VIN Consult s.r.o.

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VIN Consult Prague was founded in 1993 as a member of Inros Lackner, a German consultancy group. The company is focusing on bridges, structural analysis and traffic engineering.

Key specializations

- Bridges, engineering structures, structural analysis
- Design and renewal of bridges and engineering structures
- Bearing structures of buildings and industrial structures
- Reinforced and prestressed concrete, composite and steel structures, special foundation
- Non-linear analysis, stability problems, dynamics of structures
- Road structures, traffic engineering

History

At the beginning the company started with the design of roads and bridges, partly for German clients. In the second half of the nineties more attention was paid to industrial structures and buildings, with a significant amount of precast concrete structures. At the same time a new construction technology of arch bridges interacting with the soil was developed.
In the new millennium VIN Consult is trying to make use of knowledge in different fields of structural analysis and design, focusing on large multifunctional objects and structures both in the analysis and in the design, combining innovative structural solutions, new materials and clever construction technologies.

References

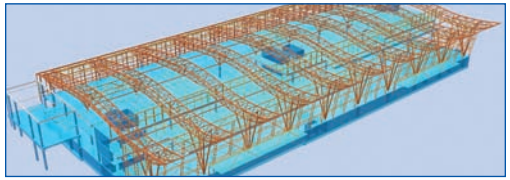
- Shopping Centre Europark Prague, Vankovka Brno, Chodov Prague
- Shopping Centre Arkady Prague, Arkady Liberec, Foundation Pit Liberec
- Bridge over the Kartouzska Street in Prague
- Pedestrian Bridge Ocelarska in Prague

Vision

The company wants to further develop its flexibility and special know-how, combining innovative solutions with high-tech computing and CAD instruments.

Software

VIN Consult uses two fully independent 3D-software packages with prestressing, dynamics and geotechnical model – Trimas from RIB Stuttgart and Scia Engineer. Beside these complex instruments many smaller software tools for local structural problems are used, mainly from RIB, geotechnical programs from FIDES as well as non-linear concrete analysis ATENA from Cervenka Consulting.
CAD design is carried out with Allplan.



Short Description

New Airport Terminal in Bratislava

The new airport terminal in Bratislava is designed as a six-storey building (one basement and 5 overground levels) with dimensions of 182x70m in plan and an above-ground height of 22 m.
According to high demands on operation, layout and construction technology a rather complicated structure is designed with a corresponding aesthetical level.
For the design, a full 3D CAD model of the structure was built in Allplan, which was used for the drawings as well as subsequently for the transfer to a 3D structural model in Scia Engineer. The transfer was successful resulting in a comprehensive structural model that allowed the static structural analysis as well as the dynamic analysis of seismic loading.

Project Information

Owner: Airport M.R.Stefanika, Bratislava
Architect: AGA-Letiste Prague and Casua Prague
General Contractor: Strabag
Engineering Office: VIN Consult Prague

Construction Start: 01/09/2008
Construction End: 31/03/2010
Location: Bratislava, Slovak Republic;

