It’s not often you can carry the formworks for a 5-ton, 19-foot-tall hyperbolic paraboloid (hypars) concrete shell in a pair of suitcases. But that’s exactly what Dr. Mariana Popescu and her colleague from Switzerland’s Block Research Group (BRG) carried onboard a flight from Zurich to Mexico City. The contents of their suitcases formed the basis for an award-winning tribute to renowned Mexican-Spanish architect Felix Candela (1910–1997) called KnitCandela. The curvy, sinewy concrete shell was designed and built by BRG, Zaha Hadid Architects Code, and UK-based Architecture Extrapolated.

TO UNDERSTAND THE DESIGN POWER OF KNITCANDELA, START WITH A PAIR OF SUITCASES.

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THE INCREDIBLE LIGHTNESS OF CONCRETE

To help turn the precisely fabricated knit into a rigid 3D shape, the fabric, the shuttering component, is supported by a load-bearing cable net. The fabric is coated with a specially formulated cement paste.

In many respects, the precise off-site nature of the KnitCandela process resembles modular construction. The net result is a complex formworks mold that drastically reduces the need for field effort and uncertainty, which vastly simplifies logistics.

Hold your breath

With so much of the formworks meticulously choreographed 9,777 miles away in Zurich, was there anything left to surprise or delight in the MUAC courtyard? After all, this was the first time BRG used knitted textiles at an architectural scale. "We had no doubts about the science and computations behind the formworks," Popescu says. "However, you’re not quite sure how it will all work until you’re standing there in front of it. You hold your breath. Wow, this is happening. There’s no way this isn’t happening," she smiles.

High performance outcome

KnitCandela was an immediate sensation, earning a half-dozen notable awards and distinctions. How should architects understand the larger lessons of KnitCandela?

Consider a Formula 1 car race, Popescu advises. "You won’t find Formula 1 racers in city traffic. But the innovations used to create high-performance motor vehicles often find their way into mainstream design and manufacturing. Likewise with KnitCandela. The proven techniques used to realize sophisticated geometries in concrete now have far broader possibilities in residential and commercial design. And they are simple enough to carry in a suitcase."

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