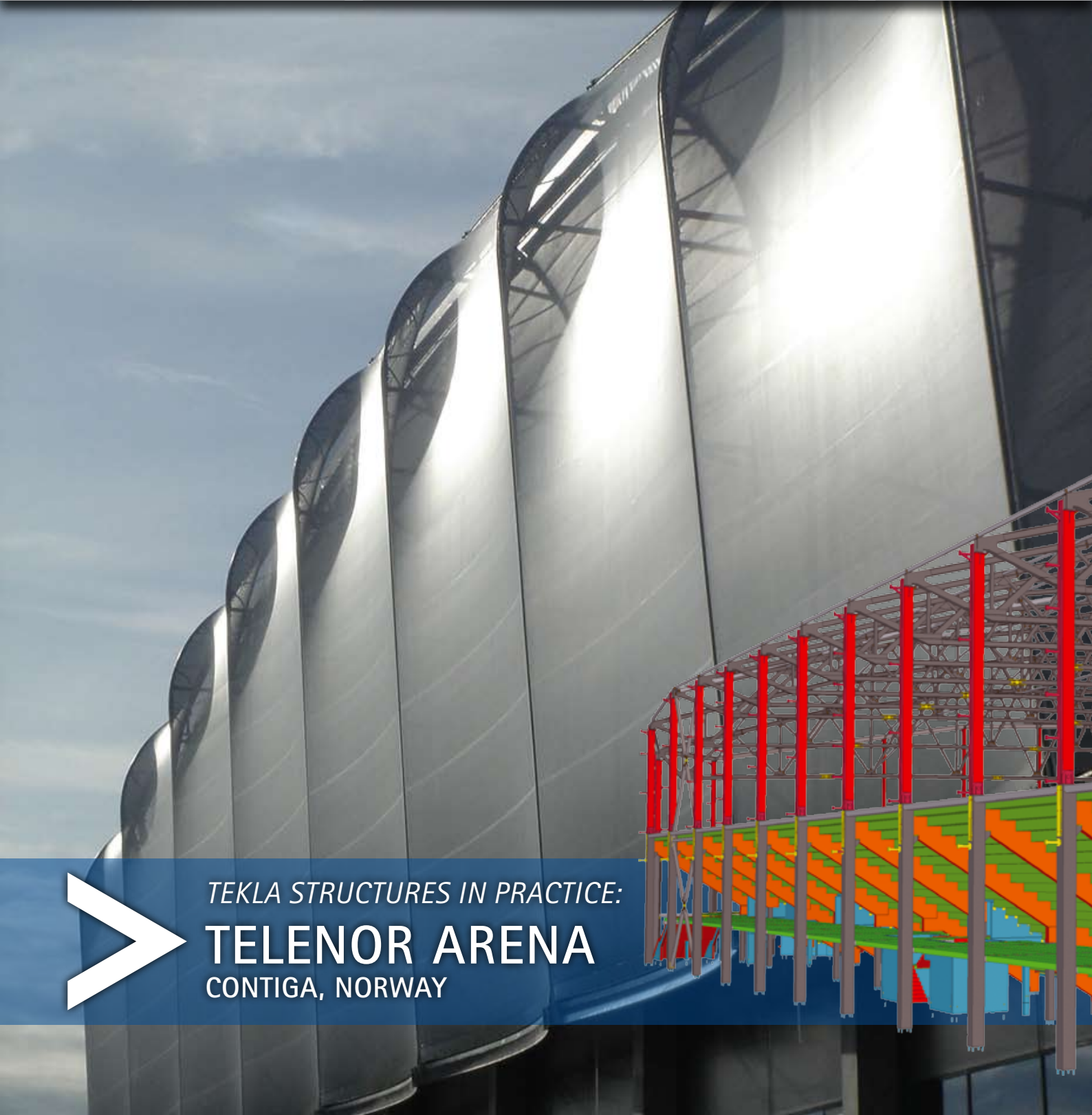




**TEKLA**® Structures



*TEKLA STRUCTURES IN PRACTICE:*

# TELENOR ARENA

CONTIGA, NORWAY



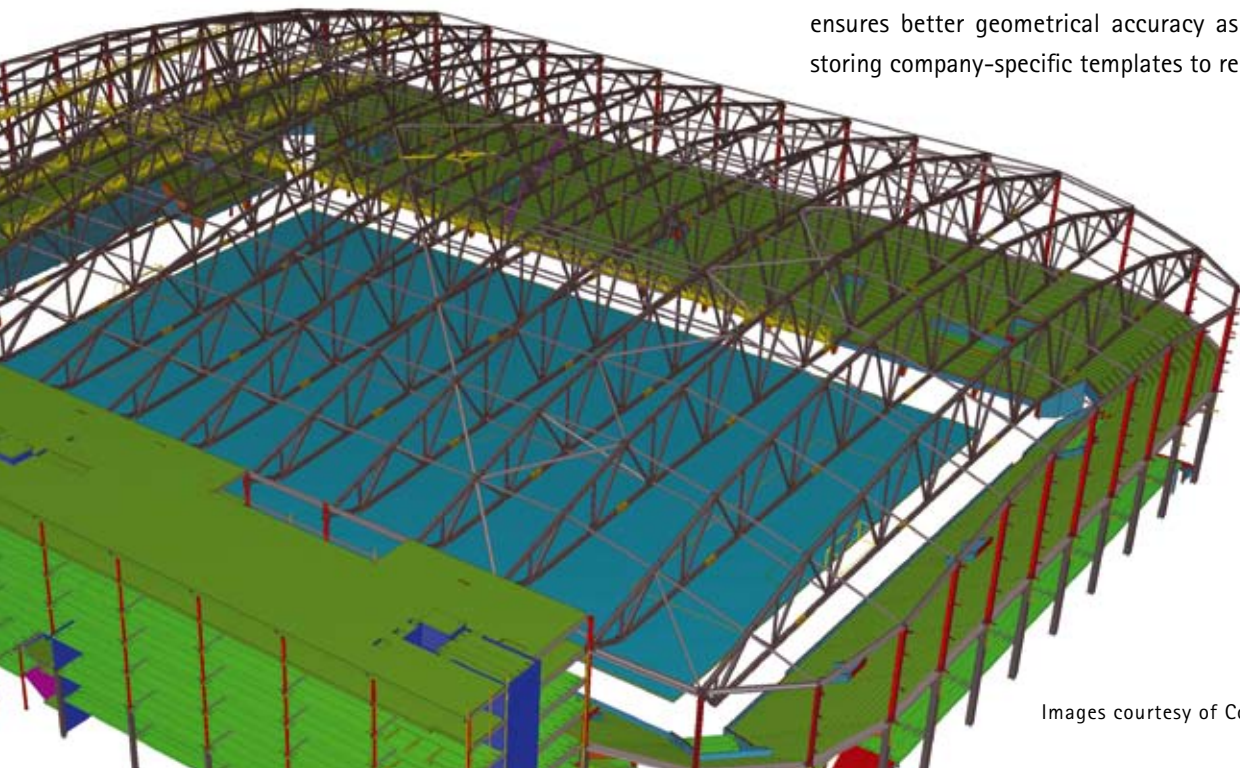
**TEKLA** Structures

## PRECAST CONCRETE AND STEEL IN PRODUCTIVE HARMONY

> Norway-based Contiga, one of the leading suppliers of prefabricated concrete and steel solutions in Scandinavia is, in their own words, "a girder in the construction industry". The company has used Tekla Structures software since 1999 in order to offer their customers efficient design and detailing of both precast concrete and steel structures. Telenor Arena in Fornebu, Norway, represents one of their most recent successes.

> Contiga's main market area is Norway and Sweden, nationwide for steel structures, and covering most of Norway and the Stockholm region in Sweden with and for precast concrete. Customers often experience Contiga better than they expected. One reason for this is the use of the most advanced modelling technology for both concrete and steel structures.

Contiga was one of the first construction companies in Scandinavia to start using Tekla Structures software in steel design and detailing nearly a decade ago, and they currently hold dozens of specialised licence configurations. Since the late 1990s, they have advanced by combining steel frame and hollow core concrete floors into the same digital structural model of a building. Structural design and detailing with Tekla Structures ensures better geometrical accuracy as well as modelling and storing company-specific templates to reuse on all projects.



