THE BEST OF BIM

Tekla BIM AWARDS

Trimble

THE BEST OF BIM

TEKLA GLOBAL
BIM AWARDS 2016

Tekla Global BIM Awards highlights top construction projects from around the world. The size, material, structure type, way of working, environment and project organization behind each structure may be different, but all the winners share some qualities. They are technologically advanced. They are successful. They offer inspiration.
Enjoy reading.

Learn more at:

www.tekla.com/bim-awards

Campus Thales Bordeaux © Frédéric Joly

THE BEST OF BIM

TEKLA GLOBAL
BIM AWARDS 2016

Best BIM & Commercial Project:
Campus Thales Bordeaux in France by GA Group

Best Industrial Project:
The Warehouse's SIDC Extension in New Zealand by Holmes Consulting Group

Best Public Project:
JUST social and healthcare center in Finland by the JUST Alliance

Best Infrastructure Project:
Ordsall Chord in UK by The Northern Hub Alliance

Best Sports & Recreation Project:
Sportcampus Zuiderpark in the Netherlands by Oostingh Staalbouw Katwijk

Best Small Project:
Euler Canopy in France by Viry (Fayat Group)

Best Student Project:
Model of Lodz City Gate in Poland by students of Lodz University of Technology

Special Recognition:
Izmit Bay Suspension Bridge in Turkey by CIMTAS

Public Vote Winner:
Midfield Terminal Complex in Abu Dhabi by Eversendai Engineering L.L.C

Best BIM and Commercial Project

A COMPREHENSIVE BIM APPROACH

CAMPUS THALES BORDEAUX

What it is: A 16-hectare campus with office space for 2,300 Thales employees, showroom and production plant building with total area of about 56,000 square meters.
Location: Bordeaux, France **By:** GA Group

DEVELOPING CONSTRUCTION METHODOLOGY

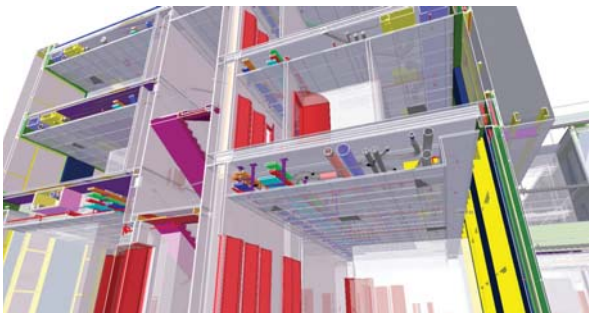
Working on Thales Campus, GA made use of the FullBIM approach it had developed achieving excellent results. The construction process only took 18 months, thanks to faultless information being available at all times.

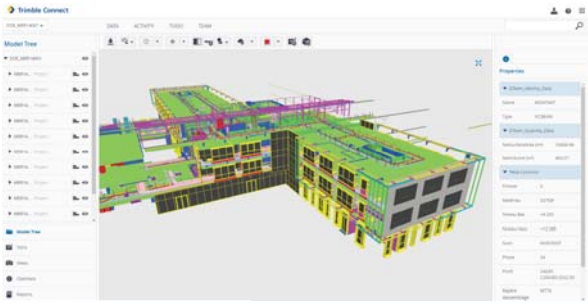
GA, who was responsible for design, fabrication and construction, had a very streamlined process. It used the model from conceptual design and detailing to fabrication, delivery and erection management. GA imported reference models, such as architectural and MEP models, to Tekla. Thanks to creating a company-specific, standardized working environment within Tekla Structures, the modeling and detailing work is very efficient.

The structural model was detailed, including formwork and the precast structure complete with rebar and embeds. The model also included an enormous amount of information, such as Bills of Materials (BOMs) and UDAs for site managers. GA chose LOD (level of development) 600, which refers to using model information not only for design, detailing and fabrication purposes but also for maintenance after the building has been completed.

BIM MADE ALL THE DIFFERENCE

In the management of the project, GA took advantage of Tekla Structures and Trimble Connect. The benefits were notable at all levels. Initially, the collaborative approach boosted exchange and understanding between the general contractor and subcontractors. In the detailing phase, 3D models and direct access to information helped the team visualize what to expect and act accordingly. As to the operation phase, the project owner can now optimize response times and consider new management methods and equipment.





Thales Campus model in Trimble Connect

SMART BUILDING

How GA works

The 140-year-old GA offers development, design, construction and management services for real estate projects from commercial properties to student housing and industrial construction. The company has developed the FullBIM approach to build virtually prior to on-site construction. Throughout the lifecycle of the project, data is aggregated in a digital 3D model that grows more and more intelligent over time. The teams at GA visualize and simulate technical elements such as acoustics, heating and cooling, sunlight and energy use by modelling the building's structure, envelope and primary systems.

Best Industrial Project

DESIGN THAT BUILDS ON POINT CLOUDS IN AN EARTHQUAKE-PRONE AREA

THE WAREHOUSE'S DISTRIBUTION CENTER EXTENSION

What it is: A 15,000 square meter distribution center extension conjoined to a building shifted during an earthquake
Location: Near Christchurch, New Zealand **By:** Holmes Consulting Group

SAFETY FIRST IN A SEISMIC ZONE

The Warehouse's old distribution center, shifted in an earthquake in 2011, needed an extension. First, Holmes Consulting Group had to assess the impact of the earthquake to ensure the building was structurally sound.

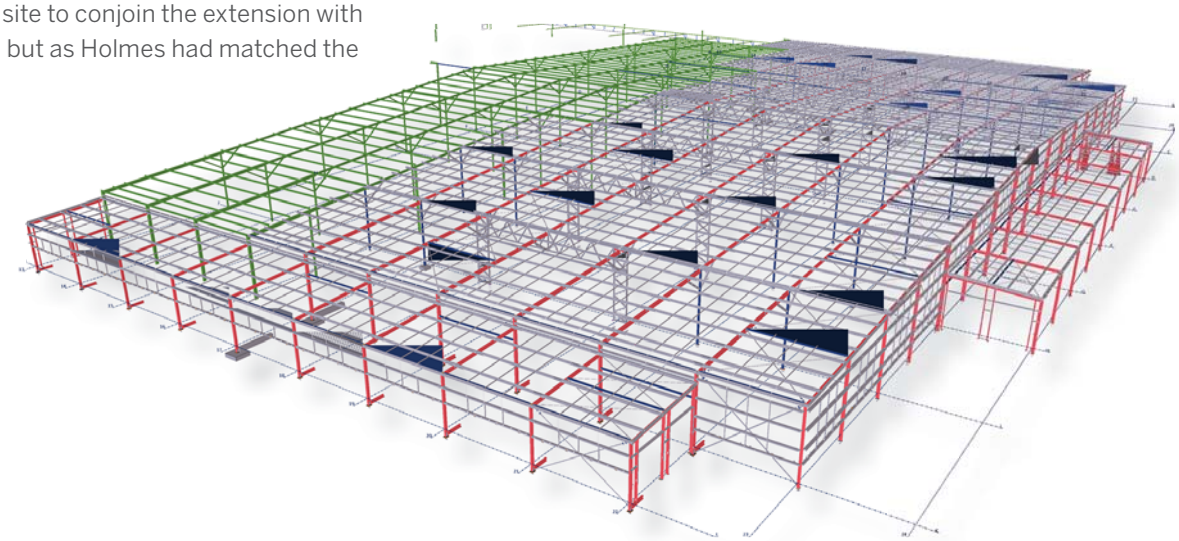
To match the old and new structures, Holmes laser-scanned the structure using Trimble equipment and software, then created a point cloud of the data. This was necessary to account for the original building's movement to avoid costly delays and re-work on site.

Throughout the construction project, the facility needs to remain fully productive, which demanded efficiency and careful planning from the construction process. The building had moved so much that major adjustments would have been needed on site to conjoin the extension with the original structure, but as Holmes had matched the structures virtually with BIM and the two structures fitted as planned. Utilizing BIM saved a lot of time, material and money.

BIM FOR THE FUTURE

Matching the old and new structures virtually was only one of the benefits of using BIM. Holmes was also able to accurately detail all the structural steel used in the project, creating a precise schedule that also provided certainty of material cost. With Tekla, they could carry out a streamlined, precise construction sequence, which was crucial on a busy site that remained operational throughout the process.

Now as the project has been completed, The Warehouse has an accurate set of models for the new extension as well as updated drawings for the original structure to use for maintenance and possible future extensions.

