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The Desert Rose of Qatar

Construction of the new National Museum of Qatar transformed a visionary design into magnificent reality – thanks to German engineering from Stuttgart

The new National Museum of Qatar appears wild and jagged at first glance – the building's structure was inspired by the crystal formations of a desert rose. Technical excellence was required for the planning and execution of the project in order to turn the complex design by French architect Jean Nouvel into a real construction. This is where the engineers from Werner Sobek came in. The international group with headquarters in Stuttgart had prior experience of many other complex large-scale projects in Asia, Europe and the Middle East, which attracted the attention of the Korean general contractor in charge of project execution. In this way, German technical expertise came to make a major contribution to the successful realization of this large-scale project. The breathtaking building was inaugurated at the end of March – and has already become an icon of the young desert State of Qatar.
The bizarre building designed by French star architect Jean Nouvel to accommodate the new National Museum of Qatar is impossible to take in at first glance.

Stretching over a distance of 400 metres between the waterfront and the centre of Doha, the structure features 539 interlocking discs designed to resemble the crystalline structure of a sand rose.

Constructed reality

Many factors are required to realize a vision such as this: courage, a pioneering attitude, innovativeness, team spirit and perseverance as well as the ability to comprehend complex grid structures. Without these, the result could have been as feared by the Neue Zürcher newspaper (NZZ) in a recently-published article: "It was by no means sure that the project realization would be such a resounding success, even with the greatest of faith in technology. There's a fine line between ingenious design and dismal failure," commented the NZZ shortly after the museum opened in March 2019. No wonder that Werner Sobek was selected for the detailed design of the façade. The international engineering company with headquarters in Stuttgart is known for an ability to transform even very unconventional designs into viable projects thanks to expert planning. Over the past few years, Werner Sobek has made a mark with diverse outstanding engineering projects such as the Heydar Aliyey Center in Baku as well as the new terminal building at Kuwait International Airport – which is why the company was especially selected for this Middle Eastern project by the Korean building contractor.

Different dimensions

The idea behind the new National Museum was to evoke the form of a desert rose – a formation of crystals incorporating grains of sand - in a vast architectural complex measuring approximately 400 x 250 metres in area and reaching a height of up to 40 metres. The building itself is constructed from 539 different disc-shaped elements, each with a diameter of up to 87 metres. The discs are arranged in a staggered fashion, partially overlapping one another. The complex geometry of the building's exterior is continued inside the museum, creating a unique spatial experience.
The Korean general contractor for the project commissioned Werner Sobek with the engineering of the building envelope, in order to turn the extraordinary design into a feasible construction. The project scope also included the provision of a team at the construction site, responsible for site supervision, interface clarification, coordination and, last but not least, for the presentation of project plans to local contractors.

Mastering extreme complexity

A key component of the planning process was a vast BIM (Building Information Modelling) model into which all planners involved continuously fed their data and which served as the basis for project execution. "The model enabled us to master the high geometrical complexity of the project", explained Project Manager Dr.-Ing. Thomas Winterstetter, Chairman and Partner of Werner Sobek Stuttgart –and since 2018 also Honorary Professor of the University of Stuttgart.

Award-winning: The innovative application of BIM technology

Werner Sobek won the BIM Award back in 2016 for the innovative use of BIM technology on the construction of the new National Museum in Qatar. The sheer scale of the project as well as its extreme level of detail (LOD 400) made it one of the largest models in the world of its kind at the time of its creation. The construction project required a completely new set of planning and coordination techniques: for example, a specialist company was engaged solely for the coordination of BIM processes between all involved parties.

Thomas Winterstetter summarized the project as follows: "This outstanding architectural vision could only be turned into a reality thanks to the continuous, highly-professional commitment of all those involved, as well as through state-of-the-art planning and construction technology - and not least because of the vision and courage of the building developer",. The museum officially opened its doors on 27th March 2019, as planned.

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About Werner Sobek

Named after its founder, the Werner Sobek Group was set up in 1992 and has become known throughout the world for engineering, design and sustainability, with over 350 employees working across locations in Berlin, Buenos Aires, Dubai, Frankfurt, Moscow, New York and Stuttgart. All Werner Sobek projects are characterized by a winning combination of superior design and premium engineering, featuring ingenious concepts designed to minimize the use of energy and material resources. In 2015, company founder Werner Sobek was awarded the Fritz Leonhardt Prize for lifetime achievements followed by the Balthasar-Neumann Prize on May 17th, 2018.

Werner Sobek is known for an ability to transform even very unconventional designs into viable projects with clever planning expertise. One of the company's most recent projects was the new National Museum of Qatar, designed by Jean Nouvel. Werner Sobek was selected by a building contractor from Korea for a number of tasks including the engineering of the building envelope. Image: Andreas Keller, Altdorf

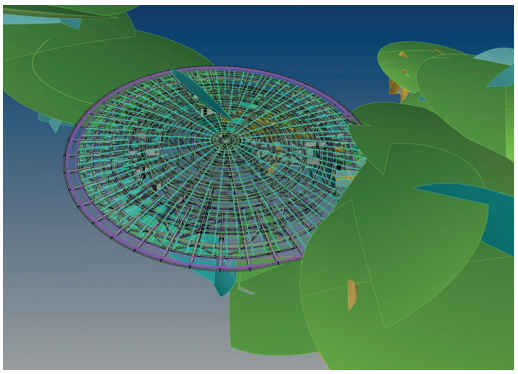
The idea behind the new National Museum was to evoke the form of a desert rose - a formation of crystals incorporating grains of sand - in a vast architectural complex measuring approximately 400 x 250 metres in area and reaching a height of up to 40 metres.
Image: Andreas Keller, Altdorf

Technical excellence was required for planning and execution from the project team in order to turn the complex design into a real construction. This is exactly where the engineers from Werner Sobek came in. The international group with headquarters in Stuttgart had previously been involved in many other complex large-scale projects in Asia, Europe and the Middle East. Image: Andreas Keller, Altdorf

The building is composed of 539 different disc-shaped elements, each with a diameter of up to 87 metres. The discs are arranged in a staggered fashion, partially overlapping one another. Image: Andreas Keller, Altdorf

German know-how from the Werner Sobek Group made a major contribution to the successful realization of this large-scale project. The defined project scope also included the provision of a team at the construction site, responsible for site supervision, interface clarification, coordination and, last but not least, for the presentation of project plans to local contractors.
Image: HG Esch, Hennef

DA detail view of the staggered disc-shaped elements, evoking the crystalline structure of a desert rose. The realization of the challenging construction design required a superior level of technical expertise from the Werner Sobek engineering team.
Image: HG Esch, Hennef



Werner Sobek won the BIM Award back in 2016 for the innovative use of BIM technology on the new National Museum in Qatar. The sheer scale of the project as well as its extreme level of detail (LOD 400) made it one of the largest models in the world of its kind at the time of its creation. Image: Werner Sobek

Prof. Dr. Dr. E.h. Dr. h.c. Werner Sobek. The renowned architect and engineer Werner Sobek founded the Werner Sobek Group in 1992. He is internationally regarded as a pioneer of sustainable construction for the future. Image: A.T. Schaefer, Stuttgart