

THE *Art* OF STRUCTURAL DESIGN

10th
EDITION



User Contest 2017

Showcasing remarkable
customer projects

Foreword

Dear Reader,

I am happy to present to you the impressive and inspiring work of our customers in the 10th edition of the SCIA User Contest, aptly named "The Art of Structural Design".

We launched the first SCIA User Contest in 1992, when the software was still running on DOS, with dozens of participating projects located in several European countries. Since 2005, we have held the User Contest every other year and the number of participating projects has grown to over 100 from around the world. Many engineering firms have been participating since the beginning of the User Contest.

The 2017 edition illustrates 124 outstanding international structural and civil engineering projects and their designers. Utilising SCIA Engineer as the structural analysis and design software, all of these projects not only showcased originality and precision but many also focused on sustainability and the application of BIM.

Our international jury of renowned experts from the industry and academia was very impressed with the great achievements of all participants and their contribution to the global engineering community reflecting the very art of structural design. Winners were selected in the four main contest categories introduced to you on the first pages of this book. In addition, the jury awarded the best "BIM" project with the "Prize of the Jury" award.

As in the last edition of the User Contest, we asked the public to select their favourite projects. The winner with the most votes received the "Prize of the Public" award.

In all we do, our aim is to delight our customers by helping them create the best structural designs. I am very proud of every one of the projects in this book and the work our customers have been able to achieve with SCIA Engineer. Our dedication to R&D and innovation, combined with inspiration and input from our customers, will continue to power SCIA Engineer to help structural engineers do their best work.

On behalf of the whole SCIA team, I would like to sincerely congratulate the winners and thank all participants for having shared their projects and know-how with us.

I hope you enjoy seeing and learning about all the projects as much as we do!

Hilde Sevens
Chief Executive Officer

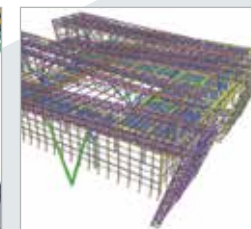


Table of Contents

Foreword	1
Table of Contents	2
Winners	6
The International Jury	7
SCIA Engineer	8

Category 1: Buildings

WINNER Mouton cvba	9
WINNER Pell Frischmann	10
NOMINEE BAM Advies & Engineering	12
NOMINEE Van Rossum Raadgevende Ingenieurs	14
NOMINEE Van Rossum Raadgevende Ingenieurs	16
Abicon nv	18
Abicon nv	20
Alberti Ingénieurs SA	21
B2K design s.r.o.	22
Baues + Wicht beratende Ingenieure	23
Birou de Arhitectura Pintilie srl	24
Brand & Gleinser GmbH	25
CampbellReith.	26
CAMSECT.	27
con-tura	28
edibo nv	29
Establis	30
Establis	31
Establis	32
Forsgren Associates Inc.	33
Heijmans & Partners Ingenieurs	34
Heijmans & Partners Ingenieurs	35
Ingenieurbüro Nowak	36
Ingenieurbüro Nowak	37
INGPHI SA	38
MB 'Pramonés Inžinerija'	39
MP Ingénieurs Conseils SA	40
OVALE & Partenaires Sàrl	41
P-H-A Ateliér	42
Porr Design & Engineering GmbH	43
Porr Design & Engineering GmbH	44
PRODIS plus, s.r.o.	45
PRODIS plus, s.r.o.	46
ProSteel Consulting	47
RVW Consulting Ltd	48
Port House - Antwerp, Belgium	49
Centre Point - London, United Kingdom	
Groninger Forum - Groningen, Netherlands	
Pontsteiger - Amsterdam, Netherlands	
RAI Hotel - Amsterdam, Netherlands	
Eribo Office Building - Waregem, Belgium	
VLAS Police Station - Kortrijk, Belgium	
Collège Alpin International Beau Soleil - Villars-sur-Ollon, Switzerland	
Garden Towers Residential Complex - Prague, Czech Republic	
Broicher Karreé Residential Building - Korschenbroich, Germany	
Primary and Secondary School - Branistea, Dambovita County, Romania	
Car Park Extension - Southern Germany	
UCLH Proton Beam Therapy Centre - London, United Kingdom	
Scarlet Building - Sihanoukville, Cambodia	
Pulseberlin Office Building - Berlin, Germany	
Relex - Aartselaar, Belgium	
Cruise Terminal - Zeebrugge, Belgium	
Ekla Mixed-Use Building - Brussels, Belgium	
Nieuw Zuid Blok 6 - Antwerp, Belgium	
Office and Warehouse - Logan, Utah, United States	
Residential Buildings - Waalwijk, Netherlands	
Villa H - Hilvarenbeek, Netherlands	
Car Dealership - Bergkamen, Germany	
Residential and Office Building - Lüdinghausen, Germany	
CEVA Railway Stations - Geneva, Switzerland	
Administrative Building - Vilnius, Lithuania	
Public school - Verney, Puidoux, Switzerland	
Libre17 Building - Remaufens, Switzerland	
Zenklova Residential Building - Prague, Czech Republic	
HARIBO International Head Office - Graftschaff, Germany	
MySky Residential and Student Building - Vienna, Austria	
Einsteinova Offices - Bratislava, Slovakia	
Panorama City III - Bratislava, Slovakia	
Residential Building - Viçosa, Brazil	
Bayscape - Cardiff, United Kingdom	



Table of Contents

Ryklin Statik	Residential House Renovation - Mannheim-Seckenheim, Germany	50
Ryklin Statik	Trade Center Garage - Bruchsal, Germany	51
Schroeder & Associés	National Fire and Rescue Centre - Gasperich, Luxembourg	52
SD Ingénierie Lausanne SA	OASSIS PEC 2 Building - Crissier, Switzerland	53
Structa LLP	Hampden Road Block A - London, United Kingdom	54
Technocon bvba	Barco One Campus - Kortrijk, Belgium	55
VISIA s. r. o.	Ahoj Park Residential Complex - Bratislava, Slovakia	56

Category 2: Civil Structures

WINNER Ingenieursbureau Stendess N.V.	Bridge over Rhine River - Strasbourg, France / Kehl, Germany	60
NOMINEE Emch+Berger SA Lausanne	Martinet Footbridge - Lausanne, Switzerland	62
NOMINEE Iv-Infra	Zandhazen Bridge - Muiderberg, Netherlands	64
NOMINEE Novak & Partner, Ltd.	Bridge over Chomutovka River Valley - Velemysleves, Czech Republic	66
Adams Civiel Advies	Gust Romijn Bridge - Rotterdam, Netherlands	68
Arcadis	Burgemeester Gabriel Theunis Bridge - Antwerp, Belgium	69
Eurometaétudes	Metro Viaduct Pier Reconstruction - Paris, France	70
Ingenieursbureau Stendess N.V.	Jaagpad Bridge - Avelgem, Belgium	71
Ingenieursbureau Stendess N.V.	Koningin Maxima Bridge - Alphen aan de Rijn, Netherlands	72
Ingenieursgroep Romkes BV	Passerelle Dieren - Dieren, Netherlands	73
Movares Nederland	Arch Bridges - Rotterdam, Netherlands	74
Movares Nederland	ProLife Bridge over River Waal - Netherlands	75
Royal HaskoningDHV	Lammermarkt Underground Parking - Leiden, Netherlands	76
SD Ingénierie Lausanne SA	Lateral West Way Bridge - Lancy / Genève, Switzerland	77
SD Ingénierie Lausanne SA	Saint-Triphon Bridge - Saint-Triphon, Switzerland	78
Tauw	IJsselbrug Composite Bridge Elements - Doesburg, Netherlands	79



Table of Contents

Category 3: Industrial Buildings and Plants	81
WINNER I.d.d. Engineering	Shoaiba II Power Plant - Shoaiba, Saudi Arabia 82
NOMINEE Casale Project a.s.	Ammonium Nitrate Production - Novomoskovsk, Russia 84
NOMINEE Officine Ghidoni SA	Membrane Gasometer Supporting Structure - Biasca, Switzerland 86
NOMINEE VODOTIKA, a.s.	Hydraulic Structure - Želiezovce, Slovakia 88
Abicon nv	Siam Factory - Bangplakot, Thailand 90
Allcons Industry s.r.o.	Power Regeneration Facility - Grati, Indonesia 91
B.G.S. sprl.	Lambiotte & Cie - Marbehan, Belgium 92
Brand & Gleinser GmbH	Cement Mill Modification - Aalborg, Denmark 93
Bureau d'Etudes Lemaire sa	Mithra Pharmaceuticals Production Plant - Flemalle, Belgium 94
Calcinotto	Selective Catalytic Reduction System - Barrow-in-Furness, United Kingdom 95
Casale Project a.s.	Granulated Urea Production - Tchernepovets, Russia 96
Casale Project a.s.	Syra 4 Plant - Köping, Sweden 97
edibo nv	Paesmans - Bree, Belgium 98
Ergo Design	Rapid Freezing Chambers - Thessaloniki, Greece 99
Frazier Industrial Company	Grocery Facility - Henderson, Nevada, United States 100
I.d.d. Engineering	Testing Hall - Zwijnaarde, Belgium 101
Ing. Jaromír Bartoněk	Conveyor Bridge - Molln, Austria 102
Movares Nederland	Tank Recalculation - Rotterdam, Netherlands 103
MULTI N.V.	Blast Furnace Gas Pipe System - Ghent, Belgium 104
Navláčil stavební firma, s.r.o.	Industrial Hall - Valašská Polanka, Czech Republic 105
ProSteel Consulting	Biological Control Laboratory - Sete Lagoas, Brazil 106
Snetselaar Constructieve Ingenieurs	Tile Factory - Urmitz, Germany 107
Snoeck Gebrs NV	Food Processing Factory Expansion - Aalst, Belgium 108
Snoeck Gebrs NV	Concrete Batching Facility - Moeskroen, Belgium 109
Stadsbader	Santens Metaalwaren Building - Merelbeke, Belgium 110
Statika OK	Bicameral Silo - Niemegk, Germany 111
Statika OK	Cement Plant Control Bin - Eskisehir, Turkey 112
Statika OK	Discharge Hopper - Dunkerque, France 113
T.E. Consulting Engineer	Retrofitting of Industrial Plant - Chania Crete, Greece 114
Tides	Storage System - Spain 115
Vicoma Engineering	Support Structure for Cold-Air Ducting - Pengerang, Malaysia 116



Category 4: Special Projects 119

WINNER Estra Engenharia Ltda.	Rafael Núñez Airport Expansion - Cartagena De Indias, Colombia	120
WINNER HESCON s.r.o.	Football Stadium - Dunajská Streda, Slovakia	122
NOMINEE AECOM	Serpentine Summer Houses 2016 - London, United Kingdom	124
NOMINEE Comi Service	Notre Dame Renovation Scaffold - Cholet, France	126
NOMINEE Ney & Partners	Osterrieth House Glass Roof - Antwerp, Belgium	128
AECOM	National Football Stadium at Windsor Park - Belfast, Northern Ireland	130
B2K design s.r.o.	Eagle Aviary - Brno, Czech Republic	131
Baudin Chateaufneuf	Mayol Stadium Redevelopment - Toulon, France	132
BET Duberseuil & Cie	Elysée Montmartre Reconstruction - Paris, France	133
Bilfinger Industrial Services	Innovative Scaffolding Solution - Sluis, Netherlands	134
Euromodules	Temporary RBS Module Structure - Faulquemont, France	135
Flexible Engineering	Portal Platform - Grängesberg, Sweden	136
Hexa Structures	Structures for Salone del Mobile 2016 - Milan, Italy and Pukkelpop - Hasselt, Belgium	137
I.d.d. Engineering	Lifting Frame - Vietnam	138
Ingenieurbüro für Stahlbau Dipl.-Ing. Jürgen Mark	Waste Water Tower - Esslingen, Germany	139
Jaroslav Pražan	Plastic Technological Boat - Czech Republic	140
Jaroslav Pražan	Polyethylene Plastic Tank with Steel Cage - St. Petersburg, Russia	141
KPFF Consulting Engineers - NYC	Jane Sanders Softball Complex - Eugene, Oregon, United States	142
KPFF Consulting Engineers - NYC	US Embassy Compound - Maputo, Mozambique	143
KPFF Consulting Engineers - NYC	Pacific Northwest College of Arts - Portland, Oregon, United States	144
Li Chong Lee	Taxi Stop - Brasília, Brasil	145
Locapal SAS	Temporary Crane Base - Paris, France	146
OSI Gabon	Gas Storage Extension - Libreville, Gabon	147
P-H-A Ateliér	Snowman - Novosibirsk, Russia	148
P-H-A Ateliér	Stadium Steel Roof - Kladno, Czech Republic	149
Ryklin Statik	Scaffold Tribune Reinforcement - Sandhausen, Germany	150
Schroeder & Associés	MUSE Apartment and Office Building - Metz, France	151
Skála & Vít, s.r.o.	Steel Structure as Base for Art - Hradec Králové, Czech Republic	152
Snetselaar Constructieve Ingenieurs	Mediahuis Staircase - Antwerp, Belgium	153
Snoeck Gebrs NV	Hoisting and Displacement of 63-ton Machine - Kortrijk, Belgium	154
SPIE Controlec Engineering	Electrical Power Tower - Netherlands	155
T.E. Consulting Engineer	Football Stadium Grandstand Canopy - Athens, Greece	156
Tides	Duelling Alpine Coaster - Ieper, Belgium	157
vanderWeide - van Bragt	Province House - Antwerp, Belgium	158
VK Architects & Engineers	GH Delta Learning and Innovation Centre - Roeselare, Belgium	159



Winners

Category 1: Buildings

Design of buildings, residences, apartments, roof spans for houses, also high-rise buildings.

Mouton cvba

Port House - Antwerp, Belgium 10



Category 4: Special Projects

Specialty structures - sustainable, ecological and green structures – scaffolding – art work – mechanical equipment... Larger projects - storage tanks, conveyer belts, cold storage installations, supporting structures, playground equipment, cranes, tubular connections... As well as stadiums and spectacular roofs.

Estra Engenharia Ltda.

Rafael Núñez Airport Expansion - Cartagena De Indias, Colombia ... 120



Category 2: Civil Structures

Any type of structure that fits within civil engineering. This includes any bridge type (beam, arch, cable-stayed, suspension bridge...), tunnels, bulkheads, locks, dams.

Ingenieursbureau Stendess N.V.

Bridge over Rhine River - Strasbourg, France / Kehl, Germany 60



Special Prize of the Jury

From each of the four categories one project was selected and put forward to win the "Special Prize of the Jury". The jury deliberated on these four projects and chose this fifth winner. Special attention was paid to projects having adopted a BIM workflow or illustrated best practices in sustainability, environmental conditions and advanced ecological and green structures.

HESCON s.r.o

Football Stadium - Dunajská Streda, Slovakia 122



Category 3: Industrial Buildings and Plants

Design of general steel or concrete structures, power plants, frame structures, large span halls and hangars, pre-engineered buildings.

I.d.d. Engineering

Shoaiba II Power Plant - Shoaiba, Saudi Arabia 82



Prize of the Public

This winner was selected by a voting system via SCIA's Facebook channel independently of the jury gathering. Any Facebook member could vote on any uploaded project.

Pell Frischmann

Centre Point - London, United Kingdom 12



The International Jury

How were the projects judged?

An international jury, from both the academic and professional community, gathered in May 2017 for the evaluation of all submitted projects.

The jury took the following characteristics into account:

- The technical level of the design, detailing and/or the calculations (doubled points)
- The originality and prestige of the project
- The attractiveness and completeness of the presentation and the uploaded documentation
- The optimal use of the software functionalities and the illustration of a BIM process
- The overall impression of the project

In each of the 4 categories, one winner and three nominees were selected. From all the participating projects, the jury also chose the "Special Prize of the Jury".



Doc. Ing. Hana Gattermayerová, CSc.



Czech Technical University in Prague

- Department: Building Structures
- Function: University Professor, Structural Engineer
- Specialty: Building structures

Prof. Alain Nussbaumer



EPFL/ENAC

- Department: Resilient Steel Structures Lab., Civil Engineering
- Function: Professor
- Specialty: Bridges and fatigue-resistant design, industrial buildings

Dipl.-Ing. (univ) IWE Juergen Hilfinger



LGA Bayern KdÖR

- Department: Department of Structural Safety
- Function: Field Executive
- Specialty: Structural engineering

Ing. PhD. Seddik Sakji



Scientific and Technical Center of Building (CSTB)

- Department: Safety of Structures and Fire
- Function: Engineer R&D, Project Leader
- Specialty: Structural and civil engineering, fire resistance engineering

Prof. Ir. Cornelis S. Kleinman



Kleinman Holding/HTI

- Department: Structural design
- Function: Prof. Em. TUE & Board Member of Hoger Technisch Instituut Amsterdam
- Specialty: Structural design

Ir. Dorien Staal



Voorbij Prefab

- Department: General management
- Function: Director
- Specialty: Housing, BIM, precast

Prof. René Maquoi



University of Liège

- Department: Civil Engineering
- Function: Retired (Professor Emeritus)
- Specialty: Structural stability, steel and composite construction

Dr. Ass. Prof. Konstantinos Daniel Tsavdaridis



University of Leeds

- Department: Institute for Resilient Infrastructure, School of Civil Engineering
- Function: Assoc. Prof. of Structural Engineering
- Specialty: Steel and SCC structures, perforated beams, optimisation techniques, high-rise buildings, seismic-resistant design

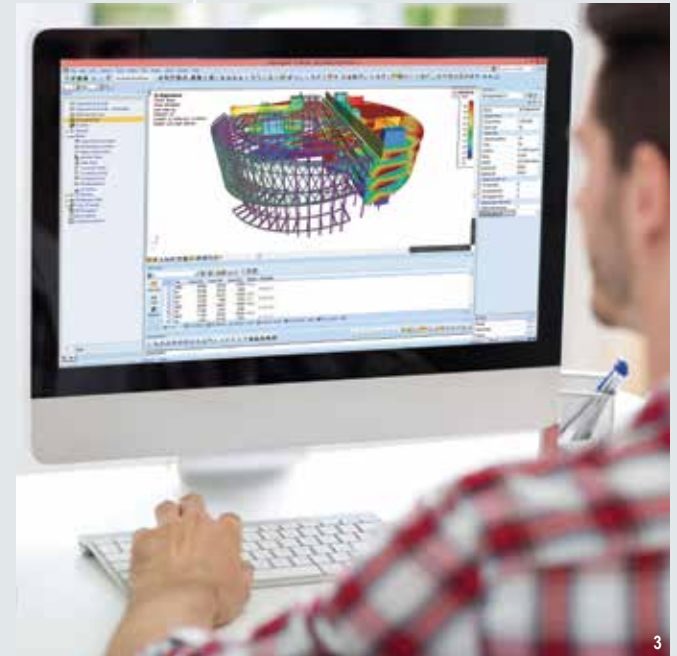
SCIA Engineer

SCIA Engineer is an integrated, multi-material analysis and design software for all kinds of structures, from the simple to the complex, that perfectly plugs into BIM workflows. Design office buildings, industrial plants, bridges or any other project, all within the same intuitive and easy-to-use environment.

It is an efficient and accurate software for structural engineers that includes a powerful modeling environment, a high-performance mesh generator, a very fast finite element solver and integrated tools to check or optimize the structure in compliance with a variety of international and national building codes.

- All-in-one, flexible, advanced analysis
- Cutting-edge technologies and tools for boosting your productivity
- Easy handling of project changes
- Enabling trusted and safe design according to international codes
- Customizable and up-to-date reports and documentation
- Fitting into any BIM workflow (Open BIM and proprietary links)
- Expert local help every step of the way

SCIA Engineer is powered by our dedication to R&D and innovation, combined with input and inspiration from our customers.

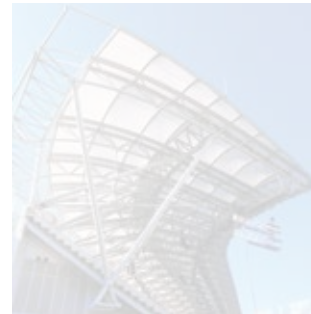


FAST ACCURATE POWERFUL

1. Arch & Teco Group
2. & 3. Establis nv & Technocon bvba,
© Jaspers-Eyers Architects –
photography by Philippe Van
Gelooven
4. Royal HaskoningDHV
5. Maxfalcon
6. Ingenieursbureau Stendess N.V.

Buildings

1



Category 1

Design of buildings, residences, apartments, roof spans for houses, also high-rise buildings... modelled, analysed and designed in SCIA Engineer.

WINNER

Category 1: Buildings



"This genius architectural design, located in the harbor of Antwerp, is a very unique structure. Transferring this great idea into a structural design that fits the architectural needs is a real engineering challenge. SCIA Engineer greatly supported the design of this structure under the challenging circumstances, making it possible to combine a restored fire station with a new impressive structure hanging over it."

