

Design Workshop for Elastic Lattice Shells the Realization of Prototypes

Project Type Research and teaching

Status Completed

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Questions and Content

This project is an experimental teaching project in the form of a design workshop. It is about the optimization of lattice technology using elastic glass-fiber-reinforced plastic rods. In August 2012 a test structure of the first elastic lattice shell with an irregular grid mesh was built in the Peter-Behrens-Halle. The lattice shell spanned more than ten meters and was five meters tall. It employed glass-fiber-reinforced plastic rods, known as GFR rods, six meters in length with a diameter of two centimeters. Optimizing the topology of the lattice and the elastic rods make it possible to preassemble the construction on the floor and then construct the hemispheres very quickly. Constructing this lattice shell offers a first impression of the fundamental potential of this construction method for temporary and mobile uses.

The project was developed as part of the "Active Bending" research focus of the Chair of Structural Design and Technology at the UdK Berlin in cooperation with the working group Geometry and Mathematical Physics of the Department of Mathematics of the TU Berlin. The design workshop with students from the UdK was the first opportunity to put the construction to a real test, and the resulting prototype was impressive.

Use and Target Audience

Imagine a mobile planetarium built from the lattice shell, which would act as a skeleton in this hybrid structure – covered by a 2-ply pressure-stabilized membrane. While the outer membrane would be compressed onto the skeleton, the inner membrane would take the form, not attaching to the lattice, but »floating« in the room, offering a precise projection surface for the dome.

Support from the Hybrid Plattform

The Hybrid Plattform established contact between the partners. It is also searching for possible areas of application and project partners to realize a dome, which could be used to test and present 3-D applications in a wide variety of disciplines. It would also be possible to imagine partners in the fields of event management and stage-set design.