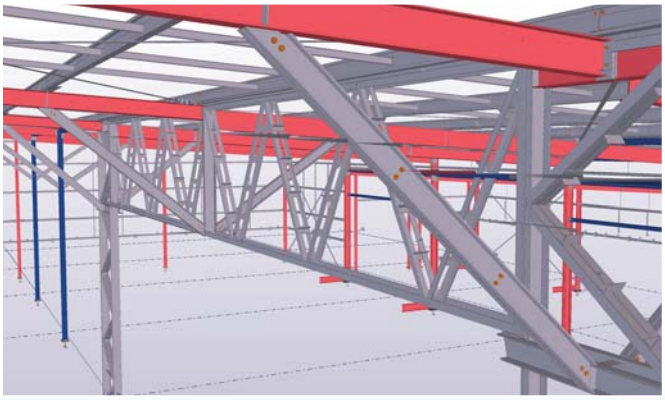


Holmes Consulting

A warehouse for The Warehouse

The Warehouse has more than 90 stores across Australia and New Zealand. Their new distribution center features:

- 15,000 m2 of new storage and distribution space
- 2,000 m2 of new container canopies
- 1,100 m2 administration block
- 900 Lm of conveyor system
- 6500 m2 of asphalt perimeter roadways and a carpark
- 33,000 m2 warehouse space



Best Public Project

A SUCCESSFUL ALLIANCE OF NINE PROJECT PARTIES

SOCIAL AND HEALTHCARE CENTER JUST

What it is: A new social and healthcare center, a parking facility and a tunnel
Location: Järvenpää, Finland **By:** JUST Alliance

A PROJECT WITH MULTI-EVERYTHING

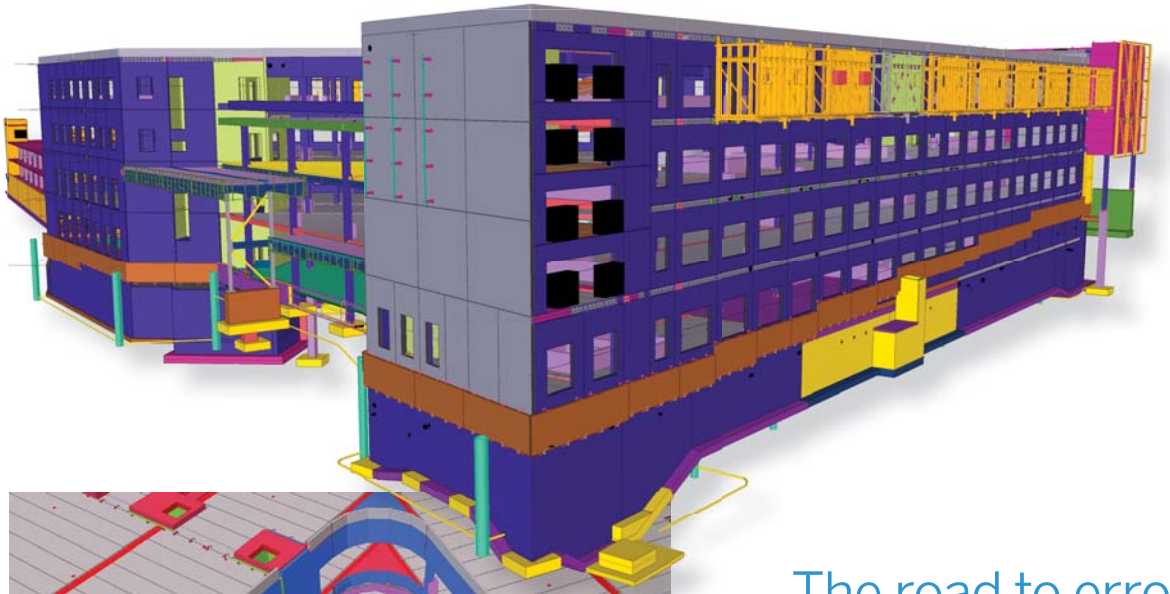
Multi-material, multi-design-branch, multi-Trimble product – in the JUST project, nothing was restricted to a single source. All nine project parties used BIM for a wide range of activities, including procurement inquiries; production, site, schedule and task planning; sectioning; cost estimating and quality assurance. The team classified and analyzed the model content to suit different uses and aimed to develop new processes for utilizing BIM during the lifecycle of the building.

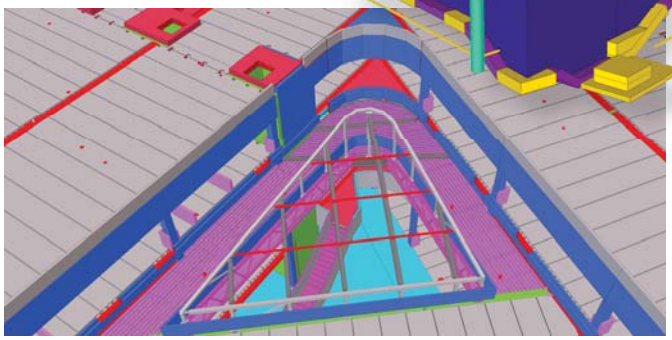
To ensure the collaboration between the parties and the diverse utilization of the information models, the project employed Virtual Design and Construction approach.

ONE PROPERTY, ONE ALLIANCE

To start the project, first a service provider put together a planning team and, together with the owner, they composed proposals, general design and building permit plans. Next, the property was developed by the planning consortium, the contractor and the owner together.

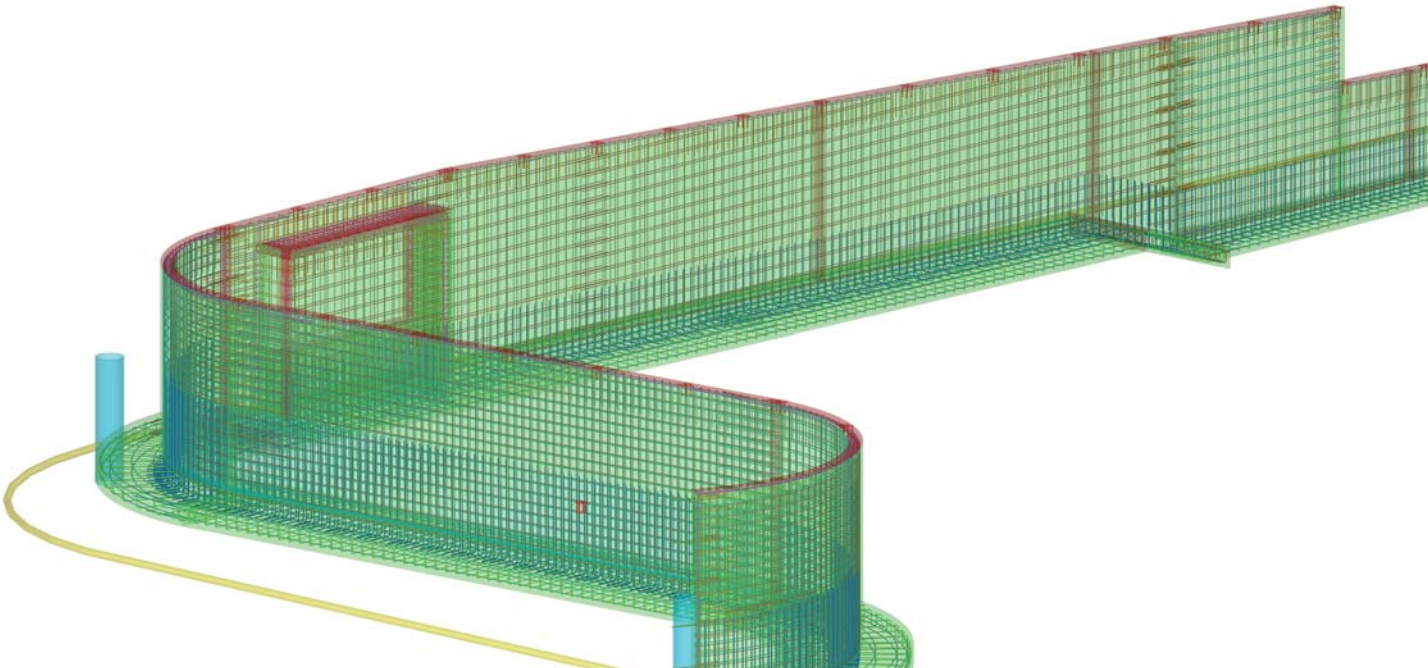
JUST was a created by an alliance. Everyone wants to maximize the benefits of BIM, which was used in procurement enquiries, production planning, sectioning, site planning (Trimble SketchUp), cost estimating (Vico Office), schedule planning (Vico Office and Tekla Structures), task planning and quality assurance. The team used IFC files for collaboration. The project stands out for excellent documentation, visionary usage of BIM and new level of user participation.





