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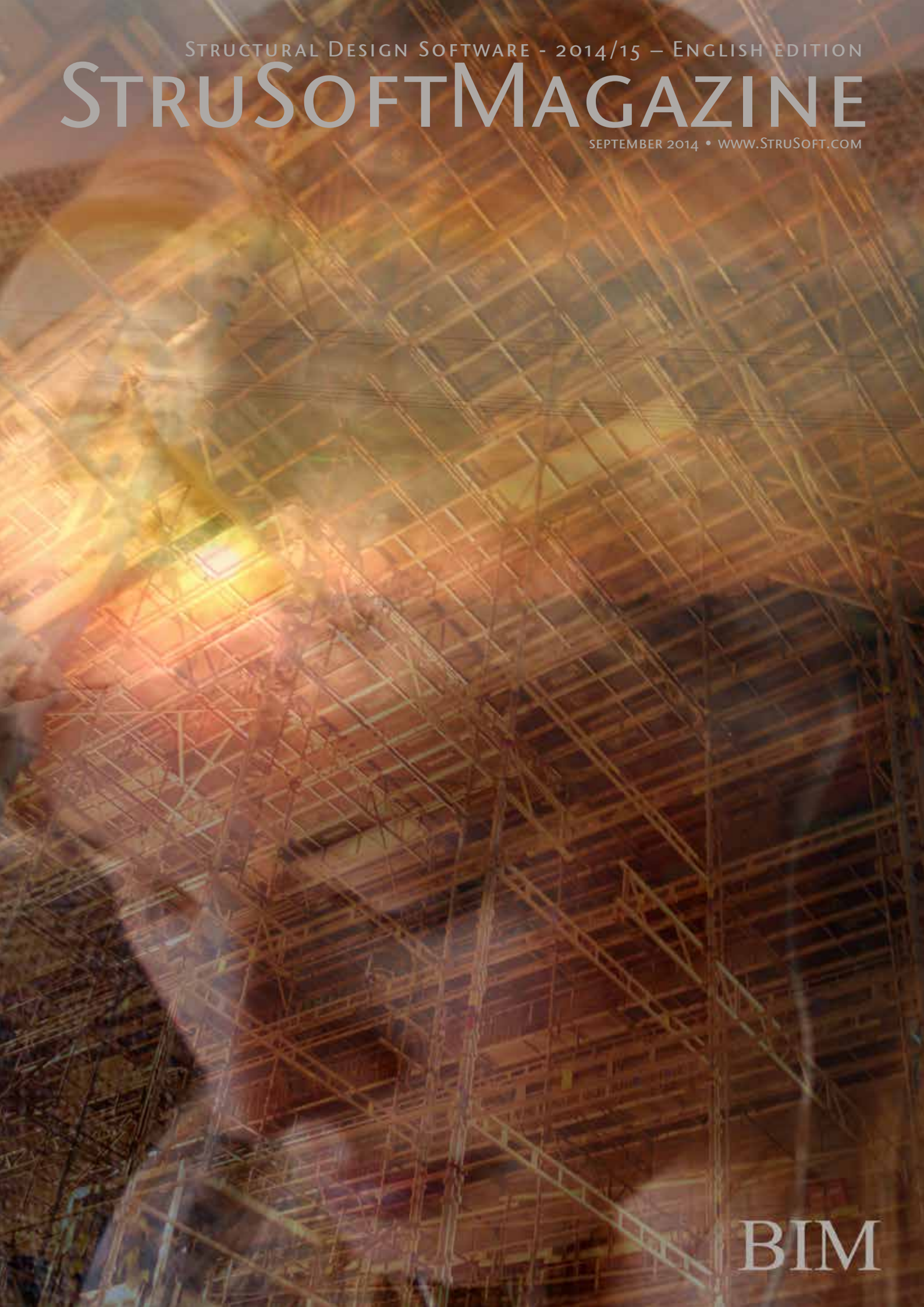

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New Cloud based ways of working will simplify life for our users

We believe that the future lies in the clouds. It has fantastic potential to simplify and improve work for designers as well as the whole building industry. That is why we have started development work so that our programmes will be fully accessible in different cloud based services.

