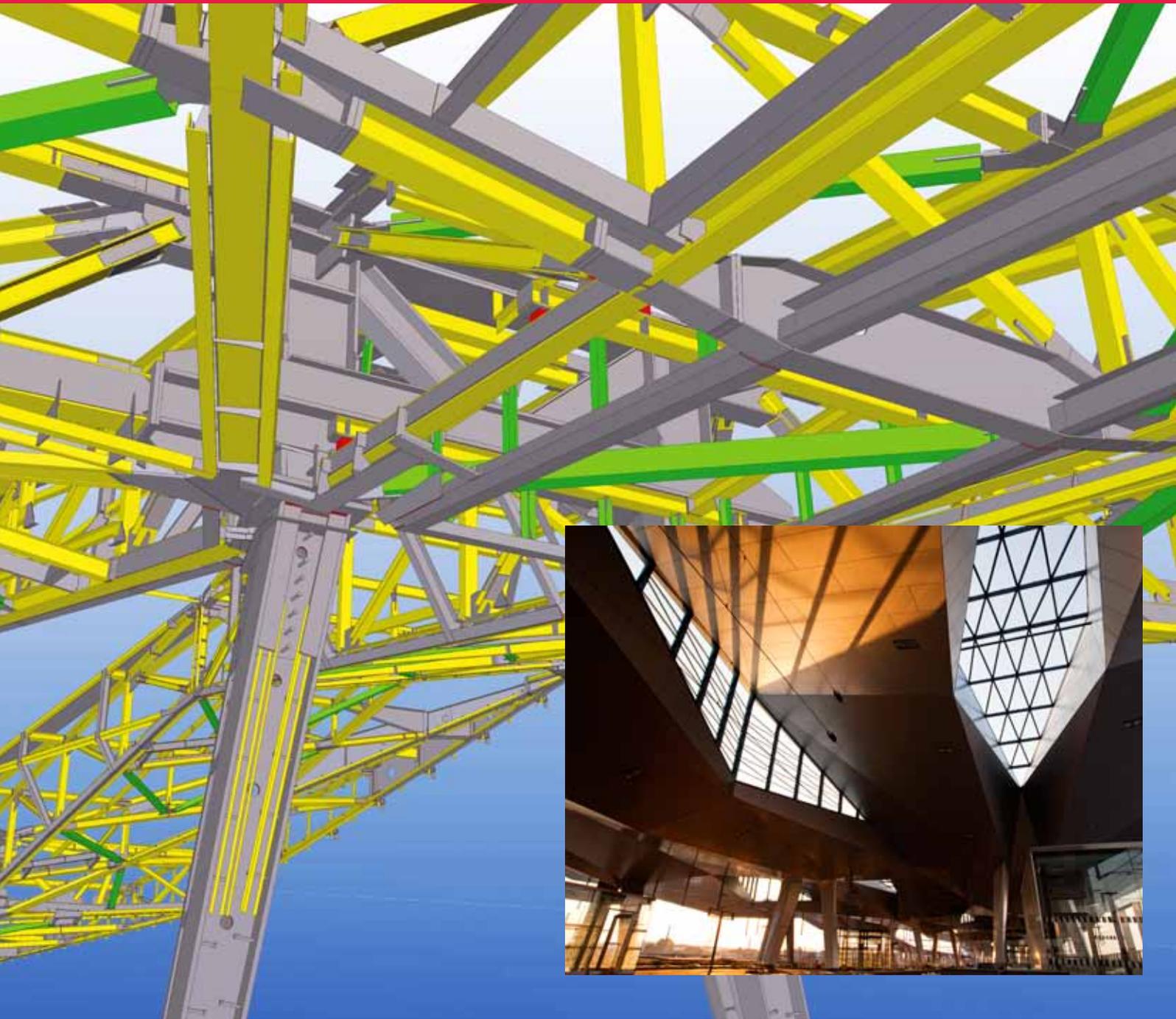


TEKLA STRUCTURES IN PRACTICE:

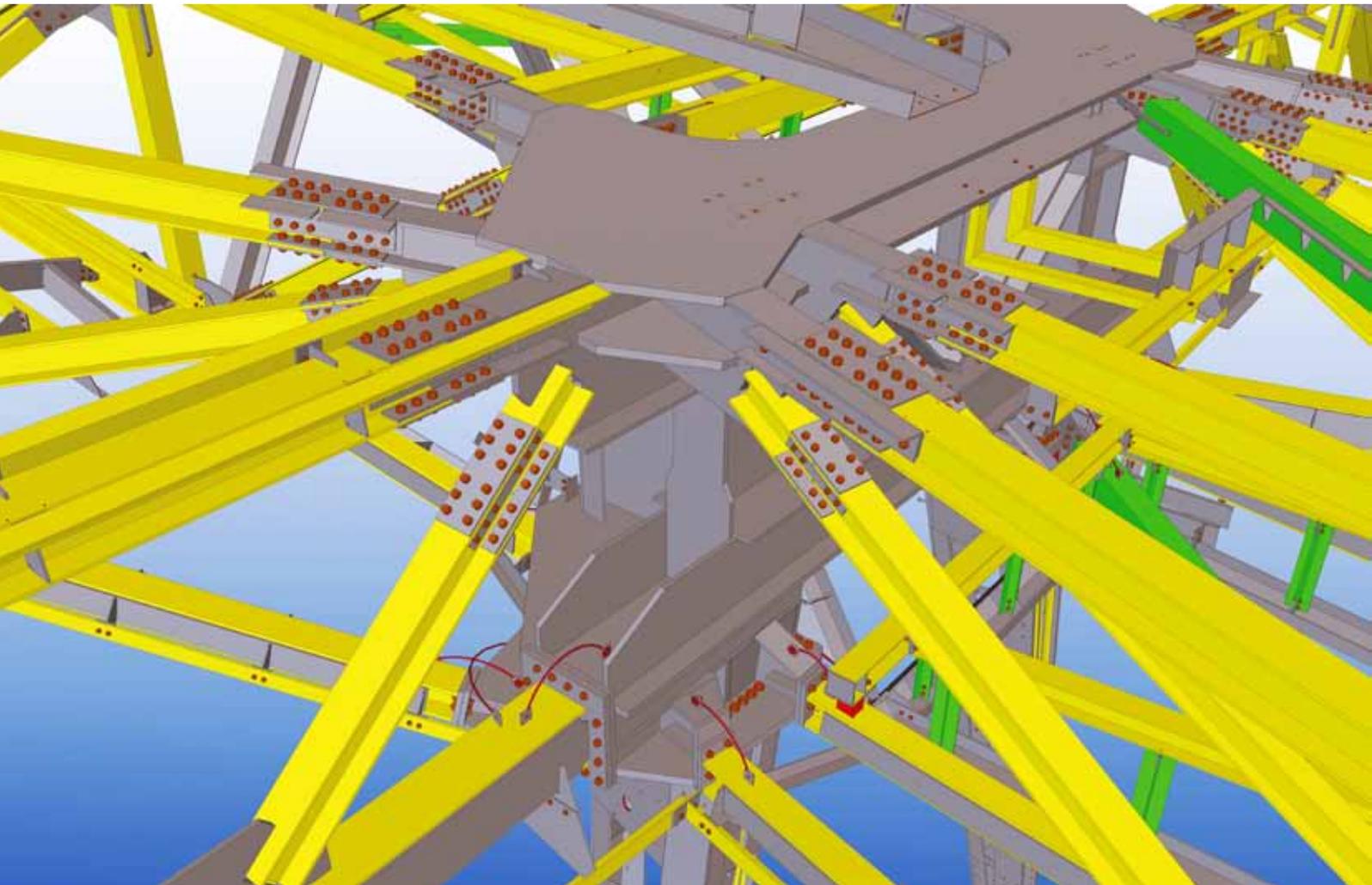
VIENNA CENTRAL RAILWAY STATION

AUSTRIA



CREATING THE FIRST GLIMPSE OF VIENNA WITH TEKLA AND TRIMBLE

➤ Thirty-five experts from Unger Steel Group utilized Tekla's BIM software in a very advanced way to plan, produce and assemble the diamond trusses of the partially transparent, architecturally stunning roof of the new Vienna Central Railway Station. Now when the first trains have arrived to the station and passengers see the first glimpse of the city through the roof, Unger sees both Tekla and the robotic survey device Trimble Total Station necessary for the creation of complex, hard to assemble structure.



