2:15 -2:45

Frank Henning
Fraunhofer Institut Chemische Technologie (ICT)
*New Long Rayon Fiber Reinforced
Thermoplastics Utilizing the LFT-D Process*

2:45-3:15

Manfred Brümmer
Dieffenbacher
*Long-Fiber Reinforced Thermoplastics
Tailored for Structural Performance*

3:15-3:30

COFFEE BREAK (*sponsored by AOC, LLC*) & EXHIBITS - EXHIBITION AREA

3:30-5:00

PANEL DISCUSSION - *Composites in the Specialty Vehicle Segment* - AUDITORIUM
Panel Members: Marcus McCammon, American Specialty Cars; Dr. Guan Chew, Porsche Engineering Services, Inc.;
Dave Luik, MSX; Donald Lasell, Vermont Composites Inc.; Dave Zajac, Roush Engineering
Moderator: Fred Deans, Azdel, Inc.

	AUDITORIUM	AMPITHEATRE 101	AMPITHEATRE 102
8:00-9:00	BREAKFAST (sponsored by Polywheels Manufacturing) & EXHIBITS - EXHIBITION AREA		
9:00-9:30	KEYNOTE SPEAKER - William Abbatt, Esq., Brooks Kushman, P.C. - AUDITORIUM <i>Strategic Management of Intellectual Property</i>		
	HYBRID REINFORCEMENTS - PART 1	ADVANCES IN PROCESSING - PART 1	NEW COMPOSITE MATERIALS - PART 1
9:30-10:00	Doug Stratton <i>Bayer MaterialScience LLC</i> <i>An Integrated Automotive Roof Module Concept: Plastic-Metal Hybrid and Polyurethane Composite Technology</i>	Donald Lasell <i>Vermont Composites, Inc.</i> <i>Fiber Reinforced Dimensional Capability of Carbon Fiber Reinforced Epoxy Exterior Automotive Products</i>	Dan Fuller <i>Dow Chemical Company</i> <i>Exterior Long Glass Fiber Polypropylene System for Automotive Applications</i>
10:00-10:30	Rama Koganti <i>Ford Motor Company</i> <i>Carbon Fiber and Super Plastic Aluminum Formed Panel Decklid Manufacturing Development for the Ford GT</i>	Steve Courington <i>Signature Control Systems</i> <i>Using Impedance Sensing to Improve SMC-IMC Molding</i>	Hiroshi Suzuki <i>Chisso America</i> <i>Development of High Impact Strength for Long-Glass-Fiber Reinforced Polypropylene</i>
10:30-11:00	COFFEE BREAK (sponsored by DuPont Automotive) & EXHIBITS - EXHIBITION AREA		
	HYBRID REINFORCEMENTS - PART 2	ADVANCES IN PROCESSING - PART 2	NEW COMPOSITE MATERIALS - PART 2
11:00-11:30	David Cramer <i>Fiberforge</i> <i>Feasibility of Continuous-Fiber Reinforced Blanks for Automotive Applications</i>	Tim Donovan <i>Krauss-Maffei</i> <i>LFI-PUR®: The Process for High Quality, Long-Glass-Fiber-Reinforced Polyurethane Parts</i>	Arthur Blinkhorn <i>Owens Corning Automotive</i> <i>Development of a New Composite Material with Improved Structural & Acoustical Properties for Automotive Interiors</i>
11:30-12:00	Samar Teli <i>Dow Automotive</i> <i>Bonded Hybrid Automotive Front End Carriers</i>	Carroll Grant <i>Aerospace Composites Consulting</i> <i>Aerospace Composites Processing Methods for Light Weight Automotive Body Panels</i>	Suresh Shah <i>Delphi Corporation</i> <i>Nanocomposite Opportunities for Automotive Applications</i>
12:00-1:00	LUNCH (sponsored by Azdel, Inc.) & EXHIBITS - LOBBY & MEZZANINE/DINING ROOM		
1:00-1:30	KEYNOTE SPEAKER - Marco Wacker, Jacob Composites GmbH - AUDITORIUM <i>Moulding the Future of Composite Crash Structures</i>		
	ENABLING TECHNOLOGIES - PART 1	NATURAL FIBERS - PART 1	
1:30-2:00	Dale Brosius <i>Quickstep Technologies Pty. Ltd.</i> <i>Quickstep: A Manufacturing Solution for Advanced Composite Components on High-Performance Niche Vehicles</i>	James Holbery <i>Pacific Northwest National Laboratory</i> <i>Role of Fiber Adhesion in Natural Fiber Composite Processing for Automotive Applications</i>	
2:00-2:30	William Asmann <i>Collano, Inc</i> <i>Thermoplastic Film Adhesives</i>	Ellen Lee <i>Ford Motor Company</i> <i>Hemp-Fiber-Reinforced Sheet Molding Compounds for Automotive Applications</i>	
2:30-3:00	Ignasio Osio <i>Bayer MaterialScience LLC</i> <i>Embedded Attachments for PU-Based Sandwich Composites</i>	Minh-Tan Ton-That <i>National Research Council of Canada</i> <i>Wood Fiber Composites from Recycled Polyolefin</i>	
3:00-3:30	COFFEE BREAK (sponsored by Sparta Composites) & EXHIBITS - EXHIBITION AREA		
	ENABLING TECHNOLOGIES - PART 2	NATURAL FIBERS - PART 2	
3:30-4:00	James Holbery <i>Pacific Northwest National Laboratory</i> <i>Long-Fiber Thermoplastic Injection Molded Composites: From Process Modeling to Property Prediction</i>	M.S. Huda <i>Michigan State University</i> <i>Wood Fiber Reinforced Poly(lactic acid) Composites</i>	
4:00-4:30	Ian Thompson <i>The Expanded Metal Company UK</i> <i>Changing Perceptions: Are Holes the Key to the Future of Composites?</i>	Ronnie Törnqvist <i>Quadrant Plastic Composites AG</i> <i>Natural Fiber Reinforced Thermoplastics – Tailored for Interior Applications</i>	
4:30-5:00	Jackie Rehkopf <i>Ford Motor Company</i> <i>Use of Relevant, Non-Standard Mechanical Characterization of Fiber-Reinforced Thermoplastics for Structural Applications</i>	Wanjun Liu <i>Michigan State University</i> <i>Processing Methods and Physical Properties of Native Grass Reinforced Biocomposites</i>	
5:00-5:30	KEYNOTE SPEAKER - Dr. Frank Henning, Fraunhofer Institut Chemische Technologie (ICT) - AUDITORIUM <i>Sustainability by Innovation: Paving a Road for the Future Composites Industry</i>		
5:30-7:00	COCKTAIL RECEPTION (sponsored by OC Automotive) & EXHIBITS; LARGE-PART WALKTHROUGH - EXHIBITION AREA		