How will this affect your daily life at work? We intend that new working methods will appear that will create coordination benefits that did not exist before. This is made possible by storing the data of an entire project in the same location in the clouds and making it accessible for all users. This links designers with architects, suppliers and managers of concrete works. One will be able to take in the development of concrete elements in a whole new way – from design idea to manufacture.

It will be easier to cooperate and collaborate benefiting the whole building industry. A bug in the programme is easy to handle as each installation does not need updating. It happens instead in the cloud and is directly accessible to all the connected users.

Using our services in the cloud based environment will help to develop BIM. More people will be able to share the model and in recent years the quality of computer graphics in the web browser has improved radically. BIM is in no way a radical innovation for us. The truth is that ever since StruSoft started we have held to the idea of BIM and that has steered our program development as a whole. BIM has always been our loyal companion, leading us down new paths. The cloud based project environment BIMcontact is one example.

We offer you a foretaste of our cloud computing services on our site www.vip-energy.com, where we have launched a web version of the energy calculation program VIP-Energy. The future of cloud computing is already here!

StruSoft AB

Paul Rehn
CEO

Content

IMPACT cuts lead time in Poland's growing economy

IMPACT cuts lead time, from design to production drawings, says Polish structural design engineer Bartosz Oleksiak at Precon Polska, where he and his colleagues design prefabricated elements for housing, industry and farming.

The Polish economy is expanding and several building projects are starting in different sectors of business. Construction may well be increasing because the Polish government has announced Government grants for the building of energy-efficient housing.

The country's economy is dominated amongst others by industry and farming. Two areas from which Precon Polska have their customers. The company is a subsidiary of Swedish Abetong, which is a part of Heidelberg-Cement Group, German producers of cement and concrete. Precon Polska's head office with the design department is situated in Warsaw, and the factory is in Jastrowie, in the west of the country. All in together, they employ 170 people, of which 20 work in Warsaw.

3D advantages

Polish Precon Polska design and produce prefabricated elements used mostly in farming, housing and commercial buildings, such as offices and other premises as well as tanks for industrial purposes including sedimentation and toxic waste plants. The design department employs 15 people, all using IMPACT to design the elements.

– One of our largest projects so far involved designing precast elements for a milk powder factory, says designer Piotr Kopacz. The building is 32 metres tall and contains approximately a hundred walls which are composite with concrete columns. We used IMPACT to create a 3D model to produce production drawings for each element, and, finally, the assembly details.

Part of the milk powder factory process line in 3D.

Piotr and his colleague Bartosz Oleksiak, also a structural design engineer, benefited from using 3D. It is easy to check and compare the placing of the elements. An overview of the entire model on the screen makes it also possible to prevent errors. Visualizing in 3D makes it easy for the designer in a way 2D can never do.

IMPACT cuts lead time

For Piotr and Bartosz, time is critical.

– The biggest advantage of IMPACT is that the program significantly shortens lead time, from the initial stage of designing the elements to production drawings, says Bartosz.

He gives two main reasons for this.

– There are a large number of specialist tools for modeling any type of precast element in 3D. The second reason is that the production drawings are generated automatically.

IMPACT is also a designers' tool for checking and documenting of the work flow.

– The program calculates the volume and weight of each element, and provides quantities of cast in materials and reinforcement in a separate report.

Besides the fact that the model provides an overview of how the elements are connected together, the program helps to monitor the whole process down to the detail level.

At the start of each project, construction data is delivered in dwg or pdf format.

Recently, the designers have imported 3D Revit-based data. Before actually starting a project and the construction phase begins, a time plan is agreed with the customer that is subsequently adopted. When the design work is completed, the production phase takes over.

The completed design is sent in pdf format together with the information on cast in materials and reinforcement. Bartosz says that they will most likely begin using IMPACT's planning tools.

IMPACT helps cut lead time for structural design engineers Bartosz Oleksiak (above) and Piotr Kopacz.

When working with the planning tools, IMPACT becomes a part of the whole production chain, from the initial ideas through to the design stages of the elements and production. It also serves as a control on quality as the program helps to monitor the process. Precon Polska benefits from an improved work flow and thereby save time. This is naturally important in a country whose economy is growing and where the demand for housing and commercial buildings is growing with it. New opportunities are created, enabling the country to continue to develop.