The road to error-free

BIM and digitalization can bring all project stakeholders closer to each other. For example, end-users (in this case, the healthcare facility nurses) could influence the locations of rooms and spaces during the design phase. Dividing planning and construction into separate stages enabled certain designs to be finalized after other sections of the building had already been installed. BIM-based design coordination was a success, and the produced designs are exceptionally free of errors and conflicts. Inaccurate plans were a rare sight on site.



Best Infrastructure Project

TODAY'S COLLABORATION IN A HISTORICAL SETTING

ORDSALL CHORD

What it is: A 300-meter railway connecting five railway stations in central Manchester and including a new viaduct that fits in with a historical bridge from 1830.
Location: Manchester, UK **By:** The Northern Hub Alliance (Network Rail, Siemens, Amey Sersa JV and Skanska BAM JV)

BRINGING TOGETHER OLD AND NEW

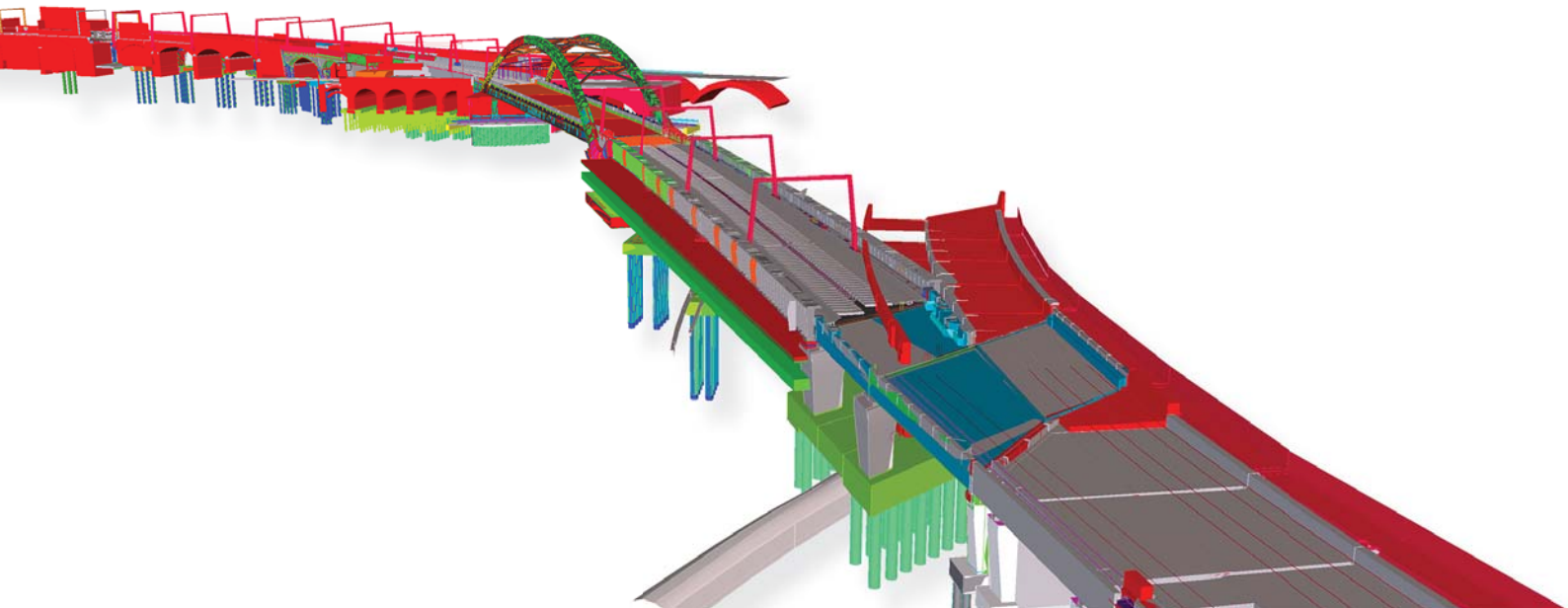
An infrastructure project inevitably faces extra challenges, if it includes structures dating back to the days when railways were cutting-edge technology. This was the case in Manchester, where the Ordsall Chord project incorporated structures from the 1800s, on top of being part of a busy transportation network.

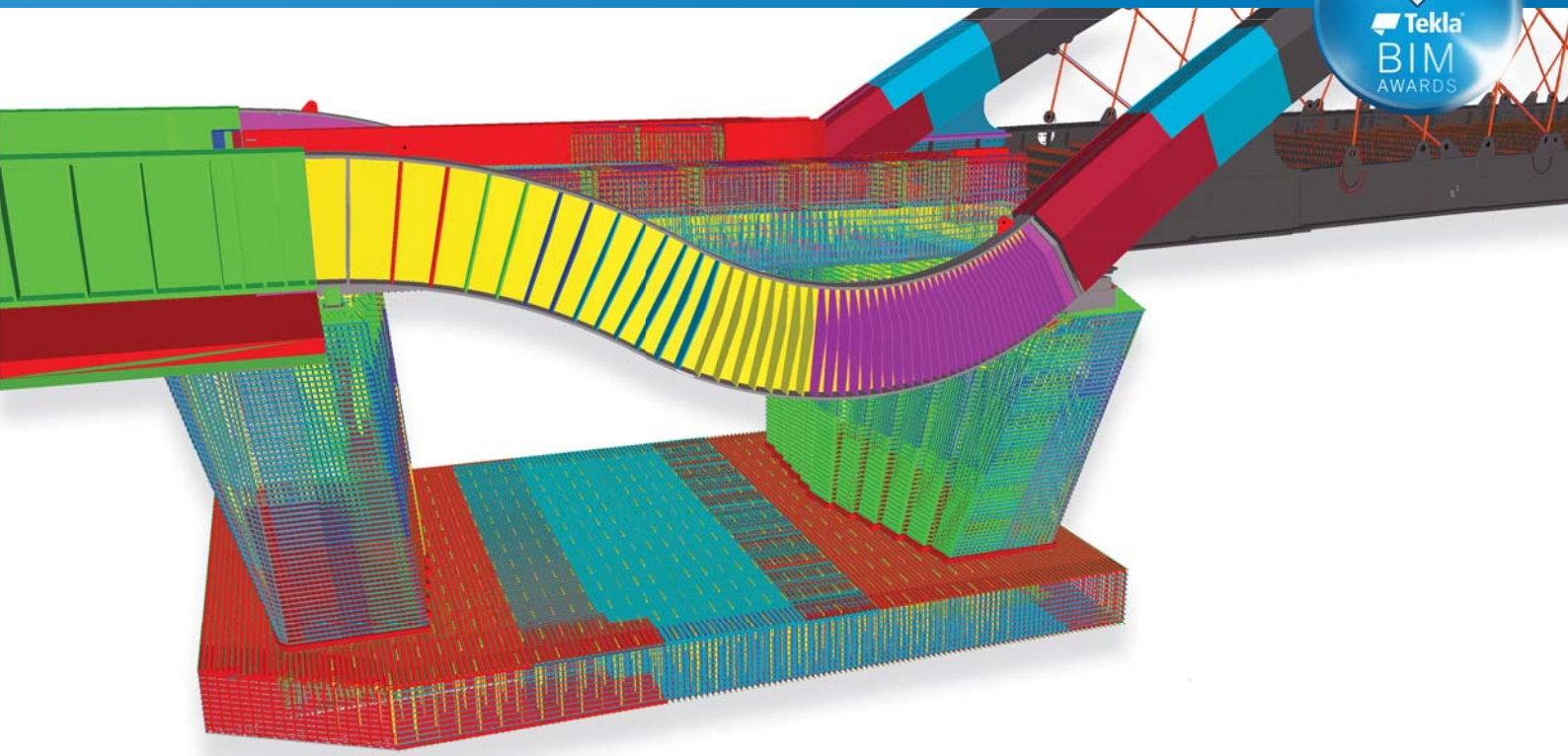
At Ordsall Chord, the team used topographical and point cloud data of the existing infrastructure as a basis for modeling. The team members produced a rough design intent model using the survey data for modeling the existing infrastructure and the documents on the architectural intent as well as the engineering input. Later, they created constructible steel and concrete models with higher LOD (level of development) using Tekla Structures.