Project history

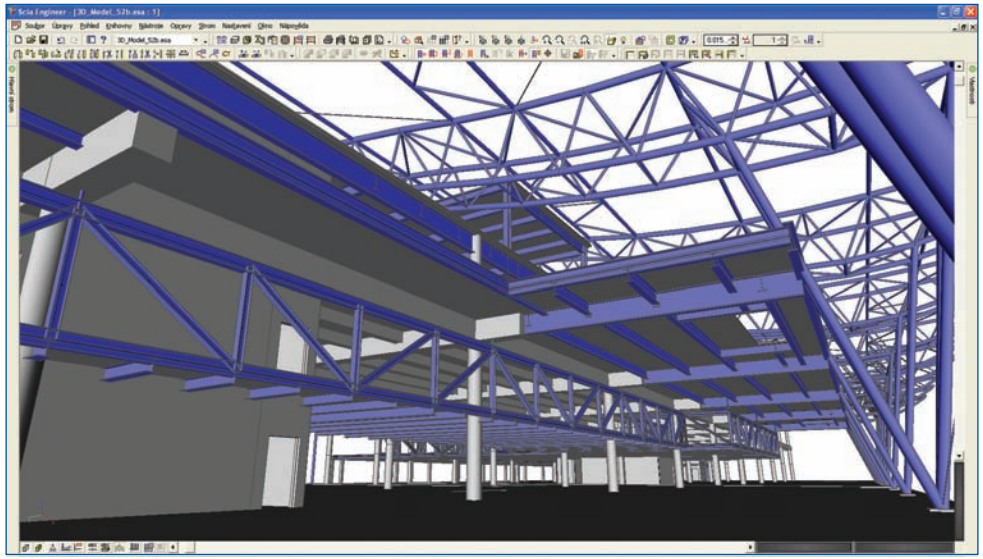
As VIN Consult came to the structural design in early 2008, a routine structure was being planned. During the building permit design the concept solution was totally changed, the aim being to develop a challenging structure, although not purposeless.

The materials and technologies should be used according to layout, operating as well as construction requirements.

Description of the structure

The new airport terminal in Bratislava is designed as a six-storey building (one basement and 5 overground levels) with dimensions of 182x70 m in plan and above-the-ground height of 22 m.

In the basement there are technical rooms and storages, passenger premises are situated on the 1-st and 3-rd floor. On the 2-nd floor there are offices as well as spaces to rent, the 4-th and 5-th level are



Used software: Scia Engineer, Allplan Engineering

only partial decks for technics and machine rooms. The bearing structure is designed as a combined skeleton, with basic modulus span of 18m in the longitudinal direction and irregular spanning of 12+9+18+9 m in the transverse direction.

The foundation slab and underground walls are made of cast-in-place concrete, with cast-in-place flat slab on the ground level. The main overground floor slab on the third level is designed mainly in concrete, with prestressed primary beams and prestressed secondary beams, partly as a composite structure. On the 2-nd level an intermediate deck is designed, which has to be suspended from the main deck according to spatial requirements. The primary beams are thus designed as truss girders spanning 18m, with composite secondary beams. The technological decks on the 4-th and 5-th level are designed as composite structures with primary steel and secondary beams with a concrete slab.
The roof structure is designed as a continuous wavy truss girder with a total length of 84,5m, spanning 39+27 m with cantilevers on both ends. Each truss girder is a spatial structure in both longitudinal and transverse direction, supported with three columns, which branch out in four legs to support the truss.
Besides the main steel structure of the roof, an auxiliary truss steel structure is designed to support the facade.

CAD design

According to the complicated structural layout (every floor has different dimensions) it was decided to make a complete 3D-model of the structure, while in architecture only 2D-design was carried out.
The aim of the 3D-model was to check all of the complicated spatial details of edges and intersections, as well as to generate plan and elevation drawings without mistakes.

The 3D-CAD design was carried out in Allplan, whereas a subsequent transfer to a structural model in Scia Engineer was planned. Furthermore the 3D-model should be later used in as a base for form- and reinforcement drawings.

Structural analysis

The comprehensive 3D structural model was carried out in Scia Engineer, with partial automatic transfer from Allplan. Although much handwork has to be added to develop the structural model, the use of the architectural model from Allplan was successful. The structural model was then completed with geotechnical subsoil - thanks to Scia Engineer's Soilin module - and used for the global structural analysis.
Besides of static calculations also a dynamic analysis of seismic loading was carried out.
In the next step of the design process, it was considered to make the model even more complete with respect to construction phases as well as other detailed solutions.

Project evaluation

The challenging structure of the new airport terminal was successfully designed in the phase of building permit as well as tender documents. The combination of the 3D architectural and structural models of Allplan and Scia Engineer was very useful and saved a great amount of time and routine work.

The next phase of execution detailing started in autumn 2008. The structure is now under construction and the execution detailing is carried out by another consulting company using casual designing techniques.