By Love Janson

IMPACT Precast

Milk powder factory.

Skanska saved the cost of bored piles thanks to 3D Soil

When Skanska designed the foundations of the building complex, Malmö Live, they used a completely new approach. The innovative FEM-Design 3D Soil helped to provide a more accurate assessment of the building settlement, saved valuable time and, moreover, made bored piles completely redundant.

Last year, StruSoft launched their new FEM-Design analysis and design module 3D Soil. Its application enables more accurate assessment of building settlements. With the help of 3D Module Soil even the soil layers become a part of the simulation along with the concrete and reinforcement and are integrated into the building model.

The earlier spring method used to estimate deformations has been shown to not provide accurate enough results. That is because it is dependent upon the distribution of the springs having all the same stiffnesses. But the soil does not have such even characteristics. StruSoft has participated in the development of 3D Soil which you can read about in the previous edition of the StruSoft Magazine.

One all-inclusive analysis instead of two

Right in the middle of the city, Malmö Live, is now emerging. It consists of three developments: a hotel, a congress and concert hall. 3D Soil was used in the design of the project.

–The different characteristics of the soil were imported into the module directly from the geotechnical investigation, says Carl Jonsson, project leader at Skanska Sweden who participated in the project.

In large projects like Malmo Live the engineers would have had to work separately in their own disciplines. The geotechnical people would have taken the results of the soil investigation and worked out the settlements. The structural analysis was then iterated until both geotechnical and structural engineers were happy with the predicted values.

–The calculation work was extensive and took a long time, says Carl.

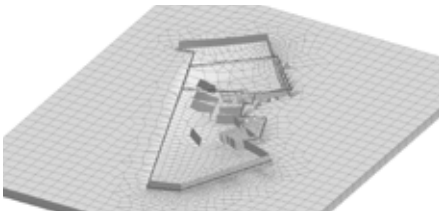
These circumstances are eliminated with the help of 3D Soil because the engineers have integrated the soil with the structure above. Exchange of information between them is no longer necessary.

–It all comes down to risk analysis, says Carl. The better the model and the input data - the more accurate and efficient the design.

Flexible evaluation of natural variations

Working with one overall model gives other advantages, adds Carl, namely sensitivity analysis. Nature as we all know is not homogeneous, constant and unvarying but there are natural constants that can be included in the model.

With the help of this integrated model it is possible to vary the characteristics, for example, to increase one parameter by 10 percent and study how this affects the settlements. If that is ok, then what happens if we increase it to 12 percent?



Result of simulation. This shows the result of the settlement calculation.

Previously these calculations used to require a lot of time and resources. He remembers it as a very laborious way of working. With 3D Soil it is significantly simpler, maintains Carl.

Skanska had great benefit of the module in the design of the complex building foundations. To be sure that the ground had adequate stability bored piles are usually used. Deep holes are bored into the ground down to the chalk strata and then filled with concrete but this method is both costly and time consuming, maintains Carl.

When the analysis of the ground in the integrated model produced the results, we were able to meet the settlement criteria without piles. From the results of analysis we were able to design the raft within the design requirements.

Using piles can have a negative effect on the surrounding structures. As the hotel is the highest and heaviest building the ground would have needed to be piled. The other two buildings didn't need to be piled. This created a problem because the piled and the un-piled parts can act differently and give rise to differential settlements.

Thanks to 3D Soil Skanska avoided using piles. Using an integrated analysis model saved time because the geotechnical and structural engineers didn't have to work it out separately. That saved time and money and gave more accurate results.

By Love Janson

FEM-Design

This is StruSoft

PRODUCTS
FEM-Design
WIN-Statik
IMPACT Precast
PRE-Stress
VIP-Energy
BIMcontact
SyncroSite

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Engineering
Training

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The VIP-Energy concept in development to meet new challenges

Simulation programs for energy performance of buildings must continually evolve to meet challenging new requirements. Within StruSoft this is a given; thus a number of development projects that will culminate in entirely new program variants within the VIP family are underway.

