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THE BIG STORY / APRIL 2017



AUTOMOTIVE INTERIORS:
**From Steel
to Spider
Webs**

LIGHTWEIGHTING, THE INFLUENCE OF CHINESE CONSUMERS, DRAMATICALLY DIFFERENT SEATS AND “DECOTAINMENT” PROMISE TO BE MAJOR DISRUPTORS IN NEXT TWO PRODUCT CYCLES.



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Cover photo:
Lexus UX
Concept CUV



Lexus UX Concept CUV introduced at 2016 Paris Auto Show.

The Lexus UX Concept CUV introduced at the Paris auto show last year is noteworthy for several reasons.

- It features an unusual bare-bones “deconstructed” interior design.
- A separate world premier was staged at the motor show just for a more refined version of the vehicle’s seats.

- The seat material is made from spider webs.

Auto designers have been dreaming up lightweight seats made of gossamer wings for decades, but the Lexus Kinetic Seat Concept uses synthetic spider silk that is a functional and extremely tough material.

Made by Japan-based Spiber, the main ingredient is protein created through microbial ferment-



Seat frame “upholstery” comprises spider web-pattern net with threads that spread radially from center of back rest.



Lexus Kinetic Seat Concept uses synthetic spider silk that is functional and extremely tough material.



Center of back rest at shoulder blade height, which induces rotational movement of chest around seat’s pivotal axis. This helps stabilize head and helps ensure high level of support.

tation. The protein then is spun and processed into a new material with impressive properties. Another benefit is it is not derived from petroleum. Called QMONOS, it currently is being commercialized for a variety of applications.

What’s more, the seat isn’t just

a gimmicky sling or a hammock. The seat cushion and backrest are designed to move kinetically with occupant weight and external forces. Sitting in the seat helps stabilize head movement caused by vehicle motion, keeping the field of vision steady,



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Lexus says.

It's unlikely this idea will show up in production soon, but it illustrates how hard automakers are looking for new ways to impress consumers with style and comfort while chopping weight at the same time.

In a move that underscores how focused interior suppliers – in addition to OEMs – are on reducing weight, Lear became the first automotive Tier 1 to license NanoSteel products.

While not as exotic as synthetic spider webs, NanoSteel has developed a family of advanced high-strength steel alloys that feature a special combination of very high strength with the enhanced formability normally found only in low-strength mild steels, says Craig Parsons, president-Automotive.

The blend of properties gives designers the ability to optimize part geometries resulting in thinner, lighter components and allows part producers to avoid costly production processes, such as stamping shapes at high temperature when forming new

designs. And even highly sophisticated steel grades typically remain much less expensive than alternative lightweight materials such as aluminum, magnesium, advanced composites – or QMONOS.

Parsons won't comment on exactly what type of components Lear is interested in, but Lear CEO Matthew Simoncini says he is optimistic about NanoSteel's AHSS ability to contribute lighter materials for vehicle seating structures.

Even though the industry is obsessed with how autonomy will impact vehicle interiors in 2025 or 2030, reducing weight is but one of the powerful forces reshaping vehicles and the supply chain right now.

Designers and engineers are cooking up a mind boggling array of new materials, seats and user experiences aimed at surprising and delighting future car buyers, but let's start with the startling impact wealthy Chinese consumers are making on interior vehicle design and the manufacturing supply chain.



Rear seats in all luxury vehicles now much more lavish thanks to Chinese consumers.

Chinese Driving Profound Changes

The China luxury market is predicted to be one and half times larger than the U.S. and Europe combined by 2020, says Rose Ryntz vice president-Advanced Development and Material Engineering, at interior supplier IAC.

The tastes of wealthy Chinese consumers who prefer to be chauffeured rather than drive themselves already have changed luxury-car design, shifting more focus than ever before on rear-seat legroom, craftsmanship and backseat amenities. And this is

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turning into a feature that affluent consumers all over the world have taken a liking to, even those who drive themselves.

But now a relatively new trend, sensitivity to smells, is shaking the interior supply chain to its core.

“The biggest things the Chinese are doing are the VOC (volatile organic compound) and odor regulations. They are forcing a lot of changes in the types of materials, adhesives and cover stocks we are using,” Ryntz says.

Unfortunately the emissions from plastics and adhesives that many Americans still fondly call the “new car smell,” are widely despised in the world’s largest vehicle market.

If you look at Chinese consumer surveys, odors usually lead the list of complaints about interiors, Ryntz says. “That has forced a lot of us to look at not just different constructions but also about how we put things together.” That in turn has driven IAC’s sub-suppliers of adhesives and other materials to search for new ways to eliminate odors, she says.