Quote of the Jury

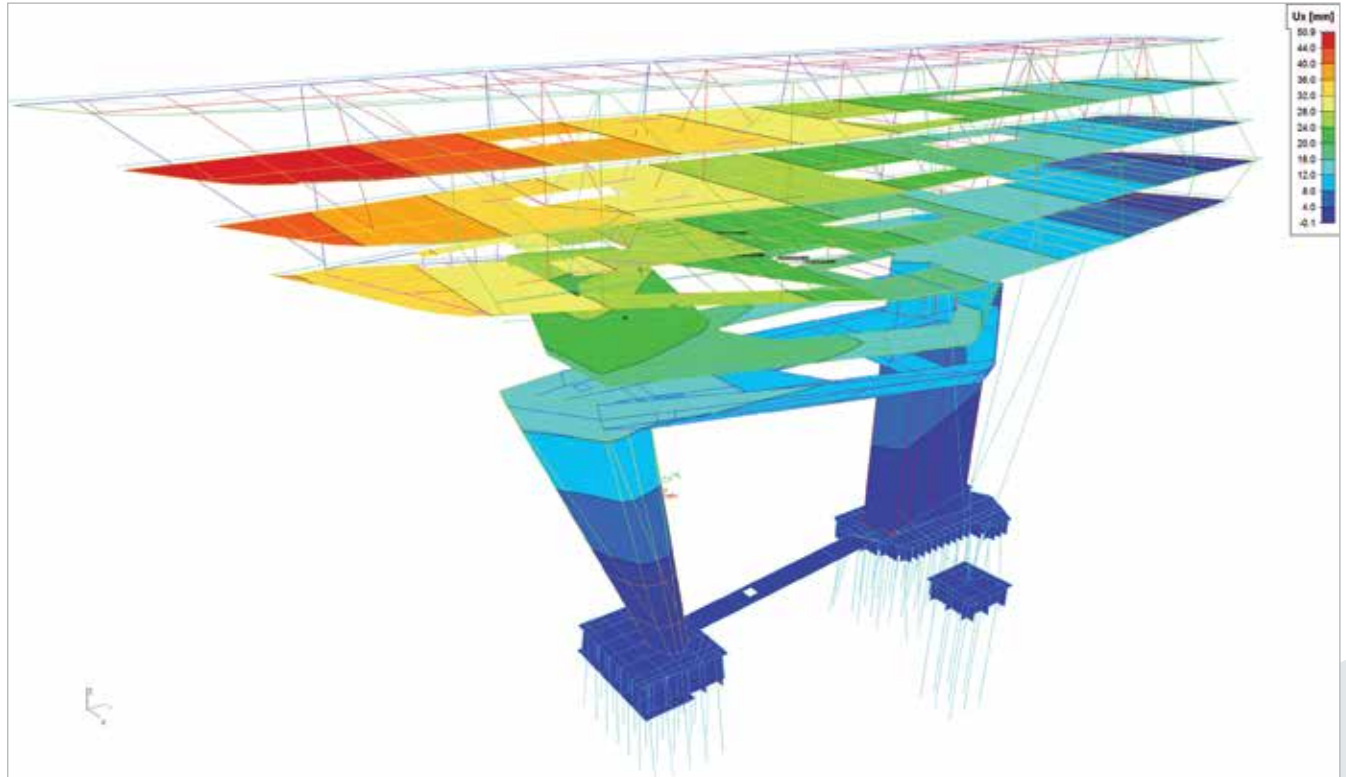


Port House - Antwerp, Belgium

Owner Antwerp Port Authority
 Architect Zaha Hadid Architects in collaboration with Bureau
 Bouwtechniek and Origin architecture and engineer-
 ing
 General Contractor Interbuild
 Engineering Office Studieburo Mouton
 Construction Period 09/2012 - 09/2016

The new Port House consists of two buildings: a restored former fire station and new construction that has a truly remarkable sculptural form. This elongated volume is approximately 100 m long, 24 m wide and four stories high. It consists of three three-story-high steel trusses: a middle one and two angled facade trusses. The supporting structure of this volume consists of two parts: a sculptural construction in concrete in the form of a trapezium-shaped ring that encloses the south wing of the existing building in a vertical direction, and a four-legged steel structure bent rather like an opened paper clip. The most prominent part of the concrete ring is the inclined concrete front-leg located in front of the building. The bridge links the front-leg with the concrete core in the atrium splits around the masonry tower of the existing building.

SCIA Engineer was used to calculate a global model of the new building (steel structure and sculptural concrete forms), including steel checks and reinforcement calculation. For the steel columns in the atrium (with an arbitrary quadrilateral cross section), a nonlinear calculation was performed considering bow imperfections. The eigenfrequencies of the new building were computed and seismic analysis of the structure was performed.

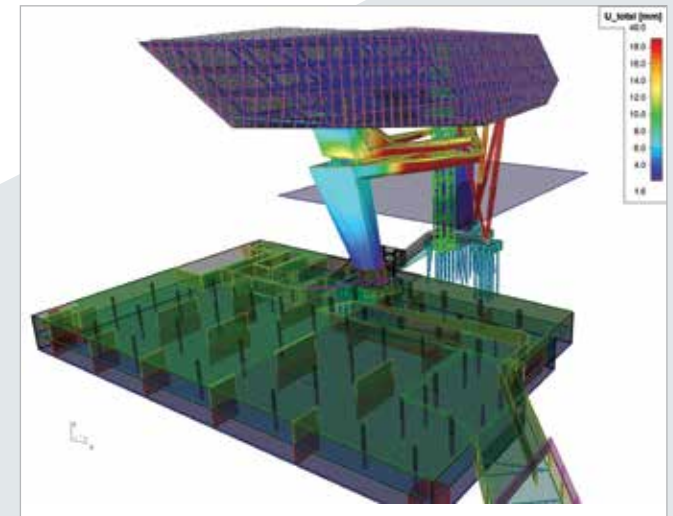
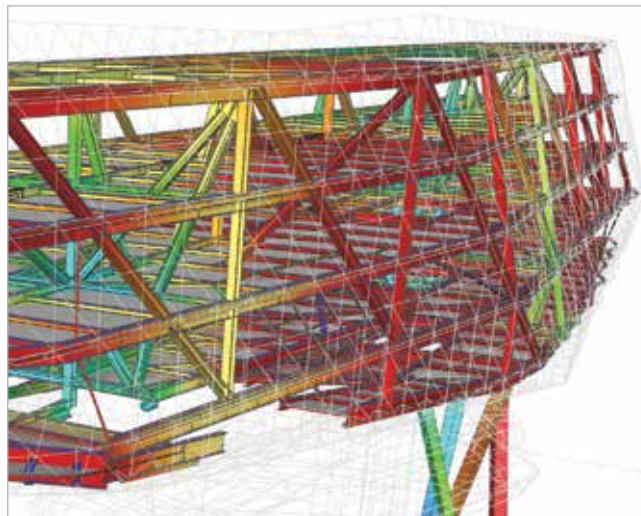


Mouton cvba

Contact Anne Botte
 Address Voskenslaan, 171
 9000 Gent, Belgium
 Website www.mouton.eu

MOUTON

Mouton is active in designing structures, with a strong emphasis on architectural projects. Its philosophy is that structure, like architecture, has to be designed. Moreover, it is often the case that the structure is inseparable from the architecture and structure plays a prominent role in the perception of the design. Mouton's ambition is to develop a strong structural concept and to help shaping the architectural design. This happens preferably in a team with the architect and other construction partners, and from an early design phase.



WINNER

Prize of the Public



Centre Point - London, United Kingdom

Owner *Almacantar*
Architect *Rick Mather/ Conran*
General Contractor *Multiplex*
Engineering Office *Pell Frischmann*
Construction Period *10/2014 - 07/2017*

Centre Point is an icon in the heart of London. Built in the 1960s, it was one of the first skyscrapers in London and is now Grade II listed reflecting its technological and historic importance. The building is currently undergoing a large-scale transformation, engineered by Pell Frischmann, converting the former office into 21,000 sqm of luxury residential units and 7,500 sqm of prime retail space which surrounds a new square to a major new station entrance to the Elizabeth Tube Line which opens in 2018. The project consists of the refurbishment of three existing buildings including the main tower and the construction of a new 8 storey residential building.

Some of the interesting challenges were a new piled raft design to limit ground pressure on the new Elisabeth tube tunnel. Removal of two entire floors of the annex building to enable double height retail spaces around the new square while the apartments above the works were inhabited. Façade retention at level 33 and 34 of the tower to replace the existing plant area floors with new shallow PT floors increasing headroom to the new apartments. We believe that in doing so we achieved the worlds' highest façade retention. Major alterations to the stability system of the buildings and temporary sequencing was assessed using construction stages analysis.

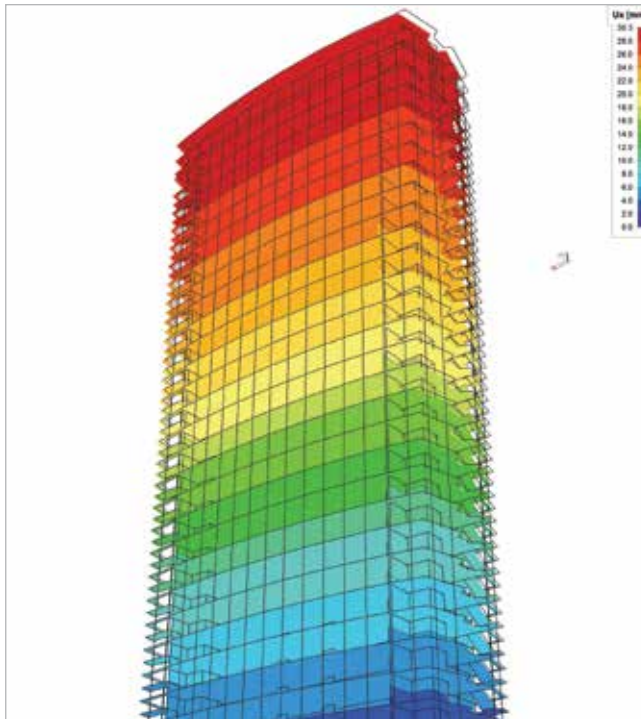
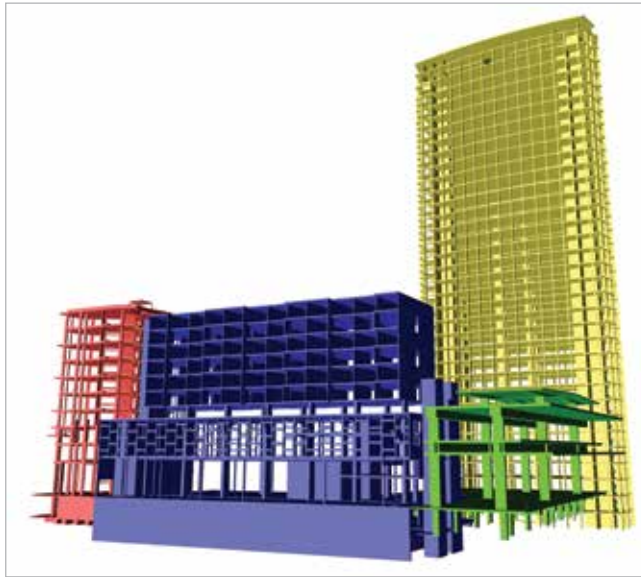
Pell Frischmann

Contact *Juliano Chapon*
Address *5 Manchester Square*
W1U3PD London, United Kingdom
Website *www.pellfrischmann.com*

Pell
Frischmann

Pell Frischmann are a multi-disciplinary engineering consultancy practice, who set out to challenge the conventional role of the engineer in the traditional design and construction process enabling our clients to achieve their ambitions.

In recent years, the firm's consultative approach to resolving highly technical projects has been widely recognised and celebrated in the industry through project awards such as the Institution of Civil Engineering Excellence Award, the SCIA awards, the Institution of Structural Engineers Awards and nominations for the Stirling Prize which recognizes the UK's best architecture.



NOMINEE

Category 1: Buildings



Groninger Forum - Groningen, Netherlands

Owner Gemeente Groningen
Architect NL Architects
General Contractor BAM Bouw en Techniek
Engineering Office ABT bv Velp & BAM Advies & Engineering Bunnik
Construction Period 10/2012 - 12/2018

The Groninger Forum is a 35,000 m² multipurpose conference building located in the heart of the city of Groningen. Commissioned by the municipality of Groningen, NL Architects designed a spectacular building. The contour of the superstructure is characterised by the various wall surfaces extending obliquely in a forward or backward tilt. Two concrete cores at the ends of the building are the main elements that provide lateral stability. The steel framed spaces, constructed from oblique trusses, are connected to these cores. At the top levels, a steel bridge connects the two cores.

Consulting firm ABT created an SCIA Engineer model for the 2D and 3D analysis of the building in the permanent state, see SCIA User Contest 2013. In close cooperation with ABT, BAM analysed the construction phasing with the construction stages module of SCIA Engineer. As the main contractor, BAM was responsible for the safe construction of the building and keeping within tight construction tolerances. The model helped us to develop a safe construction works method statement, to determine forces in the temporary steelwork and bracing, and to accurately predict deflections and precamber requirements in the different construction stages. In addition, the module has helped us to develop a detailed set-out plan to be used on site to monitor deflections and tolerances as construction progressed.

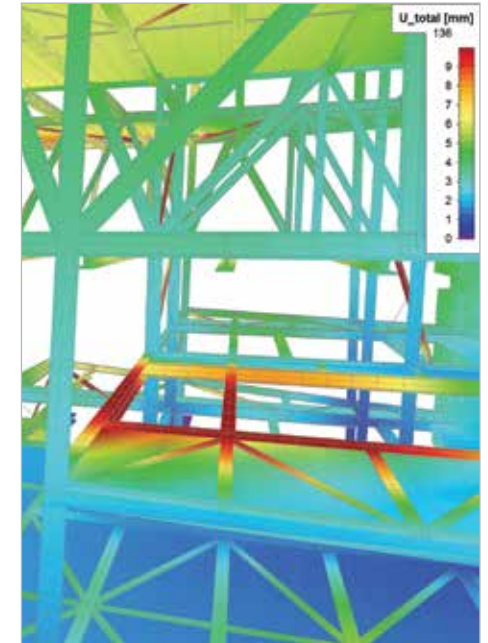
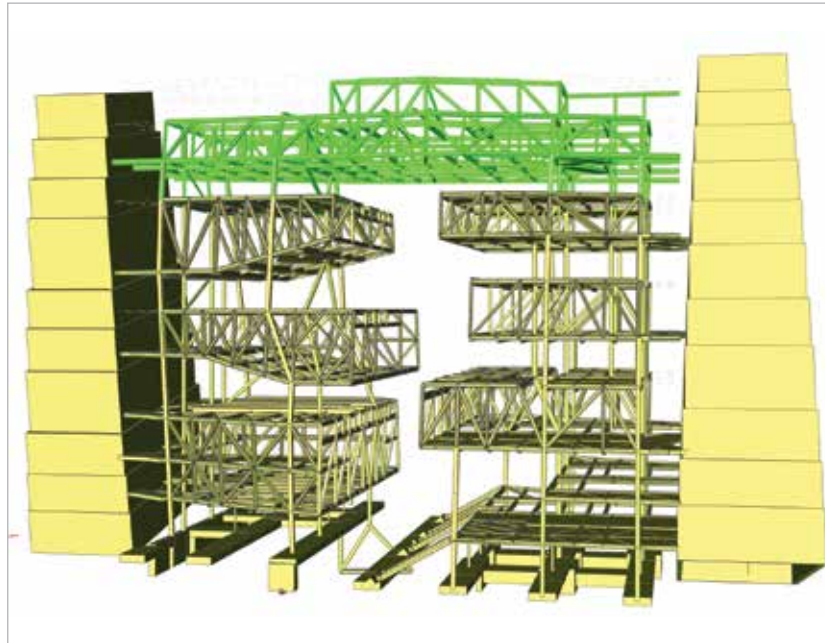
The structure of the building is very complex and has many engineering challenges. This project provides a good example of the use of SCIA Engineer for both the design and construction stages of a complicated structure.

BAM Advies & Engineering

Contact Joris Hesselink
Address Runnenburg 12
3981AZ Bunnik, Netherlands
Website www.bambouwentechniek.nl



BAM Advies & Engineering is a multi-disciplinary consultancy and is the design and engineering department of BAM Bouw en Vastgoed. BAM Advies & Engineering provides consulting, management, design and engineering expertise for the Royal BAM Group. The department includes teams of architects, planners, architectural & structural engineers, construction & temporary work experts, project managers, development managers, M&E consultants, cost experts, sustainability consultants, BIM experts and modellers, and system engineers.



NOMINEE

Category 1: Buildings



Pontsteiger - Amsterdam, Netherlands

Owner Dura Vermeer / De Nijs
Architect Arons & Gelauff Architecten
General Contractor Dura Vermeer / De Nijs
Engineering Office Van Rossum Raadgevende Ingenieurs
Construction Period 2015 - 2018

This complex project, involving the construction of a "bridge" hung between two 90 meter high towers, is being built in the IJ in Amsterdam. After winning the tender, the architect approached Van Rossum for further development of the project.

The building comprises two parts: a low-rise and a high-rise section. The design was created for the high-rise with prefab inner walls and a load-bearing prefab exterior wall. This enables the construction speed of one story per week. The bridge construction between both towers comprises of four steel lattice trusses and a secondary load-bearing structure safeguarding these trusses. The trusses are designed in such a way that each joist can be eliminated without causing the rest of the construction to fail. In order to prevent the lattice trusses being jammed between both towers, a pure hinge system was designed as a support.

During the design phases of the project, SCIA Engineer allowed us to quickly review different alternatives for the structural design. During a short period of a few weeks, different stability systems were taken into account, resulting in an optimal combination of structural inner walls and a structural facade.

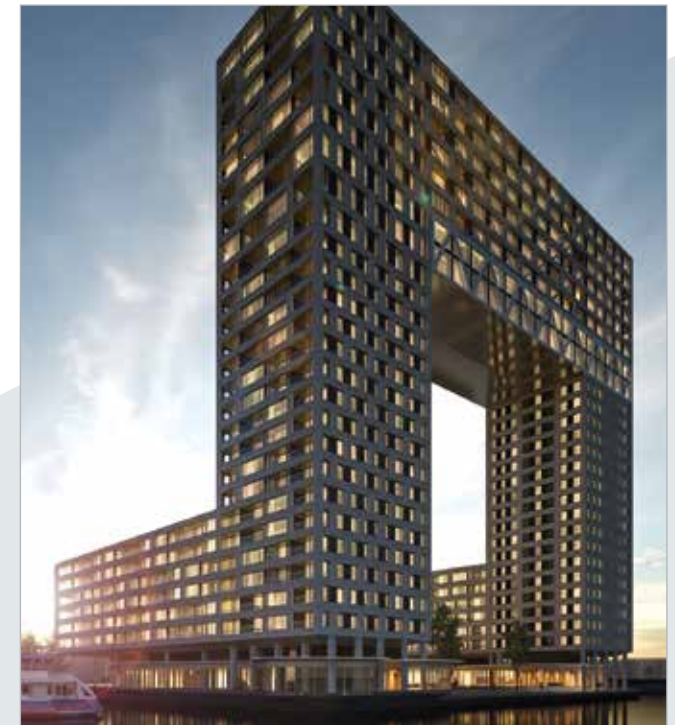
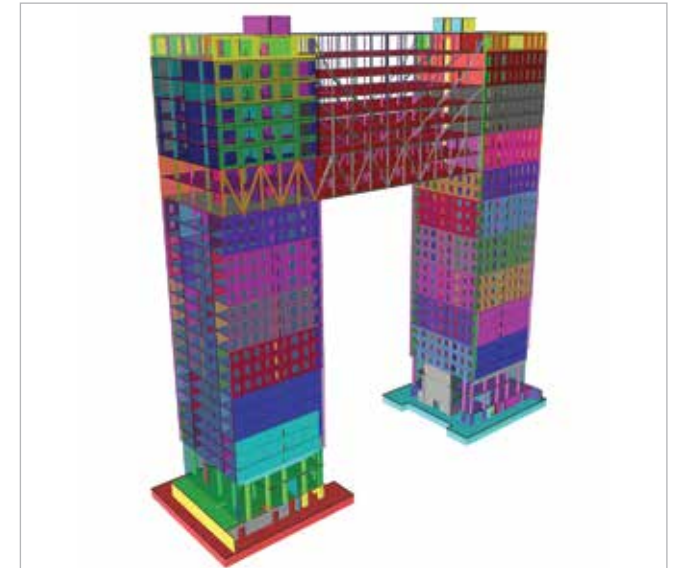
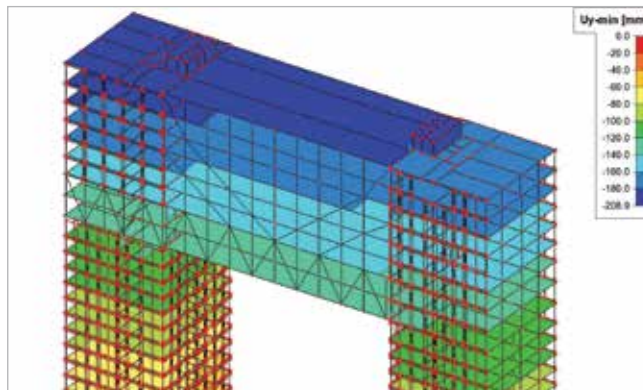
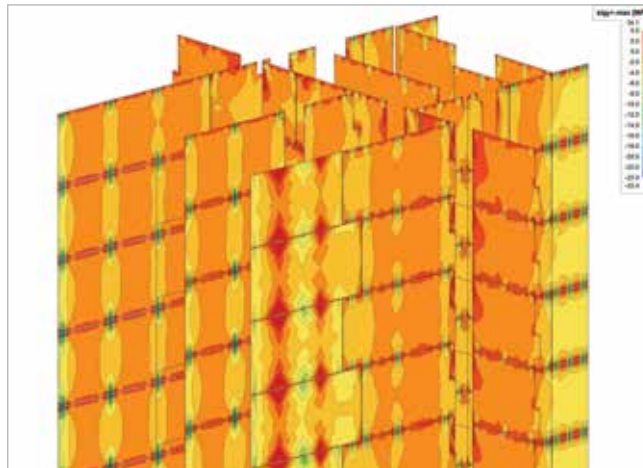
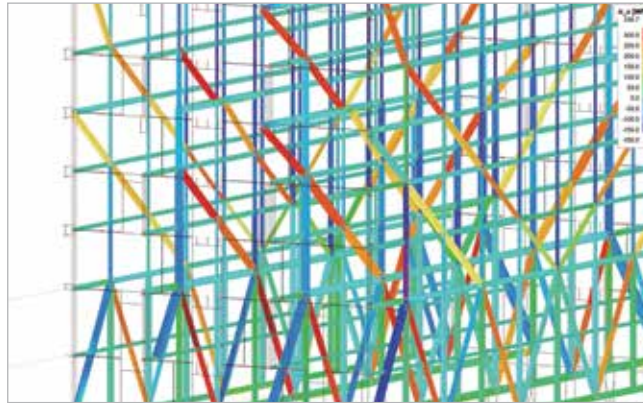
In the final phases, an accurate calculation of internal forces of all structural elements was carried out in SCIA Engineer. This calculation is both used by us as the main structural engineer to design the elements and by the sub-contractors to calculate their individual elements.