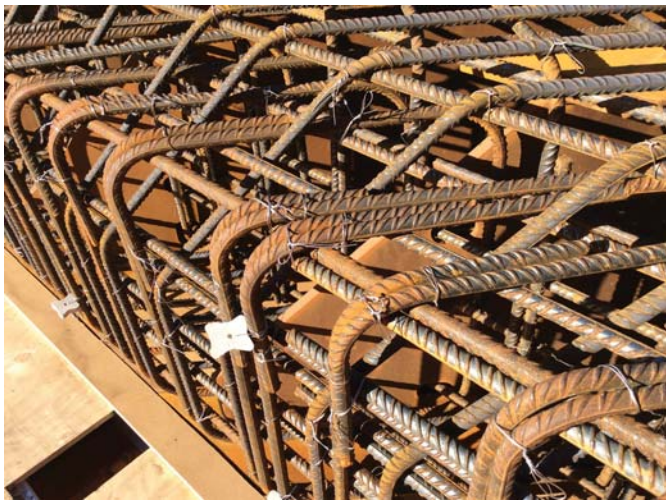
COLLABORATION FROM EARLY ON

The Northern Hub Alliance encouraged early involvement of the key partners, which improved the process and design. The key steelwork contractor, Severfield, was engaged very early on, and as with the main civil contractor, its tender was evaluated with a weighting given to collaboration. The models were available to contractors during all stages of the construction process, including planning.

However, a technology platform fit for fabrication-ready LOD and extensive collaboration turned out to be necessary. During the project, Tekla Structures was chosen for modelling and detailing. The steel fabricator, including their detailers, had access to relevant information very early and were able to contribute to the development of the design models. Using Tekla Structures, both the steel and concrete models could interface directly.







Why we like it?

The jury members of the Tekla Global BIM Awards were impressed by Ordsall Chord because of its challenging location under the public eye, conjoining to the existing infrastructure in a historical setting. Then there was the collaborative spirit of the Alliance: early involvement of project parties in order to achieve better processes and outcomes, and taking advantage of technology when ensuring coordination: For example, they used of models in meetings to review the progress, and making bold technology decisions that supported the project.

Best Sports & Recreation Project

BIM IS FOR MORE THAN JUST DESIGN

SPORTCAMPUS ZUIDERPARK

What it is: Sportcampus Zuiderpark has 30,000 square meters housing the International Sports Academy and offering community sports facilities.
Location: The Hague, the Netherlands **By:** Oostingh Staalbouw Katwijk

ALL STAGES, ALL DETAILS

Sportcampus Zuiderpark is a result of extensive, clever Building Information Modeling and utilizing the model information. The project team at Oostingh Staalbouw Katwijk modeled the structural design of the foundations and the steel and concrete frame, but also the other materials used. They detailed the model on a level that would meet the requirements of fabrication.

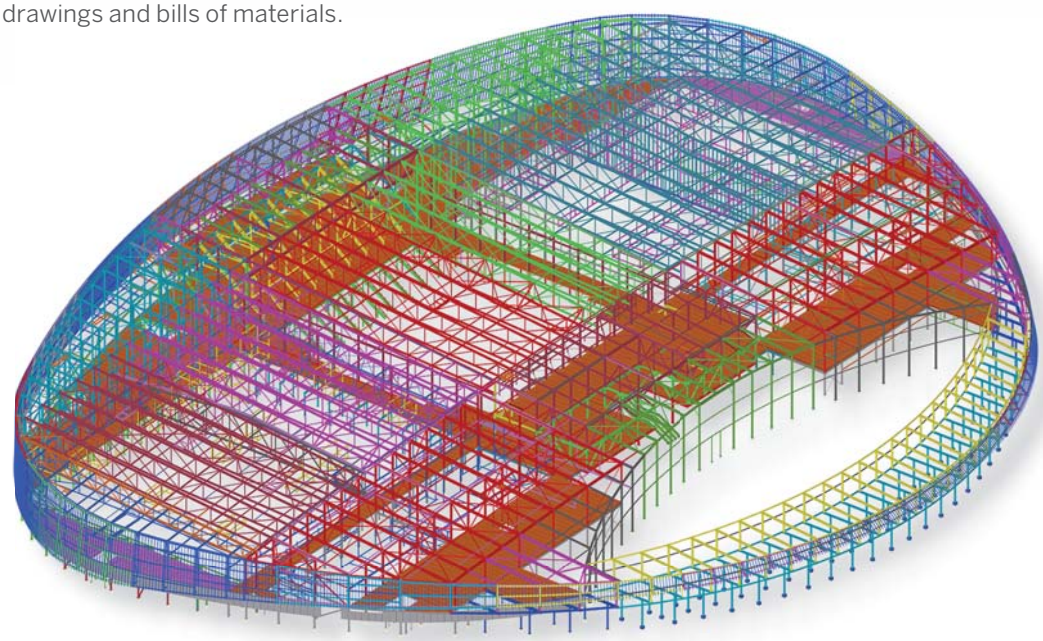
The main file format used for collaboration was IFC. However, sending IFC files back and forth proved not to be enough for modern construction collaboration. Oostingh Staalbouw decided to use Tekla Model Sharing, which allowed 15 designers in three locations to work on the model. Still, the model was always up to date.

What is more, the team really took advantage of the model information: They used the model for estimation, purchasing, production planning and erection, in addition to creating drawings and bills of materials.

MODELING FOR FABRICATION AND DELIVERY

One can say that Oostingh Staalbouw's machinery is capable of executing every thinkable operation. These machines obtain their instructions from Tekla software through an application. In addition to structural steel fabrication, the team coordinated the precast hollow core floor and fireproofing information with the model.

After evaluating the project, Oostingh Staalbouw's view is that the project became successful because of estimating all components and structures using the digital model. BIM allowed finding any possible clashes proactively. The tightness of the contractual schedule did provide challenges, but nevertheless, the team got a feeling of achievement and creating a unique project. This was proven by the end results.

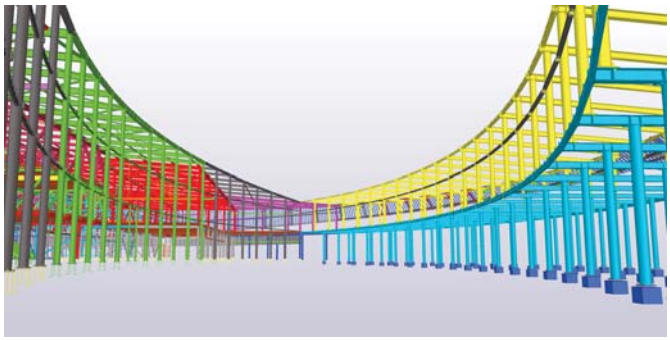


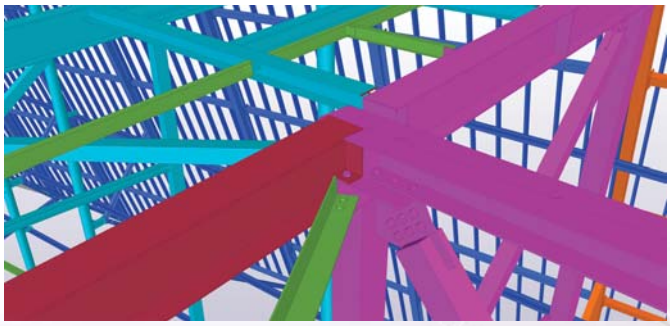
Tekla Model Sharing

BIM collaboration in the Sportcampus project

Tekla Model Sharing allows project teams to work together efficiently on their Tekla Structures regardless of their location – in case of Oostingh Staalbouw's winning project, in two company offices and one contracting. The company was happy to have one source of information for everything: Every user, internal and external, could access the latest model and collaborate. They also knew when to start internal processes for material optimization, purchasing and production planning.