And at the top of the food chain, concern over losing sales due to odiferous cabins is driving global automakers to tighten their standards for VOC and odor emissions for all vehicles, not just those sold in China. But it is problematic, because like beauty, smell is in the eye – or nose – of the beholder. “There is no standard nose, right?” Ryntz says.



Adient autonomous-vehicle concept one of many featuring natural-looking wood floor.



The Future of Natural Materials in Interiors

Concerns about odors and other issues could lead to leather being replaced in highly crafted luxury vehicles in the future with alternatives that offer similar haptics and appearance, Ryntz says, but the demand for other natural materials such as wood is strong among designers working on advanced vehicles, she says.

“I see more wood coming onboard or wood-like substitutes, especially when you go to ride-sharing and autonomous types of

vehicles. Some designers at OEMs ask us for wood-like flooring to look more like a living room.”

And in fact autonomous concepts from Mercedes, Volkswagen, Adient and Yanfeng are just a few examples that feature wood floors.

Suede-like Alcantara, which is made from several different polymers, already is being used extensively in high-end luxury vehicles in place of leather for headliners and trim. And numerous suppliers and automakers are experiment-

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ing with leather substitutes made from mushrooms.

But leather suppliers argue authentic leather will never go out of style. GST Seton Autoleather contends that as vehicles become more autonomous and vehicle interiors become more like living rooms, the demand for natural, authentic materials will increase.

And many designers agree.

“It’s pretty clear that humans respond better to real materials in a more positive way than they do synthetic materials,” says Gary Braddock, design partner at Pocketsquare Design.

“Wood has a feel and a texture, and visually it might be hand-finished with certain stains and treatments to make it really beautiful. That is something people are naturally drawn to. The same thing with leather, it’s a natural material,” Braddock says.

“Metal is a natural material as well; plastic not so much. Plastic feels cheap, it’s always felt cheap. There is a lot of technology that can make plastic look really good, but at the end of the day it’s still plastic. And car companies like the



Faurecia’s Intuition cockpit concept features cutting edge ‘Decotainment’ features and authentic stone trim.

ability to say a car has real wood and real leather when they reach for that type of premium level.”

Interiors supplier Faurecia may be taking the ultimate plunge into trim made from natural materials. It recently showed off its Intuition cockpit concept that features an instrument panel trim piece made of real stone.

Faurecia sources quickly point out the trim is a thin, highly engineered material that does not cre-



Touchscreens losing premium cache as they become common in everyday life, designers say.



ate a significant weight penalty and is capable of meeting all safety rules. Its advantages are a unique look and texture that feels natural and is cool to the touch. What type of vehicle might use such trim in the future? Faurecia sources are tight-lipped, but they suggest it likely would first be used on ultra-luxury cars with 7-figure price tags.

However, many other aspects of the cockpit have more mainstream aspirations. For instance, Faurecia has developed processes to convert wood, aluminum, fabric or plastic into a smart surface so that conventional controls are replaced with touch-sensitive, capacitive switches integrated into the decorative surface, such as its

DecoControl Alu control panel.

When these switches are used to turn on air conditioning, for example, they provide a haptic and visual response through a vibration and illumination indicating the activation of the heating or cooling system. These same smart surfaces can bring ambient light to the cockpit.

The ability to engineer natural materials into very thin pieces and use capacitive touch and sensing technology is leading to a trend PocketSquare designers have dubbed “Decotainment.”

Big touchscreens used to be a premium-feature focal point in high-end vehicles only, but now touchscreens are everywhere, even



in unglamorous locations such as gas pumps and ATM machines.

“Touchscreens just don’t say premium anymore,” Braddock says. “The opportunity you might derive from this type of thinking is the idea of Decotainment, where you find a different way of doing interfaces. Instead of touching a plastic screen, you are touching a different type of material that might give a different effect or be in a different location. It might be adjusting the temperature of the car just by touching the aluminum surround on the air vent.”

If new cockpit concepts are any indication, Decotainment may be the next big thing in interiors.

Outlook for Leather

Independent of all the other interior trends, the near-term outlook for authentic leather continues to look strong despite some doubters.

Demand is soaring worldwide as automakers seek to make the interiors of vehicles from subcompacts to pickup trucks more luxu-



Despite concerns about long-term acceptance in China, most designers think leather will endure as premium material.



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The beef industry is increasing meat production by raising larger and larger cows in fewer and fewer numbers, decreasing the number of hides available for interiors.