Agenda

WEDNESDAY, SEPT. 14, 2005

AUDITORIUM

AMPITHEATRE 101

AMPITHEATRE 102

8:00-9:00 **BREAKFAST** (sponsored by Williams-White) & EXHIBITS - EXHIBITION AREA

9:00-9:45 **KEYNOTE SPEAKER - Dr. Lawrence Drzal, Michigan State University - Composite Materials & Structure Center - AUDITORIUM**
Future Opportunities & Challenges for "Green" Materials & Nanocomposites

NANO- & BIOCOMPOSITES - PART 1

AESTHETICS - PART 1

STRUCTURAL COMPOSITES APPLICATIONS - PART 1

9:45-10:15 **Yuanxin Zhou**
Tuskegee University - Center for Advanced Materials (T-CAM)
Fabrication and Characterization of Clay / Epoxy Nanocomposite

David Pahl
GE / LNP
LFRT for Structural Aesthetic Applications

Philippe Vatel
Faurecia
Development of Lightweight, Hybrid Steel / GMT Composite IP Carrier to Meet World Crash Requirements on Passenger Vehicles

10:15-10:45 **Karl Kamena**
Southern Clay Products
Nanoclays: Multi-Dimensional New Nano-Tools in the Polymer Development Toolbox

Bary Pile
Cannon USA
RIM PUR on Vacuum Formed Foils: The Right Choice for Aesthetic Structural Parts

Edward Zenk
International Truck and Engine Corp.
Composites in the Trucking Industry

10:45-11:15 **Yuanxin Zhou**
Tuskegee University - Center for Advanced Materials (T-CAM)
Fabrication and Evaluation on Nano-Phased Unidirectional Carbon Fiber Reinforced Epoxy

Romeo Stanciu
The Woodbridge Group
Polyurethane Structural Composites: An Innovative Process using In-Mold Decorating Films for Exterior Vehicle Parts

Stanley Iobst
General Motors R&D
Automotive Composites Consortium B-Pillar Molding Program

11:15-11:30 **COFFEE BREAK** (sponsored by Dieffenbacher NA) & EXHIBITS - EXHIBITION AREA

NANO- & BIOCOMPOSITES - PART 2

AESTHETICS - PART 2

STRUCTURAL COMPOSITES APPLICATIONS - PART 2

11:30-12:00 **Kyriaki Kalaitzidou**
Michigan State University
Graphite Nanoplatelet-Polypropylene Nanocomposites

Patrick Gaule
GE Advanced Materials
Using Aesthetic Additives in Engineering Thermal Plastics for In-Mold Automotive Applications