UNGER ON VIENNA CENTRAL RAILWAY STATION SITE

- Unger Steel Group produced the roof with 14 diamond-shaped trusses, which are 76 meters long and situated 15 meters above platform level.
- Each truss is a unique masterpiece with one-of-a-kind appearance.
- 5,000 tons of processed steel with area of 40,000 m².
- The roof includes 254,000 screws, 54,100 frames and 271,100 metal sheets.
- Unger created 52,700 individual and 22,200 welded components.
- The roof has no horizontally arranged components.
- Unger started work in 2010, the first trains arrived to station in late 2012 and it is scheduled to be fully operational in 2015.

"So far we have used Trimble Total Station with Tekla in just two projects, but in future we will do it in all complex projects."

– Erich Fladerer, Unger Steel Group

VIENNA CENTRAL RAILWAY STATION PROJECT

➤ The new Vienna Central Railway Station is a major European traffic hub – when completed, about 145,000 passengers and 1,000 trains will pass through the station every day – and development project with attached shopping mall, residential buildings and park. Unger Steel Group had to work with precision on crowded site and take the other project parties into account. Unger's contract, the roof which covers the tracks, offered the company some challenge with the complex geometry of the 14 unique diamond-shaped steel trusses. The company has used Tekla software since 2001 when Tekla reseller Construsoft provided them with training and consultation, and for the station project, it was a clear choice from the first minute.



254,000 screws hold the diamond trusses together.
© Renée Del Missier/
Unger Steel Group



At Unger, information flows from Tekla software to fabrication machinery.
© Renée Del Missier/Unger Steel Group

AUTOMATING PRODUCTION

➤ For production at Unger's workshop, the required data transfers directly from design office to DSTV and interfaces with the cutting machines in workshop. The process provides Unger with advantage: production can start immediately after completion of planning, and transferring fabrication information automatically to production machinery allows them to avoid errors.

PUNCTUAL LOGISTICS

➤ Unger chose Tekla for planning transportation lists because they had to work punctually, timing and having the right material at the right place being crucial. Unger's team had to assemble the complex diamond trusses in a very limited space which also contributed to the logistical challenges. The individual pieces arrived to the site just before the staff bolted them together. The site staff was already assembling the first diamonds on Vienna Central Station while workshop team produced the remaining ones, the entire process from cutting one truss to its final assembly taking on average 3.5 months.

WHAT IS IN THE MODEL?

➤ For the Vienna Central Station project, Tekla served Unger for numerous purposes: The company created constructable steel structures, modeled and detailed the main structure and substructures like cable channels, and extracted data and drawings for production and assembly, simulated welding sequences of the complex components. Up to ten designers worked on the model in multi-user mode.

Unger Steel Group's team imported the architects' model as 3D DWG files to Tekla Structures for designing and detailing the diamond trusses. As numerous project parties operated on the huge construction site, Unger included also platforms with rails and concrete foundations to the model in order to notice and solve possible clashes already in the design phase.

BIM EVERYWHERE

➤ At Unger BIM does not stop to the design office door. The company configures each new version of Tekla Structures according to their standards, which enables them to plan specifically for their cutting and production machines. For the Vienna Central Station, they created all transport lists and surveys directly from the model in Tekla and used it to control production and assembly sequence.

In general, the company uses Tekla in tendering as they wish to produce informed estimations for bidding. Even the salespersons are familiar with Tekla BIMsight.



To deliver the right parts on the right time to Vienna Central Station, Unger extracted transportation lists from the information-rich Tekla model. © Renée Del Missier/Unger Steel Group



Trimble Total Station on site.

POSITIONING WITH TRIMBLE TOTAL STATION

➤ For assembling the diamond trusses, Unger Steel decided to use Trimble Total Station with Tekla for the first time. Unger assembled the roof components while these hung from a crane, and the team needed exact position information for lifting and fitting the components correctly at 15 meters above the platforms. They utilized the combination of Tekla and Trimble in a preassembly workshop to measure the components after welding to spot possible manufacturing tolerances before assembly, and later to control the position of the structure and put the parts together.