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rious. Plus, the availability of hides is improving because fewer shoes are being made of leather due to a global consumer shift to more casual footwear, says leather-industry consultant David Peters.

According to *WardsAuto* data, installation rates for leather seats in light vehicles have increased from 35.4% in 2012 to 43.9% in 2016. Luxury cars lead the way, with 85.8% being equipped with leather seats, but more than half of SUVs (65.4%) and CUVs (51.9%) also are equipped with leather seats. While it trails other segments, the small-car sector also has seen significant growth, increasing 10.4 percentage points

during the same period.

Peters sees both positive and negative trends for automotive leather. On the positive side, he says leather provides a sensory experience that connects with people and excites them. On the downside, he says it is a challenging raw material because “you have absolutely no control over supply. Availability has nothing to do with demand.”

The trend away from leather in shoes is increasing availability of some types of leather for automotive applications, but countering this trend is the beef industry, which is increasing meat production by raising larger and larger



cows in fewer and fewer numbers, decreasing the number of hides available for interiors. And only a small portion of cow hides are suitable for automotive use.

Three things drive the quality of a cowhide, Peters says: location, breed and feed. “Hides from different places are very different. Making leather is similar to making wine.”

More sophisticated supply-chain management and digitized processes for cutting and manufacturing leather interiors will enable leather to keep up with future challenges such as faster product cycles and an increasing focus on craftsmanship and customization, but leather always will have unique supply-chain challenges, he says.

Competition for beef supply and demand for shoe leather determines whether the auto industry will get more or fewer hides, he says.

New Seats

Automotive seats also are undergoing a quiet revolution and not just in luxury cars.

Adient’s Vision Seat does not

look as radical as the Lexus Kinetic Seat Concept, but does have some of the same goals.

It is designed around the idea of creating an automotive seat that is comfortable regardless of an occupant’s size and seating position. Like the Lexus team, Adient designers worked without any of the assumptions typically used in traditional seat construction.

Their starting point was considering the human side of design and studying and reacting to how people’s bodies move when they are sitting in a vehicle.

The result is a seat that moves and adjusts differently from a conventional seat but offers superior comfort and a more optimal sitting position.

“The goal of the Vision Seat was to understand the marketplace and create an ever-evolving platform for seating-concept development,” says Nick Petouhoff, executive director-Engineering. “This design applies Adient’s knowledge of human anthropometry (the scientific study of measurements and proportions of the human body) to create the



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Bose unveiled automotive seat suspension technology for autonomous vehicles at CES in January.



best possible human interface in a vehicle seat.”

The benefits of the new seat design include a thinner and lighter seat profile, greater comfort and easier seat adjustment, whether done manually or electrically. Adient says it will apply the principles it developed while designing the Vision Seat into future production vehicles.

The Bose name most often is associated with audio systems but the company has been con-

ducting research in suspension and motion-control for more than three decades. It began with a research initiative launched in the early 1980s to improve automotive suspension systems. The breakthroughs were revolutionary and became the foundation for the technology’s first commercial application, the Bose Ride system for heavy-duty trucking, introduced in 2010.

The Bose Ride system completely redefined the performance



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of truck-seating suspension by counteracting the road-induced shaking, bumps and jolts that can harm drivers over time. Adopted by fleets and individual owner-operators across North America, the seats significantly improve comfort for long-haul drivers, while dramatically reducing their fatigue and pain, Bose says.

At CES in January, Bose unveiled automotive-seat-suspension technology designed for autonomous vehicles that isolates passengers from road vibrations, shaking and unwanted motion.

By minimizing the constant movement passengers feel inside even the most advanced luxury vehicles, the company says Bose Ride technology transforms the cabin, making it a natural extension of the office, or a personal entertainment hub for listening to music, watching sports and enjoying movies.

The seats also appear to be one of the answers to the potential problem of occupants suffering from nausea while engaged in various activities in fully autonomous vehicles.

“No one can predict exactly what vehicles will look like or how they’ll operate in the decades ahead, but our personal-suspension technology is already proven, and it can dramatically enhance the passenger experience regardless of how transportation evolves,” says Marc Mansell, vice president, Bose Automotive Systems.

All-in-all consumers won’t have to wait until 2025 to see dramatically different interiors in new vehicles. **WA**



DREW WINTER
is a senior content director at WardsAuto and also

oversees the content and agendas for the annual WardsAuto Interiors and User-Experience Conferences. He has been writing about automotive technology and materials for 30 years.