Ronnie Törnqvist
Quadrant Plastic Composites AG
NISSAN Murano Thermoplastic Hatchback Door

12:00-12:30 **Amar Mohanty**
Michigan State University
Biobased Nanocomposites from Toughened Bacterial Bioplastic and Titanate Modified Layer Silicate: A Potential Replacement for Reinforced TPO

Randall Myers
GE Plastics
In-Mold Decoration for Structural, Weatherable Applications

Andreas Rugg
Esoro AG
Seating Structures and Other Structural Applications with Locally Unidirectional Reinforced Thermoplastic Composites

12:30-1:30 **LUNCH** (sponsored by Quadrant Plastic Composites, Inc.) & EXHIBITS - LOBBY & MEZZANINE/DINING ROOM

1:30-2:00 **KEYNOTE SPEAKER - Peter Stahl, GE Advanced Materials - AUDITORIUM**
Innovations in Plastic Body Panels

2:00-3:30 **PANEL DISCUSSION - The Future of Automotive Composites — OEM Perspective**
Panel Members: Richard Jeryan, Ford Motor Company; Dave Mattis, General Motors; Saad Abouzahr, DaimlerChrysler; Mike Bernas, Toyota Motor Manufacturing North America; Kevin Smith, Decoma International, Inc.
Moderator: Dale Brosius, Brosius Management Consulting

3:30-3:45 **CLOSING REMARKS - Klaus Gleich, '05 SPE Composites Conference Program Chair**

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- 2004 - Ford/Volvo/Mazda Structural IP Carrier by Faurecia (*Advanced GMT Composites*)
- 2003 - BMW Underbody Shield by Seeber (*SymaLITE™ Lightweight Reinforced Thermoplastic Composite*)
- 2001 - Volvo Gear Box Support Bracket by Polytec SA (*Advanced GMT Composites*)

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Presentations



KEYNOTE SPEAKERS

Thoughts on the Composites Industry

- Richard Morrison
MFG Companies
NOT AVAILABLE AT PRESS TIME

Materials & Advanced Engineering of the 2005 Ford GT High Performance Sports Car

- Matthew Zaluzec
Ford Motor Company
This presentation will focus on the materials, manufacturing, joining, and assembly of the Ford GT super car.

Strategic Management of Intellectual Property

- William Abbatt
Brooks Kushman, P.C.
This presentation discusses management of all intellectual property aspects of a company's operations, including substantive tasks, procedural and reporting tasks, and a proposed model for allocating these tasks.

Moulding the Future of Composite Crash Structures

- Marco Wacker
Jacob Composites GmbH
This presentation describes research, design, analysis, and testing work conducted to develop a thermoplastic-composite front-end crash structure for a conventional front-wheel drive vehicle. This was a collaborative effort between British consultancy Lotus Engineering and Germany's Jacob Composite GmbH.

Sustainability by Innovation — Paving a Road for the Future Composite Industry

- Frank Henning
Fraunhofer Institut Chemische Technologie (ICT)
- Klaus Gleich
Johns Manville
This presentation will highlight process technologies, new materials, and application milestones in the European automotive industry for fiber-reinforced polymers. New tailor-made materials suitable for medium and large-scale production offer new application possibilities. Teaming up to develop such products is changing the auto industry supply chain.

Future Opportunities & Challenges for "Green" Materials & Nanocomposites

- Lawrence Drzal
Michigan State University —
Composite Materials & Structure Center
This presentation will provide an overview of both the "green" and "nano" materials fields with a focus on automotive needs. The current and future potential of these materials for structural applications will be discussed, as well as challenges that must be overcome in order for them to achieve their potential in automotive applications.

Advances in Thermoplastic Composite Body Panels

- Peter Stahl
GE Advanced Materials
This presentation will review innovations in materials for vertical and horizontal body panels that have yielded higher modulus, lower coefficients of thermal expansion, and extended design freedom for highly integrated and weight-saving parts with Class-A paintable surface quality.

ADVANCES IN LONG-GLASS-FIBER-REINFORCED THERMOPLASTICS

PushtrusionSM Direct In-Line Compounding

- Stephan Bowen
PlastiComp, LLC
PushtrusionSM is a new technology combining continuous-fiber reinforcement with molten polymer to create fiber-reinforced compounds during the molding process. The technology can be used in conjunction with many common forming processes, including injection, compression, and transfer molding; extrusion; and filament winding.

Use of Co-Rotating Twin Screw Extruders in the Automotive Sector for Composite and In Line Process Applications

- Daniel Schwendemann
Coperion Werner & Pfleiderer GmbH & Co. KG
This presentation provides an overview of successful automotive applications where co-rotating twin-screw extrusion and other processing steps are combined.