FROM TOTAL STATION TO TEKLA AND BACK

➤ The workflow of positioning the roof parts proceeded in rounds: Unger's team measured the structure with Trimble Total Station, imported the data to Tekla Structures, adjusted it, and exported the modified data back to Total Station for positioning.

As any inaccuracies would have affected the composition, the Unger team performed control measurements continuously in case the components would carry tolerances from fabrication or transport. On the connection points of the diamond trusses, the team measured the structure, downloaded the measurements into the Tekla model and after this planned and manufactured the connection parts. On site, they also marked building axes with Trimble Total Station.

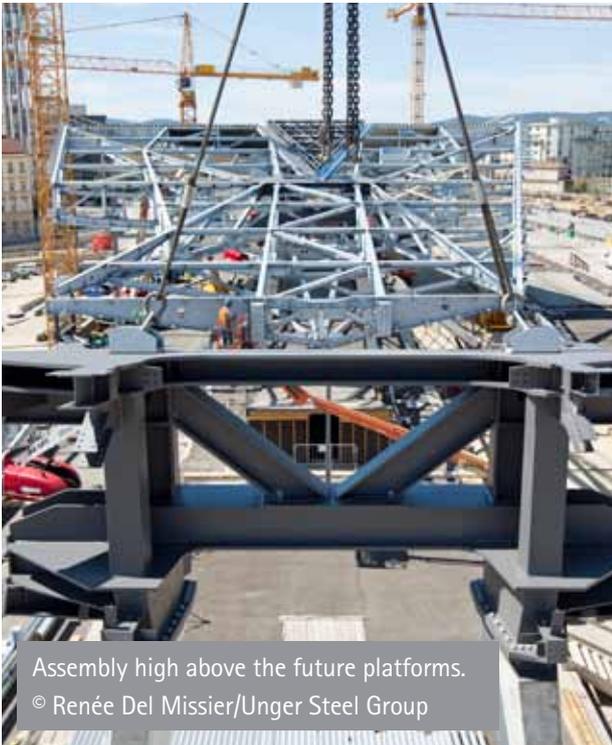
“Benefits of Tekla? We had the necessary information centralized to the model and available for sharing, production, installation and billing - quickly and with the right quality.”

– Erich Fladerer, Unger Steel Group

TIME, MONEY AND WORKFLOW

> Smooth workflow between office and site is the goal of every construction company, and according to Unger's experience, Trimble and Tekla together take their customers closer to this goal.

BIM and automated data transfer accelerated the project. With Trimble Total Station, Unger's own staff could measure the structures to save on expenses of external surveyors. And as they transferred the measurements of the built structure directly to Tekla, they saved time and labor because they did not have to enter the measuring data manually. Tekla eased the logistical challenge with automatically generated transport lists and aid in controlling production and assembly sequence.



Assembly high above the future platforms.
© Renée Del Missier/Unger Steel Group

COLLABORATION USING TEKLA BIM SIGHT

> For collaboration with project parties like architects and structural engineers, Unger chose Tekla BIMsight. The main benefit Unger experienced with their choice was that each project party had the building information model available and could work together - including production and installation teams on site. Unger also utilized Tekla BIMsight for approval process in the planning phase.

