IGUBA, s.r.o.

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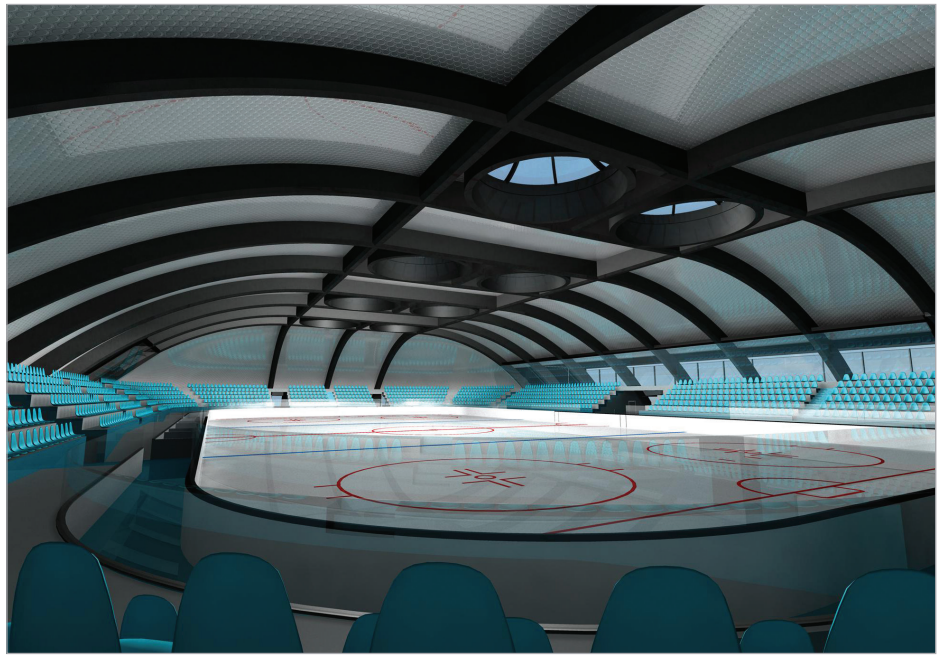
The company IGUBA was established in 1997. The owner, Ivan Guba, is a static engineer who works on his own. The annual turnover amounts from 60.000 to 75.000 Euros.

Structural engineering

- Civil engineering: all about static and construction
- Design of the static 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

Hockey Hall - Senec, Slovak Republic

Description of the steel structure

The steel structure of the hall has 8 modules A-H of transversally stiffened frames made of rolled profiles with an axial distance of 6.50 m. An extra 19.95 m module is inserted between the first and last module, which means that the overall length of the hall is 7 x 6.50 + 2 x 19.95 = 85.40 m. The overall width of the hall is 2 x (7.70 + 19.95) = 55.30 m. The axial distance of the transversal joints is 33.80 m. The main columns support stiffened beams with their lower edges at the height of 12.50 m.

The supporting structure of the hall is made of steel and consists of vertical rolled columns HEA 600, stiffened cross beams and longitudinal rolled beams HEA 200 and HEA 300 with transversal as well as longitudinal stiffening in horizontal and vertical planes. On the supporting steel elements there are externally affixed sandwich panels (30 kg/m²) protecting the hall against wind and rain. Illuminators of a maximum weight of 5 kg/m² will be hung on the lower flange of the stiffened beam.

Description of the steel structure parts

The primary supporting system of the building was considered in the static calculation as one special unit. The steel columns consisting of profiles HEA 600 have a height of 12.500 mm in the highest point of the countertype roof. On the columns there are inserted beams - lattice girders, verticals and diagonals which have been designed using double angle profiles of various dimensions. Longitudinal beams made of profiles HEA 200 and HEA 300 are welded to the upper chord. Statically they are considered as simple beams, on which sandwich panels of the roof are inserted.

The connection to columns and beams is made through steel sheet flanges and bolts. Floor beams are made of open-section rolled steel beams. The parts are connected with bolts during the erection phase.

Foundations

The steel columns are supported by reinforced concrete foundation pads made of concrete of class C16/20. The dimensions of the reinforced concrete foundation pads in the ground plan are 2.200 x 2.200 mm and they reach to the depth of 2.000 mm. The foundation pads are located on concrete piles (each one with a bearing capacity of 500 kN). The foundation of the building was quite a challenge. The seismicity is of 7o MSK-64, category “A”.

Material and loading data

The foundation and load-bearing elements were designed according to ENV 1993-1-1:1992 Eurocode 3. The design of the building consists of the calculation and evaluation of a number of load cases and their complex combination effects: in addition to the dead load (self weight) also the live load was considered - in this case only the illuminators. No service platforms, which would increase the load of the supporting steel structure, were designed.

The snow loading (area II.) was equal to 0.70 kN/m² and the wind loading was wo = 0.55 kN/m² (during the erection phase and on the final building). Moreover, seismicity 7o MSK-64, category “A” was considered as well as 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 was prepared with the software NEXIS (ESA Prima Win) rel. 3.100. 24. The most critical combinations were calculated according to ENV 1993-1-1:1992 Eurocode 3 with the coefficient set to 1.35 in two basic combinations (load-bearing capacity and deformations).

The model contains 291 nodes, 514 bars and 100 1D macros. The model has 5 different profile sections made of both basic materials, i.e. steel and concrete. The basic linear calculation module (3D frame) has solved over 10.000 equations.

Hockey Hall

Senec, Slovak Republic

Project information

Owner	City Senec
Architect	Pavel Kosnáč
General Contractor	City Senec
Engineering Office	IGUBA, s.r.o.
Construction Period	From January 2011 to October 2011
Location	Senec, Slovak Republic

Short project description

This project presents the static calculation of a 283 ton heavy steel structure (S235) for the hockey hall in the town of Senec - Slovak Republic. The steel structure was mounted from January to September 2010. The total length of this construction is 85.6 m; it has a width of 55.3 m, a total area of 4.600 m² and a volume of more than 40.000 m³. The building costs are 5.000.000 Euro. The hall can be used by approximately 2.500 visitors. Hockey halls are rather rarely realized in the Slovak Republic which makes the realization of this type of building all the more interesting.