Introduction of Corn By-Products to Composites for Use in In-Line Compounding

- Darin Grinsteiner
Composite Products Inc.
This presentation discusses the use of corn by-products in composites for use with in-line compounding (ILC) processes.

New Long Rayon Fiber Reinforced Thermoplastics Utilizing the LFT-D Process

- Frank Henning
Fraunhofer Institut Chemische Technologie (ICT)
The flexibility of direct processing technologies such as the LFT-D-ILC enable new material development and optimization. The presentation will focus on new long rayon-fiber-reinforced thermoplastics and possible applications.

Presentations

Long-Fiber Reinforced Thermoplastics Tailored for Structural Performance

✎ Manfred Brümmer
Dieffenbacher

This presentation describes long-fiber-reinforced thermoplastics tailored for structural performance.

NEW COMPOSITE APPLICATIONS

Low Cost, Light Weight, Single Material Solution for Soft Touch Vehicle Interior Substrates

✎ Jesse Hipwell
Azdel, Inc.

The basic composition, properties, design capabilities, and forming processes for low-density glass-mat thermoplastic (LD-GMT) composites are described, along with their benefits in various applications and their performance against several auto interior standards.

Automotive Composite Fuel Cell Bipolar Plates: Hydrogen Permeation Concerns

✎ Richard Blunk
General Motors

This study addresses H₂ permeation concerns associated with using thin, highly filled composite fuel-cell plates, and investigates factors affecting permeation, such as plate temperature, thickness, graphite loading, and aging.

Thermoplastic Pressure Vessels for Automotive Applications

✎ Ralph Funck
Comat Composite Materials GmbH

High-pressure vessels for compressed air tanks used on air suspensions and for braking systems are placing very demanding requirements on composites. A new thermoplastic composite system has been developed that produces pressure vessels that are lighter than steel and corrosion resistant.

HYBRID REINFORCEMENTS

An Integrated Automotive Roof Module Concept: Plastic-Metal Hybrid and Polyurethane Composite Technology

✎ Doug Stratton
Bayer MaterialScience LLC

The paper presents a roof module concept that utilizes a plastic-metal hybrid to create a roof frame welded to the body-in-white structure that is capable of passing through the electrostatic coating (e-coat) process.

Carbon Fiber and Super Plastic Aluminum Formed Panel Decklid Manufacturing Development for the Ford GT

✎ Rama Koganti
Ford Motor Company

This report summarizes the manufacture and assembly processes for the lightweight carbon fiber and super plastic aluminum formed panel decklid for the Ford GT.

Feasibility of Continuous-Fiber Reinforced Thermoplastic Tailored Blanks for Automotive Applications

✎ David Cramer
Fiberforge

This presentation investigates the feasibility of stamp-forming continuous-fiber-reinforced thermoplastic tailored blanks, including experimental results and the potential for a high-quality surface finish.

Bonded Hybrid Automotive Front End Carriers

✎ Samar Teli
Dow Automotive

This presentation outlines a prototype development of an injection-molded plastic bonded to an e-coated metal reinforcement. An adhesive is used to create a front-end carrier featuring a closed-box profile with a continuous joint between the metal and the plastic that is not possible using traditional joining methods.

ADVANCES IN PROCESSING

Fiber Reinforced Dimensional Capability of Carbon Fiber Reinforced Epoxy Exterior Automotive Products

✎ Donald Lasell
Vermont Composites, Inc.

Work on the design and development process and dimensional capabilities of the carbon-fiber reinforced Corvette Z06 front fenders is summarized.

Using Impedance Sensing to Improve SMC-IMC Molding

✎ Steve Courington
Signature Control Systems

This presentation reviews the first implementation of impedance sensing technology for production of an SMC body panel with a conductive in-mold coating for a freight truck.

LFI-PUR® – The Process for High Quality, Long-Glass-Fiber-Reinforced Polyurethane Parts

✎ Tim Donovan
Krauss-Maffei

LFI-PUR® technology can be used to reinforce both lightweight (foamed) and solid polyurethane with long glass fibers to produce parts with high stiffness, high surface quality, and low thermal expansion.



Presentations



Aerospace Composites Processing Methods for Light Weight Automotive Body Components

✧ Carroll Grant

Aerospace Composites Consulting

This presentation describes how the aerospace automated tape-layer process might be used to produce automotive composite components with shapes of low complexity for low-volume production.

NEW COMPOSITE MATERIALS

Exterior Long Glass Fiber Polypropylene System for Automotive Applications

✧ Dan Fuller

Dow Chemical Company

In this work, a long-glass-fiber (LGF) composite with an ABS matrix was developed for use in the direct extrusion-compression process. The material met stringent part performance needs, including molded-in color, aesthetics, customer weathering specifications, mechanical properties, and impact performance.

