



Introduction

This project is a continuation of an existing home-building initiative in a Bratislava location. The building is divided into three parts, with each having a different number of storeys. The ground plan dimensions of the whole object are 96 m x 25 m and it is divided into five dilatation units. The maximal height of the building is 28.8 m.

There are projected flats (third-storey and higher), offices (second-storey), shops (first-storey) and a car parking facility (two sub-levels) within this object.

The motivation for this project is to have all the roofs designed as "greenery" so that the roof layers' weight generates the load case on the roofs' reinforced concrete slab.

Geological conditions

According to the results of the geological examination of the foundation's soil, the following points were determined: the surface layer is created by dirt-sand with a clay addition, underneath which there is a gravel layer, and then at a depth of 13 m is a layer of neogen clay. Underground water was found at a 2.5 - 3.0 m depth during the geological examination. The water is in direct relation to the Danube river.

Load bearing system

The main load bearing system is a combination of reinforced concrete walls, columns, communication cores and slabs. The car parking facility has two underground storeys comprising reinforced concrete box with a foundation slab. The thickness of the reinforced concrete walls is 200 mm. There are various types of column dimensions. The thickness of the typical slabs is 200 mm, while for the roof slabs it is 250 mm. The foundation slab has three different thicknesses – 900 mm, 800 mm and 700 mm.

Use of Scia Engineer software

The calculation consists of static analysis regarding the vertical load, wind load and dynamic loads. For the static and dynamic (seismic) solutions for the structure, a 3D model was created for the whole object with

Scia Engineer software using finite element method calculations. The loads were calculated according to Eurocode 1.

The seismic load is considered as a standard designed spectrum of seismic response according to Eurocode 8. The seismic response of the structure was calculated using modal analysis, which consists of the eigen vectors solution and then the internal forces solution for each load case.

Scia module Soilin was used for the calculation of the interaction of the foundation soil and reinforced concrete structure.

Separate calculations were performed for the typical floor slabs. A particular model was created for each slab, while the internal forces and deflections with creep were calculated.

Scia software helped us to decide on the foundation. In just a short time it is possible to make adjustments and to calculate the response of the concrete structure.

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Vodotika a.s. is an engineering company established in May 1990. At present, we employ more than 20 people who variously specialise in civil and structural engineering as architects, civil engineers, structural engineers and hydraulic engineers.

The main company activities are divided into two parts that cover all design stages:

- Design of building constructions (apartment blocks, multifunctional buildings, dwelling units, blocks of flats)
- Design of water and environmental constructions (hydropower plants, dams, hydraulic complex facilities, polders)

Our company has been the chief designer of multifunctional buildings in Bratislava-Petržalka (Šustekova-Bosákova streets) since 2002. One of the most significant reference cases in our design of building constructions can be seen in Scia User Contest 2009, p.102 - "High-rise building Vodotika". Vodotika company has held an EN ISO 9001 certificate since 2003.

Project information

Owner	Vodotika-MG, spol. s.r.o.
Architect	Vodotika a.s.
Engineering Office	Vodotika a.s.
Location	Bratislava, Slovakia
Construction Start	11/2013

Short description | Polyfunctional Building

The polyfunctional building project is situated in Bratislava-Petržalka's Lužná street. It is the next phase and the continuation of home-building in this location. The project comprises of a complex of three buildings, each with a different number of storeys, which include flats, offices, shops and two sub-levels of car parking. The construction is divided into five dilatation units. The load bearing system is a combination of reinforced concrete walls, columns, communication cores and slabs. For the static and dynamic analysis of the structure and for the foundation concept, the 3D model was created using Scia Engineer software.