Van Rossum Raadgevende Ingenieurs

VAN ROSSUM
RAADGEVENDE
INGENIEURS

Contact Marjan Kluit
Address Pedro de Medinalaan 3a
 1086 XK Amsterdam, Netherlands
 Postbus 37290
 1030 AG Amsterdam, Netherlands
Website www.vanrossumbv.nl

Van Rossum is characterised as a creative solver; a construction adviser who knows that many integral solutions are only possible with the knowledge from the other construction fields. Choices made at the start of the design process have a major influence on construction costs and quality. In the first stage of a project in particular, we can exert defining influence on efficiency within the process. It is therefore important to start the process with a top design team that maintains 100% communication. We act as advisers to our clients and are able to make a clear economic constructive concept. Guaranteeing the feasibility of project.



NOMINEE

Category 1: Buildings



RAI Hotel - Amsterdam, Netherlands

Owner COD
Architect OMA
General Contractor Pleijssierbouw
Engineering Office Van Rossum Raadgevende Ingenieurs
Construction Period 2016 - 2018

In Amsterdam, the biggest hotel of the Benelux is being built next to the RAI Amsterdam, conference hall, with 650 hotel rooms. The building is a tower of 91 metres in height, with triangular volumes cantilevering out from the structural core in the centre of the building.

The main load-bearing structure consists of a concrete core, with walls cantilevering from the core. A secondary steel structure is designed to make the second cantilever for the façade. The farthest point of the floors makes a cantilever of 23 metres to the core.

During the initial design phase, SCIA Engineer gave us the possibility to make quick parametric studies to make comparisons between different structural options and show the feasibility of the structural design with regards to the special architecture of the building.

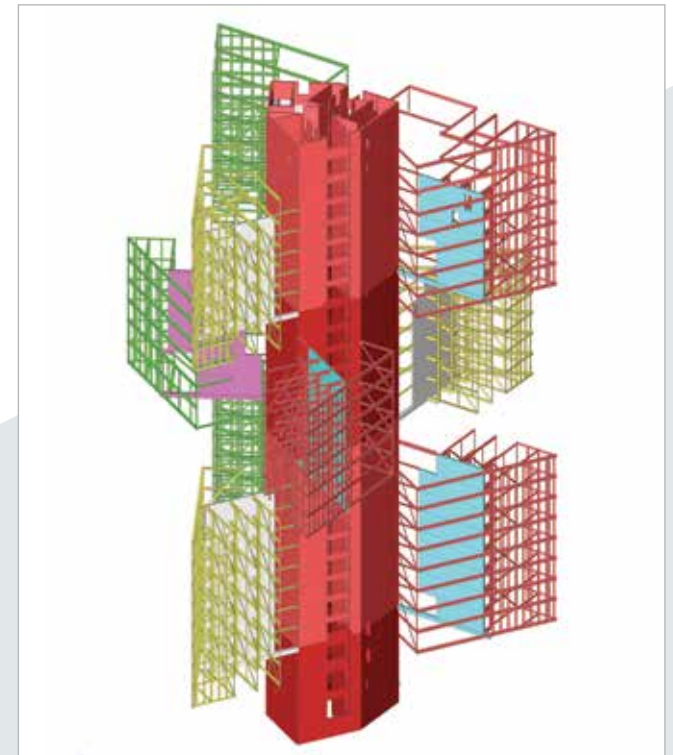
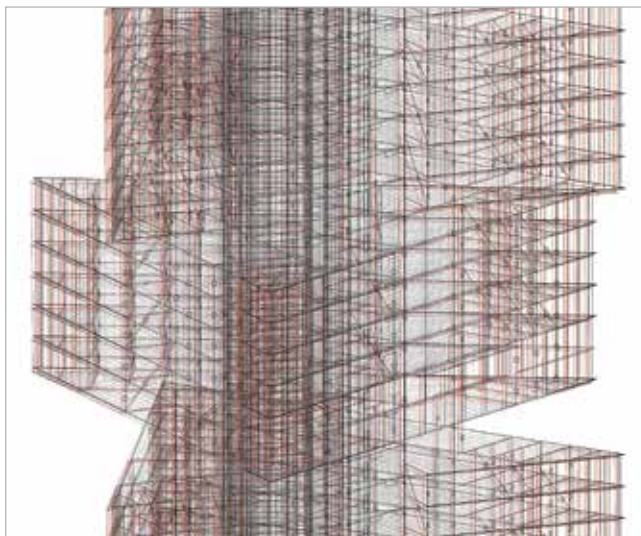
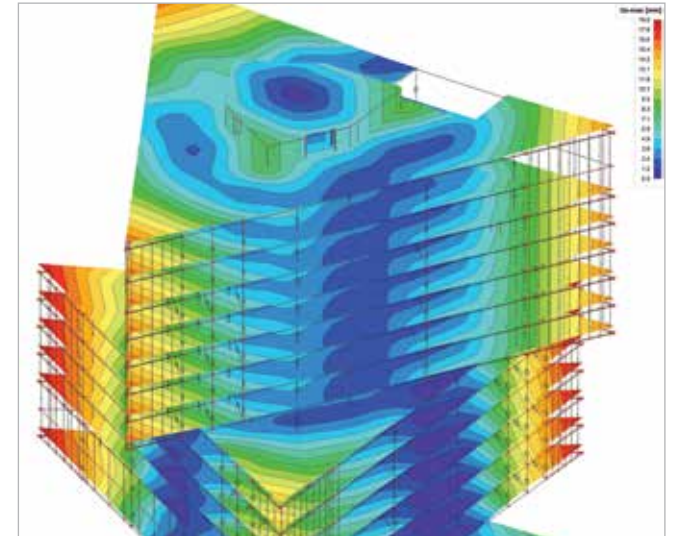
SCIA Engineer was used to perform a stability calculation, including the determination of eigenfrequencies and accelerations. Moreover, internal forces in all the structural elements in the building were calculated with SCIA Engineer. The SCIA Engineer's output of the concrete forces was directly used to determine the reinforcement in the concrete core.

Van Rossum Raadgevende Ingenieurs

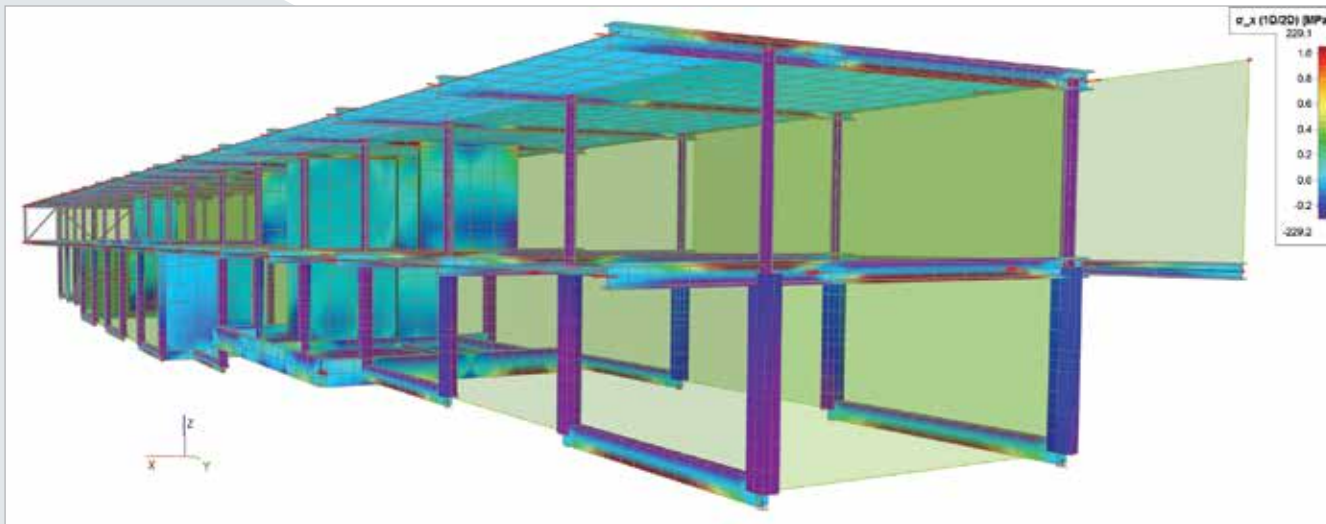
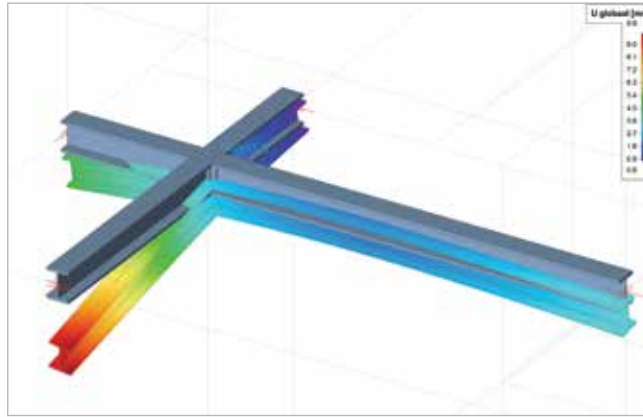
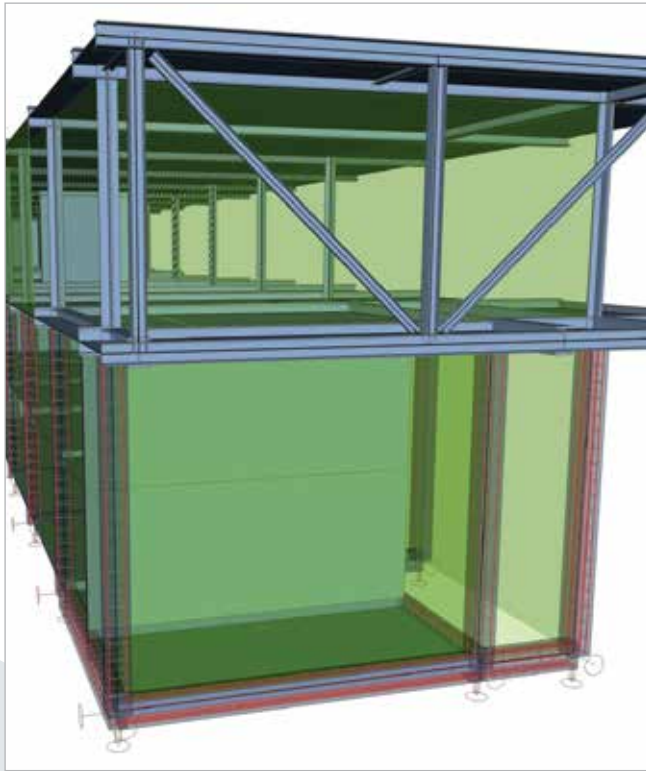
Contact Marjan Kluit
Address Pedro de Medinalaan 3a
1086 XK Amsterdam, Netherlands
Postbus 37290
1030 AG Amsterdam, Netherlands
Website www.vanrossumbv.nl

VAN RAADGEVENDE
ROSSUM INGENIEURS

Van Rossum is characterised as a creative solver; a construction adviser who knows that many integral solutions are only possible with the knowledge from the other construction fields. Choices made at the start of the design process have a major influence on construction costs and quality. In the first stage of a project in particular, we can exert defining influence on efficiency within the process. It is therefore important to start the process with a top design team that maintains 100% communication. We act as advisers to our clients and are able to make a clear economic constructive concept. Guaranteeing the feasibility of project.



Eribo Office Building - Waregem, Belgium



Owner *Eribo*
 Architect *Wim Embo*
 General Contractor *Stadsbader*
 Engineering Office *Abicon nv*
 Construction Period *04/2016 - 07/2017*

The project consists of a new office building with an industrial hall. The two-storey office is 100 m long. The terrain is not flat, so in the lowest part, a third storey is added. The front side of the first floor is entirely in glass. The part under the first floor is a parking space, the rest is a joinery and storage.

First, a 3D model was made in SCIA Engineer with all the columns and beams. Then, load panels were added so we could get all the reactions and internal forces in the beams and columns. Also determined were the deformations of the columns due to wind load and deformations of all the beams. Lastly, the model was used for the calculations of the steel connections.

In this project, due to the glass used in the front side, the deformations must be as small as possible. Additionally, timber was used in the construction because no columns were allowed on the left side.

Abicon nv

Contact *Stijn Breye*
 Address *Marialoopsesteenweg 2H*
8700 Tielt, Belgium
 Website *www.abicon.be*



Abicon nv is an independent engineering company, our core business is constructions with concrete and steel. We work out a project from A to Z. Most projects are new buildings to be used as offices, residential buildings and homes but we do also a lot of industrial buildings.

We also have the know-how to make precast designs for every building or construction, set ready for production.

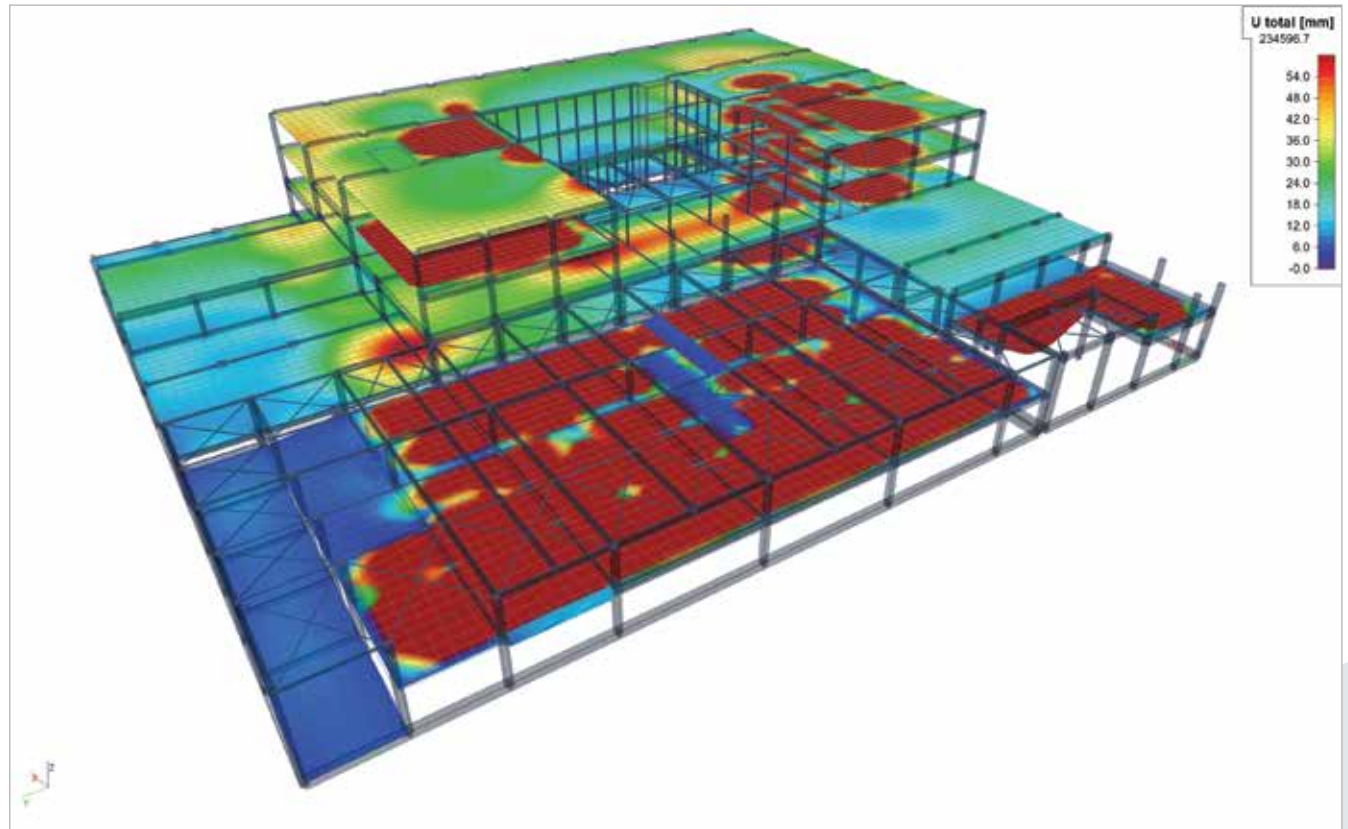
VLAS Police Station - Kortrijk, Belgium

Owner THV Vlas Drie Hofsteden
Architect Goedefroo-Goedefroo + Bureau D'hondt
General Contractor THV Vlas Drie Hofsteden
Engineering Office Bureau D'hondt - Abicon nv
Construction Period 09/2016 - 07/2018

The building concerned is a new police station in the centre of Kortrijk Belgium. It consists of two large sections, an office, and a car park. The office is a three storey building, with the possibility to add a fourth storey. In the middle, there is an open space with a hanging staircase. The car park has two stories.

We made a 3D model in SCIA Engineer including all of the columns and beams. We also used concrete plates for the calculation of the wind stability. Then we added the load panels to get all of the reactions and internal forces of the beams and columns. The deformations of the columns as a reaction to the wind were also obtained.

In this project, the hanging staircase in the open space was a real challenge. Furthermore, the side elements in concrete were also a challenging problem as they are very long.



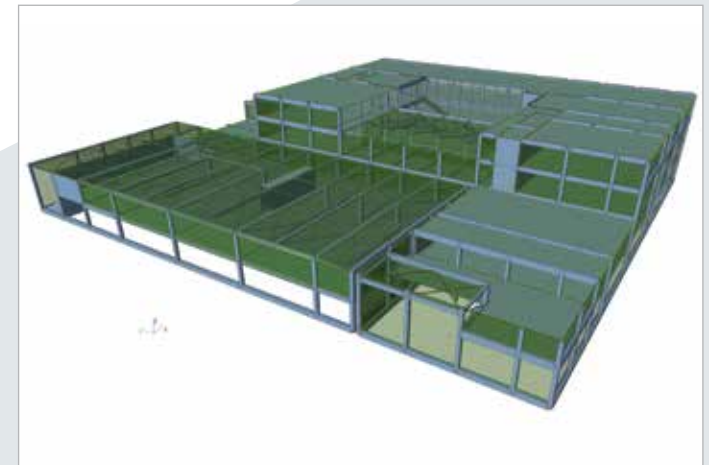
Abicon nv

Contact Stijn Breye
Address Marialoopsesteenweg 2H
8700 Tielt, Belgium
Website www.abicon.be



Abicon nv is an independent engineering company, our core business is constructions with concrete and steel. We work out a project from A to Z. Most projects are new buildings to be used as offices, residential buildings and homes but we do also a lot of industrial buildings.

We also have the know-how to make precast designs for every building or construction, set ready for production.



Collège Alpin International Beau Soleil - Villars-sur-Ollon, Switzerland

Owner *Leosolis*
 Architect *ABA Partenaires SA*
 General Contractor *Losinger Marazzi SA*
 Engineering Office *Alberti Ingénieurs SA*
 Construction Period *2016 - 2017*

The background of the wonderful scenery of the Alps indicates the complexity of the extension and transformation of the "Collège Alpin International".

Surrounded by the existing school and the main road to the city at 1,250 metres above the sea level, the project is difficult to reach and had to be delivered within an exceptionally short time.

The gross floor area of the project is about 9,000 m². The project is composed of two chalets, a gymnasium, eleven classrooms, six laboratories, a boarding school, a cafeteria and meeting rooms.

Backed by the mountain, the challenge was to support the road by an anchored pile retaining wall of 14 m height and 120 m long during the construction stage. In the long term, the new building is designed to totally support the earth's pressure. Post-tensioned concrete beams with large openings as well as post-tensioned concrete slabs have been used to support the two chalets above the gymnasium.

The complexity of the project, the construction stages and the soil-structure interaction are the reasons why the structure has been completely investigated and calculated in SCIA Engineer.

