

Vahanen Consulting Engineers

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Vahanen Group

Vahanen Group is a Finnish based engineering firm employing some 400 experts in Finland, Estonia, Russia, Romania and Switzerland. The company was founded in 1955 and nowadays it providing services with regard to architectural design, structural design, civil engineering and building services. The company takes an advantage in a multidisciplinary approach combining techniques to processes and systematic engineering to creativity.

The company has a strong position in a Russia. The offices of Moscow and St. Petersburg offer their clients a full service package including concept design, site evaluations, design services, project management, supervision and approval process management.

Vahanen is committed to sustainable development and seeks new approaches in its projects to find enduring, environment safety and energy efficient solutions in cooperation with its customers.

Services and projects

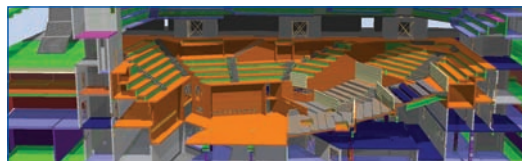
The company has the target to unite an architectural vision into successful business concepts both in greenfield projects and in existing buildings. The company designed already major department stores and shopping malls in Finland and in Russia. One example is the Nevski Centre, a large shopping

centre in the heart of St. Petersburg, where demanding soil conditions and strict historical restrictions had to be taken into account. The company has also designed many commercially successful spas and swimming centres.

The company has been involved in many cultural projects like the National opera of Finland and the refurbishment of The National theatre of Finland. In addition to all these projects, the project portfolio includes The Museum of Modern Art, the Cultural Centre in Hämeenlinna and finally The Helsinki Music Hall.

Vahanen is known for its expertise in building physics. Using high level software, simulation techniques and material technology, the company is designing healthy, comfortable and productive environments for people to work and live. The projects include schools, kindergartens, office premises etc... Laboratory services and field studies provide a sound background for engineering tasks. The emission properties of new and existing materials are being studied thoroughly in order to make the right choices for construction.

There have been many industrial projects in Russia for international companies. Our total service concept has offered our clients a safe and a fast way of putting up production plants, industrial parks and logistic centres.



Helsinki Music Hall

Short Description

The project regards a music hall in the centre of Helsinki. The main concert hall will have seats for 1.700 listeners; there will also be smaller halls for concerts and rehearsals.

The acoustics and vibration isolation were the most important factors affecting the architectural and structural design. As the music hall is located near the Töölö Bay, a part of the Finnish gulf, there is a water pressure of 10 meters loading the underground structures which are made of large bore piles.

The roof structure was also an interesting engineering task as the span is 40 meters and the roof itself is quite heavy for acoustical reasons. Besides that, additional loading to the roof comes from the facade which is made of glass panels which are hanging from the roof.

Project Information

Owner: Senaatti Kiinteistöt
 Architect: LPR-arkkitehdit Oy
 General Contractor: SRV-viitokset Oy
 Engineering Office: Vahanen Group

Construction Start: 01/06/2006
 Construction End: 31/12/2010
 Location: Helsinki, Finland

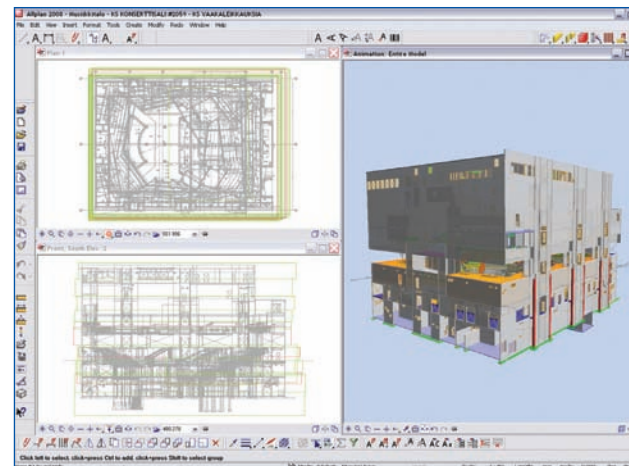


Quote of the Jury

"This project attracts high public interest. It is technically very demanding due to the complex geometry and the acoustic requirements. During the multidisciplinary design process the advantages of BIM have been explored very convincingly, especially for coping with ongoing design changes."

The Helsinki Music Hall is a long awaited building in the centre of Helsinki. It will be located just besides the Houses of Parliament. Excavations started in the summer of 2006. The foundation stone was laid on 22.10.2008 and the first concert is expected to be held in May 2011. The main concert hall will have seats for 1 700 listeners and there are also smaller halls for concerts and rehearsals.

The basic design was done in a period when the construction market was running overheated. The results of the tender competition of the main contract exceeded the budget heavily. Many changes were needed to reduce the cost of the project. In the cost reducing process BIM modelling proved its strength. The changes were relatively easy to design and the costs simple to estimate.



Finally the construction was done using Design and Build Model. The timetable for the erection of the structural frame was very tight. The design was changed one more time into a more production friendly direction. The changes in the structural part were made efficiently using Allplan Engineering. Besides the time based challenges there were also high level technical demands. The acoustics and vibration isolation were the most important factors affecting the architectural and structural design.

On the other side of the building is situated the street with the most amount of traffic, including trams and buses, of Helsinki. On the opposite side there is the main railway station. The structural sound isolation was done with the help of structural absorbers, springs and room-in-room techniques.

The shape and form of the main concert hall is quite complex and the acoustic demands are very strict. The concrete structures have been designed with the help of Allplan Engineering. The contractor wanted to have very accurate reinforcement drawings with steel lists of all the reinforcement. The property of Allplan Engineering for reinforcing multiformed structures was used in order to do the work fast, accurately and effectively.

The Music hall is located near the Töölö Bay which is part of the Finnish gulf. As a result there is a water pressure of 10 meters loading the underground structures which are made of large bore piles. The roof structure was an interesting engineering task because the span is 40 meters and the roof itself is quite heavy for acoustical reasons. Additional loading to the roof comes from the facade which is made of glass panels which are hanging from the roof. The roof structure was done using post tensioned concrete beams.

The fitting of the HVAC-techniques to the building proved to be quite a challenging task in this Design and Built project. There were a large amount of openings in the walls and slabs. The fitting and the cross checking was done BIM model based using the IFC standard in the data transfer.