Development of High Impact Strength for Long-Glass-Fiber Reinforced Polypropylene

✧ Hiroshi Suzuki

Chisso

A method for increasing the impact performance of long-glass-fiber-reinforced thermoplastics will be described and suggestions on the best way to use these materials will be given.

Development of a New Composite Material with Improved Structural & Acoustical Properties for Automotive Interiors

✧ Arthur Blinkhorn

OC Automotive

A new type of thermoplastic-composite headliner material has been developed with enhanced acoustics and semi-structural properties allowing production of composite headliners with a simpler structure.

Nanocomposite Opportunities for Automotive Applications

✧ Suresh Shah

Delphi Corporation

This presentation discusses the current use of nanotechnology in automotive applications, including technical requirements, challenges and opportunities, selection criteria, plus steps industry should take to benefit from the promise of nanotechnology.

ENABLING TECHNOLOGIES

Quickstep: A Manufacturing Solution for Advanced Composite Components on High-Performance Niche Vehicles

✧ Dale Brosius

Quickstep Technologies Pty. Ltd.

The Quickstep process uses fluid heating and cooling and a floating mould concept to process advanced-composite components in a fraction of the time and at significantly lower costs than traditional autoclave techniques while meeting specific technical needs of the automotive industry.

Thermoplastic Film Adhesives

✧ William Asmann

Collano, Inc.

The presentation discusses the manufacture and use of thermoplastic film adhesives in the automotive industry.

Embedded Attachments for PU-Based Sandwich Composites

✧ Ignasio Osio

Bayer Material Science LLC

Attachments are critical to the performance of sandwich composites in automotive components. This presentation discusses results from continuing investigations of attachment techniques and testing for polyurethane-based sandwich composites.

Long-Fiber Thermoplastic Injection Molded Composites: From Process Modeling to Property Prediction

✧ James Holbery

Pacific Northwest National Laboratory

This presentation highlights efforts to develop process and constitutive models and computational tools to predict the microstructure of the as-formed long-fiber thermoplastic injection-moldable composite and its resulting properties.

Changing Perceptions: Are Holes the Key to the Future of Composites?

✧ Ian Thompson

The Expanded Metal Company UK

This thought-provoking presentation will explore the possibilities that 100-year-old technology may open the doors for a new era of developments for composites. Through production of holes of varying shapes within the base material, interesting properties are achieved, including strength and surface-area increases.

Presentations

Use of Relevant, Non-Standard Mechanical Characterization of Fiber-Reinforced Thermoplastics for Structural Applications

✎ Jackie Rehkopf
Ford Motor Company

This presentation will discuss methodology to characterize fiber-reinforced thermoplastics for fatigue performance, and methodology for measuring high strain-rate performance to assess material behavior for structural applications.

NATURAL FIBERS

Role of Fiber Adhesion in Natural Fiber Composite Processing for Automotive Application

✎ James Holbery
Pacific Northwest National Laboratory

This presentation discusses preliminary surface-modification findings on hemp fiber and attempts to resolve the role that fiber interface-adhesion characterization plays on the understanding and prediction of fiber performance in polymer matrices.

Hemp-Fiber-Reinforced Sheet Molding Compounds for Automotive Applications

✎ Ellen Lee
Ford Motor Company

Hemp-fiber-reinforced sheet-molding compound (SMC) was prepared and compared to conventional glass-reinforced SMC for cost, density, and mechanical properties.

Wood Fiber Composites from Recycled Polyolefin

✎ Minh-Tan Ton-That
National Research Council Canada

This presentation reviews the physical and mechanical properties of wood composites based on recycled polypropylene and fabricated via melt processing.

Wood Fiber Reinforced Poly(lactic acid) Composites

✎ M.S. Huda
Michigan State University

This presentation discusses results of a study of processing and physical properties of environmentally friendly wood-fiber-reinforced poly(lactic acid) composites, which were produced using a micro-compounding molding system.

Natural Fiber Reinforced Thermoplastics – Tailored for Interior Applications

✎ Ronnie Törnqvist
Quadrant Plastic Composites AG

This presentation discusses natural-fiber-reinforced thermoplastics for interior applications, highlighting 2 examples: a loadfloor and a side-door insert.

Processing Methods and Physical Properties of Native Grass Reinforced Biocomposites

✎ Wanjun Liu
Michigan State University

Big-blue-stem grass fiber-reinforced biocomposites were fabricated with extrusion, followed by injection molding and SMC compounding, followed by compression molding. Then physical properties of the resultant samples were evaluated with dynamic mechanical analysis, mechanical testing, and microscopy.

