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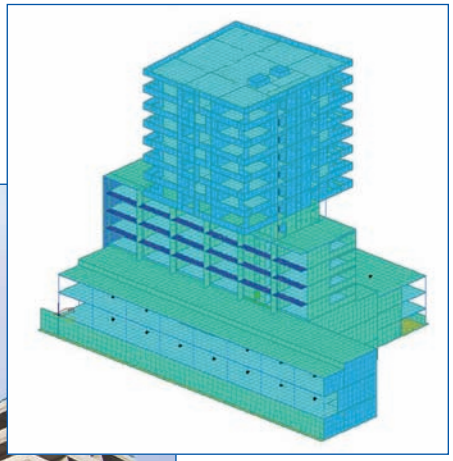
Our small company has been founded in 1992 and is dealing with the design and solution of static problems of bearing constructions of buildings, technological buildings and also transportation buildings.
During the existence of our company we have participated in the design of bearing constructions in the field of industrial buildings - productive and technological halls - and constructions, technological buildings with regard to productive technological equipment in the agricultural area and also residential constructions of multifunctional and apartment buildings (concrete skeletons of the bearing constructions).

We are a member of the Slovak Chamber of Civil Engineers.

Our small office employs 3-4 engineers.



Short Description

Tatra City Multifunctional Complex

The Tatra City complex located in the capital city of Slovakia, Bratislava, contains on the one hand an administrative part and on the other hand a residential part.
It is composed of 15 above-ground floors and one basement floor and has a height of 46 m.
The bearing system of the building is created from a concrete monolithic combined plank and wall system.
The basic bearing system of the tower blocks consists of concrete cores with the parameters 7.6 x 9.9 m a vertical communication core.

Project Information

Owner: Tatra Residence
Architect: Ing.Arch. L. Závodný
General Contractor: ZIPP Bratislava
Engineering Office: Ing.Arch. Lubomír Závodný Aa

Construction Start: 01/04/2007
Construction End: 01/05/2009
Location: Bratislava, Slovakia

In general

The Tatra City complex is a multifunctional building with one administrative part and a residential part. In particular we are going to deal with the residential one because it was the main purpose of our work.

The authors of the architectural design are Ing.arch. Ľ. Závodný, Ing.arch. D. Michalák, Ing.arch. m. Lang, mgr.arch. O. Pleidel. The chief designer of the project is Ing. Ľubomír Žemla. The building has 2 dilatation units and each of them has 15 above-ground floors and one basement floor. The maximum height of the object is 46 m above the terrain.

Geological conditions

It is located on the right bank of the river Danube. From the geological point of view massive gravel-sand layers with the river sedimentation of the river Danube are participated in the location of interest. This layer reaches to 10-15 m and the ground is made up from neogenic sediments in sand-clay and clay evolution. The level of the underground water can be found 4.0 – 4.2 m under the surface.

Foundation

Following preliminary research of the area it was clear that the building had to be founded on the gravel layer. Based on this presumption the foundation of the object was designed on the plank. The calculation showed sufficient suitable ground. The supplier of the construction decided to change the system of the foundation from planar to piles. The piles were designed by a company which realised both the distribution and the carrying power of the piles; it was solved with their length. Following the presentation of their design the calculation of the whole object was requested. In the final phase we arrived at 820 mm thick piles with 10 – 14 m length. The basement parts of the object were solved as waterproof construction because of wobbling level of the underground water.

Bearing system

The bearing system of the object is created from the concrete monolithic combined plank and wall systems and the skeleton construction based on the foundation plank with piles together with the point-supported ceiling planks. In particular in the tower blocks, the basic bearing system consists of concrete cores with the parameters 7.6 x 9.9 m. The thickness of the walls is narrowed from the foundation to the last floor (400-200 mm). Bearing columns, size 600/300 mm, represent the next part of the system in the open spaces and in the basement because of the parking area.

The object has 2 large above-ground floors – the multifunctional part. It is a linear residential building with a width of 13.25 m, up to the 8th above-ground floor. The technological floor is located on the 9th floor. On this floor the angle bracket construction of the remaining floors partially begins. This is the most

Used software: ESA-Prima Win / Nexis

critical point not only from the calculation point of view but also from the realisation of the construction itself. It was checked in detail by the supplier and the planner. The remaining floors are characterised as a wall system of 200 mm thickness and a plank system of 250 mm thickness. The full solidity of the planks is secured by a circuit firm attic gable.

The construction of the elevator wells was designed as a separately standing object, horizontally secured in the particular levels of the planks.

The material used in the wall and plank construction was concrete C25/30. The columns were designed from concrete C30/37.

Calculation

The construction was modelled with the ESA-Prima Win Nexis 60 programme. The whole bearing construction of the object was simulated with the 3D model; this was necessary for the analysis of the construction according to the interesting shape. The basement was solved with the soilin module following the Winkler combination together with the elastic support in the place of the future piles. The sufficient horizontal stiffness was showed so the modelling of the partial ceiling planks could follow. Each ceiling plank got its partial 3D model of its own floor. The most critical ceiling plank construction was the one on the level of the angle bracket above the 9th floor. Here we had to solve some models together with the particular phases of the realisation of the object. The results were the required dimension stiffening drawings directly from the program.