

VODOTIKA a.s.

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The company Vodotika was established in May 1990 starting out from one of the largest Slovak engineering companies. At the present time we employ 20 people with various specializations such as architects, civil and structural designers, M-E engineers, hydro-mechanics and hydro-energetic engineers.

The main activities are divided into two parts covering all design stages:

- Water and environmental structures (hydropower stations, dams, powerhouses)
- Buildings (apartment blocks, multifunctional buildings, domestic dwelling)

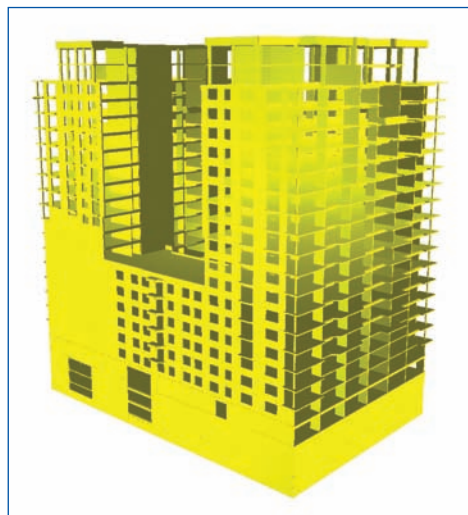
From 2002 on, our company is the chief designer of polyfunctional buildings in Bratislava-Petrzalka (Sustekova-Bosakova streets). Development

plan is in 6 phases divided. "High rise buildings – VODOTIKA" is the 3rd phase of home building.

Vodotika obtained its EN ISO 9001:2000 certificate in 2003 and a lot of essential water-management structures have been designed and built in its 18 years of existence.

Most important references:

- Apartment Blocks and Multifunctional buildings: Sustekova-Bosakova streets, Bratislava-Petrzalka
- Small hydro-electric powerstations: SHS Velke Blahovo, Ziar nad Hronom, Vozokany, Kralovany, Strecno
- Dams: Oreské, Slatinka
- Flood protection dam: Sturovo - Waterproofing for River Danube



Short Description

High rise building - Vodotika

The project regards a multifunctional high-rise building situated in Bratislava-Petrzalka and contains flats, offices and retail units. It has two 20-storey towers, which are connected up to the 7th floor and it includes 3 sublevels. The floor dimensions are 60 m by 40 m and the maximal height of the building is 63,5 m. The main bearing system is a combination of reinforced concrete walls, columns, communication cores and floor slabs. For the static and dynamic (seismic) design of the structure a 3D model was created for this project with the help of Scia software, using finite element methods.

Project Information

Owner: Vodotika - MG, spol. s.r.o.
 Architect: Vodotika a.s.
 General Contractor: Vodotika - MG, spol. s.r.o.
 Engineering Office: Vodotika a.s.

Construction Start: 01/11/2007
 Construction End: 01/11/2010
 Location: Bratislava, Slovakia



In general

The project "High rise building – VODOTIKA" is being built at this moment in Bratislava-Petrzalka. It is multifunctional building, where you can find flats, offices and retail units. It includes two 20-storey towers connected until the 7th floor.

There are 3 underground floors. Because of the underground water the building is designed as a dilatation unit. The floor plan dimensions of whole object are 60 m x 40 m. The maximal height of the building is 63,5 m.

Geological conditions

According to the results, a geological examination of the foundation's soil was determined: the surface layer is created by dirt-sand with clay addition, then there is a layer of gravel and at 13 m under the surface the layer of neogen clay was found. Underground water was found in 2,5-3,0 m depth during geological examinations. It is in direct relation with the Danube River.

Load bearing system

The main bearing system is a combination of reinforced concrete walls, columns, communication cores and floor slabs. In each tower there are 2 communication cores.

The building has 3 underground storeys which is created by a reinforced concrete box with a

foundation raft. The walls are from 200 mm – to 400 mm thickness. There are various types of dimensions of columns. The floor slabs are 200 mm thick. There are two types of concrete used - C30/37 (walls and columns at first and second storey) and C25/30 (the rest of the structure).

Structural design

The calculation consists of a static analysis from the vertical load, wind load and from a dynamic analysis from a combination of vertical and seismic loads. For the static and dynamic (seismic) design of the structure a 3D model was created for the whole object in the Nexis 32 3.60.17 software package using the finite element methods.

The loads were calculated according to the Slovak standards. Because of the reinforced concrete fixed retaining walls, the footwall was simulated in two concepts of the soil interaction and the foundation raft.

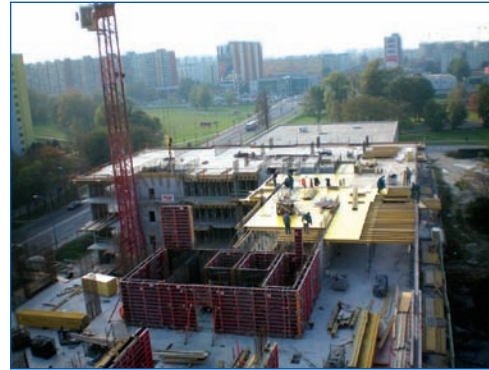
At first the footwall was calculated like the "elastic" with relevant values "cz" of a spring and compared with the results from Scia's Soilin module with real properties of the foundation's soil.

The seismic load is considered as a standard designed spectrum of the seismic response according to Slovak standards. The seismic response of the structure was calculated using a modal analysis, which consists of an eigen vectors solution, followed

by an internal forces solution for each load case. All floor slabs were calculated separately too. For each slab a proper model was created and the internal forces and deflections including creep were calculated.

Conclusion

To find an adequate solution of the internal forces and deflections on such a demanding structure, it is important to define the interaction of the footwall and foundation structures and the stiffness of the whole structure. Scia's software fulfils these requirements.



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