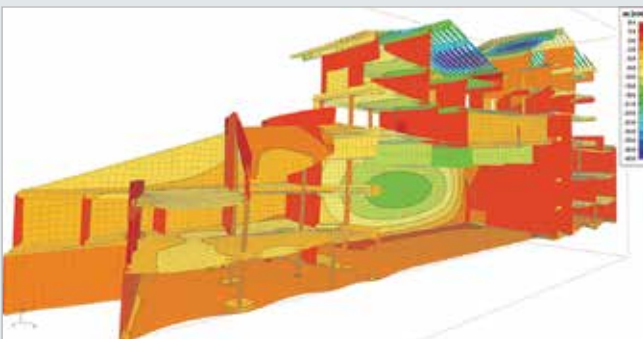
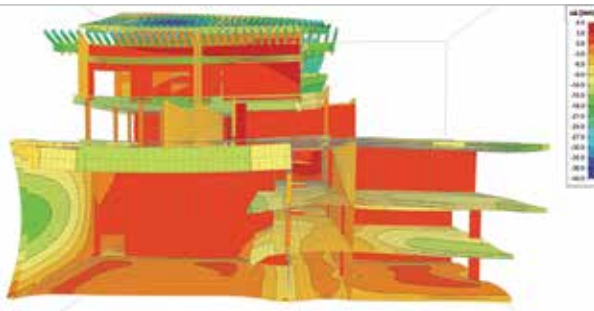
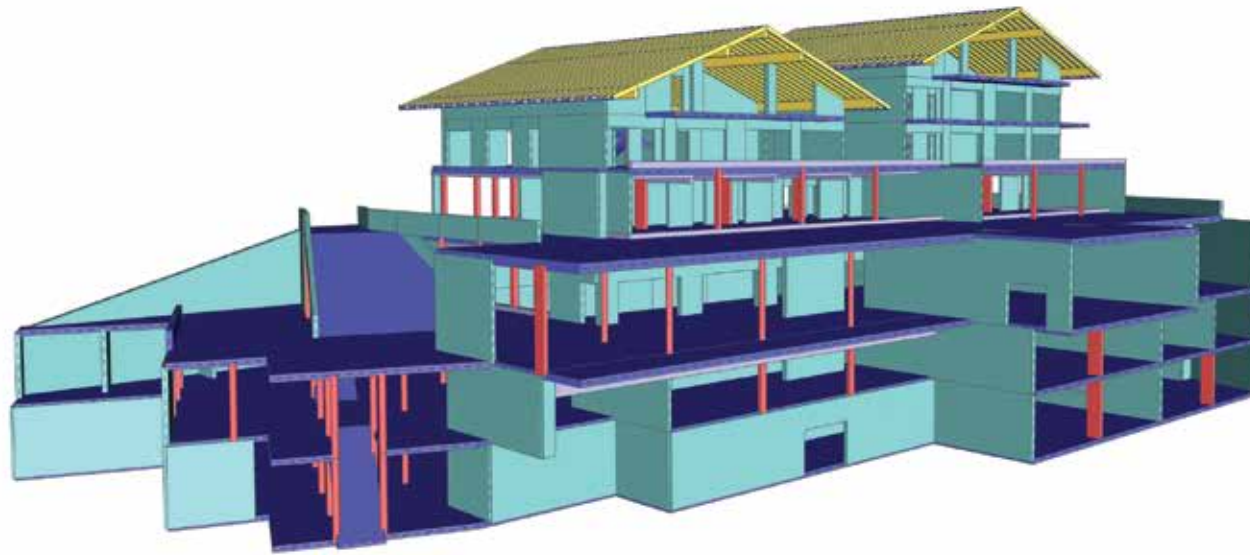
Alberti Ingénieurs SA

Contact *Benjamin Moroni*
 Address *Avenue Eugène-Rambert 1*
1005 Lausanne, Switzerland
 Website *www.alberti-ing.ch*



The engineering office was founded in 1959 by Justin and Jacques Alberti. Patrick Alberti joined the family company in 1987 and currently managed it since 2003. The company has been ISO 9001 certified since 2000.

The Alberti Ingénieurs SA team (composed by engineers, technicians, draftsmen, accountants and secretaries) has shown for decades its ability to realise any type of construction projects from the simple to the most complicated, continuously listening to their clients, searching for efficiency and rationality while respecting sustainability criteria.



Garden Towers Residential Complex - Prague, Czech Republic

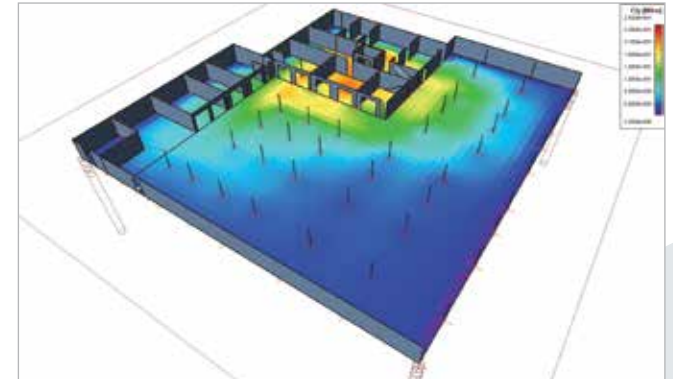
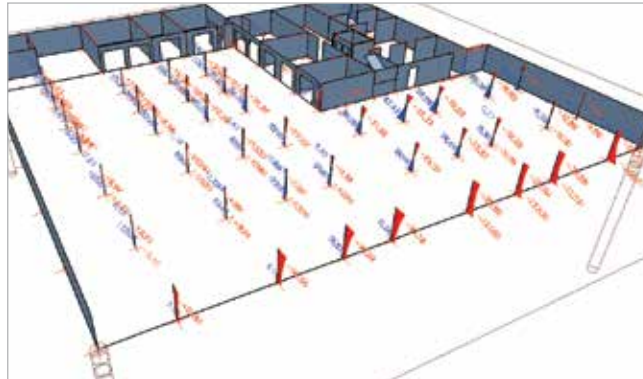
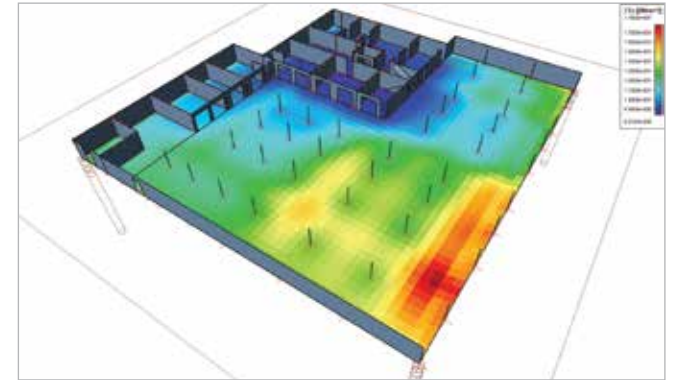
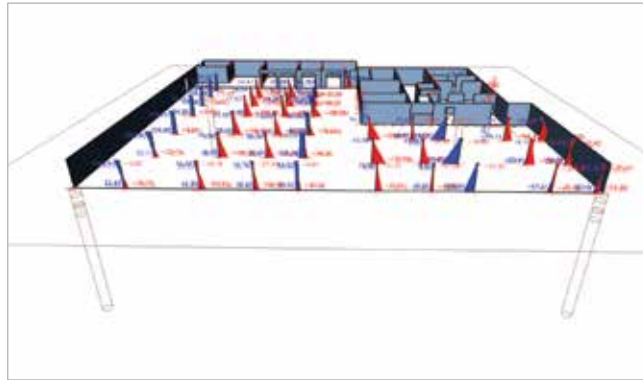
Owner Central Group a.s.
Architect Central Group a.s.
General Contractor Metrostav a.s.
Engineering Office B2K design s.r.o.
Construction Period 09/2014 - 08/2016

Garden Towers residential complex is one of the largest in the country. The complex has about 700 units (floor area 46,205 m²) of which 86% is residential and 14% commercial.

The complex consists of five towers with 18 floors and a height of approx. 54 m. The towers sit on a common base with three underground and six above-ground floors. The towers plan dimensions are roughly square 20 x 20 m. The foundation base is 6.7 to 10.1 m below the existing terrain.

The building site was located close to a tram line, Zizkov cargo station and a Metro line. The design of the foundations takes into account the protection against stray currents and the pressure of the water. The foundations combine bored piles 4 m - 11.5 m deep embedded into the bedrock and a foundation slab. The slab together with the external walls form a waterproof structure without an additional membrane.

Assessing the real behaviour of a load bearing structure including its response to variable soil properties requires several successive calculations with different modifications of input data. It is made possible by using an additional module, "Soil-in", with analysis of upper structure and subsoil.



B2K design s.r.o.

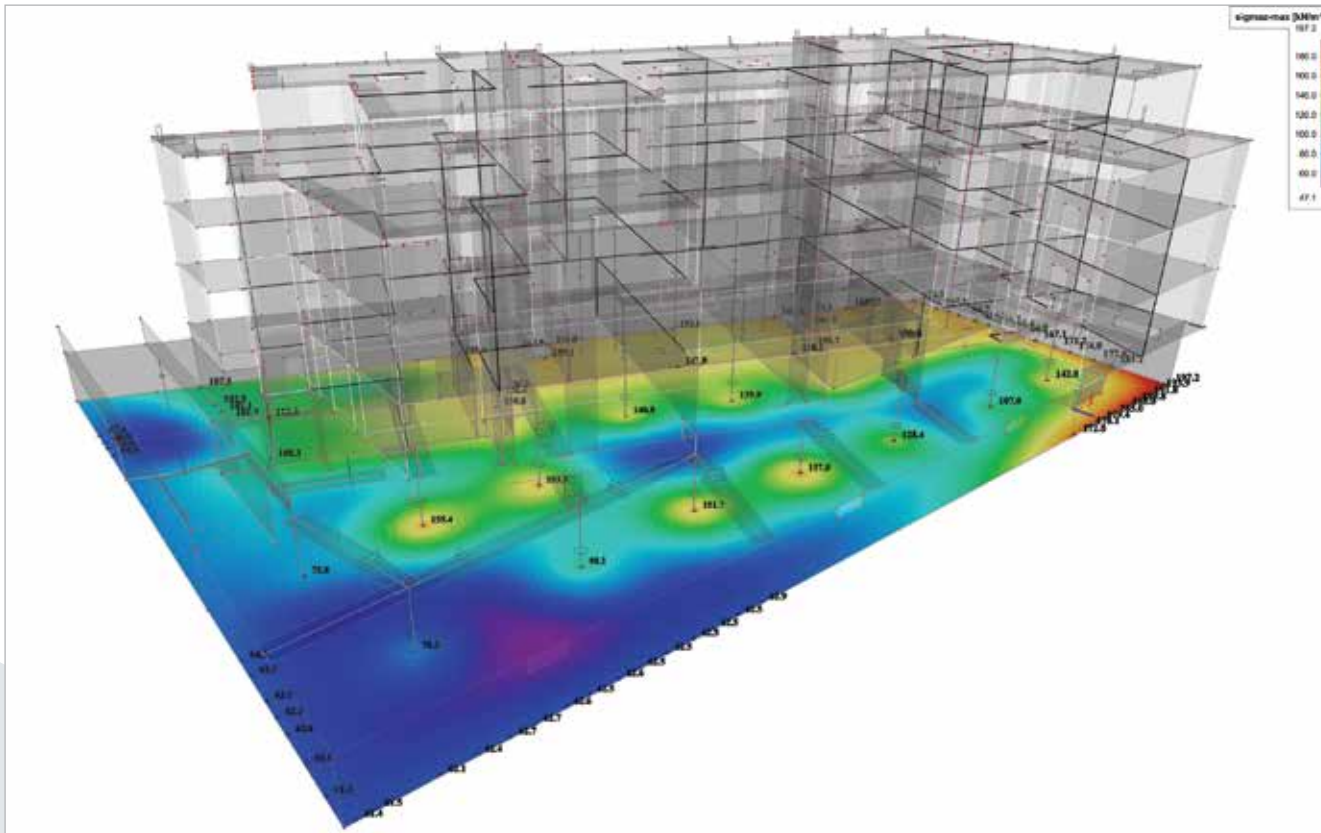
Contact Martin Beneš
Address Strážovská 17
15300 Prague, Czech Republic
Website www.b2kdesign.cz



B2K design s.r.o. is a design and engineering company founded in 2007. From the outset, broadly focused and handles projects from public and residential construction, through industry, agriculture to energy at all stages including consultancy and supervision on site. The company began as an engineering office and over time has expanded its services also to other professions. The company currently provides management of design work as chief designer. The company processes and designs, both in steel, concrete and wooden structures, including the foundations, but also constructions from aluminium and glass. We specialize in the design of supporting structures exposed to fire in co-operation with fire specialists.



Broicher Karreé Residential Building - Korschenbroich, Germany



Owner CQ Haus MG I GmbH
Architect Baues Architekten
General Contractor Baues Projekt GmbH
Engineering Office Baues + Wicht beratende Ingenieure
Construction Period 03/2017 - 06/2018

The "Broicher Karreé" is a new residential building with 25 apartments. High standards on exterior and interior design are obligatory for the CQ-Haus Company. In accordance with the inner-city location with little space, high ground water level and underground parking, it took a lot of effort to realize this five-floor project. As we believe in future viability of the BIM method in Germany we stopped talking about BIM but tried it out on this project. We used SCIA Engineer Professional Edition including "BIM Toolbox" to import the structural model of the architect and generate a full FEM analysis model. Using the "Property Modifier 2D" to simulate the flux of forces in masonry, the internal forces and displacements of the whole construction were analysed in one step, both for masonry and concrete. The analysis output was used for the code dependent design of the walls, beams and plates. The concrete structure was directly designed by the "Concrete 15" tool of SCIA Engineering including non-linear and creep displacements.

As a result, there is a waterproof concrete basement with four storey high cantilevers on the main floor, which are the main supports of the building.

By using SCIA Engineer Professional Edition, we were able to start BIM planning. In addition, with Allplan 2017 and ARCHICAD20, we gained a lot of useful experience in this new process of planning and we are not finished yet.

Baues + Wicht beratende Ingenieure

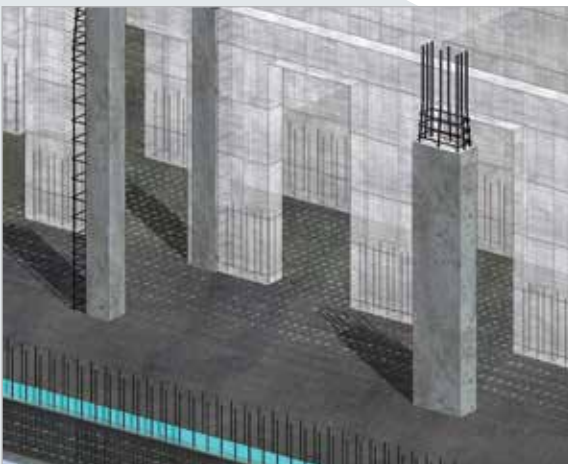
Contact Stefan Baues
Address Ladestraße 11
 41352 Korschenbroich, Germany
Website www.baues-wicht.de



"Baues + Wicht beratende Ingenieure" is an engineering company with a wide range of clients. Beside structural engineering we perform engineering in thermal and noise insulation as well as passive fire protection.

Our competencies range from residential construction and commercial construction to public buildings.

Recently we have been responsible for constructions of up to €5 Mio per each project construction.



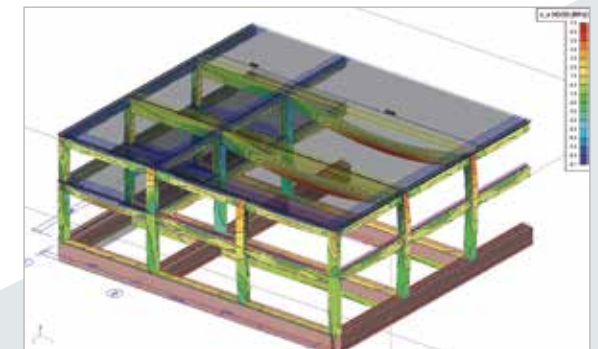
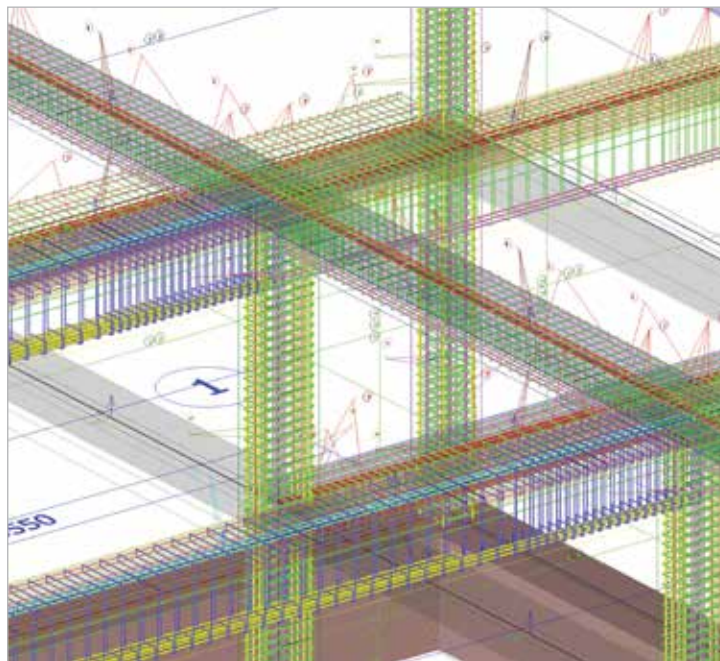
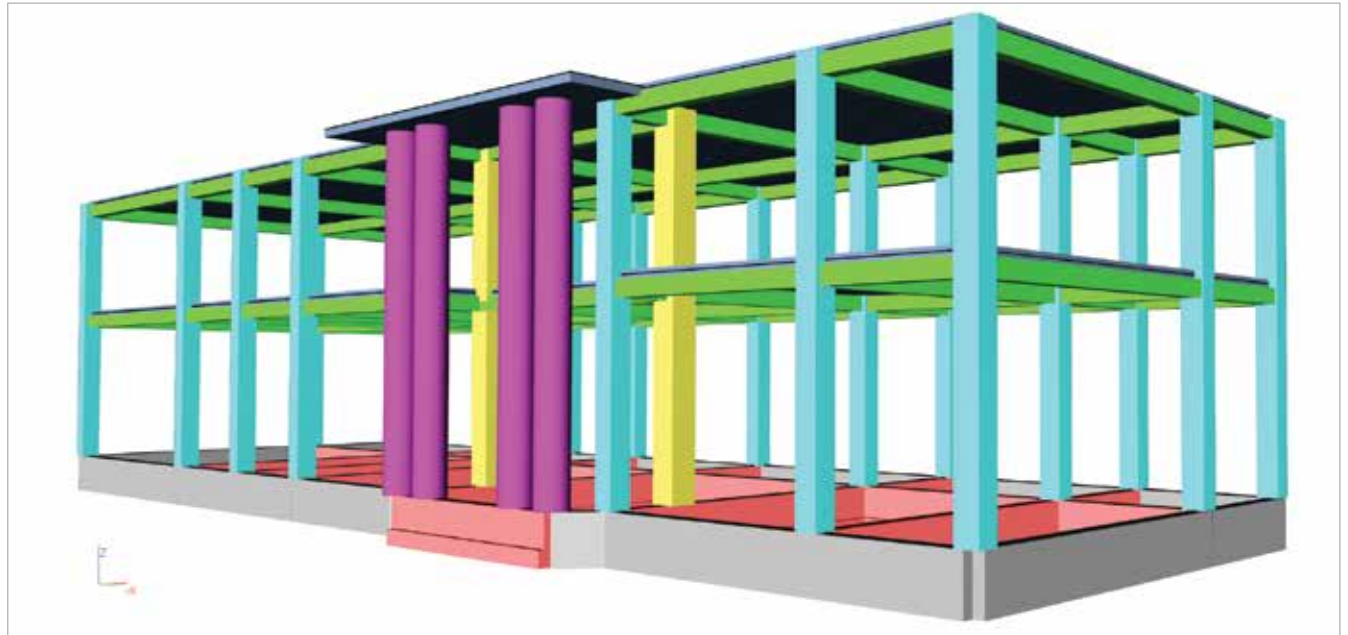
Primary and Secondary School - Branistea, Dambovita County, Romania

Owner Comuna Branistea
Architect Bogdan Pintilie
Engineering Office Pintilie Proiectare S.R.L.
Construction Period 2017

The school is situated in the metropolitan area of the Titu city in Dambovita County, Romania. The area measures 5,601 square metres and is situated in a protected area of historical monuments. The old school structure is going to be demolished and replaced with the new one. The school is "ground floor + 1 storey + roof" and includes classrooms, laboratories, a library and a multifunctional facility. The school has eclectic decorations but also modern elements like curtain-walls and wood finishes.

The initial model was created in Allplan and exported to IFC. The structural elements were imported into SCIA Engineer and the entire model was divided into several structural elements because the building is located in a seismic area. It is vital in seismic areas to have regular shapes and avoid torsion and this is the reason why each substructure needed to be analysed individually. There was no problem in exporting back several IFC files that resulted from each model and assemble them into Allplan.

The export of 3D reinforcement was also helpful to provide the reinforcement cages to the Allplan detailers without the need of traditional reinforcement drafts. Also, SCIA Engineer's bills of material for concrete, formwork and reinforcement were very helpful to establish a project budget from the beginning. In the end, the BIM workflow ensured an efficient way to control quantities and changes to the project.



