

How Innovative Textiles are Changing the Way We Travel. By Debra Cobb

PLANES, TRAINS AND Automobiles

Despite terrorist attacks, political upheavals, and natural disasters, travel in the last decade has continued to grow, according to the Adventure Travel Trade Association (ATTA), with annual global trips growing from some 22 million in the 1960s to 1.3 billion in 2017.

Today's travelers are more adventurous—and more demanding. “Demographics have shifted to the point where the biggest group of Western travelers, aged 25–45, who have grown up traveling, often see it as a right, and are demanding authentic, unique experiences,” the ATTA reports.

With an emphasis on customization, textiles for the travel industry are rising to the challenge.

A Comfortable Seat

Whether sitting in a plane, train, automobile, RV, stadium chair, or an amusement park ride, comfort contributes to the traveler's experience. Quantum Materials, a vertical manufacturer of solution-based textile innovations, recently collaborated with Acme Mills to introduce Comfort Zone

powered by QUANTUM ZXT, an innovative textile technology for airline seating.

Comfort Zone powered by QUANTUM ZXT supports and conforms to the passenger's body with variable pressure mapping zones throughout the seat, and provides healthier ventilation. By replacing traditional materials such as springs, foam, fill, and upholstery, the alternative seating reduces weight by up to eight pounds per chair.

Quantum's expertise in the extrusion and texturing of elastomeric and bi-component yarns has informed their development of synthetic elastomeric suspension systems for transportation, office, and outdoor seating since 1985. Jeff Bruner, Quantum's creator and chief technology officer, explains, “Comfort Zone powered by QUANTUM ZXT is just a next step, building on our extensive knowledge to provide solutions for companies needing a B-surface type of fabric.”

Importantly, the concept is also customizable. Bett Faircloth, business development and marketing, points out that every fabric Quantum produces is solution-based and unique to a specific customer, with yarns and fabrics engineered per requirement to provide functions such as antimicrobial and UV protection, static dissipation, or performance needs related to airline industry regulations.

New Rules of the Road

Perhaps nothing stands to disrupt the travel industry more than the autonomous vehicle; and the textile industry has taken note. Whether used for on-demand taxi service, group travel, or as a replacement for today's family car, lightweight, electric vehicles will be engineered with innovative and smart textiles inside and out.

“Autonomous electric vehicles will feature different interior materials—more like a living room,” believes Connie Huffa, president of disruptive 3D knitter Fabdesigns. “Your environment will be embedded in the seats, with materials that can multi-task.”

Using 3D knitting, functional yarns for heating, cooling, fiber optics, and communication can be custom embedded in interior componentry, while reinforcement materials such as carbon can be knit into shape for lightweight exterior parts. “Vehicle skins will also be multi-functional and lightweight,” predicts Huffa.

“The customization factor in automotive is becoming very elevated again,” agrees Stephanie Rodgers, director of product research and development at Apex Mills. As an example, she calls out a new Volkswagen production feature, a 10-color LED interior lighting system.

“The instrument panel as we know it is completely disappearing,” Rodgers continues. “It will become a stylized panel with steering wheel and touch screen. The analog interior is going away.”

Rodgers notes that such developments are not confined to autonomous cars, but were featured in displays for boats, campers, and RVs at the Consumer Electronics Show in January.

Tools of the Trade

Knitting machine and technology provider Shima Seiki is already expanding its focus from apparel manufacturing

to the automotive industry, via Shima SVR and SRY flatbed shaping machines, and MACH2XS WHOLEGARMENT knitting.

Last year President Mitsuhiro Shima announced plans to use the 3D knitting technology to create lightweight, non-steel frames for car parts, which would be solidified by coating with resins.

“The automotive market is shifting to customization,” confirms Hayato Nishi, sales and senior business development for Shima Seiki USA.

“Our 3D knitting aspect minimizes construction, waste, and labor costs,” Nishi explains. “By using our machines, textile manufacturers are capable of creating just-in-time, customizable covers for seats and dashboards. In addition, by knitting different yarns and constructions in specific area, we're able to integrate different qualities in one fabric without additional attachments. The yarn unwinding option and inlay capabilities on the SVR and SRY machines allows the use of previously unknittable yarns such as monofilament, carbon, or fiber optics.”

Other Shima innovations for automotive and industrial textile manufacturing include the P-CAM cutting machine, a sophisticated cutting system for more complex fabrics such as those using carbon fiber.

It All Starts with Yarn

The ongoing development of smart and customizable yarns is changing the game for transportation textiles. Rodgers calls out Supreme's VOLT conductive technology, which encapsulates up to four copper lines within a polyester yarn and is coated for insulation. This creates a knittable conductive yarn that is safe in proximity to body chemistries.

Huffa cites Arkema's Kynar polyvinylidene fluoride (PVDF) high-performance polymer, which can be engineered as a barrier film or fiber with resistance to moisture, UV rays, various chemicals, viruses, and flame—possibly reducing the “ick” factor in aviation and mass transit interiors.

There is also renewed interest in natural fibers for transportation textiles, according to Huffa. “Wool is making a comeback, due to its ability to pass flammability testing,” she points out.

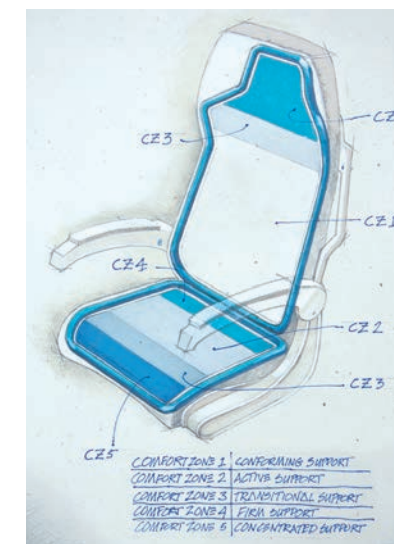
Südwolle's Stöhr brand wool-based yarns for transportation and technical end uses are naturally anti-static and thermo-regulating, with inherent moisture management and antimicrobial properties, and virtually no VOC emissions. According to Bettina Christensen, Stöhr Yarns director, “They are predominately custom yarns, built specifically for a customer or function. The largest markets we serve are upholstery for residential, commercial/contract and transportation.”

Christensen adds, “We have found that wool functions and performs better than other fibers in these applications due to the strength, durability and comfort of wool.”

Disrupting the Way We Travel

While travelers and commuters are currently enjoying textile innovations such as 3D knitted backpacks and “smart” luggage sporting chargers and GPS tracking systems, textiles for transportation are sure to play a key role in the future traveler's experience, from autonomous cars to Elon Musk's Chicago Hyperloop transit tunnel to Virgin Galactic flights into space.

“Transportation is really happening because the industry is very forward-thinking,” says Rodgers. ●



Comfort Zone powered by Quantum ZXT supports and conforms to the passenger's body with variable pressure mapping zones throughout the seat.

Left: Adaptive textiles will create customized environments for travelers. Right: The base body fabric of this Toray seat was knit without seams on Shima WholeGarment machinery to fit the metal frame.



Photo: Elite Traveler



Photo by Deb Cobb

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