*"We've achieved at least a 10% increase in precast concrete productivity and 50% more accurate detailing and fabrication through efficient modelling."*

*– Andreas Solberg, Contiga, Norway*

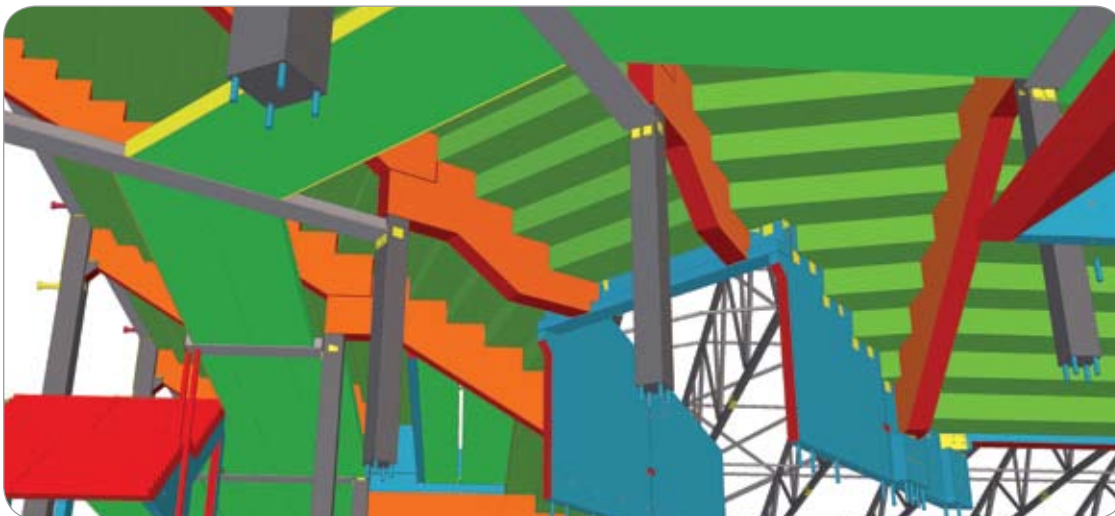
## REALISING THE BENEFITS OF 3D MODELLING EARLY

> According to Andreas Solberg, 3D modelling benefits in the Fornebu Telenor project also include DAP in steel plate production and automatic output of lists to plan steel production and order steel profiles. It was convenient to present the 3D model to customers and architects as well as to share it with multiple users to enable concurrent engineering.

According to **Eivind Berg**, Manager of Structural Group at EDR, the Tekla representative reseller in Norway: "Contiga is a perfect example of a company that has early on realised the benefits of 3D modelling in the design and production of precast and steel structures. Our long-term local cooperation and deep understanding of their needs have ensured fluent data transfer between construction project participants and helped Contiga establish the productive business that they now lead."



Contiga offers its customers complete solutions consisting of all services from construction project development and conceptual design to on-site installation and documentation of the end-product. In Norway, Contiga produces precast concrete in Moss, Fredrikstad and Stjørdal, and steel structures in Kongsvinger and Flisa. Total production capacity in Norway is 500,000 square meters of hollow core floor elements; 100,000 square meters of wall and facade-elements; and 7,000 tons of steel structures. In Sweden, production plants are located in Norrtälje, 70 km north of Stockholm, with a production capacity of 250,000 square meters of hollow core floor elements; 50,000 square meters of wall-elements; and 5,000 tons of steel structures. Contiga has grown steadily over the last few years with turnover surpassing EUR 100 million in 2006, and more than 500 employees. More information at [www.contiga.no](http://www.contiga.no)



## TOTAL SUPPLY AND PRODUCTIVITY THROUGH EFFICIENT MODELLING

> According to **Andreas Solberg** at Contiga's office in Moss: "We've successfully used multi-material Tekla models in many projects - one of the latest being the Telenor Arena for the Norwegian football club Stabaek in Fornebu. Tekla software helps us to offer our customers a complete and cost-efficient structural solution. Many of the structures our clients want could not be built effectively without the help of an advanced solution such as Tekla Structures. In addition to being able to provide them with the complex geometry, we've achieved at least a 10% increase in precast concrete productivity and 50% more accurate detailing and fabrication through efficient modelling."