Birou de Arhitectura Pintilie srl

Contact Bogdan Alexandru Pintilie
Address Str. Leonida, nr. 5
020555 Bucuresti, Romania
Website www.bap.ro

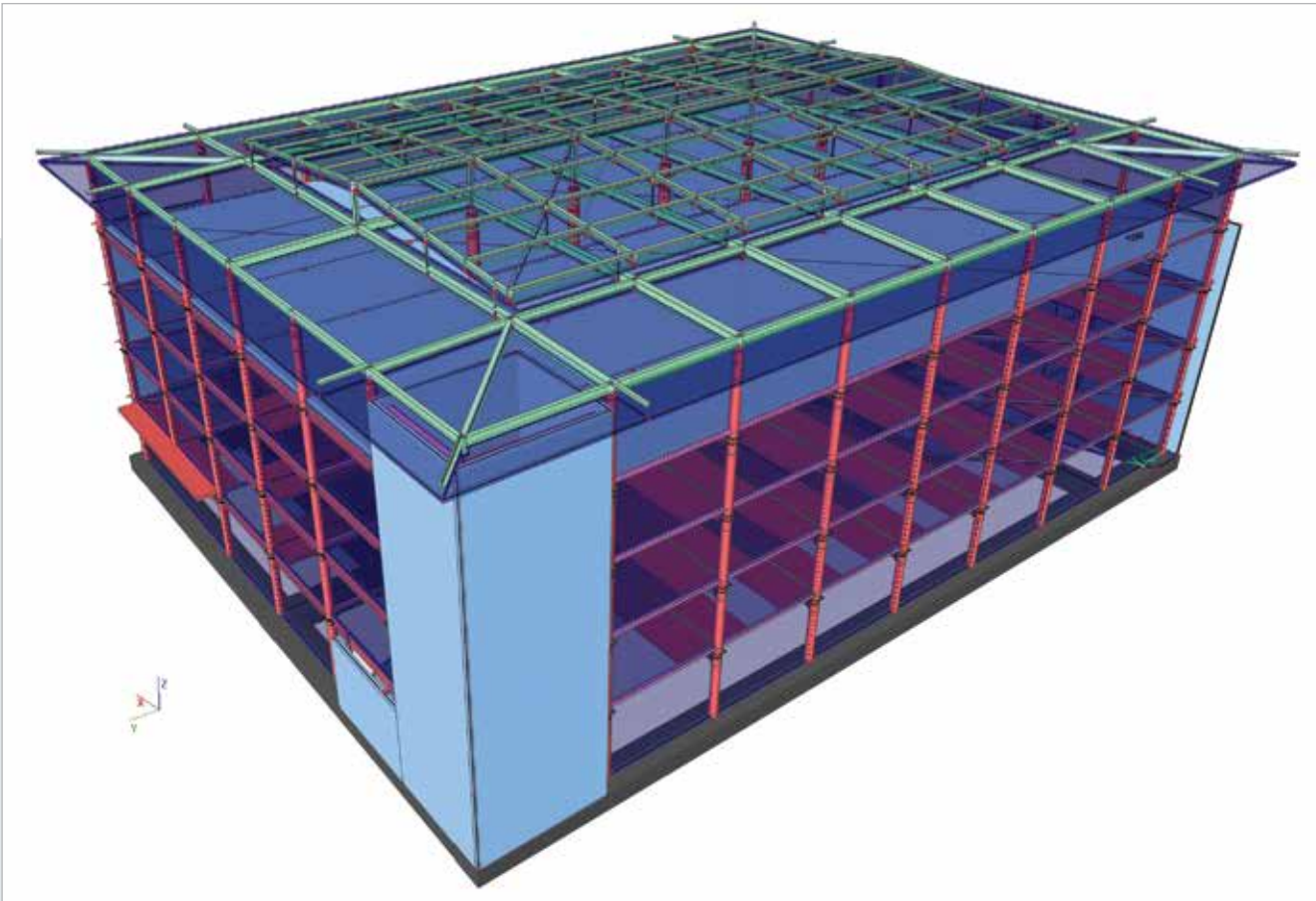
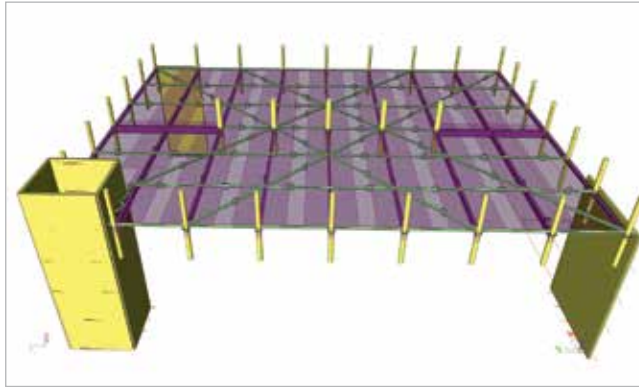
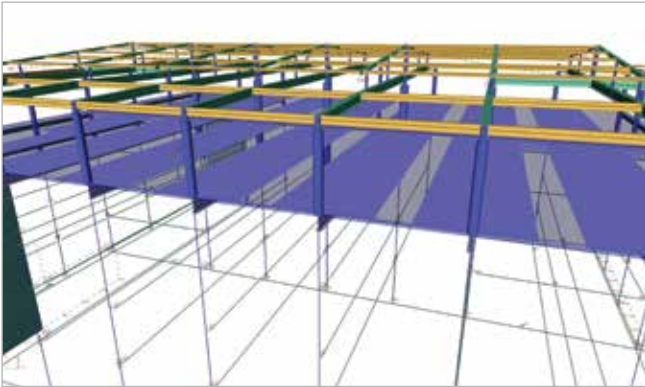


Birou de Arhitectura Pintilie (BAP) integrates all types of requirements for building projects meeting all the beneficiary demands.

Why us?

BAP integrates these 5 key principles: quality in architecture and engineering, flexibility for changes, adaptation to client needs, operational and intelligent resource attribution.

Car Park Extension - Southern Germany



Engineering Office *Brand & Gleinser GmbH*
Construction Period *10/2016 - 11/2017*

This extension to car park built in 2004-2005 will provide 260 additional spots, for an overall estimated construction budget of €7 million.

The new construction consists of a 4-storey composite floor with lattice girder slabs and cast in place concrete columns. The roof is made of steel with various coverings. The main roof is covered by metal decks, the construction in the middle by transparent PV-modules.

The principal challenge in the 3D design consisted of avoiding to introduce unnecessary constraints in the structure and of performing a correct design of the foundation beams.

Thanks to the versatile possibilities of SCIA Engineer, we could finally virtually eliminate all artificial and undesired constraints, without neglecting the actually appearing constraints. The foundation beams are submitted to significant torsion due to the eccentric position of the walls. Thanks to the precise definition of reinforcement and detailed capacity checks, even this special challenge could be tackled with confidence.

Brand & Gleinser GmbH

Contact *Leander Gleinser*
Address *Marlene-Dietrich-Straße 5*
89231 Neu-Ulm, Germany
Website *www.brand-gleinser.com*



We are your competent structural designer for steel and concrete projects.

We offer a broad and complete range of services, from the initial founding to steel workshop drawings. We are able to draw from a wealth of experience, specifically in international industrial structures and plant design as well as in designing structures in zones with seismic risk.

We develop for your project the best possible solution with respect to function, quality and economy. We pride ourselves on well-thought solution for details at the crossing between different trades.

UCLH Proton Beam Therapy Centre - London, United Kingdom

Owner University College London Hospitals (UCLH) NHS Foundation Trust
Architect Scott Tallon Walker Architects
General Contractor Bouygues UK
Engineering Office CampbellReith
Construction Period 2015 - 2020

The proton beam therapy (PBT) centre is a 372,000 ft² facility located on an extremely constrained site in central London. This poses a number of logistical and technical challenges. Below ground, a 27 m deep basement incorporates a PBT centre of approx. 81,000 ft² arranged over four levels, with four PBT rooms at the base of the facility. Above these levels there are six storeys of purpose built inpatient facilities, including eight operating theatres.

SCIA Engineer was used to analyse and design the structure for the entire project. Firstly, it was linked to Revit during its early stages. Once the complete structural model was formed, non-linear analyses were run, and code dependant deflections were assessed on the raft and floor slabs in a separate model. Load panels were added to the superstructure to determine wind forces.

The nature of the building meant that large hydrostatic and heave forces were present at the end of the excavation works. This presented challenges in ensuring that the piles and diaphragm retaining walls could withstand the uplift forces, with the raft rigid enough to transfer forces effectively to utilise the capacity of each pile. These then had to be checked against the final stage (i.e. building completion), whereby loading would be reversed with the retaining walls and piles in compression.

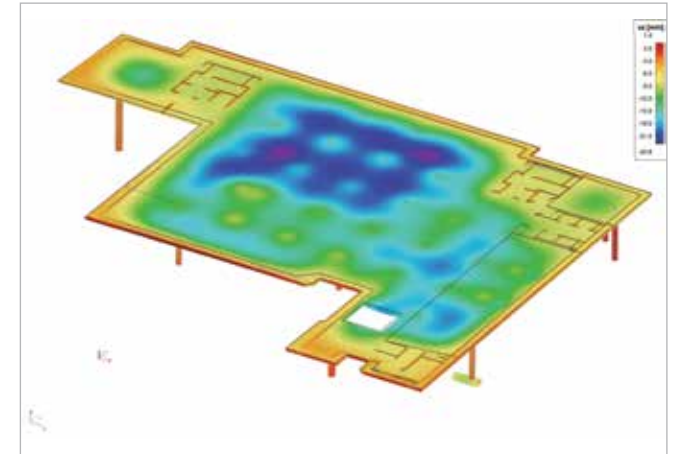
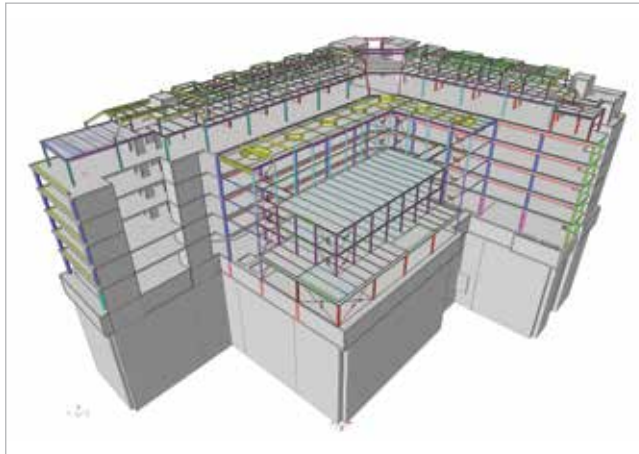
CampbellReith

Contact Andrew Tullett
Address Friars Bridge Court, 41-45 Blackfriars Road
SE1 8NZ London, United Kingdom
Website www.campbellreith.com

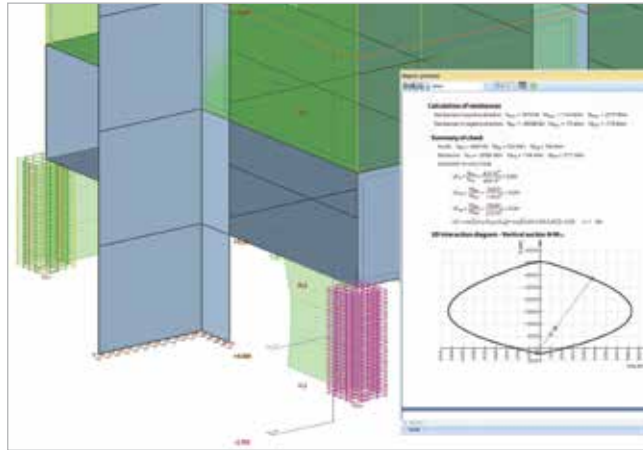
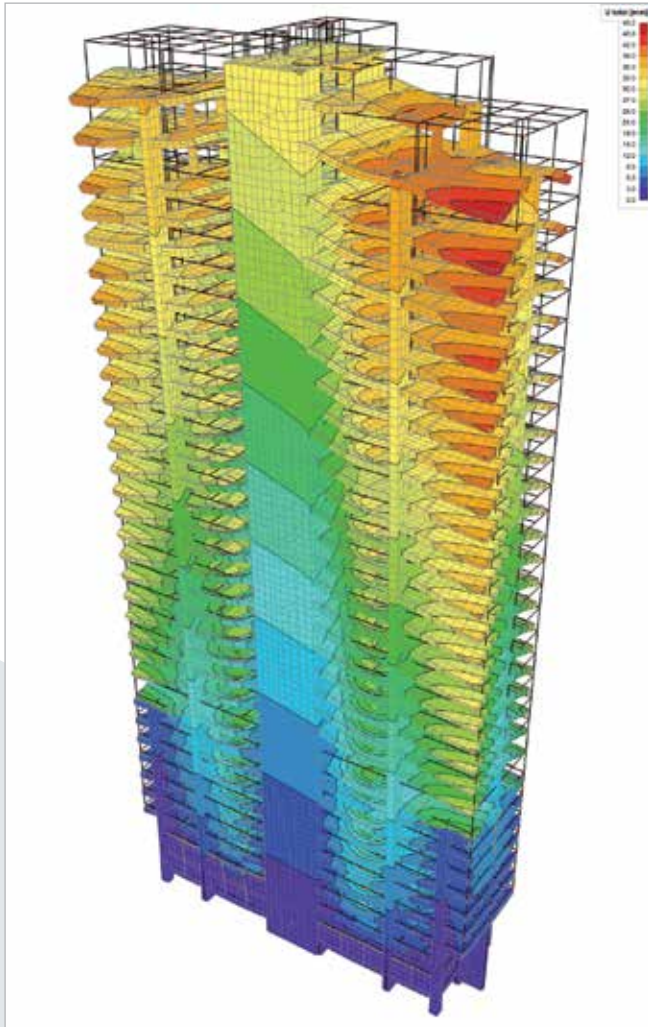
CampbellReith is an independent engineering practice founded in 1960. The practice provides structural, civil, environmental, geotechnical, highways and transport engineering services from five UK offices and overseas. CampbellReith has a reputation for producing imaginative, innovative and cost effective design solutions.

We provide skilled and intelligent engineers who know how to put our clients first – creating the right solution for them, every time. We act on a wide range of projects in terms of size, type and location, up to a value of £250 m.

CampbellReith
consulting engineers



Scarlet Building - Sihanoukville, Cambodia



Owner SCARLET
 Architect ACYC sarl Branch Architects
 General Contractor AL-MANAH
 Engineering Office CAMSECT
 Construction Period 08/2017 - 08/2021

The building is located in District 3, Sihanouk Ville, Cambodia. The building has a complex functionality: 2 restaurants, offices, apartments and duplex, swimming pool & spa and a fitness centre. The building has 2 basements, ground floor, 32 stories, an extra roof level and a machine level. A smart parking system is positioned above the ground floor restaurant, occupying 3 levels.

SCIA Engineer provided the tools to do a full 3D model to proper evaluate the general structure behaviour. The structure was not regular and many of the structural elements disappeared on top levels so all structural elements need to be dimensioned and checked. The "Concrete 15" module was used to design and check all linear elements and the Concrete module was used to design the slab reinforcement.

The challenge was to do a mesh system discreet enough to provide a valid mesh solution but with rather big finite elements where no stress concentrators could occur to be able to calculate the model in a reasonable amount of time. The project had 4,238 nodes, 1,978 beams and 1,134 slabs which meant solving 2,248,668 equations.

CAMSECT

Contact Chandamuny Kong
 Address #72, St.7, Borey Piphom Thney, Porsen
 Chhey, Phnom Penh, Kingdom of Cambodia



CAMSECT is Structural Engineering & Consultant Team in Cambodia and relative to ACYC sarl branch Architects DPLG.

The team is specialised in:

- Telecom and transmission line tower sub and super-structure
- Building structure assessment
- Low and tall buildings

Pulseberlin Office Building - Berlin, Germany

Owner Dipl.-Ing. J. Gröneveld
Architect IAA Architekten
General Contractor Stresemannstraße 69-71 GmbH & Co. KG
Engineering Office con-tura Architekten + Ingenieure GmbH
Construction Period 03/2017 - 12/2017

The new project "Pulseberlin" is the first Cradle to Cradle (C2C) Office in Germany. It is situated on Stresemannstraße in Berlin. The gross floor area is approx 12,250 m² and the underground car park offers 64 parking spaces with a total area of 1,785 m².

The main challenge was the task to design the buildings as flexible as possible and using C2C materials.

For the whole planning process, Allplan 2016 was used. As a result, the complete 3D model was ready and all technical drawings could be produced by our team.

SCIA Engineer and Frilo are the two programs used for static calculations.

Within Allplan all the elements were constructed using wizards in combination with a set of our office standards. Using the building model helped us to produce all necessary elevations, sections and various perspectives.

Reports, specified for reinforced concrete structures, gave us a very accurate overview of the material used.

The big advantage was the round-trip engineering between Allplan and SCIA Engineer in one model.

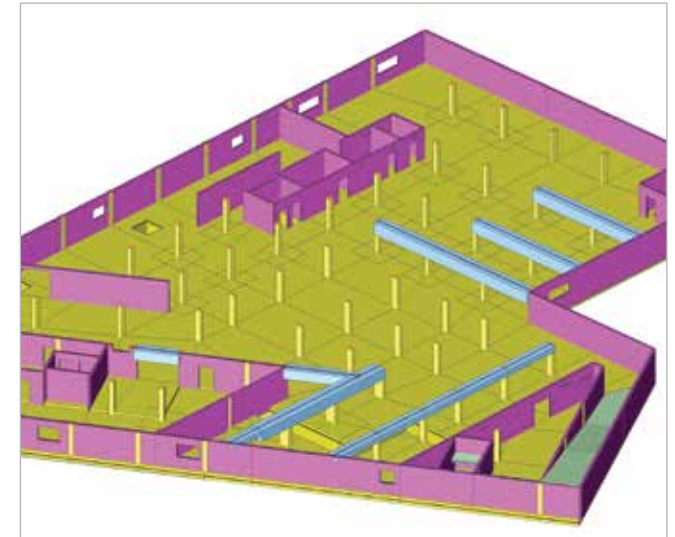
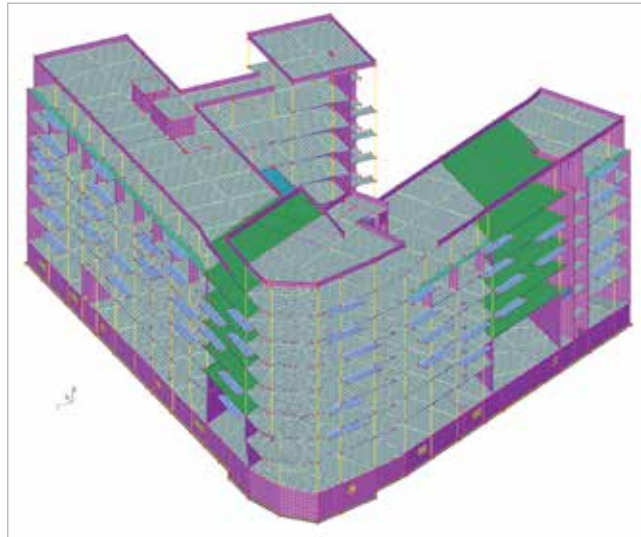
con-tura

Contact Jan Gröneveld
Address Kronprinzendamm 15
10711 Berlin, Germany
Website www.con-tura.com

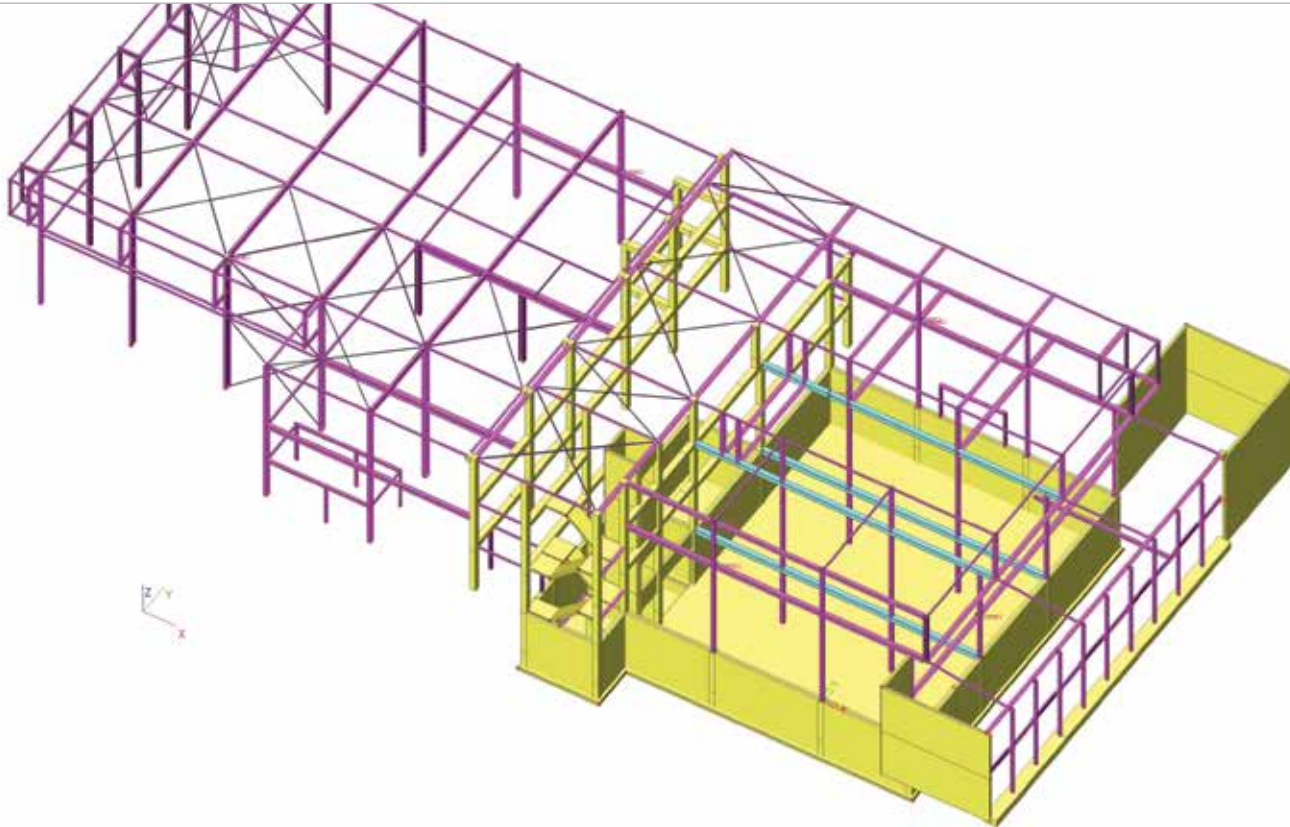


con-tura: expertise in architecture and building construction

Together with our clients from the initial idea to development and implementation of successful projects - this is the basis of our daily work. As a competent partner, we see ourselves as consultants and construction services. con-tura provides these functions in all phases of urban design, architecture, construction management, structural engineering and building physics. With the experience from our offices in Germany, Netherlands and Slovakia, we do not offer only a regional knowledge, but also international know-how. Challenge us.