OOSTINGH STAALBOUW





Best Small Project

EULER CANOPY

What it is: A 302-m2, 16-ton steel and glass canopy covering an atrium restaurant
Location: Paris, France **By:** Viry (Fayat Group)

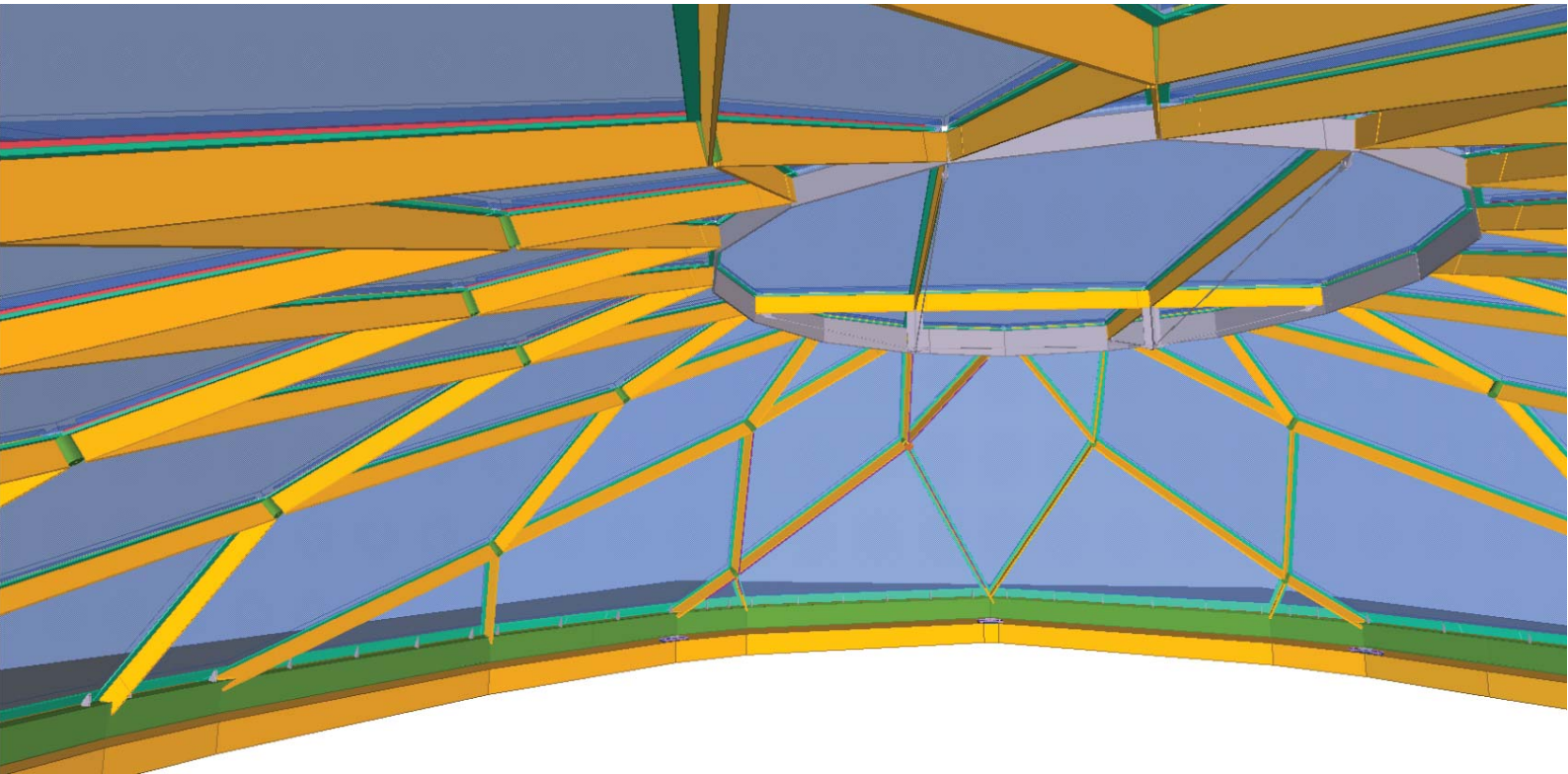
EXPERTISE IN COMPLEX WITH AN EXTRA BOOST

Viry is known for its expertise in complex architectural structures that use both steel and glass, as well as its knowledge in hybrid technologies and new building materials, integrating engineering, production and site management. In this project, the company used Tekla for steel detailing. According to Viry, working with Tekla BIM solutions allowed them to model the project with accuracy – which is of vital importance in construction.

THE CHALLENGE COMES CLOSE ON CHAMPS ELYSÉES

The canopy's T-shaped steel profile structure lacks vertical columns, which made the erection phase of the geometrically challenging structure difficult. The thinness of the materials used in the canopy indeed gives a light feeling to the structure, but it does not make construction any easier. The T-shaped structure is connected to the nodes with just 10-millimeter circular elements. Viry controlled the modeling coordinates in order to achieve the right shape.

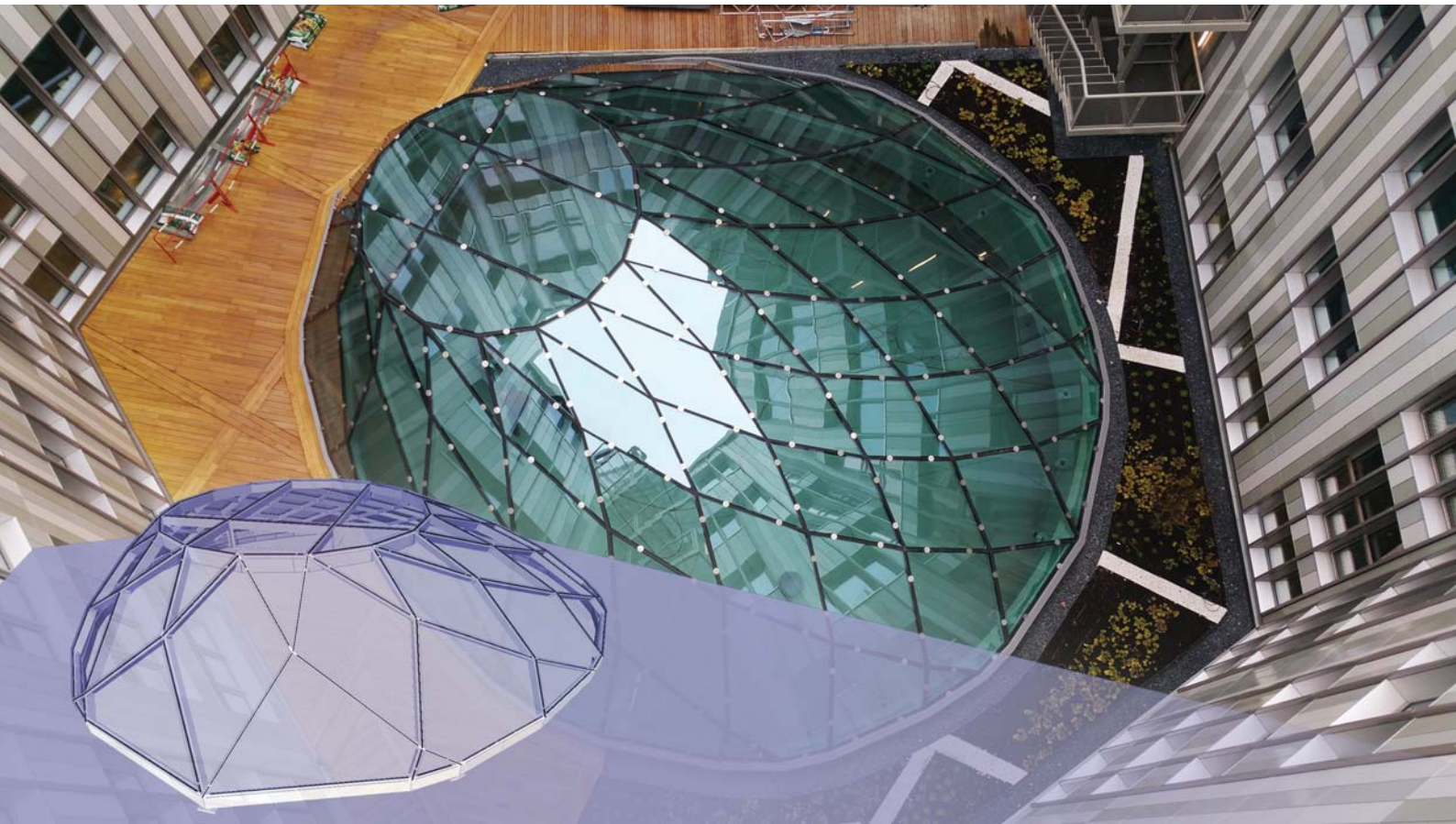
The location of the canopy, Euler building, near the busy Champs Elysées in the heart of Paris posed an additional challenge to site management and logistics, as very punctual deliveries were required.



VIRY
FAYAT GROUP

Why we like it so much?

The Euler canopy is a lovely little roof. As the jury of the Tekla BIM Awards France put it:
"This project can be described as high fashion – it is lace. It is not a big structure, but the geometry and the lightness are amazing. If we look at to the level of detail in depth, the team is really using Tekla in an innovative way."



