IGUBA, s.r.o.

Contact Ivan Guba
Address Miletičova 70
Miletičova 70
821 09 Bratislava, Slovakia

Phone +421 2 5341 5370
Email iguba.sro@mail.t-com.sk

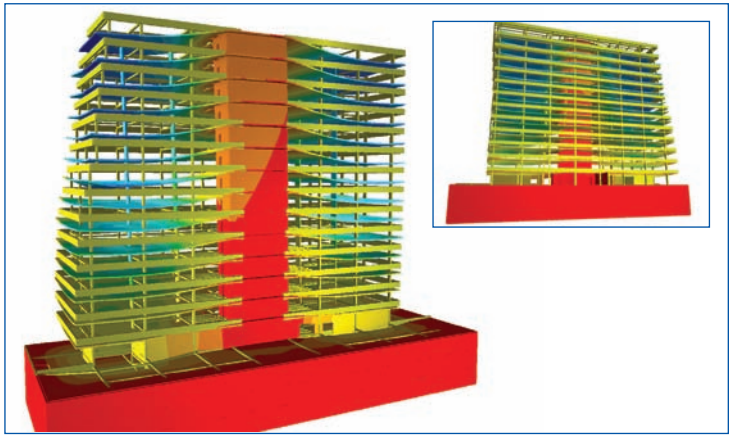
The company

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

- Structural engineering
- Civil engineering: all about static and construction
- Design of the static of residences and commercial buildings
- Diagnostics of bearing constructions
- Technical consulting

Projects since 1990

- Lift shaft of 120 m height for a Boiler Steam Structure 2x500 MW in Shen-Tou (China)
- Some platforms for a Boiler Steam Structure 2x360 MW Jorge Lacerda IV (Brasil)
- Reconstruction of the Bank „METROPOL“, Bratislava (Slovakia)
- Steel Structures of many Tank and Oil Stations „AVANTI“ (now SHELL) in the Slovak Republic, Czech Republic, Hungary, Austria, Rumania, etc.
- Commercial building „Swietelsky“ in Bratislava (Slovakia)
- Secondary Combustion Chamber & Steam Boiler and Flue Gas Cleaning in Nyborg (Denmark) – see my project in Scia User Contest Book 2002, p. 80
- Object of Furniture ATRIUM Bratislava (Slovakia) - see my project in Scia User Contest Book 2005
- Technological Centre E.O.S. Žilina (Slovakia) - see my project in Scia User Contest Book 2007
- Hockey Hall Macharova Bratislava (Slovakia) - see my project in Scia User Contest Book 2007
- Shopping-storing project Vajnorska Bratislava - see my project in Scia User Contest Book 2007



Short Description

Emporia Towers, Bratislava

This project regards the static of the reinforced concrete structure (C30/37) for the Emporia Towers Building in Bratislava–Slovakia, which will be mounted from January 2008 to May 2009. The supporting structure of the object is made of reinforced concrete from spilt concrete consisting of vertical wall and horizontal board elements forming a compact unit with transversal as well longitudinal stiffening in horizontal and vertical planes. The total length of these two towers together is 2 x 53,1 = 106,2 m, the width approximately 17,4 m, the surface area 1842 m² and the volume more than 105.000 m³. The total volume of reinforced concrete for the structure amounts up to 2 x 10,000 = 20,00 m³ and its weight up to 2 x 25000 = 50,000 t. The total building costs come to 100,000.000 Euro.

Project Information

Owner: Dipl. Ing. Ivan Guba
Architect: Dipl. Ing. Arch. Matej Siebert, Phd.
General Contractor: Emporia Towers, s.r.o., Bratislava
Engineering Office: Siebert+Talaš, s.r.o., Bratislava

Construction Start: 03/01/2008
Construction End: 30/06/2009
Location: Bratislava, Slovakia

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Description of the Structure

The reinforced concrete structure of the Emporia Towers has 21 modules 1-21, consisting of a box girder type 13-storeyed tower having a breadth distance of 17,40 m, and between which there is an expansion gap of min. 30 mm, so that the overall length of the towers will be 106,50 m.
The supporting structure of the building is made of reinforced concrete from spilt concrete consisting of vertical wall and horizontal board elements forming a compact unit with transversal, as well longitudinal stiffening in horizontal and vertical planes. On the supporting circumferential walls there are, fastened from the outside, warming panels of a planar weight 30kg/m² protecting the hall from meteorological and precipitation influences of weather and of a thermal bridge.

The horizontal structures of the ceilings are formed with monolithic plates of a thickness of 250 mm with a span of max. 7,30 m. The double-armed stairway is monolithic too. The individual towers are stiffened by monolithic circumferential walls and an internal stairway-holding wall. On the front shield wall of the stores we see the main entrance with a dominant oblique monolithic roof.

Description of the Parts of the Concrete Structure

The primary supporting system of the project is combined in the transversal, as well as in the longitudinal direction and it has been calculated for every loading effect. The object of the project in the static calculation is especially the monolithic structure supported by circumferential walls from three sides (on the fourth side – the front one – there is a glass wall) and several supporting columns in axial distances of max. 7,00 m and it is considered as one special unit.
The vertical supporting structures of the building, as well as the horizontal supporting structures of the ceilings consist of monolithic plates of a thickness of 200 mm out of concrete C30/37, which according to the static calculation are mutually stuck.
The vertical communication areas – stairways – are situated in the stairway area limited by the internal supporting monolithic walls (thickness 200 mm),

Used software: Nexis

which are limiting the stairway area (approximately 5,30 x 2,60 m).
All stiffening elements of the building are monolithic structures of the supporting system, i.e. they are designed in longitudinal, as well as in transversal direction; in the ceiling occur plane monolithic wall elements and on the fourth storey we also find supporting columns.

Foundations - Material and Loading Data

The foundation and the bearing structures were designed acc. to ENV 1993-1-1:1992 Eurocode 3. The design of the device consists of the calculation and evaluation of a number of load cases and their complex combination effect. Besides the dead load (own weight) was considered the live load; for ceilings it is the standardized value 2,50kN/m², for the stairway 3,00kN/m², for snow loading (area II.) so = 0,70 kN/m2 and for wind loading wo = 0,55 kN/m2 (during erection and on the final building). After that was considered seismicity 7o MSK-64, category "A" and temperature loading (the shell structure received higher temperatures than the column support during the operation).

Description of the Static Calculation

The static calculation is prepared with the software NEXIS rel. 3.100. The 80 most dangerous combinations were calculated acc. to ENV 1993-1-1:1992 Eurocode 3 with coefficient 1,35 in two basic combinations (bearing capacity and deformations).
The model contains 1385 macros in 1D and 2D.

Bearing Capacity, Deformations of the Walls and Ceilings

The text enclosure shows a bearing capacity of the walls and ceilings in relevant load case combinations (the same in the graphic enclosure). The nodes were selected in all four corners on each floor elevation.

The horizontal deformation in x, y direction should not exceed 1/1000 of node elevation above the support (of the structure as whole) acc. to the recommended limit deformations in ENV 1993-1-1:1992 Eurocode 3. The software evaluates extreme deformations in every direction separately (x, y, z) as well as maximum node rotation around the axes x, y, z.