IGUBA, s.r.o.

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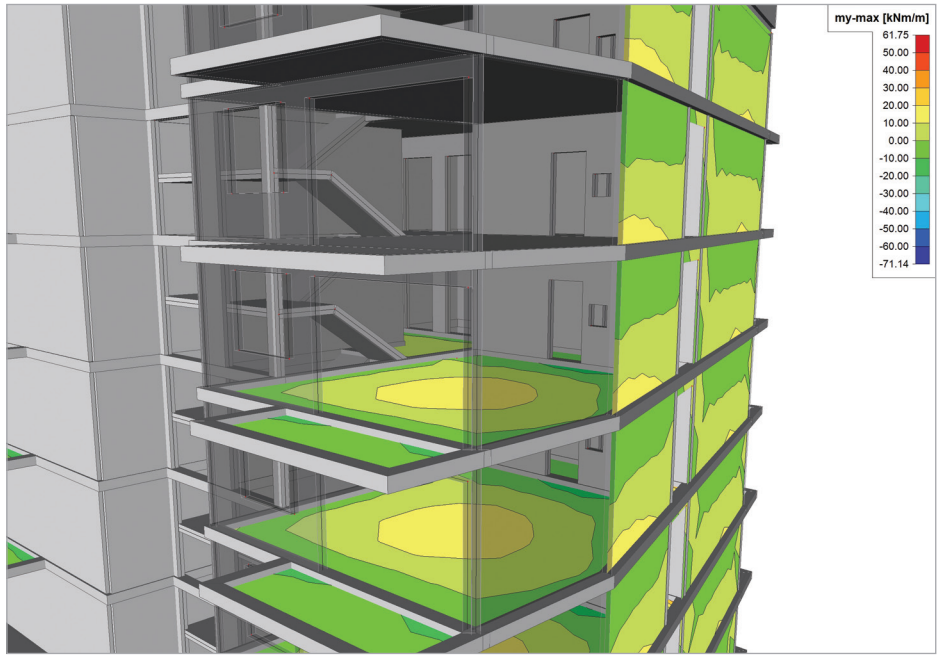
The company IGUBA was established in 1997. The owner, Ivan Guba, is a static engineer who works on his own. The annual turnover amounts from 60.000 to 75.000 Euros.

Structural engineering

- Civil engineering: all about static and construction
- Static design of residences and commercial buildings
- Diagnostics of bearing constructions.
- Technical consulting

Some projects since 1990

- Secondary Combustion Chamber & Steam Boiler and Flue Gas Cleaning (DK)
- Object of Furniture ATRIUM Bratislava (SK)
- Steel Structures of many Tank- and Oil-Stations „AVANTI“ (now SHELL) (SK, CZ, HU, AU, RO, etc.)
- Commercial building „Swietelsky“ (SK)
- Technological Center E.O.S. Žilina (SK)
- Hockeyball Hall Macharova Bratislava (SK)
- Shopping-storing project Vajnorska (SK)
- Emporia Towers Buildings in Bratislava (SK)



Software: Nexis, Scia Engineer

Thirteen-Storey Department Store - Bratislava, Slovak Republic

This project presents the static calculation of the reinforced concrete structure (C30/37) for the Department Store in Bratislava - Vrakuňa, Dvojkrížna Street, Slovakia. The building will be constructed from January 2011 to May 2012. The total length of this building varies from 20.4 to 50.6 m, its width is approximately 21.4 m, the area 725 m² and the volume is more than 30.000 m³. The total volume of the reinforced concrete for the structure amounted to 4.440 m³ and its weight to 11.100 t. The building costs add up to 35.000.000 Euro.