NANO- & BIOCOMPOSITES

Fabrication and Characterization of Clay/Epoxy Nanocomposite

✎ Yuanxin Zhou
Tuskegee University –
Center for Advanced Materials (T-CAM)

This presentation discusses the fabrication and characterization of clay/epoxy nanocomposite materials containing SC-15 epoxy resin and K-10 montmorillonite clay.

Nanoclays: Multi-Dimensional New Nano-Tools in the Polymer Development Toolbox

✎ Karl Kamena
Southern Clay Products

Nanoclays are demonstrating unique, multi-dimensional capabilities to synergistically enhance overall polymer system performance and constitute a powerful new nano-tool in the polymer-development toolbox.

Fabrication and Evaluation on Nano-Phased Unidirectional Carbon Fiber Reinforced Epoxy

✎ Yuanxin Zhou
Tuskegee University –
Center for Advanced Materials (T-CAM)

A novel manufacturing technique has been developed to fabricate unidirectional, nanophased carbon prepreps using solution impregnation and filament-winding methods.

Graphite Nanoplatelet-Polypropylene Nanocomposites

✎ Kyriaki Kalaitzidou
Michigan State University

Exfoliated graphite nanoplatelets are used as nanoreinforcement in polypropylene, the resultant nanocomposites are fabricated, and their thermo-mechanical and electrical properties are compared.



Presentations

Biobased Nanocomposites from Toughened Bacterial Bioplastic and Titanate Modified Layer Silicate: Potential Replacement for Reinforced TPO

\\ Amar Mohanty
Michigan State University

This presentation investigates toughening mechanisms for polyhydroxybutyrate (PHB) bacterial bioplastic via incorporation of elastomeric components.

AESTHETICS

LFRT for Structural Aesthetic Applications

\\ David Pahl
GE/LNP

New long-fiber-reinforced thermoplastic (LFRT) technologies for injection-molded structural aesthetic parts is reviewed, including electrostatic paintable, primerless paintable, core and cap, and molded-in color (MIC) LFRT.

RIM PUR on Vacuum Formed Foils: The Right Choice for Aesthetic Structural Parts

\\ Barry Pile
Cannon USA

Reaction-injection molded parts are created by back-foaming a PVC or PET film with standard or reinforced polyurethane in a single work station to produce parts that are well suited for a wide range of industrial applications.

Polyurethane Structural Composites: An Innovative Process using In-Mold Decorating Films for Exterior Vehicle Parts

\\ Romeo Stanciu
The Woodbridge Group

A novel fabrication technology for polyurethane composites using an open-mold pouring process, low cost tooling, low tonnage presses, and in-mold decorative films is described.

Using Aesthetic Additives in Engineering Thermal Plastics for In Mold Automotive Applications

\\ Patrick Gaule
GE Advanced Materials

This presentation provides an overview of aesthetic additives for engineering thermoplastics for automotive applications – from pigment to production.

In-Mold Decoration for Structural, Weatherable Applications

\\ Randall Myers
GE Plastics

A method has been developed for producing unpainted, high-surface-quality, weatherable thermoplastic-composite parts for applications such as automotive exterior body panels, hoods, trunk lids, fenders, and more.

STRUCTURAL COMPOSITES APPLICATIONS

Development of Lightweight, Hybrid Steel/GMT Composite IP Carrier to Meet World Crash Requirements on Passenger Vehicles

\\ Philippe Vatel
Faurecia

This presentation discusses design, development, and testing of a 2-piece, hybrid GMT composite/steel instrument panel carrier, which reduces weight, NVH, and cost while simultaneously improving parts consolidation and assembly vs. traditional steel-intensive multi-piece systems.

Composites in the Trucking Industry

\\ Edward Zenk
International Truck and Engine Corp.

This presentation will focus on advancements made in composite materials – from hand-spray to open molded parts to SMC and liquid molded resins -- for parts in the trucking industry and how quality, especially cosmetic and surface properties, has improved.

Automotive Composites Consortium B-Pillar Molding Program

\\ Stanley Iobst
General Motors

A liquid-molded carbon-fiber-reinforced composite B-pillar has been developed as part of the Automotive Composites Consortium's program to design and manufacture a composites-intensive body-in-white with 60% mass savings, production volumes of 100,000+ units/year, while meeting all structural requirements of current technology.

Nissan Murano Thermoplastic Hatchback Door

\\ Ronnie Törnqvist
Quadrant

Development and production of a GMT composite hatchback door for the Nissan Murano is described, including design, simulation, materials, processing, and surface finishing.