Best Student Project

THE TEAM OF THE YOUNGSTERS

MODEL OF LODZ CITY GATE, POLAND

What it is: An alternative version of the Lodz City Gate: a three-part, glass-covered office building with a public space
Location: : Lodz, Poland **By:** Students of Lodz University of Technology

STUDENTS FOUND THE BEAUTY OF TEKLA

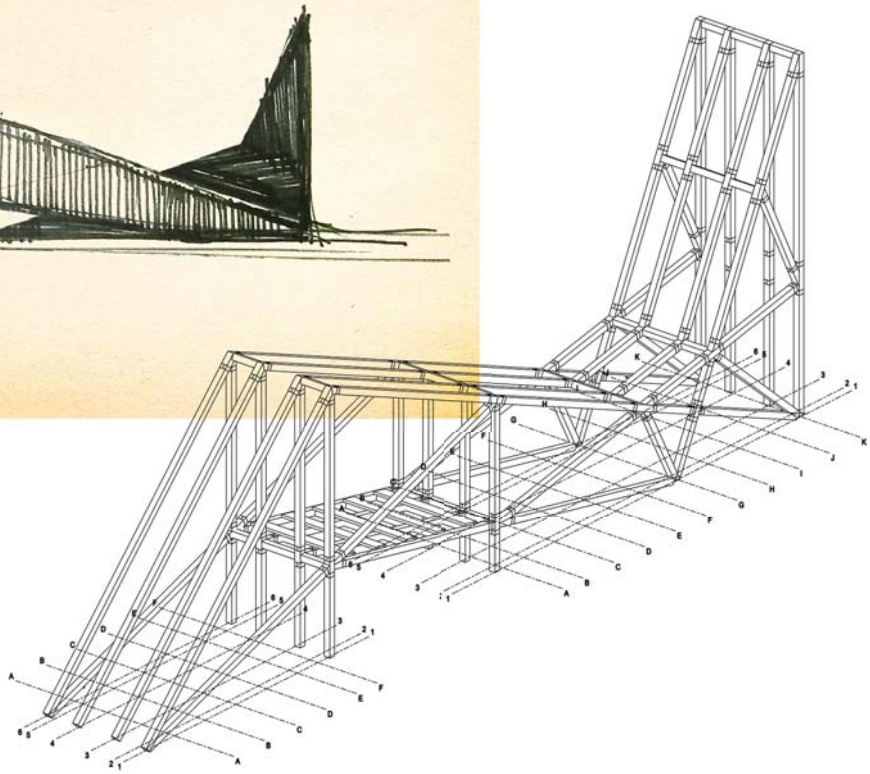
The students of civil engineering, architecture and environmental engineering created an alternative version of the current gate: a three-part, glass-covered office building including public space. Their structural solution is also architectural. Communication and collaboration were central to the success of the project: The team shared ideas, solved problems and found new solutions when discussing the project.

The project comprises an underground railway station, new railway connections through the city center as well as an arts and cultural zone. Some zones are available for the public, and there is a viewing point at the top of the complex.

VARIOUS DETAILS BRING MULTIPLE CHALLENGES

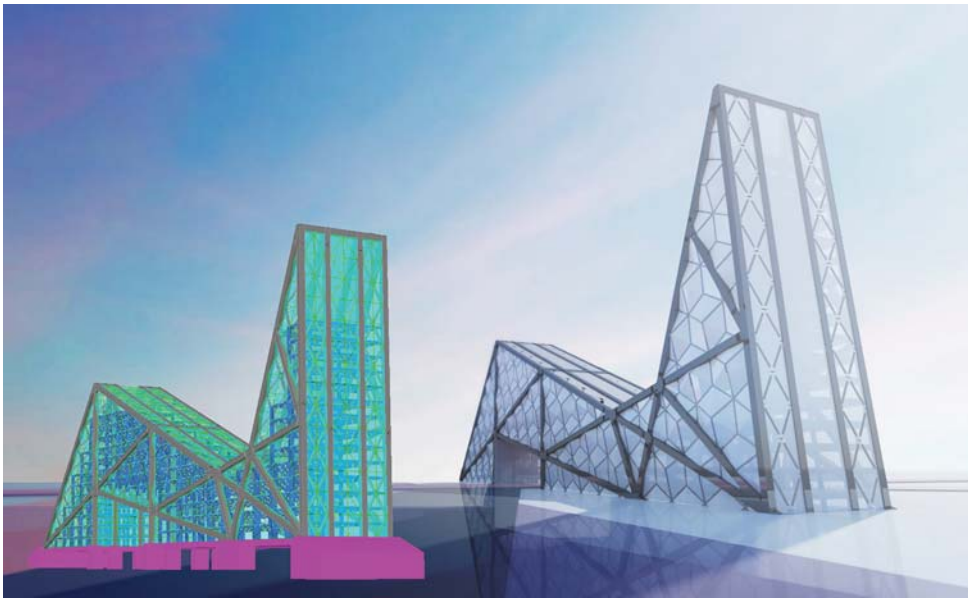
The building is divided into three parts, covered with glass elevation. The whole building was designed to make the steel elements to be both the load-bearing structure as well as provide architectural value. In order to make a structure lighter, the students planned to use cellular beams, which would also enable hiding the installations and increase ceiling height. The shape of the openings was inspired by the Angelina steel profile by Arcelor Mittal.

The main challenge of the project lied in its various details, as modeling joints took a lot of time and effort as the elements were at different angels. Almost each of the main joints needed to be made separately and could not be copied. Because of the sheer size of the building, avoiding and checking collisions took a lot of time.



Let the students talk

"Thanks to the student internships, during which we had an opportunity to work using Tekla, we could make our project successful. By sharing our ideas, we could easily solve problems and think of new solutions. As we planned the scheme of creating the project before we had started, we were able to finish it in less than a month. Using tools such as phase manager allowed as to organize the work well."



Special Recognition

IZMIT BAY SUSPENSION BRIDGE

What it is: The fourth longest suspension bridge in the world with a central span of 1,550 meters and total length of 2682 meters
Location: Izmit Bay, Marmara sea, Turkey **By:** CIMTAS

LONG, LARGE, HIGH

A total length of 2,682 meters, 566-meter side spans on both sides; 18,000 tons of steel a total height of 252m. Three lanes of traffic (both ways!) and a total weight of 34,000 tons. Izmit Bay Crossing Suspension Bridge is the world's fourth longest suspension bridge.

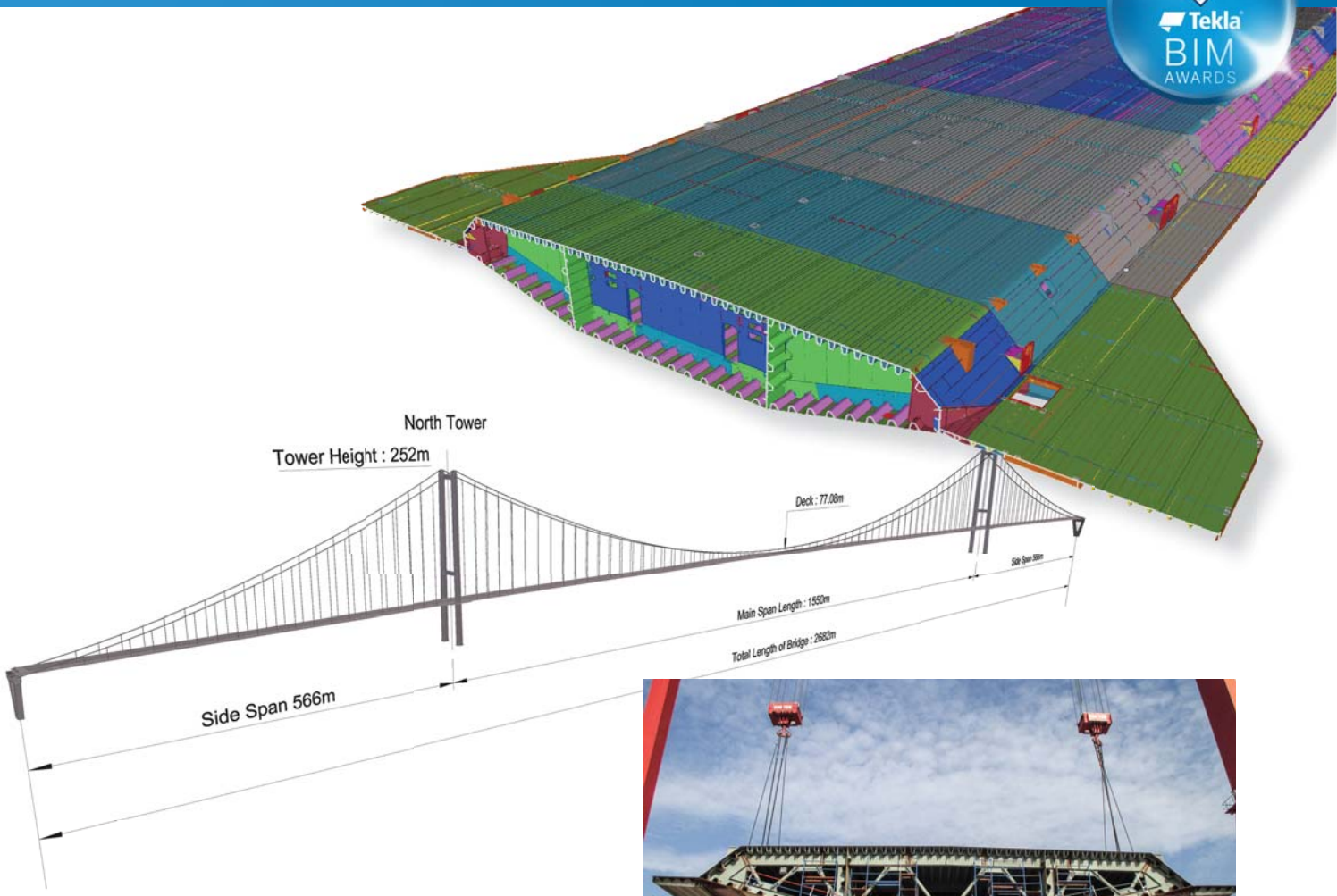
Throughout the project, fabrication tolerances were extremely small. Straightforward modeling techniques didn't suffice to properly show the real and required fabrication dimensions. Hence, the team decided to create two separate models, one model with fabrication dimensions and the other with added shrinkage values. In order to keep track of the two models, an external program was created using Tekla Open API.

