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Tension fabric solar charging station for Volvo Italy

CASE STUDY: VOLVO PURE TENSION PAVILION

Pure Tension Pavilion Fabric Structure

Client: Volvo Italy

Designed by: Synthesis Design + Architecture

Engineer: Buro Happold Los Angeles

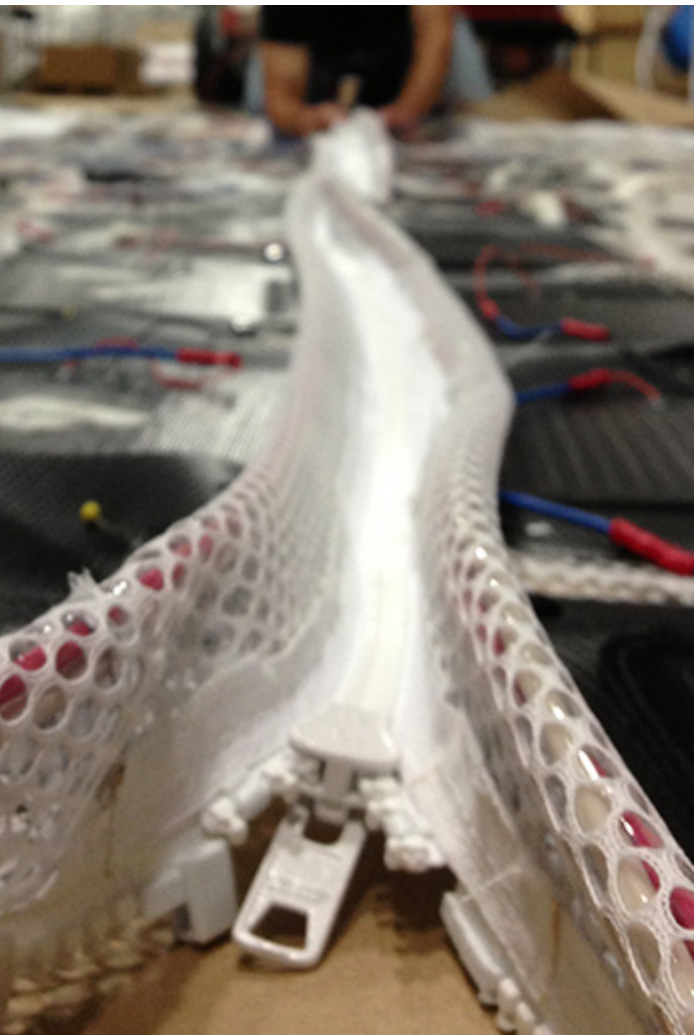
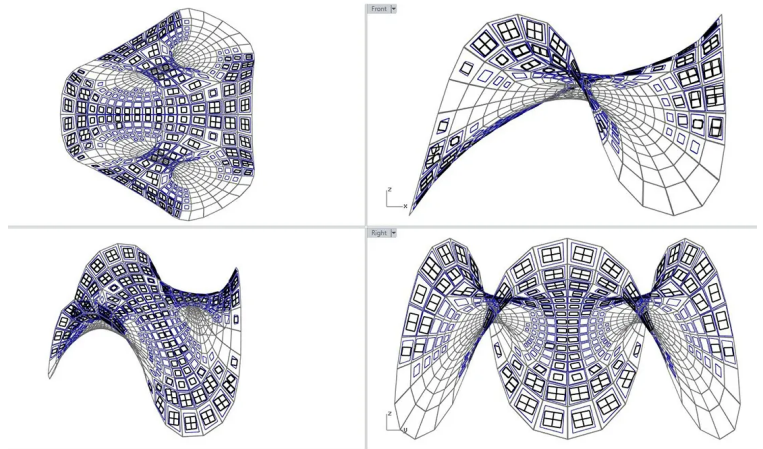
The “PURE Tension” Volvo Pavilion was a collaborative effort between Fabric Images®, Synthesis Design + Architecture (SDA), and Buro Happold (BH). The design began as a concept, commissioned by Volvo Car Italia to showcase the new Volvo V60 Plug-in Hybrid. The purpose was to create a lightweight, rapidly deployable, tensioned membrane structure that would act as a portable charging station, fitting within the car’s trunk.



Fabric Images was responsible for engineering and fabricating the 495 sq. ft. architecture, including metal finishing, fabric selection, patterning, sewing, and sourcing and integrating solar technology. In other words, Fabric Images was responsible for ensuring the solar technology would successfully charge the vehicle.

The architecture consisted of a perimeter aluminum framework tensioned in place with fabric. The frame pushes out while the fabric pulls in, creating a lightweight, cost-effective, and easily transportable solution. The fabric was patterned through a digital form exploded into non-uniform quadrilaterals to allow the digital mesh to become successfully unrolled into hundreds of tiles. A total of 518 tiles of fabric were essentially quilted together, combining tension and shape, which became the essence of the design.

Miller Mesh fabric was selected due to its balance of performance and aesthetic appearance. Along with the efficiencies of the material, the moiré effect produced by the mesh also encouraged visual interaction. Within the open quality of the mesh, two wormholes discretely took form. These tunnels were patterned into the design of the fabric, creating additional tension and expanding the visual interest of the architecture.



178 Photovoltaic cells integrated within the fabric tiles. The placement of the cells was critical to ensure a direct hit from the sun or artificial lighting. Each cell was mounted to leaf-shaped panels of black vinyl, which were secured to the mesh fabric. Once attached, the cells were wired toward a center spine leading to the main battery supply.

The PURE Tension Pavilion debuted in Milan, Italy, for the Volvo Italia press event launching the Volvo V60 Plug-in Hybrid, where the pavilion successfully charged the vehicle. In a press release by Volvo, Michele Crisci, President of Volvo Car Italia, stated, "We have rewarded an idea that is fantastic, simple and at the same time highly sophisticated from a creative point of view. I expected a project that was able to convey what is fundamentally Volvo Cars, which in addition to safety, means quality, environmental sustainability, functionality and making technology available to everyone. In this, we have it all. And to see it brought to reality increases the buzz that the initial idea generated even further."



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