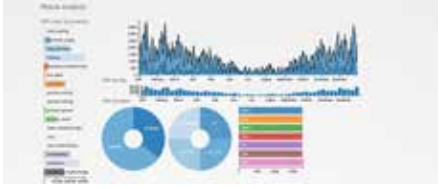
Common for the newly developed varieties is that they will be cloud-based. The software will not actually be installed on the individual user's computer. Instead, the user will communicate with the program with its features for storing user files etc. via the Internet.

New modern user interface with graphics support

First out of the new VIP-Energy variants will be a program that in many ways will be similar to the existing VIP-Energy program, but with a new, modern user interface that, among other things, will make the task of entering the input data much more efficient and intuitive. An interface, that can continuously follow the layout of the building to be simulated graphically, will later on become an element of the new VIP-Energy variant. The idea is further that established VIP-Energy users will be familiar with the structure of the program, but with the possibility of receiving time-saving user support from the program, thus making the data input activities feel fun and stimulating. Completely new VIP-Energy-users will have a much lower learning curve to get started on working with the program. To further facilitate the entry of new buildings and building types, there will be a number of standard building data sets; these can be modified quickly and adapted to the building to be simulated.

VIP-Energy Premium

A more advanced VIP-Energy-variant will be developed in a subsequent stage. Here it should be possible - in one operation - to handle different levels of input data for the simulated building. This allows for great simplification when it comes to conducting parametric studies on how different levels of input data, such as insulation or glass area and glass properties influence the calculated energy use of the building.



Interactive and detailed presentation of simulation results with the possibility to compare results.

Climate data for the entire world

Access to climate data for the location of the building to be simulated is crucial for reliable energy simulations. In the various VIP-Energy variants, climate data for any location in the world will be accessible and illustrated clearly.

GIS and energy

Being able to assess the energy status and energy efficiency potential for districts (blocks or entire neighbourhoods) is something that is required more and more of the real estate sector, energy companies, municipalities and others. A link between data collection from geographic information systems (GIS) and VIP-Energy is under development, not least in the context of the EU research project, ECO-DISTRICT, in which StruSoft is an active partner. The GIS application of VIP-Energy will become a powerful tool in future urban and energy planning.

Energy simulation at district level with flexible configuration of single buildings.

IFC application

An IFC module is under development and will be a powerful BIM-oriented tool to import building models to VIP Energy simulations. The exchange of building models between disciplines becomes useful especially when simulating in the initial part of the architectural and structural design. The integrated "viewer" makes it possible to select and import data for the energy simulation, as well as adding energy-specific data and results to the BIM model.

Further challenges

Currently, energy simulations are almost always based on fixed values of all individual input data. Especially when it comes to input parameters which are strongly influenced by user habits and -behaviour - such as the density of people in the building, window opening habits, hot water use, etc. - the simulated energy use tends to differ from measured energy figures for the buildings in use, in spite of the fact that standardized and high quality data has been used for the simulations. Within the scientific community, this has been noted for many years and everything indicates that we can expect future simulation methods to take into account the random nature of the input data for energy simulation. If satisfactory ways of tackling this problem can be found, it would be possible to speak about the reliability / security of the calculations, making it possible to allow for the uncertainties. StruSoft has initiated a wide research collaboration on this new challenge, called the probabilistic approach, within the energy simulation area.

StruSoft in the forefront of cloud technology

VIP-Energy's established calculation kernel constitutes the common basis for all VIP-Energy applications. The kernel is not only validated according to ANSI/ASHRAE 140, LEED and BREEAM, but is also regarded as one of the world's fastest dynamic energy simulation kernels. Integrating the kernel into a cloud-based infrastructure enables the calculation speed to be increased as needed via parallel runs. Thereby, innovative new methods of simulating the energy performance of buildings are made possible, helping us to more easily make good and knowledge-based decisions on energy matters. This can be achieved by simulating different design options and producing more significant results, where we allow the calculation processes and smart features in the programs to complement, and partially replace, the extensive manual work on data input that we so far have associated with energy calculations.

