
The World's Largest Textile Facade - ThyssenKrupp Tower in Rottweil

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Abstract

Standing at approximately 246 meters in height, the ThyssenKrupp company's Test Tower in the town of Rottweil is one of the tallest buildings in Germany. It is used for testing and certifying innovative high-speed elevators. The Test Tower is more than just a functional structure for researching and developing modern elevator technologies, however. Its 232-metre-high public observation deck (the highest viewing platform of its kind in Germany!) allows visitors to enjoy some breathtaking views. Moreover, the structure is also the tallest textile-clad building in the world. The tower is equipped with ten lift shafts. These are accompanied by a firefighting lift and a panoramic glass elevator.

Planning the textile facade that clads the full height of the tower was a particularly demanding challenge. It not only involved taking such questions as installation and wind loads into account, but also required the consideration of diverse aspects of maintenance, weather resistance, etc. This necessitated numerous coordination meetings with various contractors as well as a range of tests, material evaluations and experimental assemblies. The challenge was further increased by the fact that a textile facade of this height has never been built before—just one of the ways in which the project is breaking new ground.

The Test Tower's textile facade consists of PTFE-coated glass fiber fabric. This is attached to six round steel tubes that run around the tower in a helical arrangement. The tubes are positioned at a distance of 1.80 meters away from the outer edge of the concrete construction. The full height of the textile facade is made up of various different fabrics whose thread compositions become less tightly woven and less opaque as they travel towards the top of the building. This makes the concrete structure behind the textile facade increasingly visible the further up the tower you go.

Beyond its aesthetic function, the textile cladding also provides various technical advantages. Reminiscent of a Scruton helix, the facade's spiral arrangement influences the vortex shedding around the tower and minimizes the stress from lateral oscillation by approximately 40 per cent. Furthermore, the textile covering also offers protection from the elements. It shades the tower shaft, thus reducing the (sometimes significant) stresses induced in the concrete by solar radiation. Thanks to the textile façade, the amount of concrete and steel needed for the Tower could be reduced by 15 per cent.