BIM AND TEKLA STRUCTURES SPEEDING UP THE PROCESS

Fabrication of such a large scale project has to be conducted in different phases with careful planning and execution. This requires all individual parts to be designed without a mistake, carefully tracked and inspected from procurement to erection process. Throughout the process, the model created by engineers was shared with fabrication, transportation and erection teams.

The team used Tekla Structures model in transportation and erection, as well as integrated the model to the steel fabrication as a source of robotic welding and CNC data. Tekla Structures was fully integrated into the fabrication system, and it helped successfully fabricate more than 52,000 tons of steel in the same company within a relatively short period of time.

Image: Riza Kayan



cimtas

In-house development of unique modeling techniques

Tekla was one of the key players of the team in this huge project, which was completed successfully on time. The team used unique modeling techniques that had been developed in-house. These included multi-fabrication-phase modeling methods in order to count for weld shrinkages during fabrication process. They saved time by modeling just one half of the bridge and then mirroring it to crate the other half.

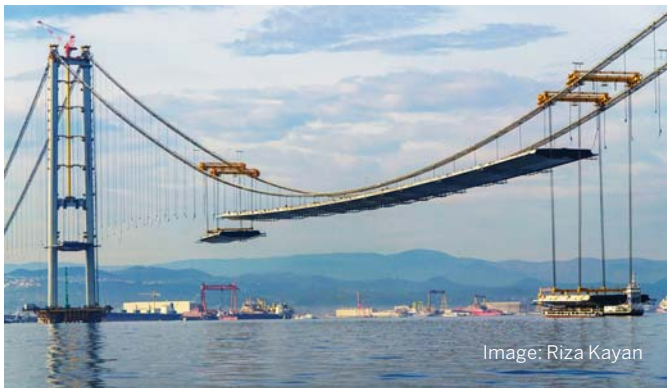


Image: Riza Kayan

Public Vote Winner

EVERSENDAI'S MIDFIELD TERMINAL COMPLEX

What it is: Piers, passenger bridges and gate houses at Midfield Airport
Location: Abu Dhabi, UAE **By:** Eversendai Engineering L.L.C

FROM DESERT TO 'GARDEN OF THE GULF'

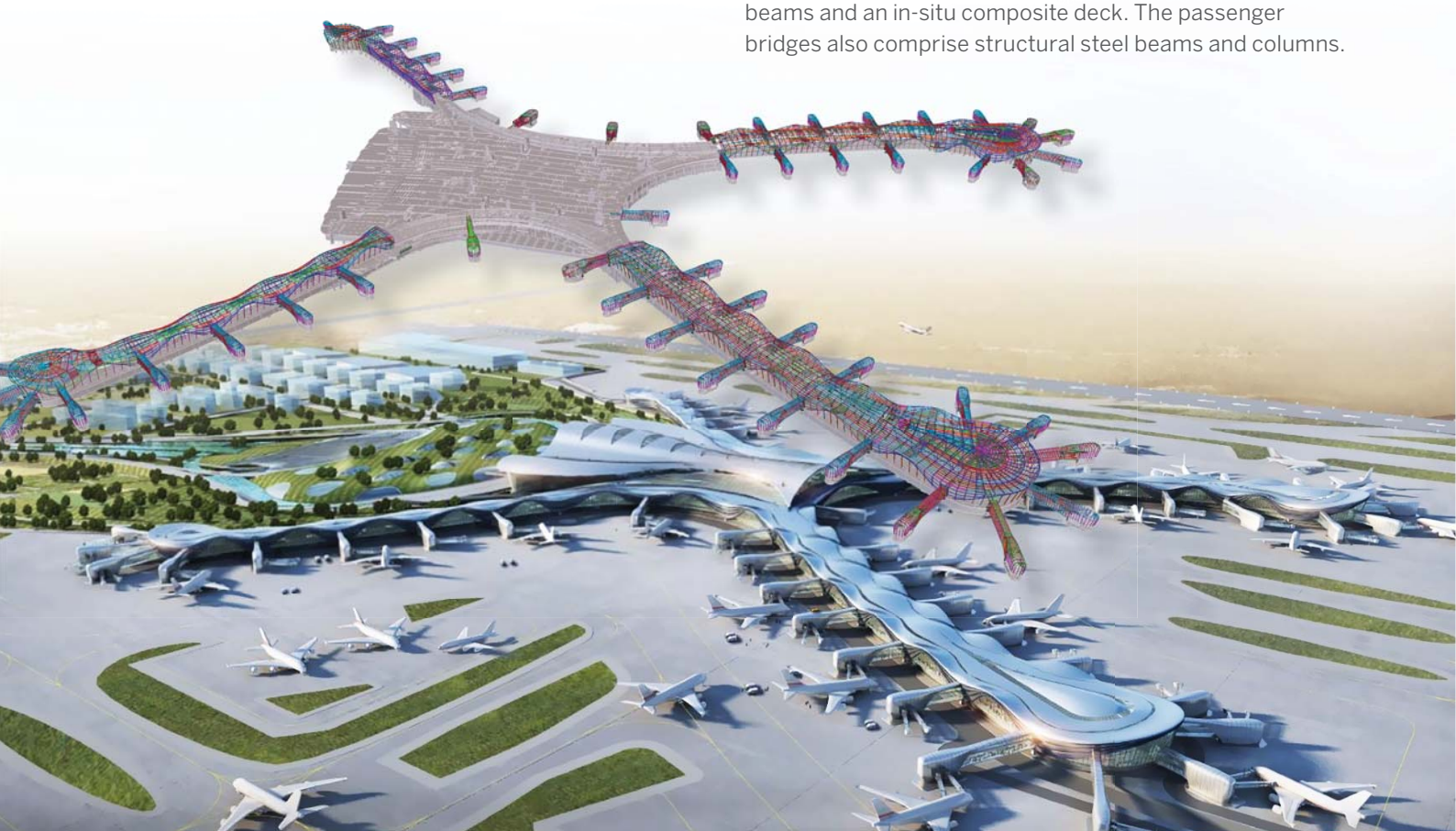
The Midfield Terminal Project Complex is an integral part of progressive development plan of Abu Dhabi 2030, the aim of which is to transform the desert into the 'Garden of the Gulf'. This will happen with the help of a design that responds to the natural environment, while meeting the needs of the rapidly growing capital.

