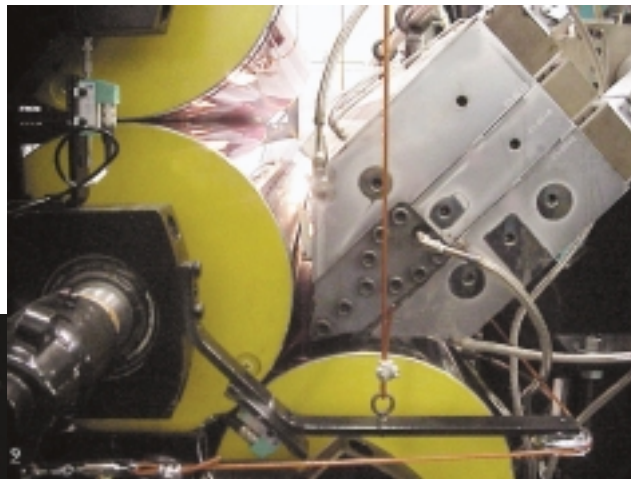


Dodge shines at SPE awards program

An in-mold decorated film for the fascia of the 2002 **Dodge Neon** has been judged the most innovative and important commercial plastics application of the year in the global automotive industry. **A. Schulman**, **ExxonMobil**, and **Mayco Plastics** were recognized along with **DaimlerChrysler** for their part in the project.



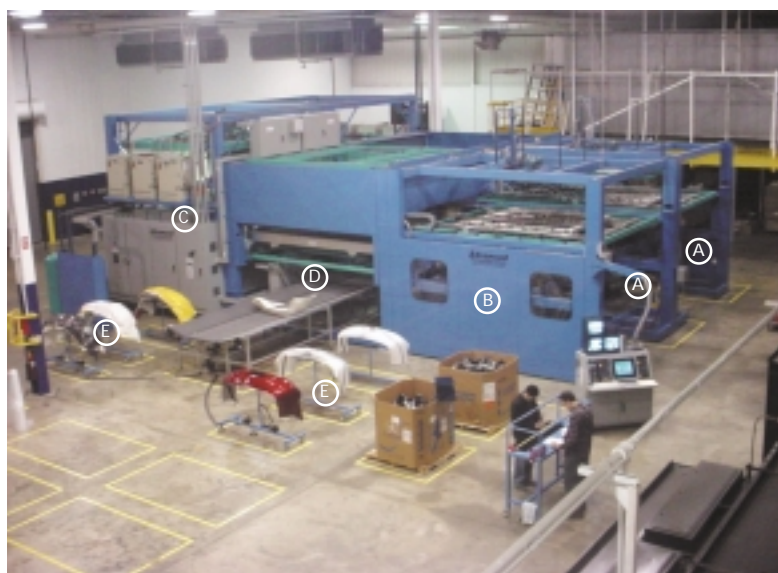
The head of this machine at Mayco Plastics extrudes the fascia film, which is cooled by the rollers.

Dodge has approved several fascia colors produced via a new mold-in-color technology for the 2003 Dodge Neon, and several other colors are in the process of being approved.



Four other projects representing different categories of plastics application were recognized in the 32nd annual Innovation Awards Program sponsored by the Automotive Division of the **Society of Plastics Engineers (SPE)**. Judging was held in October, when the category winners were announced. The overall winner was announced November 18 during the SPE awards program. The overall winner (the Grand Award recipient) was selected from among the five category winners, which were:

- Process/Enabling Technologies
Dodge Neon fascia
- Body Exterior
Chevrolet TrailBlazer rocker molding
- Chassis/Hardware/Assembly
Dodge Viper fender support system
- Body Interior
Jeep Wrangler speaker-pod assembly
- Materials
Dodge Viper door hinge



- A. Flat fascia films enter
- B. Films are heated
- C. Films are formed and cooled
- D. Films exit
- E. Films are placed on racks

A shuttle thermoforming machine heats the newly formed fascias, then transfers them to a forming and cooling station. The machine forms two fascia films at once.



The finished fascia film, formed but flimsy, is packaged for shipping to Chrysler, where a substrate will be added.

The film on the Neon front bumper fascia provides a high-gloss, Class-A finish in a range of nonmetallic and metallic colors that match the paint on Neon body panels.

The plastics industry has been working hand-in-hand with automotive engineers for more than a decade to make in-mold paint-film technology a viable alternative to painting, said the

SPE's Kevin Pageau, Innovation Awards Program chairman for the automotive division. Depending on how far the technology is developed, it could be used for all exterior panels, offering the possibility that automotive paint shops eventually could be eliminated, **Chrysler** engineers have said.

The material had to pass a list of tough criteria from Dodge. It was tested for appearance (it had to exhibit no "orange peel" look), adhesion (240-h humidity exposure test), scratch/abrasion resistance, cold-impact performance, resistance to various fluids, and durability (250,000 mi [400,000 km]).

The four-layer extruded film consists of a clear ionomer layer (UV-stabilized Formion FI-311301U-01) developed by A. Schulman; a color-matched ionomer layer from A. Schulman; an adhesive tie layer developed by A. Schulman and ExxonMobil; and a backing layer of extrudable polypropylene copolymer



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PP7032 from ExxonMobil. The film is produced at Mayco and cut into sheets. The sheets are fed into a shuttle thermoform machine where they are heated for pliability before being shuttled to the other side of the machine. There they are placed on dies for vacuum-forming and cooling. At the same time, excess material is robotically trimmed, then the film is shuttled back to a central conveyor, which presents the film for final manual processing (additional trimming and inspection).