Seating Structures and Other Structural Applications with Locally Unidirectional Reinforced Thermoplastic Composites

\\ Andreas Rugg
Esoro AG

Simulation results of different studies of structural components using locally unidirectional reinforced thermoplastic composites will be shown, as well as movies of the component's production and frontal crash testing.

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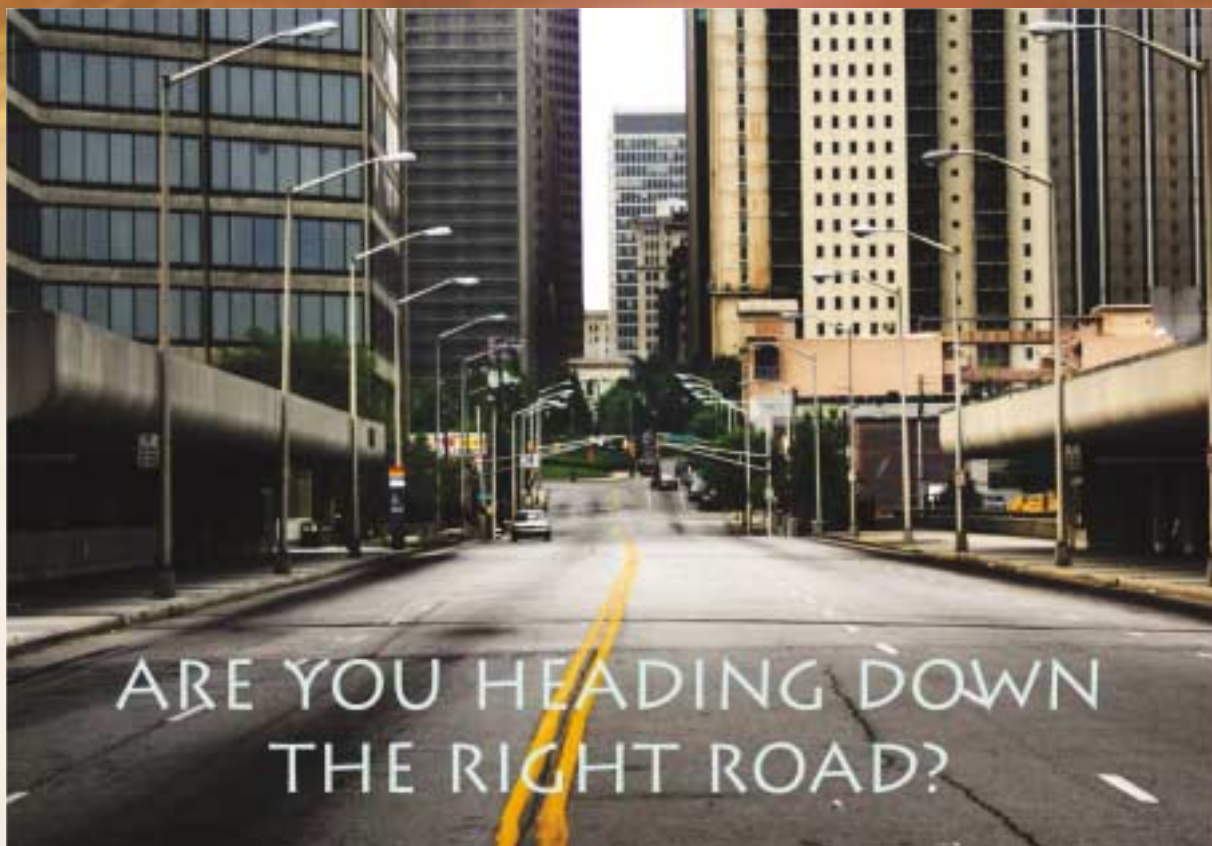
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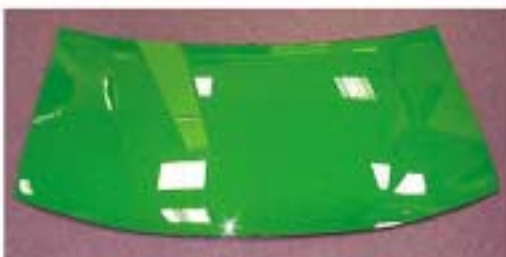