Norwegian football club Stabaek FK needed a new stadium and, as there was also a need for a bigger national stadium for concerts and major events, it was decided to kick off a construction project for an impressive indoor arena. The Telenor Arena has a spectator capacity of approximately 15,000 for football matches and 23,000 for concerts. The contract won by Contiga included total supply of everything to do with primary load-bearing structures, with the exception of excavations cast-in-situ in the office section. Contiga modelled all concrete and steel structures using Tekla Structures software, including hollow-core slabs, reinforcement, terrace elements, columns and beams.



## OVERCOMING CHALLENGES THROUGH ACCURATE DETAILING

> The Telenor Arena project started in 2006 with complete 3D planning for concrete and steel. By using the right software Contiga was able to ensure quality and automation in, for example, generating the drawings. Automatic output from Tekla Structures ensured fewer errors and intelligence in the generation of lists and drawings. The 3D Tekla model was also used to present and visualise the structures at project meetings and to resolve complex details.



*"Tekla software helps us to offer to our customers a complete and cost-efficient structural solution."*

*– Andreas Solberg, Contiga, Norway*

Complex geometry, both in concrete and steel structures, was the main challenge in the Telenor project. Using Tekla Structures, it was easy to model the many bolt connections and generate lists of them for fabrication. The 3D Tekla model was used to take out coordinates of the points that define the corners of the arena. These points were used by the architect and roof supplier. Through efficient modelling and accurate detailing, Andreas Solberg of Contiga estimates to have saved up to two months of working hours for each of the three employees who worked on the project.

The most complex structures and forms modelled with Tekla Structures include 'crocodile girders' set up on two concrete columns, along with foundation at base, and L-shaped terrace elements that were set up on the crocodile girders. The Telenor terrace elements have a span of 9.6 meters, which is optimal in respect of capacity and vibration. The L-shaped elements were cast in a DT mould and inverted, then used to terminate down towards the pitch. The demands on the finish were stringent, and the client requested a wall on the second floor with no underlying columns.

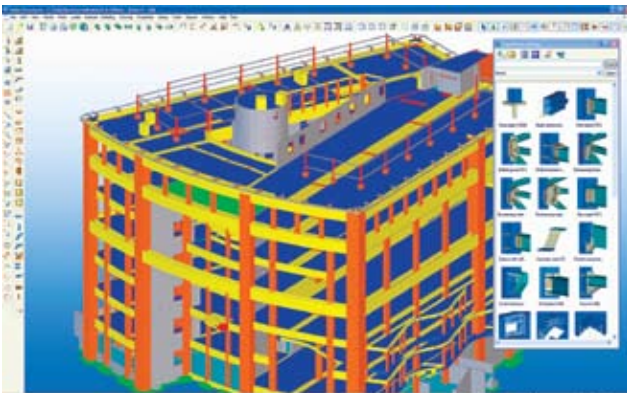
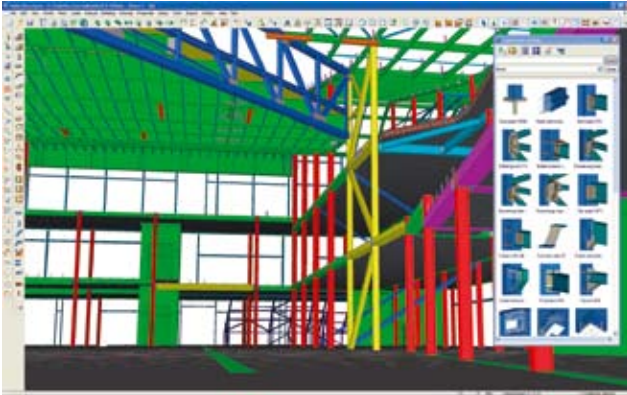




> Tekla's model-based software products make customers' core processes more effective in building and construction and infrastructure management. Tekla Corporation has area offices and partner organisations worldwide. International operations account for nearly 85% of net sales. Founded in 1966, Tekla is one of the longest operating software companies in Finland.



> Tekla Structures is the first real parametric 3D BIM (Building Information Modelling) software for precast designers and manufacturers. It features 4D visualisation, accurate detailing, adaptive reinforcement, and connections. Tekla Structures integrates the entire structural workflow from sales and conceptual design to detailing, manufacturing and erection.



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