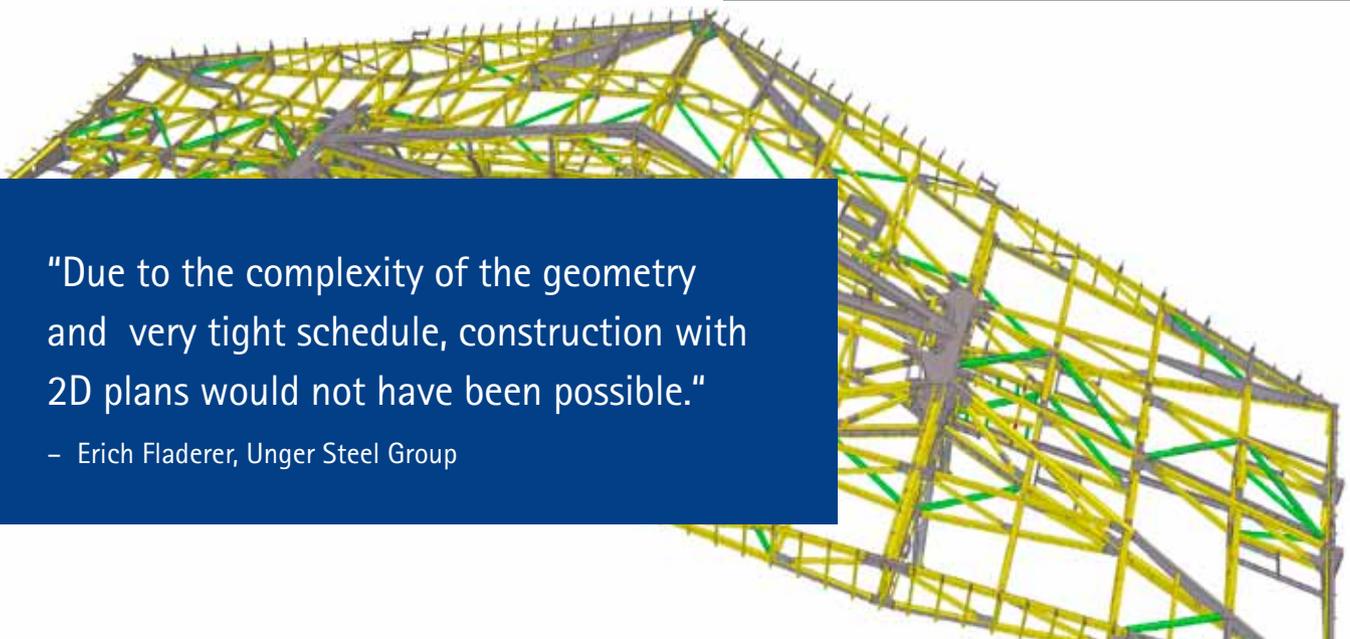


TRIMBLE TOTAL STATION

> The Trimble® RTS Series Robotic Total Stations help contractors perform layout tasks significantly more efficiently than with conventional mechanical systems. Being the most technologically advanced one on the market, the Trimble RTS robotic total station assures productivity and accuracy. As it maintains an accurate horizontal angle in all conditions and provides the fastest tracking rotation on the market, contractors measure accurately and move quickly. The most important part of the system, the LM80 field software, is the simplest, yet most capable field layout interface available. Created to be user friendly, LM80 allows contractors to utilize simple blueprints or files for layout or as-built measurements. When used with the RTS robotic total station, layout measurement becomes a productive one person operation.

“Due to the complexity of the geometry and very tight schedule, construction with 2D plans would not have been possible.”

