

Automotive Weight Reduction Strategies 2011



Picture Source: General Motors

**Final Program
June 10, 2011**

**Sheraton Detroit Novi Hotel
Novi, Michigan USA**

Sponsored by:

sapa:

Exhibitors:

- Asahi Kasei Plastics
- Evonik Degussa
- Henkel
- Sapa Extrusions
- Steel Market Development Institute
- Ticona Engineering Polymers

Vehicle on Display:

2011 Lotus Evora - presented by Lotus Engineering

7:00 a.m. Registration and Continental Breakfast

7:45 a.m. WELCOME and OPENING REMARKS

Mitra O'Malley, Managing Director
The ITB Group (U.S.A.)

Role of Materials and Fibers in Mass Reduction

8:00 a.m. Aluminum: Meeting Future Fuel Economy and Emissions Standards

The Aluminum Association Transportation Group (U.S.A.)
ATG will present its latest research findings on the integral role of reducing mass to meet future fuel economy and emissions standards in the automotive industry. ATG highlights findings pertaining to the impact of mass reduction through lightweight materials on electric and hybrid vehicle performance.

8:20 a.m. Fast Cure Epoxy Systems for Use in High Pressure RTM Applications

BASF Corporation (U.S.A.)
Epoxy composite materials deliver superior strength and durability while allowing designers to achieve lighter weight components. This presentation highlights the benefits the market can realize when a fast cure epoxy system is used with HP RTM equipment, critical system physical properties and neat resin mechanical performance data.

8:40 a.m. Predicting the Impact Properties of Hybrid Long Fiber Thermoplastic Composites

University of Toronto (Canada)
The objective of this project is to develop lightweight and high performance biofiber/biopolymer composite materials for the automotive industry by developing long fiber thermoplastic manufacturing processes. The focus of the research is arriving at a theoretical model that effectively predicts impact strength of biocomposites as a function of fiber length, fiber orientation and properties of fiber and matrix. This presentation will summarize the work in progress for achieving this objective.

9:00 a.m. Bio-reinforcement of Composites for Automotive, Aerospace and Transportation Industries

National Research Council Canada (Canada)
The objective is to develop the next generation of products for the automotive industry. As part of a larger NRC Flagship Program initiative and utilizing industrial scale equipment at the Magna-NRC Composites Centre of Excellence, work has already begun using engineering resins and natural fiber roving in the D-LFT equipment.

9:20 a.m. Mid-Morning Break

Process Innovations Targeting Mass Reduction

9:50 a.m. FutureSteelVehicle: Leading Edge Innovation Addressing Lightweight Steel Body Structures for Electrified Vehicles

United States Steel Corporation (U.S.A.)
The Phase 2 objective of the FutureSteelVehicle program is to develop detailed design concepts and fully optimize a radically different body structure for four proposed 2015-2020 year alternative energy vehicles. The presentation will disclose the final outcomes of the Phase 2 development, detailing steel body structure concepts that meet aggressive mass targets of 190 kg while meeting 2015-2020 crash performance.

10:10 a.m. ACP PROCESS and Future Steel Vehicle (FSV) ETA (U.S.A.)

United States Steel Corporation (U.S.A.)
This presentation outlines the implementation of the Accelerated Concept to Product Process into the FutureSteelVehicle product design development. It will explain how a detailed design concept was created to achieve a 35% mass reduction that met the structural and crashworthiness performance requirements while addressing all manufacturability concerns.

10:30 a.m. Composite Technologies for Automotive Lightweight Part Production

Fraunhofer ICT / KIT (Germany)
The presentation provides insight about the latest developments in composite technologies for large scale manufacturing of automotive lightweight technologies in Europe. One major focus will be the high pressure resin infusion technologies for an accelerated RTM process.

11:00 a.m. KraussMaffei Process for Resin-Transfer-Molding (RTM) KraussMaffei (U.S.A.)

The KraussMaffei RTM Process which uses high pressure mix for the epoxy system chemicals (up to 2,500 psi) will be discussed. Benefits of this process including the ability for much faster reacting chemical systems to be processed will be highlighted.

Module and System Innovations Leading to Mass Reduction

11:30 a.m. Creating Integrated Front-End Modules: Incorporating Higher Stiffness, Additional Content and Improved Functionality

HBPO North America (U.S.A.)
Front-end modules (FEM) continue to be a major contributor to lightweight vehicle design. Integration ideas are at the cornerstone of the lightweight plastic-metal hybrid carrier design for FEM applications. Several integration ideas will be presented highlighting techniques to meet the structural requirements while integrating additional function and content on the front-end carrier. Solutions for meeting high stiffness requirements while maintaining the lightweight advantage of plastic-metal hybrid over complete steel stamped structure will be highlighted.

11:50 a.m. **Lunch**

1:00 p.m. **Role of Magnesium in Reducing Vehicle Mass**

Meridian Lightweight Technologies (U.S.A.)

This presentation focuses on novel approaches to weight savings by utilizing magnesium cast alloys. Applications for 2011 vehicles including the Ford Explorer magnesium seat structures, Jeep instrument panel structures, Nissan tie bar/bolsters and Honda interior structures will be highlighted.

