Baku Flame Towers

Since 2012, the city of Baku, capital of Azerbaijan, has a striking complex of high-rise buildings: the Baku Flame Towers. The construction consists of three towers which have the shape of a flame with a maximum height of 190 m. The flame shape designed by HOK Architects was inspired by the importance of fire for the town, as there is a high number of oil wells in the region.

The Dlubal customer Werner Sobek Stuttgart was responsible for the steel spires put on the towers as well as for the spectacular facade.

Supporting Structure of Tower Spires

The main structural systems of the three towers consist of reinforced concrete. In contrast, the towers’ top stories consist of filigree steel frameworks which provide spacious room for special use.

The primary framework of the spires consists of a spatial three-hinged frame built up of round pipes with a diameter of 610 mm. Following the given geometry, the pipes were taken as biaxially curved sections to the construction site where they were connected to each other by butt welds. To reduce deformations of the construction that is 30 m high, the vertical side steel columns were attached to the frame by bending-resistant connections. A special triangular cross-section made of typical metal sheets and round steel bars was used for these columns to allow for an outside view that is as wide as possible. This cross-section was modeled in the Dlubal program SHAPE-THIN and then imported to RFEM.

The wind loads that were governing for the design were determined by a wind report, reaching very high values of 7 kN/m². Therefore, additional diagonals were needed on the curved back side of the steel constructions in order to reduce the total deformation on the tower spire to the required 90 mm.

Because technical planners were working closely together in an early phase of the project, the planning was performed successfully on schedule.

The following companies participated in the construction:

Architect
HOK Architects, London
www.hok.com

Design of facade and structural analysis of tower spires
Werner Sobek Stuttgart GmbH & Co. KG, Albstraße 14
D-70597 Stuttgart
www.wernersobek.de

Software
Dlubal Engineering Software
Am Zellweg 2
D-93464 Tiefenbach
www.dlubal.com

Designed with Dlubal Software

Structural model in RFEM showing the deformation of a tower spire (screen shot: Dlubal)