By Johnny Kronvall and Andreas Rudenå

VIP-Energy

Ramboll Denmark chooses StruSoft FEM-Design for concrete structures

A 100 meter tower is being built in the new Carlsberg City area in Copenhagen. The impressive tower is the first of several high-rise buildings that will characterize the Carlsberg City.

The tower is in Section 8, which is the first part of the Carlsberg City master plan. Section 8 consists of approximately 100.000 m2 of floor space of which the tower contains 16.000 m2 of apartments and classrooms.

We met civil engineer Daniel Halberg, from Ramboll DK, for a short interview about design tools and procedures on large scale projects.

”In Ramboll we have a variety of Finite element software. It was decided that buildings with mainly concrete structures, should be designed with StruSoft FEM-Design. It is easy to control the geometrical conditions, like the connections between plates and walls, making the structural system simulate the real behaviour of the structure more closely. This is crucial for all prefabricated structures. Furthermore the mesh generator is of high quality, and it is important that we are able to design plates using cracked section analysis.”

On the Carlsberg tower FEM-Design was used to determine the load transfer from columns and walls. 46 different combinations were defined and the results obtained were used for further detailed analysis. To achieve an accurate estimate of the below ground behaviour, nonlinear analysis was used. Due to the 46 load combinations this iterative method represents a challenge for normal computers. Thus, Ramboll used a powerful computer that has been bought for the purpose of analyzing large models.

We asked Daniel to what extent Ramboll used the FEM-Design results for this project.

”Well, for the combinations that apply to the serviceability limit state, we estimated the global displacement and frequencies. Extracting the frequency shapes and masses from the FEM-Design model formed the basis of estimates of the dynamic comfort.”

3D model in FEM-Design

Ramboll DK also used StruSoft FEM-Design to analyze the stability walls on other structures in the Carlsberg City.

Beside the Carlsberg City, Ramboll DK used FEM-Design for other projects like the Hotel and Conference Center, Malmö Live and the new Niels Bohr building containing 45.000m2 of research facilities.

3D model in FEM-Design.

Av Dennis Kristensen och Daniel Halberg

FEM-Design

Illustration of the new "Carlsberg City".

StruEngineers expand in India to meet a growing international market

The international building industry is taking several forward steps - with the assistance of StruEngineers. In a variety of projects with complex prefabricated elements which include construction, design and detailing, the key aim is to deliver them amongst other things on programme.

The company, a subsidiary to StruSoft, has grown very fast, and is growing continuously, in spite of the global economic crisis still troubling many countries in the world. The company has more than 30 employees mostly based in Pune, India. Three new engineers have recently been employed to provide support and development for IMPACT software.

– The market is slowly recovering from the economic crisis, which has had an impact in so many countries. With a positive economic growth in Europe and increasing GDP fuelling expectations, we see a steady growth of the construction market in the future, says Manoj Kalwadia, MD of StruEngineers.

StruEngineers definitely detects an increasing market but the reason for the expansion which we are now experiencing is that so many clients are starting a range of different projects, such as commercial buildings, schools, hospitals etc.

– The key to the success is the right leadership combined with the overarching service that we can offer to our customers, says Manoj. The service is not only tailor made to the customer's requirements, but we are also competitive enough to meet all their expectations. Customers appreciate our concept with comprehensive solutions to precast elements and wish to avoid several issues. Firstly, they don't have to involve several suppliers in different stages of the project. Secondly, it saves time.

Employees at StruEngineers in Pune, India.

Manoj points out that the knowledge that the company can offer is a result of a good mix of engineers and development technicians, not only from Asia and India, but from all over Europe that bring different skills and backgrounds.

– The European know-how that was originally concentrated in StruEngineers is a valuable asset to the Indian as well as the global market. The combination of skilled Indian engineers and the accumulated European experience from different countries and educational backgrounds is the reason why we can deliver with such good results to our customers.

– It is truly an international melting pot of knowledge and experience, says Manoj.

By Love Janson

IMPACT launches in a new version

In the upcoming version of IMPACT, version 14, the opportunity to monitor the journey of concrete elements from start to finish are significantly extended.