Relex - Aartselaar, Belgium



Owner *Origo nv*
 Architect *Architeam bvba*
 General Contractor *edibo nv*
 Engineering Office *edibo nv*
 Construction Period *11/2015 - 12/2016*

Relex is specialized in building, designing and maintenance of swimming pools and wellness facilities. Relex built a new establishment in Aartselaar that contains a showroom, an office space, a workplace behind the showroom, a public wellness areas in the cellar underneath the showroom and a loft on the top floor. Customers can relax and enjoy their time in the loft with an indoor terrace.

As this project contains multiple compartments which overflow horizontally and vertically, a prefabricated concrete structure (fire resistance of 2h) was used for the central area between the work space and the showroom. Thanks to the fixed connection with the foundations, the central structure also provides the required horizontal stability for the entire building because there was no bracing allowed behind the glass sections in the walls.

Due to the relatively high groundwater table and the depth of bottom plate, the cellar was designed to bear the vertical loads of all the floor levels and also the upward loads of the groundwater.

This entire project, the cellar included, was modelled in SCIA Engineer. Apart from dimensioning, the steel structure, the rebars of the prefabricated concrete elements and the cellar were determined in SCIA Engineer. Afterwards, the model was exported to X-STEEL by the drawing department of edibo to trace this project further.

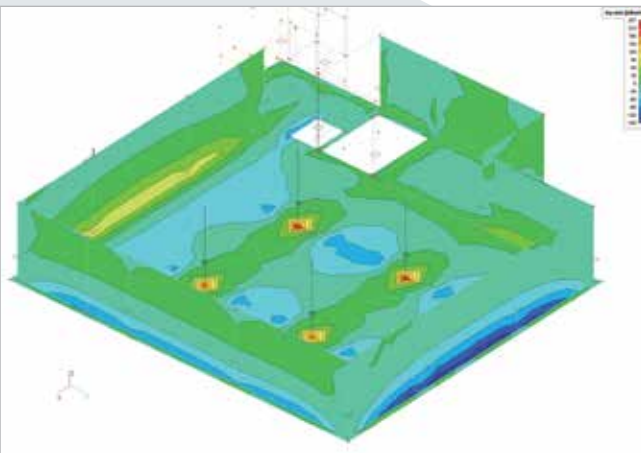
edibo nv

Contact *Jens Cannaerts*
 Address *Maatheide 1302*
3920 Lommel, Belgium
 Website *www.edibo.be*



Edibo is a general industrial building contractor with expertise in the automotive, logistics, industry, production and offices sectors since 1981.

As a construction partner for your industrial building, Edibo builds "turnkey constructions, extensions and renovation projects in steel, concrete and laminated timber. Edibo has been constructing beautiful reference projects in various sectors for more than 30 years.



Cruise Terminal - Zeebrugge, Belgium

Owner Artes Depret
Architect Salens architecten
General Contractor Artes Depret
Engineering Office Establis
Construction Period 09/2016 - Not known

The building consists of a subterranean car park and 8 upper storeys. The first 2 storeys are used as cruise terminal. Above it, new offices of Artes Depret will come, and on the 7th and 8th storey a restaurant will offer diners a beautiful view of the sea and Bruges' polder land.

The superstructure is constructed using post-tensioned slabs (28 till 55 cm in thickness). Numerous columns 20 x 45 cm in the façade are a consequence of the architectural concept. They do not run from the bottom to the top, but follow the shifted rotation of the slabs offering a maximum utilisation of the office areas. There are 2 cores and 5 inner columns with spans up to 10 m to cover the 26 x 33 m² office areas. The slab covering in the +0 and +1 floors not only transfers the increasing loads of the façade columns into five 6 m high columns, they also cantilever 6 m in 2 directions. In the basement, 8 m long composite beams 100 x 120 cm with 2 HEB 800 are used to transfer the loads of the superstructure columns to the subterranean columns to maximize the parking space. The structure is founded on piles.

The 3D model was used to determine the reinforcement in the columns and concrete walls. The deformation of the structure was analysed with special attention, since this influences the load transfer in the vertical members.

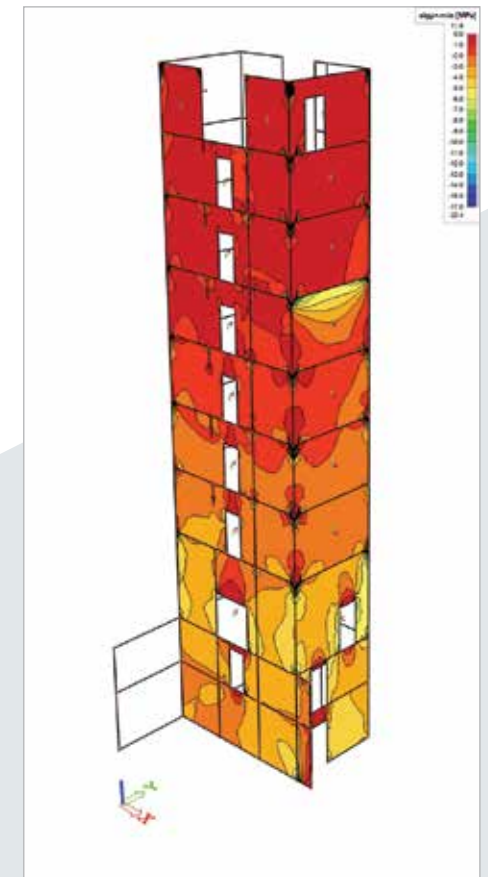
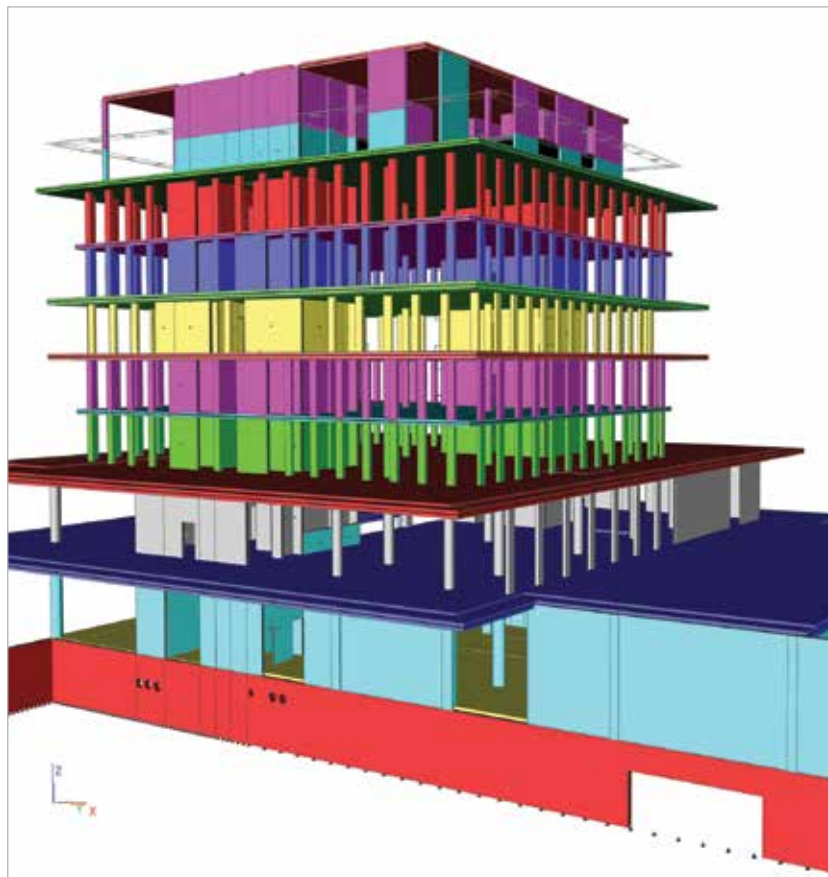
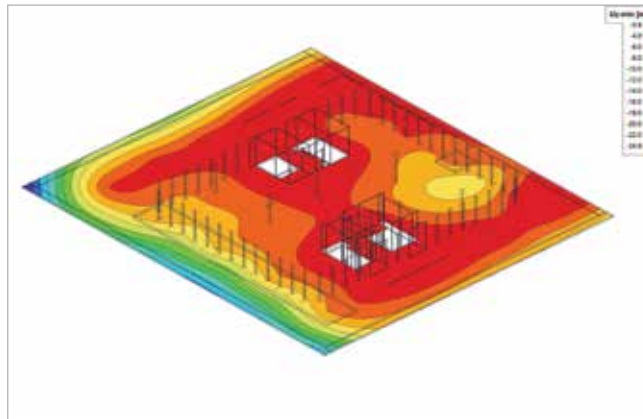
Establis

Contact Sam Vantghem
Address Beversesteenweg 612
 8800 Roeselare, Belgium
Website www.establis.eu

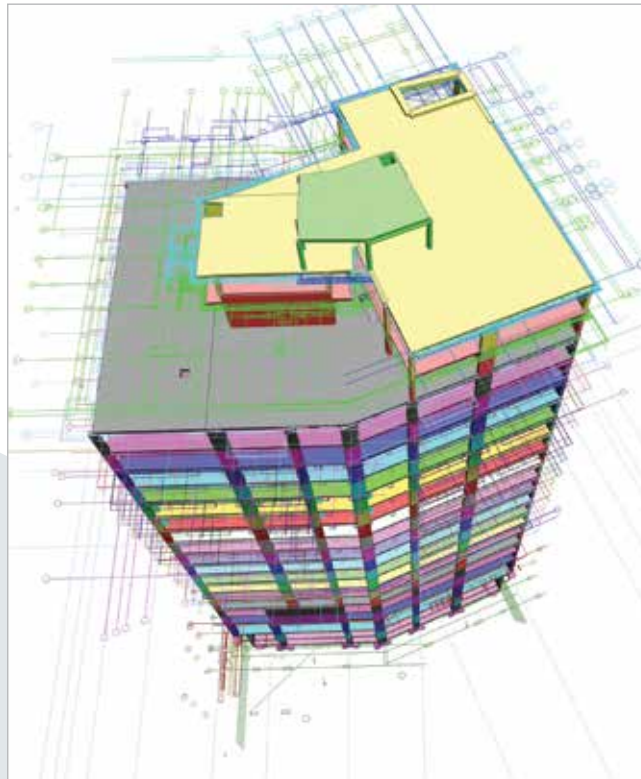
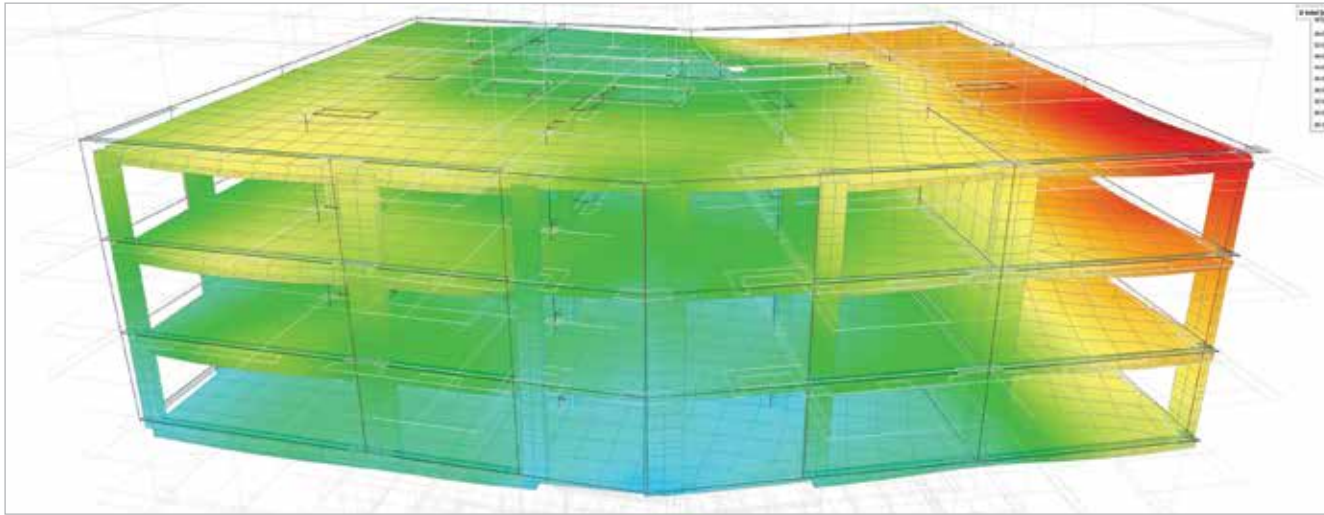
establis
 STABLE & CREATIVE SOLUTIONS

Establis guarantees creative calculations for structural engineering, finding the best solutions for the lowest costs. Our team in Antwerp and Roeselare consists of around 35 highly qualified staff with diverse specialities in, among other fields, concrete, steel, prefab, foundation and seismic engineering, all this elaborated in a BIM environment. We are standing ready to guide your unique construction project from start to finish.

Using Establis means reaching stability.



Ekla Mixed-Use Building - Brussels, Belgium



Owner *Re-vive*
Architect *BURO II & ARCHI+I*
General Contractor *Besix*
Engineering Office *Establis*
Construction Period *05/2016 - 05/2018*

The project consists of 3 separate buildings for residential and commercial use. The tower building has 19 stories; the other 2 buildings have 3 and 4 above ground level. Underground, these 3 buildings are connected with 2 underground levels.

The construction is composed mostly of lightweight floors on isolated concrete columns with a central core and additional stability walls. The foundation is a rigid slab on piles and pile caps.

Pre-dimensioning of the floors was done in a 2D model.

For the tower building a 3D model was used in further dimensioning as well as for calculating the pile loads, determining column sections and evaluating wind effects on the building.

During the execution process, the model was used for determining the reinforcement of the walls and cast in place floors.

The 3D model helped us in pre-dimensioning as well as in the execution stage to quickly evaluate the effects of the change in pile positions and other changes in design.

Establis

Contact *Alexandra Claeys*
Address *Beversesteenweg 612
8800 Roeselare, Belgium*
Website *www.establis.eu*

establis
STABLE & CREATIVE SOLUTIONS

Establis guarantees creative calculations for structural engineering, finding the best solutions for the lowest costs. Our team in Antwerp and Roeselare consists of around 35 highly qualified staff with diverse specialties in, among other fields, concrete, steel, prefab, foundation and seismic engineering, all this elaborated in a BIM environment. We are standing ready to guide your unique construction project from start to finish.

Using Establis means reaching stability.

Nieuw Zuid Blok 6 - Antwerp, Belgium

Owner Triple Living
Architect KCAP Architects&Planners i.s.m. evr-Architecten;
 Bureau Bouwtechniek
General Contractor Interbuild
Engineering Office Establis
Construction Period 09/01/2017 - Not known

The building consists of a 24-storey tower for residential purposes and a hotel of 4 levels. Both are connected by 2 subterranean levels. This building fits into a larger project which creates a new quarter south of Antwerp.

The tower is constructed using slabs which transfer loads mainly in one direction, from the central core to façade columns. The tower measures 15 x 40 m and is 83 m high, resulting in large forces in the slender core of 5 x 18 m. The façade columns fit in the architectural design of an exterior terrace structure which enlarges the tower with 3 m over the full circumference.

The 3D model is used for many purposes. First of all, the model acts as a tool for the determination of the needed pile capacities. These were modelled as springs with the parameters based on the bearing capacity and cpt diagram of the soil. The massive foundation rafts (up to 160 cm) underneath the core is designed using the 3D model. The concrete walls of the core with all their openings are also elaborated based on the model. The 3D model made it possible to analyse changes in the structure in a time efficient way during the design stage of the project. It also led to an optimization of the structure with respect to the preliminary studies of the wind effects on the structure.

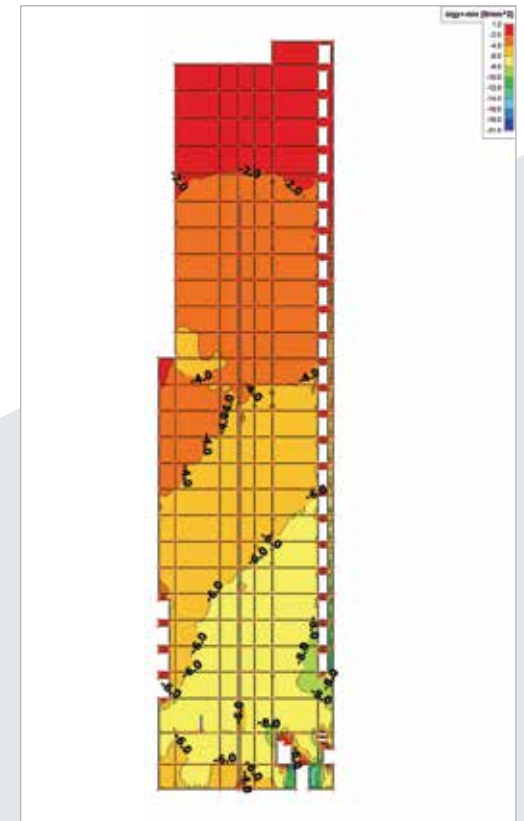
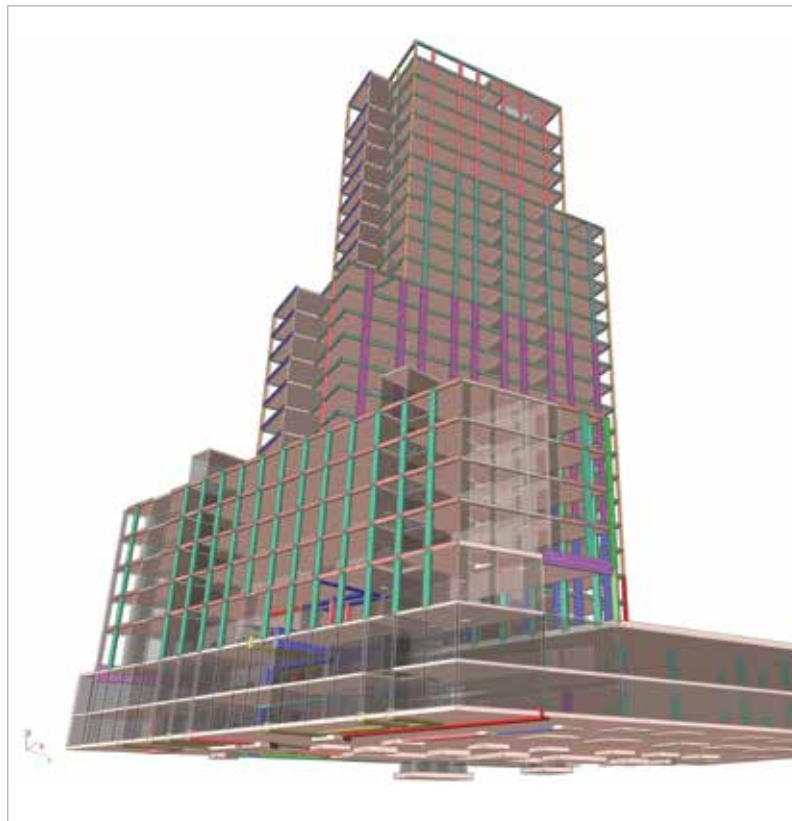
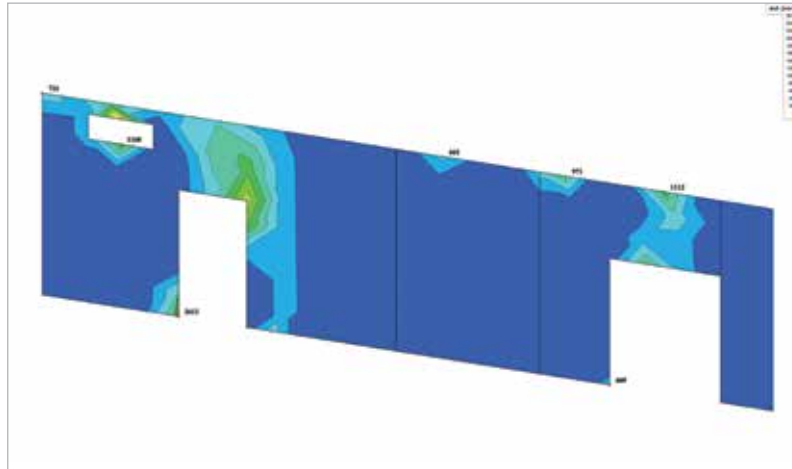
Establis