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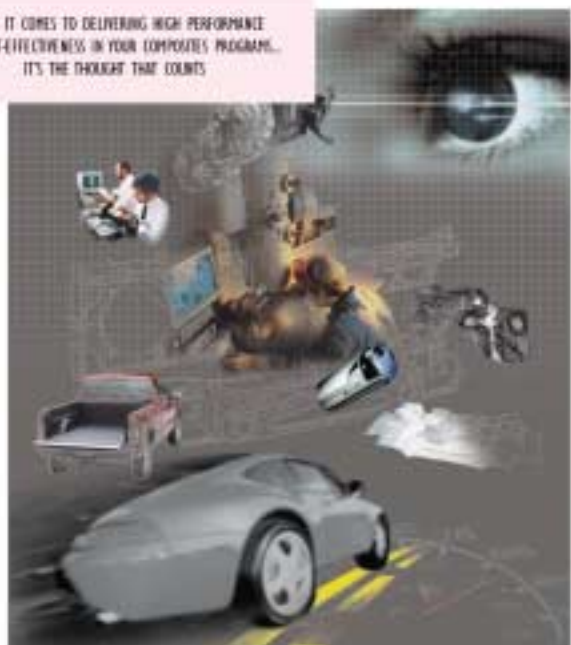
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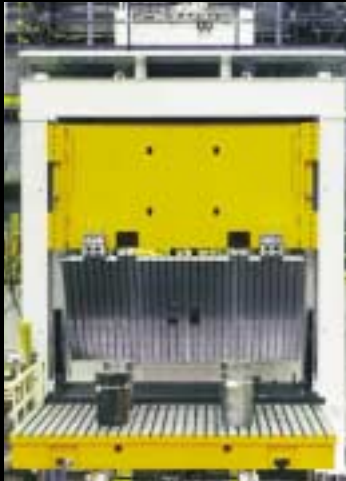
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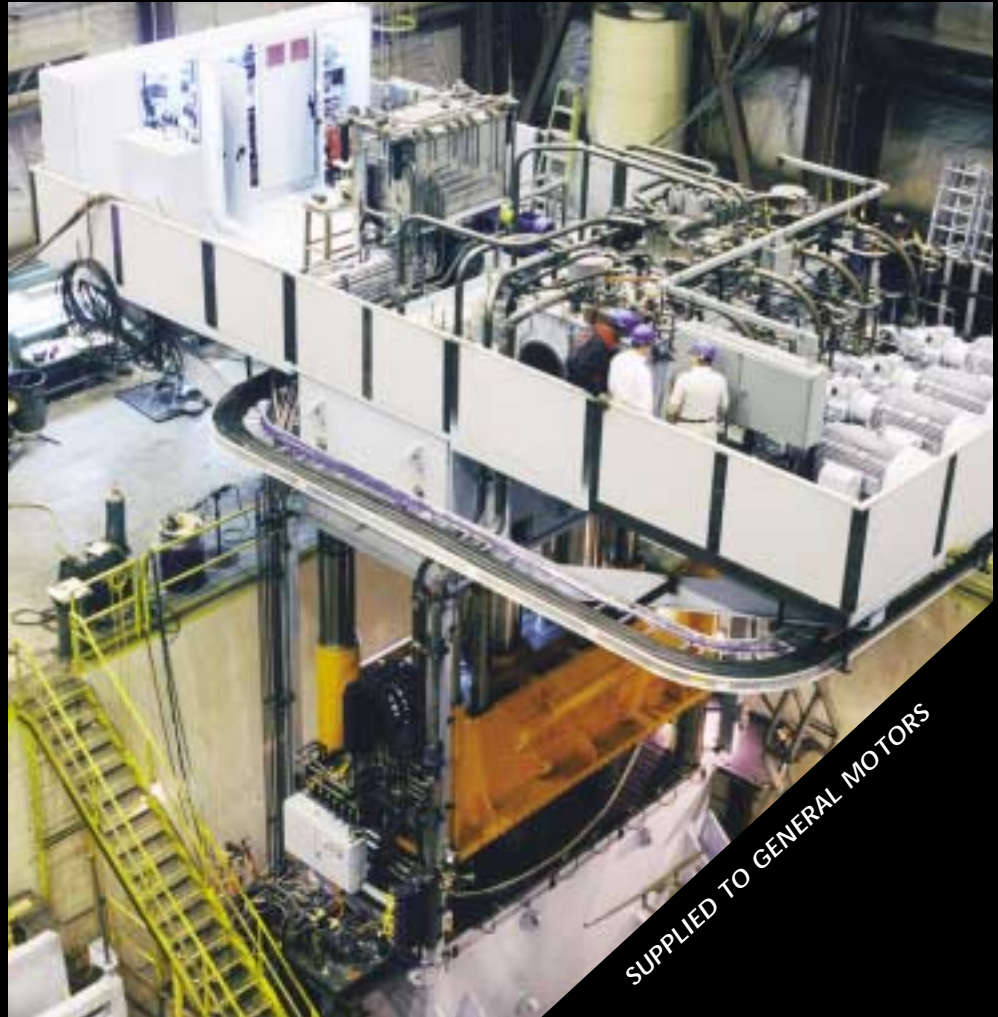
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