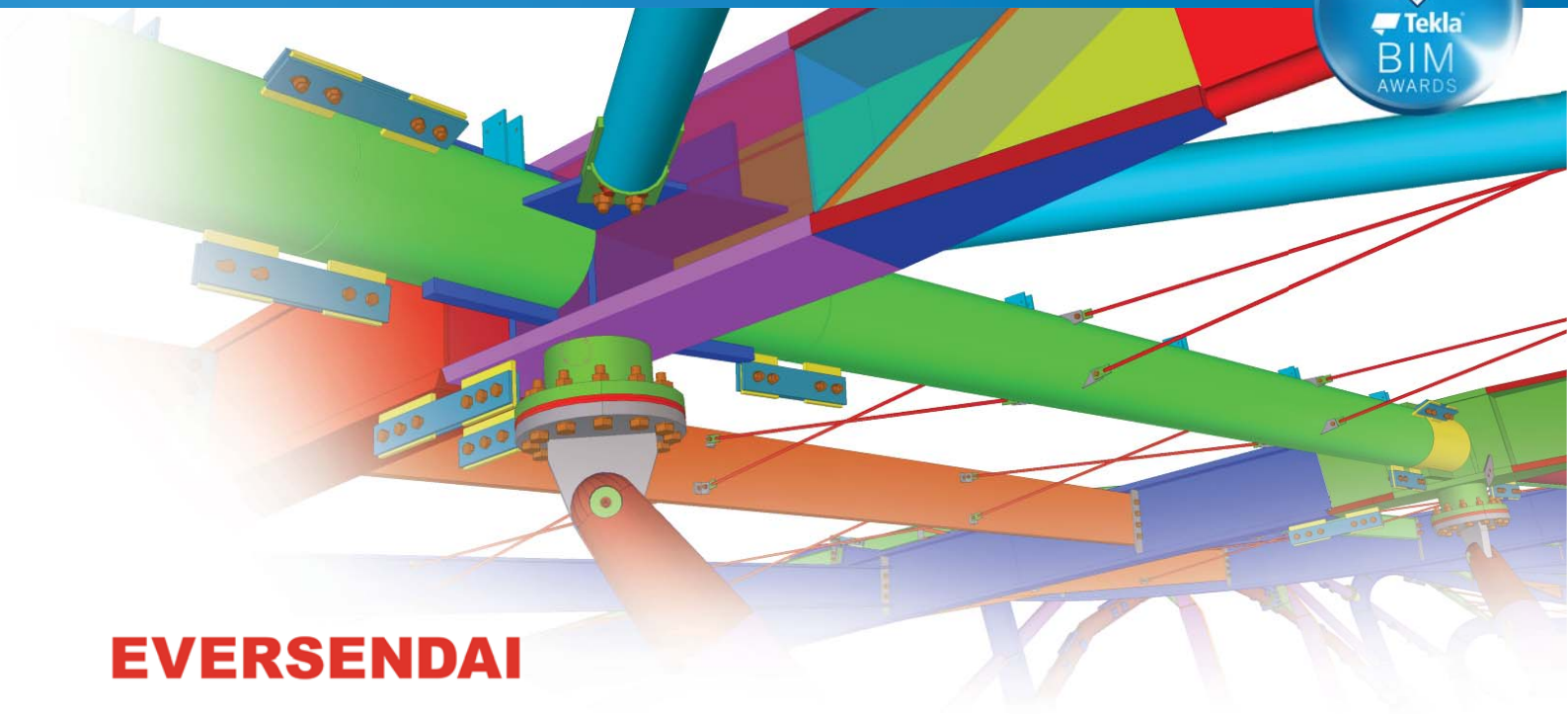
The plan of this prestigious Airport Project in X-shape programmatic efficiency, enabling the 49 gates to process around 50 million travelers annually. The roof of the piers along the X is 'pulled down' on the facade in an undulating form to protect the building and its habitants from the sun.

FULL OF COMPLEXITIES

The arched façades of the pier slope outward approximately up to 5 meters on each side; the main rafters are arranged to span between the structural mullions and the "V" columns; structural mullions support the ends of the rafters and are formed of triangular hollow sections; and the tops of the "V" columns are tied together by a spine beam which also forms the chord of the transverse stability truss. The details are plentiful and functional.

The gatehouses provide access between aircrafts and the concourses. They are two-story structures, connected to the piers via deep truss bridges known as fixed bridges. The main structure of the gatehouses themselves comprises structural steel columns, which provide support to composite beams and an in-situ composite deck. The passenger bridges also comprise structural steel beams and columns.

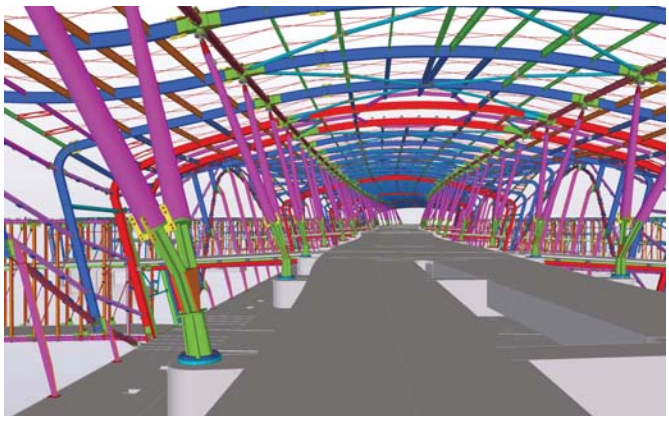




EVERSENDAI

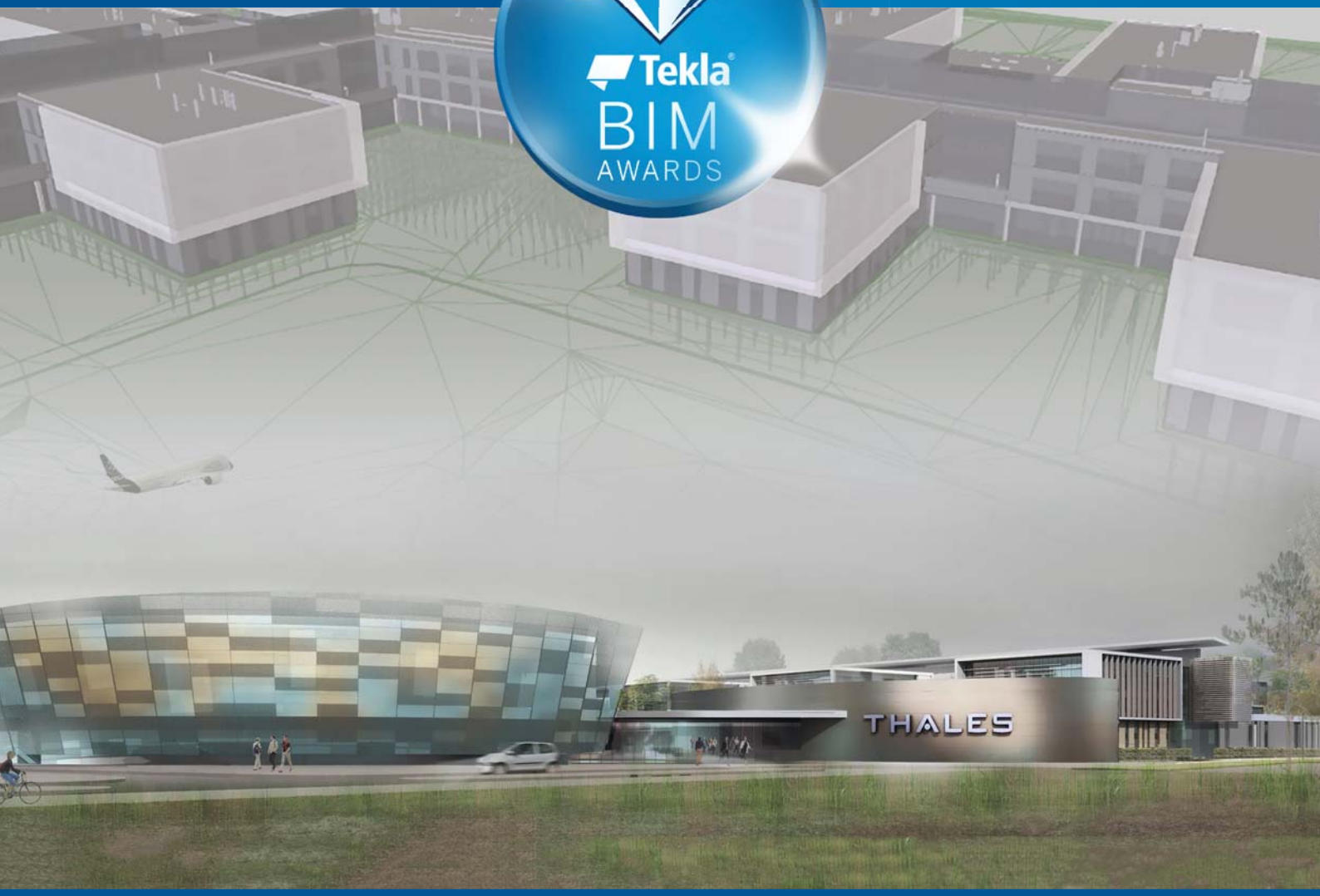
BIM eased the complexities

The complex geometry of the structure and the precise BIM coordination requirements make this project as one of the more challenging ones for Eversendai. Considering the complex geometry and precise interface requirements with various trades, BIM played a vital role in the successful completion of the project. Tekla software was used also to identify clashes with other trades like roofing contractor, façade contractor and MEP contractor, and these clashes were resolved already in the design stage.



THE BEST OF BIM

Tekla BIM AWARDS



Trimble