Description of the structure

The reinforced concrete structure is composed of 13 modules 1-13, consisting of a box girder type 13-storey tower. The building has a breadth distance of 21.40 m, the expansion gap is min. 30 mm, and the overall length of the building will be 40.50 m.
The supporting structure is made of cast-in-place reinforced concrete. It consists of vertical wall and horizontal board elements forming a compact unit with transversal, as well longitudinal, stiffening in horizontal and vertical planes. On the outer supporting circumferential walls there are fastened warming panels with a weight of 30 kg/m² protecting the hall from weather impacts and thermal bridges.
The horizontal structures of the ceilings form monolithic plates with a thickness of 250 mm and a span of max. 7.30 m. The double-armed stairway is monolithic too. The individual parts of the structure are stiffened by monolithic circumferential walls and an internal stairway-holding wall. The main entrance with a dominant oblique monolithic roof is situated on the front shield wall.

Description of the parts of the concrete structure

The primary supporting system is combined in transversal and longitudinal direction and is calculated for every loading effect. The main focus of the static calculation is laid especially on the monolithic structure supported by circumferential walls from three sides (on the fourth side - there is a glass wall) and several supporting columns with the axial distances of max. 7.00 m and this is considered as one special unit.

The vertical and horizontal supporting structures of the building consist of monolithic plates (200 mm thick) made of concrete C30/37 which are mutually stuck. The vertical communication areas - stairways - are situated in the stairway area limited by the internal supporting monolithic walls (200 mm thick) to approximately 5.30 x 2.60 m.

All stiffening elements are monolithic structures of the supporting system, i.e. they are designed in the longitudinal as well as in the transversal direction, in the ceiling plane monolithic wall elements and on the fourth storey also in supporting columns.

Material and loading data

The foundation and load-bearing elements were designed according to ENV 1993-1-1:1992 Eurocode 3. The design consists of the calculation and evaluation of a number of load cases and their complex combination effect. In addition to dead load (self weight) also live load was considered: for ceilings it is the standardized value 2.50 kN/m², for stairways 3.00 kN/m², the snow loading (area II.) so = 0.70 kN/m² and wind loading wo = 0.55 kN/m² (during the erection phase and on the final building). Other types of load were seismicity 7o MSK-64, category “A” and temperature loading (during the operation the shell structure has a higher temperature than the column support).

Description of the static calculation method

The static calculation is performed in NEXIS (ESA-Prima Win). The 80 most dangerous combinations according to ENV 1993-1-1:1992 Eurocode 3 with coefficient 1.35 in two basic combinations (load-bearing capacity and deformations) were calculated. The model contains 4.118 nodes, 1.068 bars and 1.524 1D and 2D macros.

Bearing capacity, deformations of walls and ceilings

For the load-bearing capacity of the walls and ceilings in relevant load case combinations, the nodes were selected in all four corners of each floor. The horizontal deformation in x, y direction should not exceed 1/1.000 of the node elevation above the support according to the recommended limit deformations in ENV 1993-1-1:1992 Eurocode 3. The software evaluates extreme deformations in every direction (x, y, z) as well as maximum node rotation around the x, y, z axes separately.

Thirteen-Storey Department Store

Bratislava, Slovak Republic

Project information

Owner	ATLAS REAL, s.r.o., Bratislava
Architect	Kallay Karol, Bolčo Branislav, Valenta Radovan
General Contractor	ATLAS REAL, s.r.o., Bratislava
Engineering Office	IGUBA, s.r.o., Bratislava
Construction Period	From January 2011 to October 2012
Location	Bratislava, Slovak Republic

Short project description

The total length varies from 20.4 up to 50.6 m; the width is approximately 21.4 m, the surface area 725 m^2 and the volume more than 30.000 m^3. The total volume of reinforced concrete amounted to 4.440 m^3 and its weight up to 11.100 t. The reinforced concrete structure has 13 modules 1-13, consisting of a box girder type 13-storey tower. The supporting structure is made of cast-in-place reinforced concrete. On the supporting circumferential walls there are fastened warming panels with the weight of 30 kg/m^2. The main entrance with a dominant oblique monolithic roof is located on the front shield wall.