Contact Sam Vantyghem
Address Beversesteenweg 612
 8800 Roeselare, Belgium
Website www.establis.eu

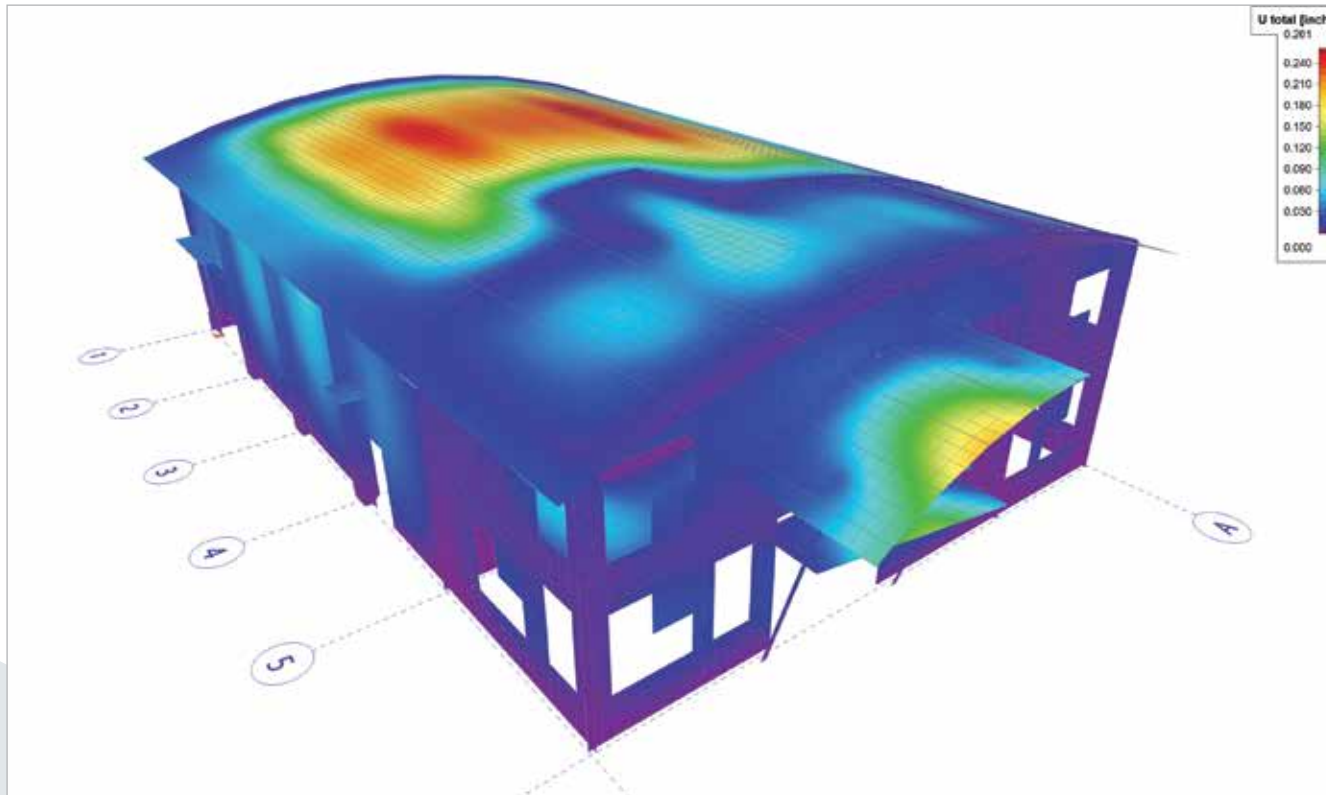
establis
 STABLE & CREATIVE SOLUTIONS

Establis guarantees creative calculations for structural engineering, finding the best solutions for the lowest costs. Our team in Antwerp and Roeselare consists of around 35 highly qualified staff with diverse specialities in, among other fields, concrete, steel, prefab, foundation and seismic engineering, all this elaborated in a BIM environment. We are standing ready to guide your unique construction project from start to finish.

Using Establis means reaching stability.



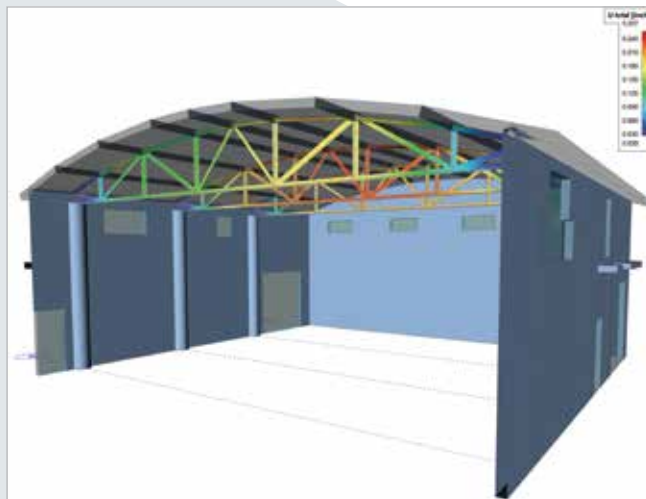
Office and Warehouse - Logan, Utah, United States



Owner *Zwolle Inc.*
 Architect *Design West Architects*
 General Contractor *Pantech*
 Engineering Office *Forsgren Associates Inc.*
 Construction Period *05/2016 - 06/2017*

The Utah Office and Warehouse building was constructed using EVG 3D panels for the walls, upper floor and roof systems. The roof panels are supported on arched steel trusses and bearing walls. The steel mesh reinforced insulated panels with shotcrete facing create a composite system that combines the structure, insulation and interior/exterior finished surfaces into one integrated product. Electrical and plumbing components were placed inside the panel units prior to placing the shotcrete surface layers.

SCIA Engineer was utilized due to its adaptability for design with the EVG 3D panel system. The complex interaction of the composite structural panel, interconnected walls, floor and roof systems were best analysed using a three-dimensional finite element method. EVG 3D panel performance characteristics were modelled in SCIA Engineer using 2D member property modifiers for standard plates. Welded wire mesh reinforcement was easily entered. Design loading was applied to the structure manually and through the integrated wind force generator. The ACI design module identified locations where additional reinforcement was necessary.



Forsgren Associates Inc.

Contact *Craig Rasmussen*
 Address *95 West 100 South Ste 115*
84321 Logan, United States
 Website *www.forsgren.com*



Established in 1962, Forsgren Associates Inc. is a multi-talented firm providing civil and environmental engineering services to both private and public sectors. We develop sustainable and economically feasible solutions to challenges in the built environment. We provide planning, design, construction management and field services for building and transportation structures, water and wastewater systems, and a wide variety of environmental projects.

Residential Buildings - Waalwijk, Netherlands

Owner MN and Iris Vastgoed
Architect Van den Pauwert en Lichtstad Architecten
General Contractor Van den Burght Bouw
Engineering Office Heijmans & Partners ingenieurs
Construction Period 2015 - 2018

The two residential blocks have been realised in Waalwijk according to the urban design of Kuiper Compagnons. The transparent entrance gives both buildings a clear eye catching portal. The main structure is formed by horizontal and vertical lines. The buildings are partly based on foundation slabs and partly on a basement. The ground level is significantly different from the upper floors and mainly consists of concrete columns with beams of steel. The precast balconies are attached to the floor slabs by an insulated connection.

We used SCIA Engineer for several reasons. It gave us a good picture of the forces in the floor slabs. Besides that, we wanted to get a whole picture of the ground pressure under the foundation. SCIA Engineer helped us also to double check the construction. We exported and imported everything by IFC. Allplan was used for modelling of the construction and the reinforcement.

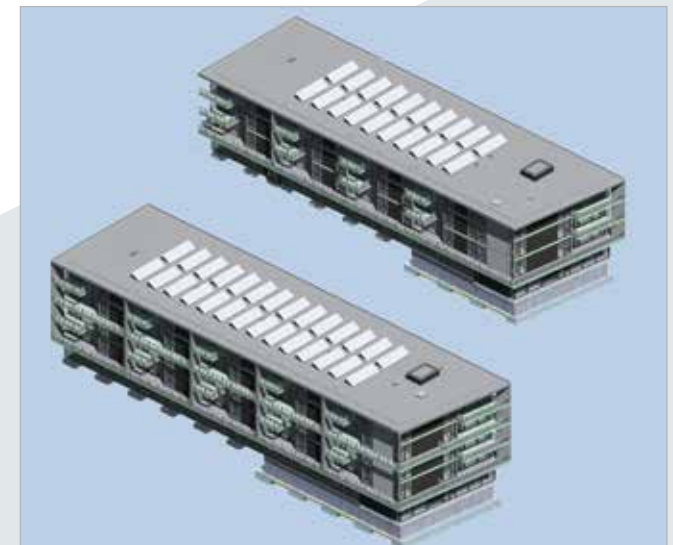
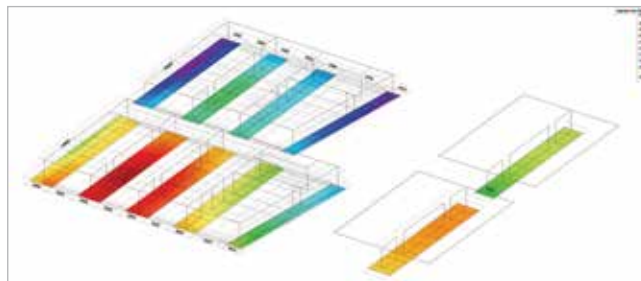
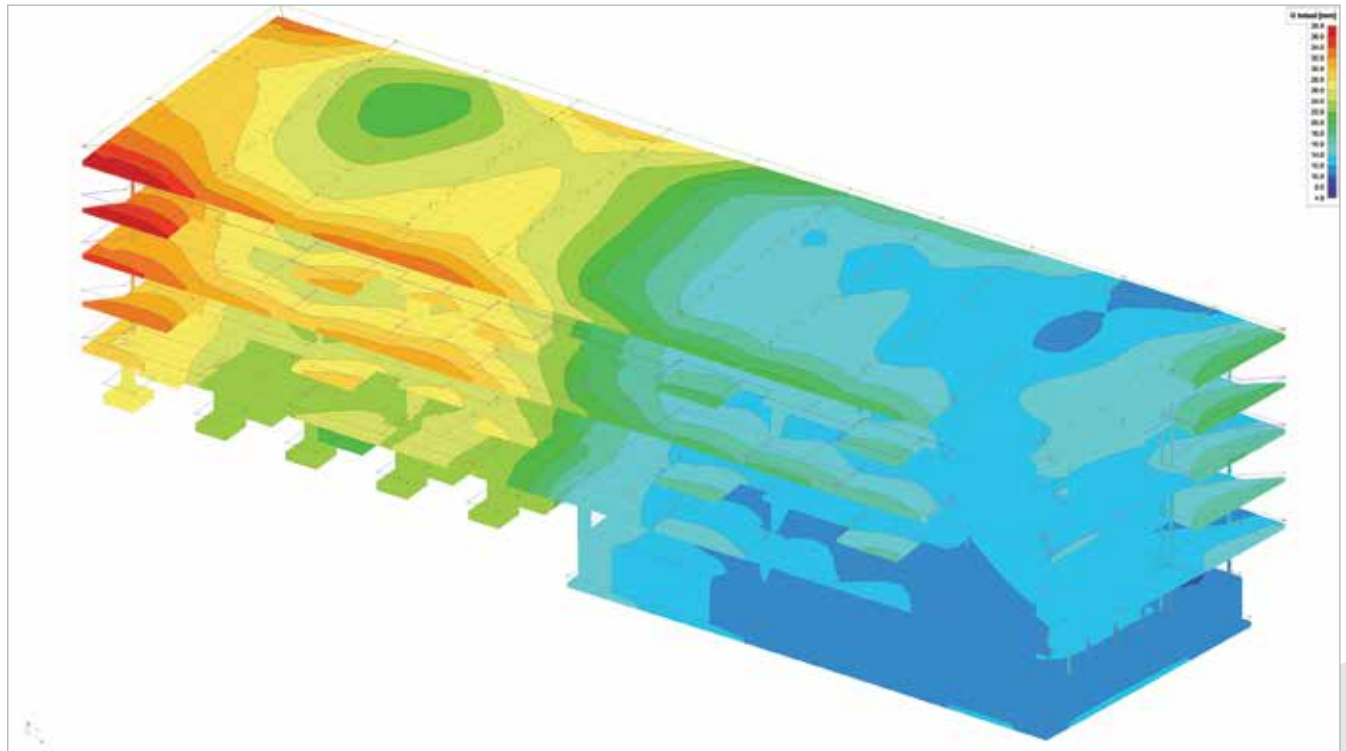
The powerful tools of SCIA Engineer helped us to develop a reinforcement plan. In this case, it was very important to keep the ground pressure under the foundation everywhere more or less the same. The output of SCIA Engineer made it easy to level the forces. SCIA Engineer has many tools which helps us double check on safety and to guarantee a well thought out construction. Together with Allplan, it gave us the opportunity to get a detailed model.

Heijmans & Partners Ingenieurs

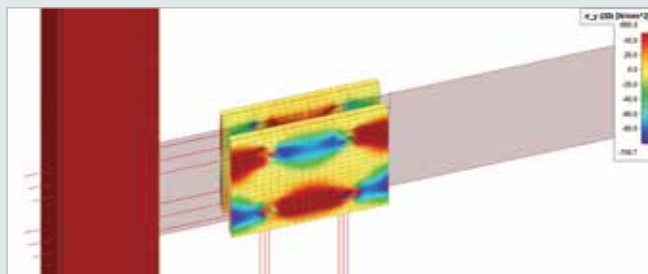
Contact Paul Heijmans
Address Hoogstraat 68
5241 CT Rosmalen, Netherlands
Website www.constructeurs.nl



"Heijmans & Partners engineers" has over 17 years of experience in construction and is a company that always looks for the optimal solutions. Quality, reliability and safety have the highest priority when realising a project. The best hardware and software on the market is used to optimise the best outcome. SCIA Engineer allows Heijmans & Partners to work with bim+ and gives the opportunity to anticipate in any design. Their strength is to listen to the client and to design a custom construction.



36



"Heijmans & Partners engineers" has over 17 years of experience in construction and is a company that always looks for the optimal solutions. Quality, reliability and safety have the highest priority when realising a project. The best hardware and software on the market is used to optimise the best outcome. SCIA Engineer allows Heijmans & Partners to work with bim+ and gives the opportunity to anticipate in any design. Their strength is to listen to the client and to design a custom construction.

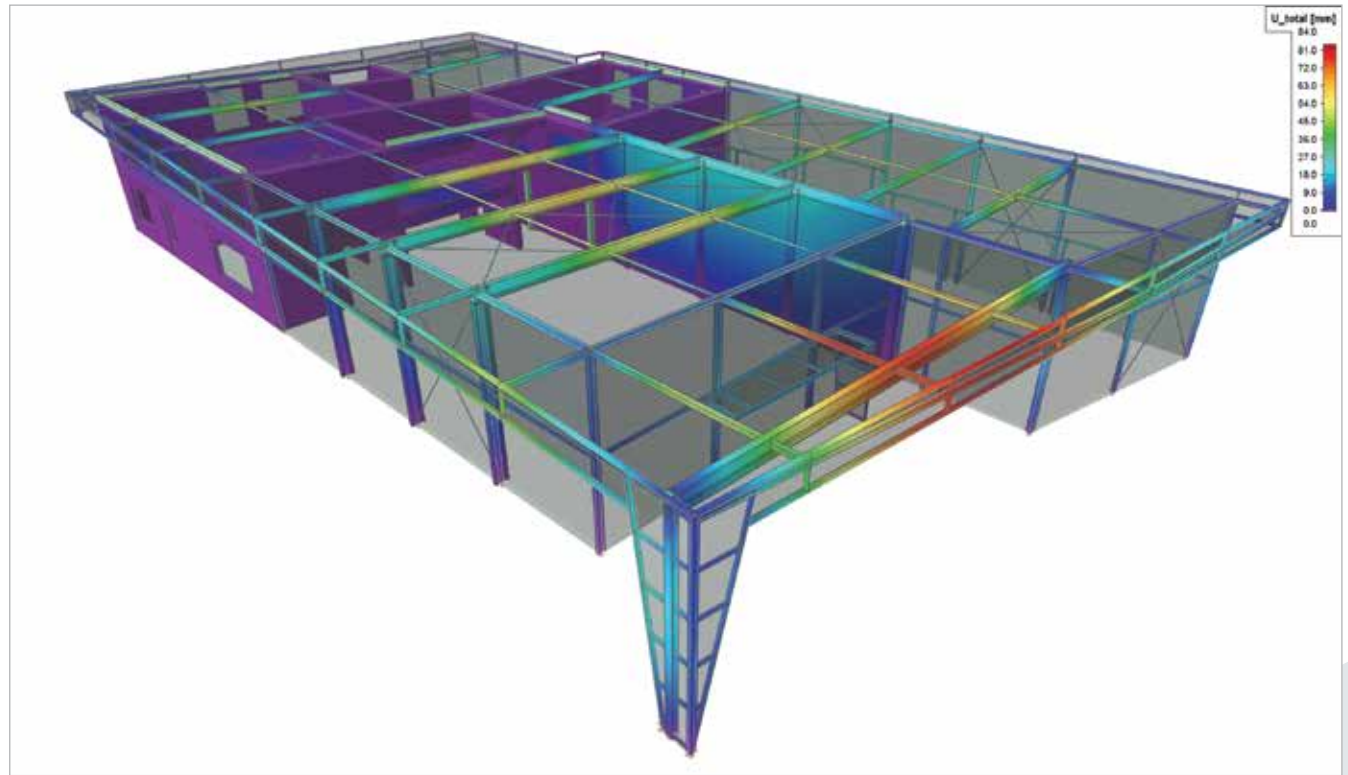
Car Dealership - Bergkamen, Germany

Owner F&A automobile
Architect Kai Ziegler
General Contractor kzgp Generalplaner GbR, Selm
Engineering Office Ingenieurbüro Dipl.-Ing. Rainer Nowak
Construction Period 01/2017 - 03/2018

A working symbiosis of functionality and architecture identifies a modern car dealership. Innovative technology must be presented in the cars as well as in the design of the showrooms.

To cover the complete range of business activities expected by customers, the project presents a compact building which includes a spectacular showroom, garage, wash-area and offices.

The design combines different properties of materials. The great glazed showroom with its futuristic roofed entrance is included harmonically into the complete building. The separate garage - also because of fire resistance issues and noise protection, is made using concrete columns with masonry in between. The roof is designed as a steel construction with diaphragms to reflect the cost-reducing aspects.



Ingenieurbüro Nowak

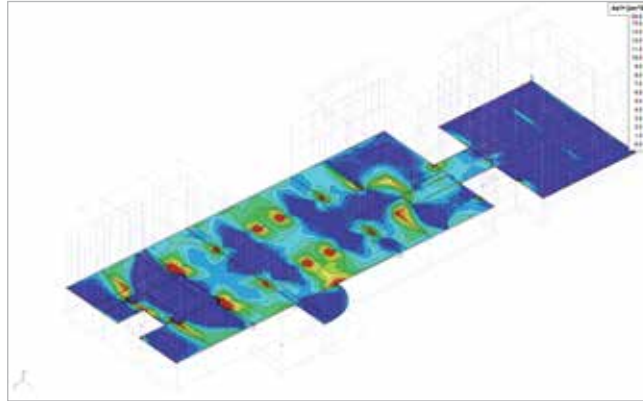
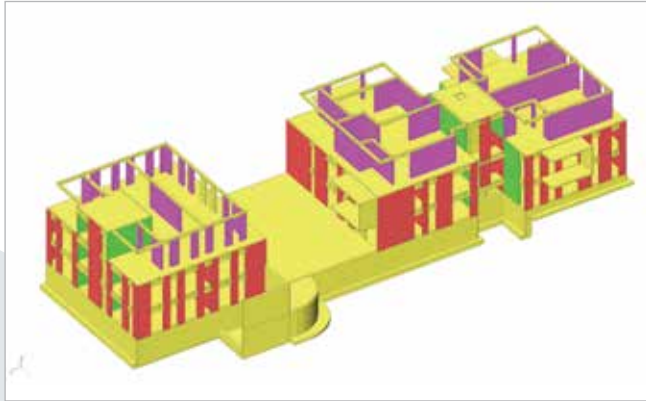
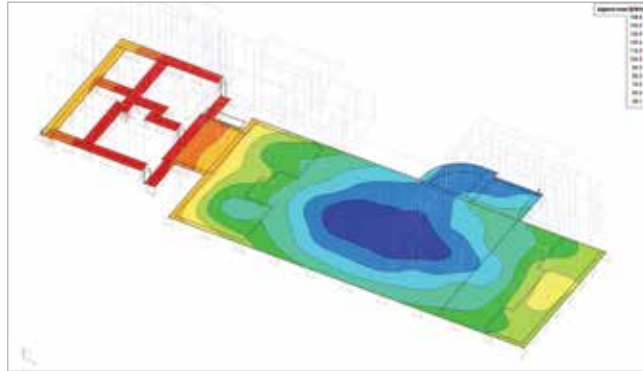
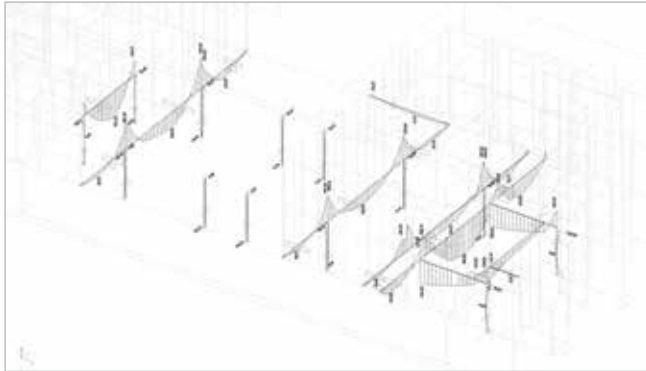
Contact Rainer Nowak
Address 59192 Bergkamen
Buchweizenkamp 15
59192 Bergkamen, Germany



Every building is unique and so there has to be an individual adjusted approach. To advise the designer and to develop feasible solutions out of visions is the permanent challenge. The Ingenieurbüro Nowak for 25 years – has been converting complex industrial, business and residential projects into effective functional buildings using the latest software.