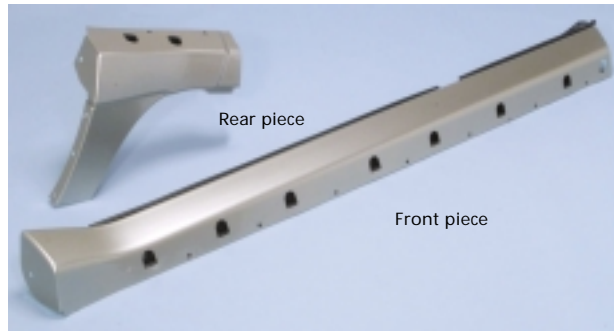
The film is then shipped next door to the Chrysler plant, where it is robotically positioned in an injection-molding machine for the addition of a substrate (polypropylene copolymer PP8074 from ExxonMobil). The finished fascia comes out with no additional processing necessary.

Innovations involved in the process include matching the vacuum-forming tool with the injection mold, robotically installing the film into the injection mold, enabling the film to be present in the mold during injection, and securing the film in the injection mold. In addition, the extrusion die contains tooling features that assist in orienting the metallic flakes during the extrusion process.

The film fascias are 100% recyclable. Film scraps can be reprocessed for use in the fascia substrate or compounded for use in non-critical application such as wheel well liners.

The extruded-in-color film technology increases manufacturing flexibility by eliminating the cost and steps involved in using primer and paint, resulting in a \$5 to \$15 savings per fascia. Use of the polymer film eliminates issues associated with painting, such as VOC (volatile organic compound) emissions, sludge disposal, and energy consumption for the curing process. About \$2 to \$12 in shipping expenses otherwise needed to send the fascia out for painting are avoided.

Because it does not have the capability to sufficiently match metallic body colors, the film could not be produced via injection molding, the project team said. Paint films, a technology that does offer good color matching, is expensive and difficult to apply on complex surfaces.



General Motors says the rocker molding on the 2003 Chevrolet TrailBlazer North Face Edition SUV is the first application of a thermoformed, high-gloss, integrally body-colored component on a production vehicle. The application won the SPE Award for Body Exterior.

The rocker molding on **General Motors Corp.**'s 2003 Chevrolet TrailBlazer North Face Edition SUV is the first application of a thermoformed, high-gloss, integrally body-colored component on a production vehicle. Formed from a special composite sheet of heavy-gauge TPO and a dry-paint layer, the thermoformed rocker replaces an injection-molded and painted thermoplastic part while offering tooling savings of 85-90% and eliminating VOCs associated with painting. **ASC Inc.**, **Carlisle Engineered Products, Inc.**, and **Polybond/Soliant/Equistar** were also part of the award-winning team recognized for the conference's Body Exterior Award.

DaimlerChrysler was presented with the Chassis/Hardware/Assembly Award for its use of a compression-molded, carbon-fiber/SMC composite fender-support system on the 2003 Dodge Viper. This application represents the first significant use of carbon-fiber-reinforced SMC on a production vehicle. The thin-wall, compression-molded, single-component part consolidates 15-20 brackets, provides attachment for 34 other components, offers dimensional reference, and supports the entire front end of the Viper body while saving 40 lb (18 kg). Participating in the project and recognized by SPE for their roles were **Meridian**, **Quantum Composites**, and **Rapid Die**.

The '03 Dodge Viper also was the winning entry in the Materials category for its use of a unique hybrid composite



The 2003 Dodge Viper was a double winner, taking honors in both the Chassis/Hardware/Assembly (for the composite fender-support system) and Materials (for a door hinge made of glass-fiber in an SMC matrix) categories.



A blow-molded speaker-pod assembly on the 2003 Jeep Wrangler brought DaimlerChrysler honors in the Body Interior category.

using carbon- and glass-fiber in an SMC matrix for a door hinge. It represents the first significant use of a co-molded, hybrid carbon-fiber and low-density glass-fiber SMC composite on a production vehicle. The compression-molded composite replaces heavier technologies such as steel tailor-welded blanks and more exotic prepreg and wet-lay-

up carbon-fiber composites from the racing world while reducing door sag, increasing door stiffness, lowering component mass by 6 lb (3 kg), and allowing the door-hinge reinforcement to be made smaller. As they were on the Viper fender support project, **Meridian**, **Quantum Composites**, and **Rapid Die** were also part of the door-hinge team.

For Body Interior, a blow-molded speaker-pod assembly on the 2003 Jeep Wrangler was judged best of class. The first blow-molded, Class-A, interior speaker enclosure in a production vehicle, this assembly reduces costs by 54% and weight by 35% vs. the steel component it replaces. The grained, molded-in-color system meets FMVSS 201 side-impact safety standard & 74/60/ECE impact testing. It also improves sound quality and directs overhead lighting. Project members included **Kautex Textron**, **Spartech Polycom**, and **Radiance Mold & Engineering**.

General Motors received two Hall of Fame Awards during the SPE program. One award was for the wiper-system transmission housing on the 1976 Chevrolet Caprice. The second award was for use of the mini-wedge latch and door-lock actuator first

featured on the 1991 **Buick** Park Avenue and **Pontiac** Bonneville. The Hall of Fame Award is presented for applications that have been in continuous production for over 10 years.

Patrick Ponticel