In the last issue of StruSoft Magazine you were able to read a brief description of how the company SCF Betongelement AB uses *IMPACT Model Viewer* to follow the progress of prefabricated concrete elements from the production factory to the completed construction on site, by "coloring" the elements.

The IMPACT Model Viewer is the engine in *IMPACT Production Suite* and *IMPACT Design Suite* to be released in the upcoming IMPACT version 14. As the names indicate, the Design Suite and the Production Suite are aimed for the design and production phases respectively. However, some modules are shared - user management and documentation, but also to perform some general simulations.

IMPACT Production Suite Resource Manager is the main program where the user defines and plans the resources. Two new facilities are the modules - *Cast Planning* and *Transport Planning*.

Transport Planning körs redan i skarpa projekt med goda erfarenheter och ytterligare kunder har Production Suite för utvärdering.

The Transport Planning module is, practically speaking, an add-in to the Model Viewer and the Resource Manager. It is used for general planning of the transportation of the prefabricated concrete elements from the production factory to the assembly on the construction site. Resources can be defined; for example, vehicle capacity and criteria regarding deadlines for deliveries. It gives the user excellent control of the complete transport process.

Through the graphical user interface the user has a complete overview of the current situation and changes and additions are easily performed with "drag and drop" and "cut and paste" methodology.

The Transport Planning module is already in use on construction projects with good feedback and other customers have the Production Suite for evaluation.

IMPACT version 14 will be launched in autumn 2014.

Av Anders Peterson

IMPACT Precast

New functions make handling documents and visualizing easier

Finding the right drawing or document is now a lot easier, thanks to a new function in BIMcontact.

Engineers will be able to tag the files with metadata, making the search easier. It simplifies the work of finding documents with similar characteristics, for example property registration or ownership. It is also a tool to facilitate the management of the project. For example, files tagged with the characteristic, *Review*, are selected from the document stream, and can be reviewed. When the files are *tagged* as approved, you get those documents that are completed. The users do not have to search through their files for documents, which saves time that can be of better use elsewhere.

The BIMcontact IFC Viewer can be used to interrogate the model directly. An IFC file is uploaded to BIMcontact and becomes viewable in the web browser using the viewer.

By using this method, the architect and the supplier can present different proposals simplifying the decision making process above all for the client. By simply showing the model in the browser, no visualization program is needed and there is no need to download files that take up a lot of space. The viewer also makes it simple to manipulate the model to communicate ideas and solutions.

BIMcontact
www.bimcontact.com

StruSoft takes part in the trade show in Turkey

This year BIBM's 21st congress was in Istanbul from the 21st to 23rd of May.

BIBM, the European Federation for Precast Concrete Industry, is an organization which represents precast concrete companies. Their congress this year also included a trade show in which StruSoft took part alongside some sixty other exhibiters.

On StruSoft's stand, Lutfi Ay greeted visitors. Lutfi is Business Manager in Turkey.

– Since the building industry in Turkey is booming, it is important that StruSoft take part in the trade show and show how the construction of precast elements can be made more efficient, he says.

The large number of visitors to the trade show is further proof of how the market is growing in the country.

StruSoft opens an office in Stockholm

This year, StruSoft opened an office in Kungsholmen, central Stockholm, specifically at Sankt Eriksgatan 63 A.

– The purpose of opening an office in Stockholm is to take us closer to the market in this region, says Mikael van de Leur who is responsible for StruSoft Nordic/Baltic-um and who works with the sales, training and support of StruSoft's design programs FEM-Design, Win-Statik, PRE-Stress, and VIP-Energy. The market for design and analysis programs is growing, he says.

– In Stockholm we have noticed an increased interest in working with model based analysis, such as our program FEM-Design. One important factor driving this development is not only that engineers are finding new ways of working with analysis models, but that object oriented CAD models increase accessibility and simplify the building model process.


Mikael van de Leur.

The expertise of the staff in the newly opened office is well suited to this development.

– One of our support engineers is a BIM specialist with experience in converting CAD models into design models. We can therefore help our customers to simplify the design work and also coach them on a project. Furthermore, we are able to train customers either in our own office or on the customers' premises. The inflow of newly qualified engineers with our customers also increases the need for such training.