Toyota BASF Tundra Seat Structure
Design, Analysis, Manufacturing and Testing

BASF Composite Technology Solutions

SAMPLE PIC - USE TOYOTA PIC IF AVAILABLE
Toyota Tundra Rear Seat Structure

Intro – nice picture of seat structure
Collaboration and history, etc
Toyota and BASF already collaborated on composite Sienna rear seat structures
- The Tundra seat is 206 mm wider, so extra structural support is needed
- A pultruded Elastocoat beam was selected for stiffness, strength, and mass savings vs competitive materials
Thermoset Pultrusion Process

**Roving and Fiber Matts**
- Provide the strength to the structure

**ELASTOCOAT**
- BASF Polyurethane System used to bind fibers together

**Fiber Alignment**
- Defines the anisotropic properties of the structure
- Can be optimized for application requirements using ULTRASIM® BASF proprietary tool

**Heating Zones**
- Used to control the curing time

**Mixing Chamber**
- Controls the impregnation of fibers with ELASTOCOAT PU system

**Customized Length Profiles**
Toyota Tundra Rear Seat Structure

- Pultrusion strength is comparable to Steel grades (fiber direction)
- Pultrusion elastic modulus is comparable to Magnesium
Example shown for 23°C, similar levels of correlation achieved for -40°C and 80°C
Toyota Tundra Rear Seat Structure

Jeep Cherokee LH Transmission Bracket
from L&L Products
(BASF Elastocoat overmolded with Ultramid B3WG6 CR)

BASF Multi-Test Part
Elastocoat® 74850
Toyota Tundra Rear Seat Structure
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15 Components

Metal Content

Weld Nuts Not included in Part Count
Toyota Tundra Rear Seat Structure

Mass and Cost Savings

63% reduced effort it takes for customers to raise folded third-row seats to their upright position.
Toyota Tundra Rear Seat Structure

- Injection mold tooling includes pins/pads to secure pultruded beam
- High temperature, high pressure injection molded material induces very high forces on beam

Short shot progression showing injection molding flow around pins holding pultruded beam
Toyota Tundra Rear Seat Structure

Crash test video and/or summary emphasizing correlation to FEA
Toyota Tundra Rear Seat Structure Summary

- The Toyota and BASF partnership allows the development novel composite seat applications combining the strengths of both companies.

- CAE tools used in the Tundra seat development continue to show outstanding prediction of real-world behavior.

- The manufacturing methods developed in this project overcome the challenges of injection overmolding composite materials.

- The mass and cost savings showcase the excellent partnership that Toyota and BASF have in designing advanced seat structures.