1:20 p.m. **Mass Reduction through the Use of Structural Cardboard**

Konal (Canada)

A breakthrough manufacturing technology for the use of cardboard, urethanes and fiberglass has yielded a superior product. By design it provides an improved strength and incredible weight reduction at a lower cost than traditional components. The combined materials offer new options for load floors, under body cladding and various substrates in the cockpit. The presentation focuses on the process and how the market can benefit from the technology.

1:40 p.m. **Offline-ONline Weight Saving Applications: Load Floor Example**

Plastic Omnium Auto Exterior (U.S.A.)

POAE has developed technologies for off-line applications that link to their experience in bumper systems and on new product lines for an easier and faster application at the OEM assembly plant for ON-line applications. Solutions that bring weight saving to diverse areas of the vehicle, specifically for load floor modules, will be addressed.

2:00 p.m. **Meet Conflicting Global Impact Requirements at Lower Mass and Styling Offsets**

Shape Corp. (U.S.A.)

An effective strategy utilized by Shape is to maximize the energy absorption capacity and efficiency of each component of the bumper system in order to simultaneously meet all low speed impact requirements. The presentation will explain how this strategy has led to 10 - 50 mm of reduced overhang and over 15% lower system mass. Easy to use tools will be demonstrated that can help design for these requirements more quickly and effectively.

2:20 p.m. **Lightweight Automotive Seating System**

Woodbridge Group (U.S.A.)

A seat design concept that results in significant (20% - 40%) weight savings in automotive seat cushions is presented. This concept replaces the traditional flexible foam and steel frame with an alternate lightweight concept using structural foam technology. Additionally, the concept uses comfort cutout areas, which allow optimization of seating comfort.

2:40 p.m. **Afternoon Break**

3:00 p.m. **Automotive Mass Reduction through Fluid Conservation**

Flo-Link (U.S.A.)

The mass of a heating and cooling system comes from many design choices and legacy design conventions. By shifting paradigms, heating and cooling systems may be optimized. Fluid quantities can be reduced. A key benefit of this approach is simultaneously reducing cost and mass by eliminating materials and reducing the size of components.

3:15 p.m. **Weight Reduction in Automotive Glazings**

Saint-Gobain Sekurit (U.S.A.)

With the demand for more efficient and less polluting vehicles, there is a desire to have thinner glazing with enhanced performance, especially in the area of heat load reduction and NVH. This presentation will highlight trends in the global glazing market as well as the challenges in moving to thinner glazings.

3:40 p.m. **Plastic Glazing: Quality and Innovation in a Modular Approach**

Freeglass (Germany)

Automotive glazing is playing an increasingly important role in vehicle evolution to reduce emissions and enhance vehicle differentiation. These objectives can be supported by the introduction and standardization of plastic glazing usage. First-in-market applications introducing several manufacturing standards in partnership with raw materials and technology providers will be discussed.

Vehicle Level Innovations

4:00 p.m. **Lightweight or Light-Weighting: Edison2's Very Light Car**

Edison2 (U.S.A.)

Edison2 is the recent Mainstream Class winner of the Progressive Insurance Automotive X Prize by building a 4-seat vehicle with the unprecedented combination of 830 lbs weight and 0.160 Cd, powered by an internal combustion engine. The innovations underlying these achievements have far-reaching implications for removing weight from automobiles. The presentation discusses the design philosophy, technical innovations, energy implications and safety strategies of the Very Light Car, as well as current work and future plans of Edison2.

4:30 p.m. **Lotus Low Mass Multi-Material Body Structure and Impact Performance**

Lotus Engineering (U.S.A.)

Lotus will provide the background for the design and development of a multi-material (aluminum, steel, magnesium and composite) body structure that weighs 40% less than the baseline steel body. Key crash models will be shown including front, rear, side and roof crush animations. Tabular and graphical results will be presented documenting body performance for stiffness, intrusion levels and body accelerations. Joining methodologies, galvanic considerations and assembly plant processing and layout will be reviewed.

5:00 p.m. **Closing Remarks and Cocktail Hour**



Upcoming ITB Activities

Multiclient Reports:

- **Automotive Integrated Center Stacks 2011** - June 2011
- **Alternative Powertrain Cost and Energy Performance Comparisons** - July 2011
- **Automotive Fuel Systems 2011** - August 2011
- **Automotive Window and Exterior Sealing Systems 2011** - August 2011
- **Opportunities in Vehicle Mass Reduction** - December 2011

Future Conferences:

- **11th Annual Automotive Cockpits 2011** - October 7, 2011, Birmingham, Michigan, USA
- **5th Annual Automotive Fuel Systems China** - October 26, 2011, Pudong, Shanghai, China
- **Automotive Cockpits and Interior Systems China** - October 27, 2011, Pudong, Shanghai, China
- **Automotive Energy Storage Systems 2012** - March 1 and 2, 2012, Novi, Michigan, USA
- **3rd Annual Automotive Weight Reduction Strategies 2012** - May 18, 2012, Novi, Michigan, USA

ITB Consulting Expertise

