

BS 536 STUDIES ON TALL BUILDINGS: DESIGN CONSIDERATIONS Fall 2017-2018

> Case Study: Evolution Towe Berfu Beliz Arslar

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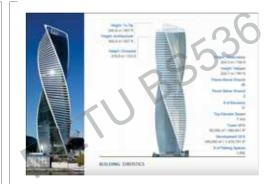


Case Study: Evolution Tower by Berfu Beliz Arslan Submitted to: Günel, Ay – Fall 2017

ountry Structural Material Global Ranking Regional Ranking National Ranking City Ranking

Evolution Tower [1] City Palace Tower, Wedding Palace [1] Completed [1] Russia [1] Moscow [1] Office [1] Reinforced Concrete [1]. Shear Walled Frame [2] 2005 [1] 2008 [1]

2015 [1]
#409 Tallest in the World [1] (as of 2018)
#18 Tallest in Europe [1] (as of 2018)
#18 Tallest in Russia [1] (as of 2018)
as Tallest in Russia [1] (as of 2018)
City-Palace LLC;
ZAO Snegiri Development; [1]
Kettle Collective: Gorproject, RMJM [1]
GK-Techstroy; Gorproject [1] Height: Architectural 246 m [1]
Floors Above Ground 55 [1]



Selected Twisting Towers CTBUH defines a "twisting" building as one that progressively rotates its flor plates or its façade as it gains height. Usually, but not always, each plate is sh similarly in plan and is turned on a shared axis a consistent number of degree from the floor below.[3] ers: Twisting Tall Buildings", CTBUH Journal, no. 3, 2016. Tall Buildings in Numbers: Twisting Tall Buildings", CTBUH Journal, no. 3, 2016.



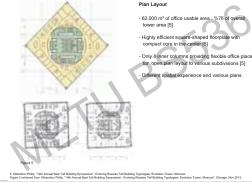
Location of Evolution Tower

- Located in the Moscow-City high-rise business district along the Moscow River. [4]
- Occupying a 2.5-hectare area, 80% of which is a landscaped terraced civic plaza. [4]
- Including a 10-meter-high ceremonial staircase, leading to the higher terraced levels, landscaped areas with green lawns, trees, water features, travellators, and feature light boxes [4]



Form and Function

- The building resembles two ribbons wrapping around each other
- The sculptural DNA-shaped twisting [4]
- Symbolizing the progress of humankind through its achievements in construction [4]
- The Evolution Gallery Mall within the podium houses a food court and a 6,000-square-meter family entertainment and educational center [4]
- The 82,000-square-meter office tower with 52 levels and each level rotated three degrees from the previous and the overall twist reaching 156 degrees clockwise [4]



Structural Elements Twisting square shaped floor plates [5] Vertical structural RC frame [5] . A central core . 8 straight columns (Ø 2.1m-1.2m de through the height of the building) 14° inclined spiraling corner columns - 3.5 m thick RC raft piled foundations (pilled cap) [5] рШd



Figure 7 drawn by: Berfu Beliz Arsla

Structural System

- Rigid frame contributes to the shear walls in the upper storeys [2]
- Reinforced concrete shear walls that are perforated contributes to the frame in the lower storeys [2]
- Very effective behavior against lateral loads by giving the structure a greater stiffness [2]



Twisting of Structure

- 52 levels, each level rotated three degrees from the previous [4]
- The overall twist
- 2 twisted ribbon





The Crown

- Providing a helipad at the very top, as well as an open observation roof deck featuring the panoramas [4]
- The tower crown, repribbon façade [4]
- Consisting of two 41-meter-span twisted-steel arches, with interim steel supports cantilevered from the central cylindrical concrete core walls [4]
- Four smaller arched supports beneath the white



- The double-curved tower envelope provided by cold-bending reflective glass units [4]
- Doubleglazed units cold-formed in 3D within the aluminum frame to avoid the visual effect of "stepping" [4]
- The world's largest cold-bent façade in terms of the area in one building [4]
- On each floor, the curtain wall consisting of 108 parallelogram façade panels 4.3 meters high and 1.5 meters



- met Halis and Ilgin Hüseyin Emre, "Tall Buildings: Structural Systems and Routledge - Taylor & Francis Group, 2014.
- CTBUH Journal, no. 3, 2016
- 4. Nikandrov Philip, "Upward Spiral: The Story of the Evolution Tower", CTBUH Journal, no. 3, 2016.