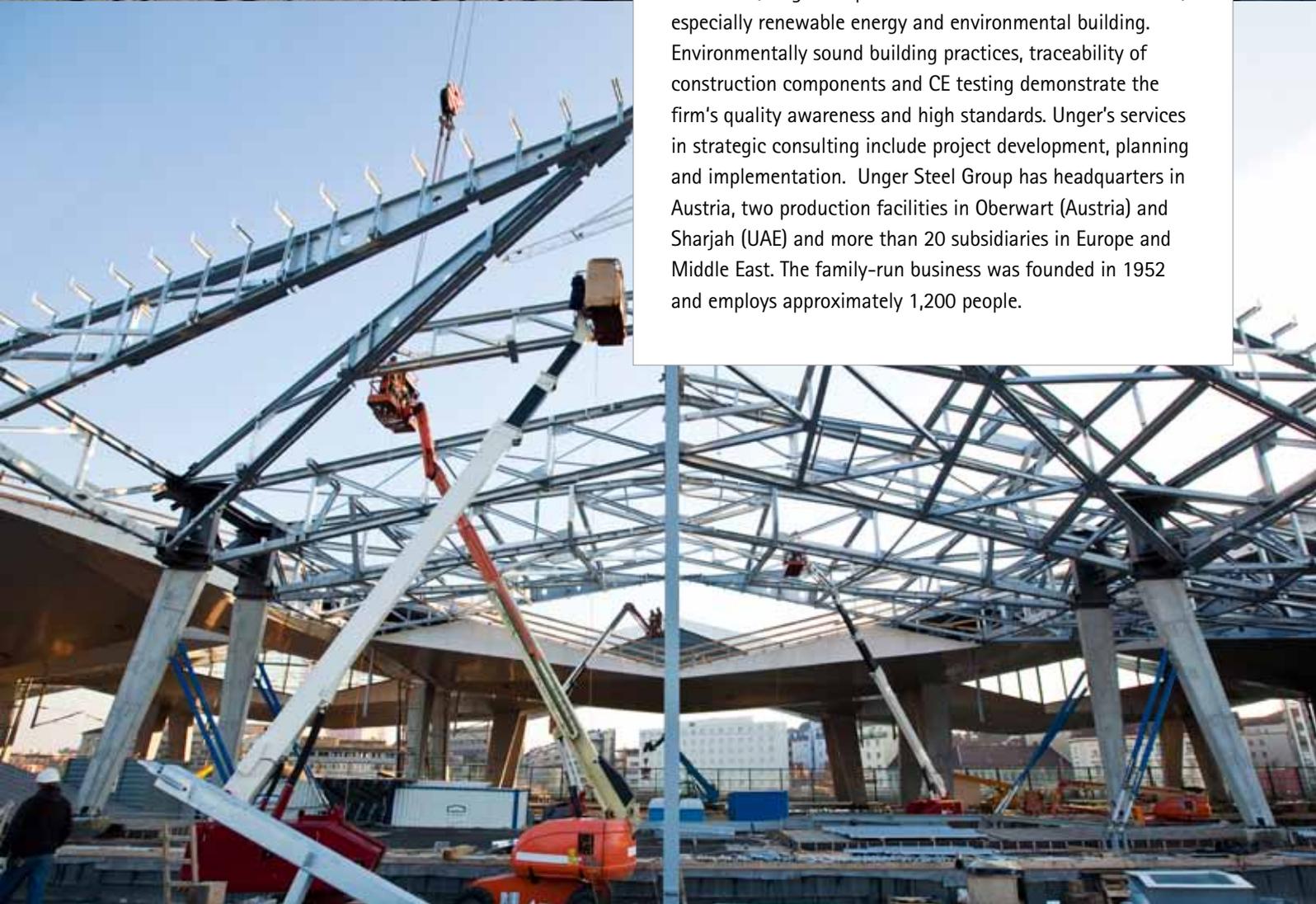
– Erich Fladerer, Unger Steel Group





UNGER STEEL GROUP

> Unger Steel Group is an Austrian group of construction industry companies with long experience in structural and architectural steel construction of projects of all sizes. The group holds reputation of quality, customer orientation, flexibility and on-time delivery. As a general contractor, Unger's expertise covers all areas of construction, especially renewable energy and environmental building. Environmentally sound building practices, traceability of construction components and CE testing demonstrate the firm's quality awareness and high standards. Unger's services in strategic consulting include project development, planning and implementation. Unger Steel Group has headquarters in Austria, two production facilities in Oberwart (Austria) and Sharjah (UAE) and more than 20 subsidiaries in Europe and Middle East. The family-run business was founded in 1952 and employs approximately 1,200 people.





OUR AMBITION IS TO MULTIPLY YOUR POTENTIAL TO THINK AND ACHIEVE BIG

> Tekla's goal is simple: multiply our customers' potential to think and achieve big. Tekla provides a BIM (Building Information Modeling) software environment that contractors, structural engineers and detailers and fabricators of all materials can share.

Tekla software creates, combines and distributes highly detailed, constructable 3D models. Information-rich models lead the way for production control and more collaborative and integrated project management and delivery. This translates into increased productivity and elimination of waste, thus making construction and buildings more sustainable and your ability to achieve big more realistic.

> Tekla drives the evolution of digital information models and provides competitive advantage to the construction and infrastructure industry. Tekla software is used to model all types of structures of all materials.

TEKLA AND TRIMBLE

> Tekla was established in 1966, and today has customers in 100 countries, offices in 15 countries, and a global partner network. Since 2011, Tekla has been a part of the Trimble Buildings Group.

Trimble Buildings Group's solutions tightly link office-based process and information with the field crew. Trimble Design-Build-Operate platform responds to the needs of owners and the AECO industry by increasing productivity and reducing rework.

Visit tekla.com



TEKLA BIMSIGHT

> Tekla BIMSight is a free professional tool for construction project collaboration. Anyone can combine models, check for clashes and share information using the same easy-to-use 3D environment. With Tekla BIMSight project participants can identify and solve issues already in the design phase.