Residential and Office Building - Lüdinghausen, Germany



Owner *Kranichholz Projekt GmbH, Dortmund*
Architect *Kai Ziegler*
General Contractor *kzgp Generalplaner, Selm*
Engineering Office *Ingenieurbüro Dipl.-Ing. Rainer Nowak*
Construction Period *01/2017 - 02/2018*

Following the rising demand for high-quality residential buildings and offices, the architect developed a complex and modern block of buildings, which is harmonically included in the urban area. The design shows two residential buildings (1 and 2) which are connected. There are 5 apartments in each of them and a building with 5 offices. Residential building No.2 and the office building are standing together on one floor which contains the underground parking and the basement. The parking has fewer walls. Therefore, there is a problem with the 3D-stability of the structure, as the load has to be carried by slim ribs and only some columns. Building 1 without the basement is reachable by the stairs from building 2. A special challenge was to support the two areas with different support stiffness's to avoid forbidden settlement differences. Furthermore, the basement is completely in groundwater. To reduce the weight the smaller floors on top of the 3 buildings are created by cellular concrete and the roof by timber.

The project was checked using a linear and nonlinear analysis for selected load combinations for the nonlinear subsoil without tension. Furthermore, an additional special nonlinear calculation was done for the time-dependent deformation with cracks in the slabs.

Ingenieurbüro Nowak

Contact *Rainer Nowak*
Address *59192 Bergkamen*
Buchweizenkamp 15
59192 Bergkamen, Germany



Every building is unique and so there has to be an individual adjusted approach. To advise the designer and to develop feasible solutions out of visions is the permanent challenge. The Ingenieurbüro Nowak for 25 years – has been converting complex industrial, business and residential projects into effective functional buildings using the latest software.



CEVA Railway Stations - Geneva, Switzerland

Owner CEVA - CFF
Architect Jean Nouvel & Eric Maria architects
General Contractor SHZ Consortium
Engineering Office INGPPI SA - Ingénieurs en Ouvrages d'Art
Construction Period 01/2016 - 12/2019

The new trans-border CEVA railway connects the Geneva main station to the French network. The five new stations, built in the city, were designed by Jean Nouvel Atelier and Eric Maria architects in close collaboration with INGPPI structural engineers, all according to the same principle: large scale glass bricks (5.40 m x 2.70 m) supported by slender steel structures. The steel structures are frames, walls, roofs, footbridges and floors (up to 20 m high and 24 m spans). Roof beams are 3 m high. All steel elements, regardless of their function, are 120 mm wide welded built-up box sections.

SCIA Engineer software was used for structural calculation. 3D beam models were built to calculate forces and displacements. The Steel code check module was used to identify the most critical elements. Buckling critical loads were calculated using the Stability module. Vibration periods were obtained using the Dynamics module to verify resonance effects under both pedestrian and wind excitations and to carry out seismic verifications.

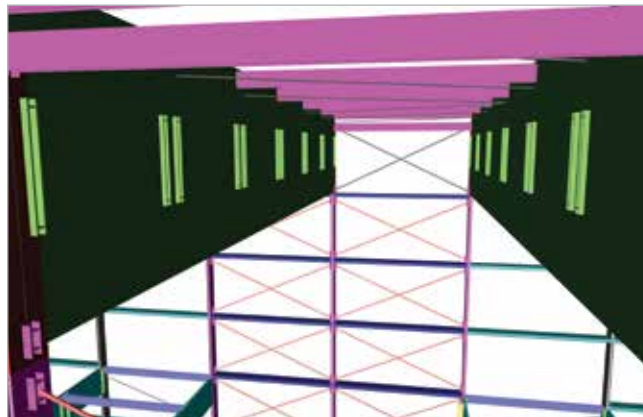
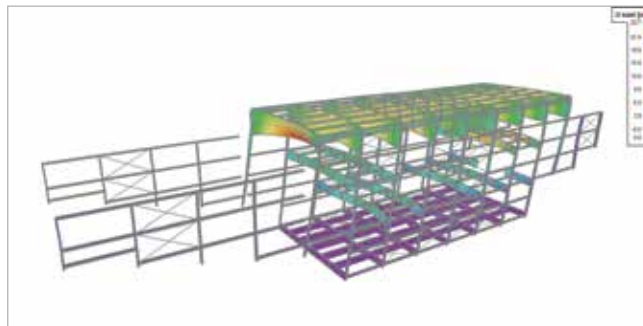
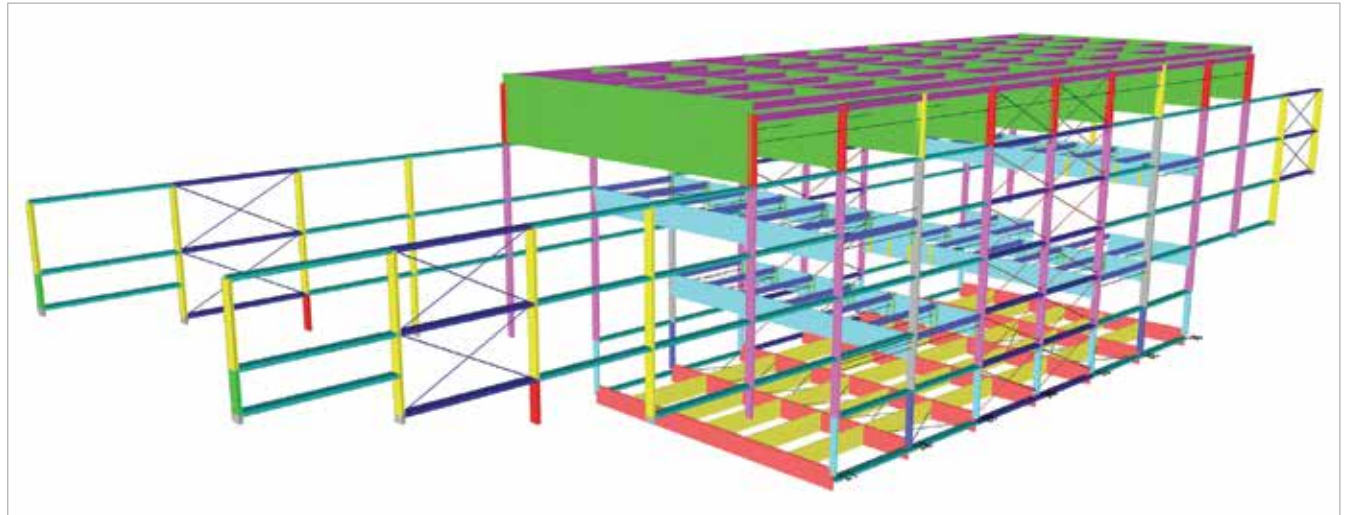
The main challenges of the project are related to the slenderness of all elements. Since the steel structures support glass façades, displacements are critical. Instability is critical for columns and roof beams. Dynamics is critical for floors. SCIA Engineer software was useful in achieving these design tasks and allowed for elegant steel structure design that meets high-level architectural requirements.

INGPPI SA

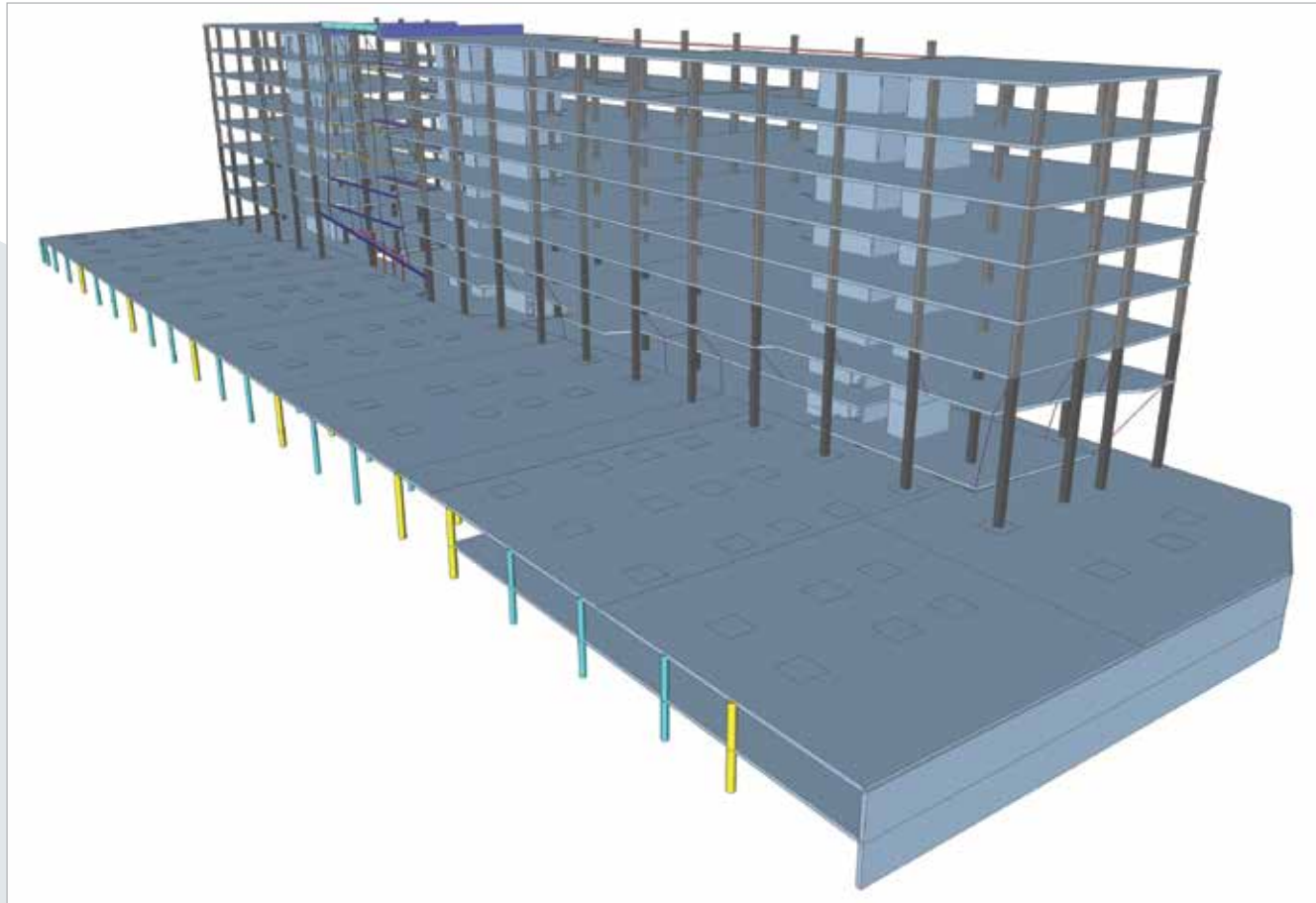
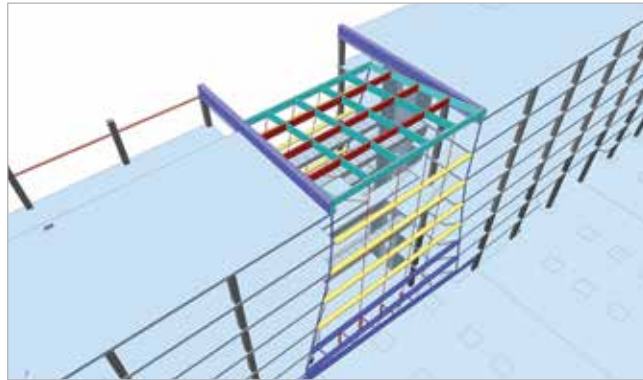
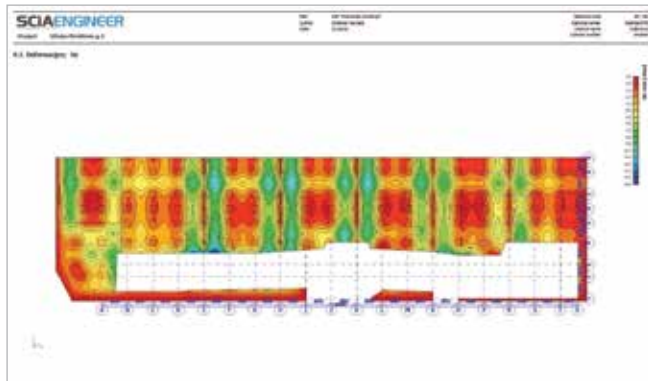
Contact Bernard Adam
Address Rue Centrale 9bis
1003 Lausanne, Switzerland
Website www.ingppi.ch



INGPPI is an engineering firm based in Lausanne (Switzerland) that focuses on creating and designing load bearing structures. It is specialized in numerical simulation, 3D modelling and innovative materials to continually improve and enhance projects quality. Each design project is viewed by INGPPI as creative work to develop unique and comprehensive structures also considering architectural criteria such as wise use of materials and complex geometries.



Administrative Building - Vilnius, Lithuania



Owner	AB Hanner
Architect	Arches
General Contractor	UAB Promola
Engineering Office	UAB ACON Engineering, MB Pramonės inžinerija
Construction Period	10/2016 - 12/2017

The administrative building, which is designed in the centre of Vilnius city, will be one of the largest office buildings of its kind. Its length is 150 m, width 18 m and height 30 m. It will have seven floors, and approx. 15,000 square metres of commercial area. All that without a huge parking area under the building!

The whole building is designed to be made from monolithic reinforced concrete more or less. So, the model is based on 1D elements – concrete columns, beams, and 2D elements – concrete slabs and walls. After importing architectural plans in the model, it's easy to place walls, columns and floor slabs. The next step, is to copy the 1st level, and make 7 floor levels with minimal corrections. Without connections, such as nodes, intersections and slab ribs the program won't understand what is designed, so connection of nodes command in SCIA Engineer is very useful. The building has to be stable in all directions, and as it is quite narrow in width, a stiffening stairwells core from concrete walls was inputted over all seven floors, and all column–slab connections were made rigid. As a result, the building would have the maximum stability in case extreme wind loads occur.

Each calculation model of a different building is only a calculation model. It is not intended to be identical geometrically as the architects designed, but it is important to come close with this calculation model, to understand the building's behaviour in a real environment.

MB 'Pramonės Inžinerija'



Contact	Redas Stulginskas
Address	K. Petrausko 19a LT-44162 Kaunas, Lithuania
Website	www.pramonesinzinerija.lt

MB „Pramonės Inžinerija“ is a team of experienced and skilled professionals working in various fields of building design. We are ambitious, strong, flexible, constantly evolving, always working quickly and qualitatively. We are working in both Lithuania and foreign markets.

We have accomplished more than thirty different projects in different fields of design, we have earned a trustful and Professional partners name.

Offering a wide range of services we are able to be flexible and operative for the needs of our clients.

Public school - Verney, Puidoux, Switzerland

Owner Association Scolaire Centre Lavaux
Architect Architecture & Retail Rites, Lausanne
General Contractor Puma Construction SA / Frutiger SA /
Revaz Construction SA
Engineering Office MP Ingénieurs Conseils SA
Construction Period 06/2015 - 06/2017

In 2013, MP Ingénieurs and aRR architects won first prize in the contest for a new public school in Verney. The choice of the metal structure played an important role in the decision of the jury, limiting the loads on poor-quality ground and revalorizing the existing building by heightening.

The project consists of two buildings and a bicycle shelter. The first one, entirely new, is a 3-level composite steel/concrete structure (precast slab). The presence of two overhangs of more than 6.0 m led to two Vierendeel beams of 24 and 32 m spans with a double story height. The second building is a rehabilitation. It was completely disassembled to save only the load-bearing elements. Then a new flat roof was created in the metal frame and a mezzanine in the old gym. Finally, the bicycle shelter was made with a box girder with 3 fixed supports and a 40 m span.

SCIA Engineer was used to create a 3D model of the steel construction as well as the concrete slabs and walls. The study of the frame angle was made using the steel connections module. We also used the software for the seismic design and we exported the model using IFC to our steel drawing software. For the bicycle shelter, the plastic shell analysis was very helpful.

MP Ingénieurs Conseils SA

Contact Claude Penseyres
Address Rue du Centre 16
1023 Crissier, Switzerland
Website www.mp-ingenieurs.ch

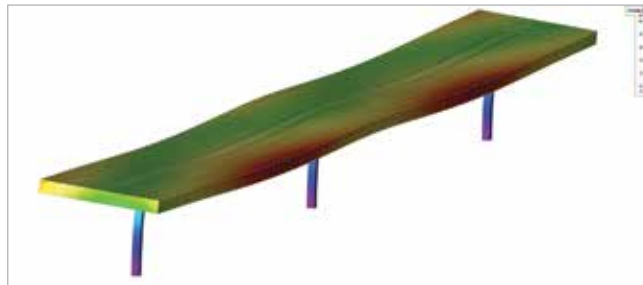
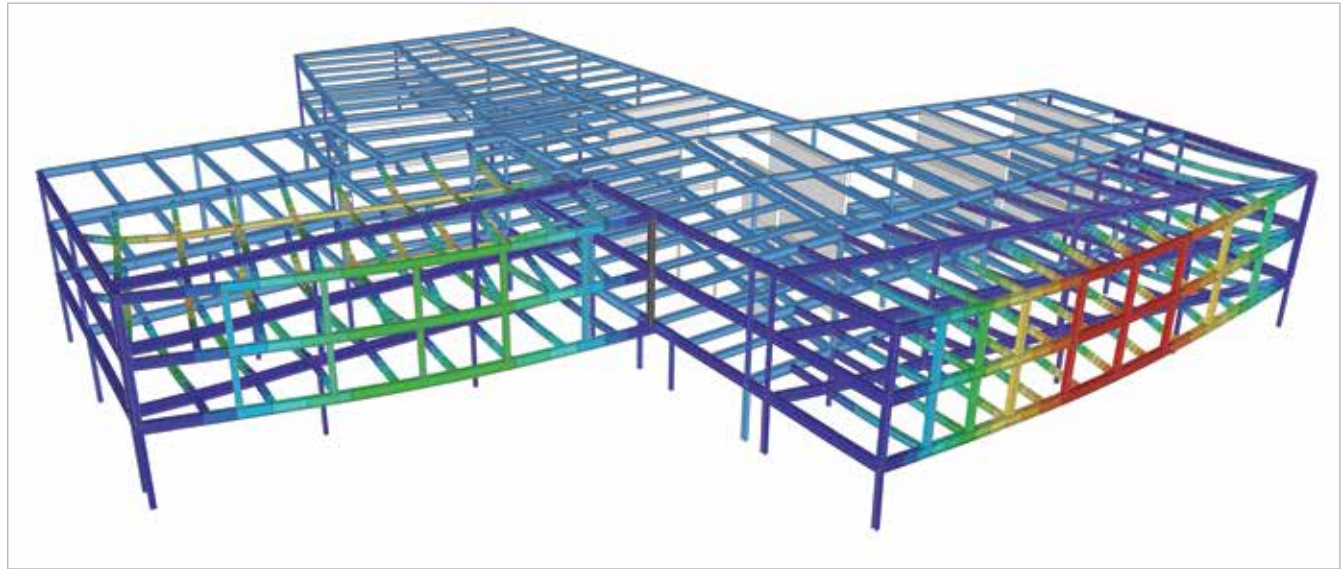


Founded in 1994, our company, based in Lausanne – Switzerland, operates in various domains of civil engineering.

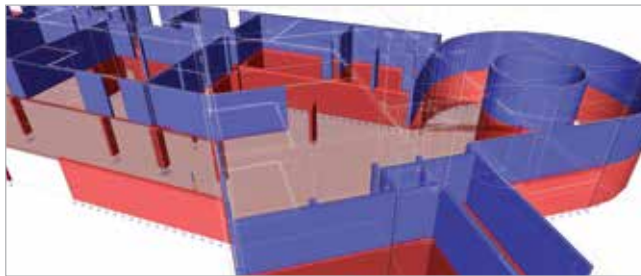
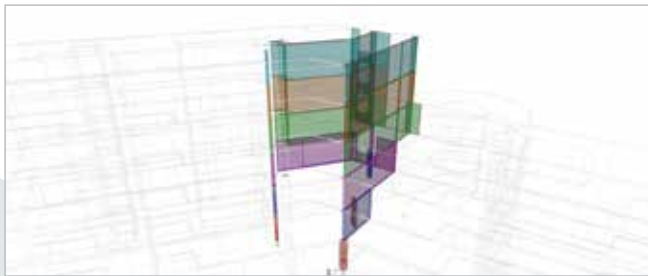
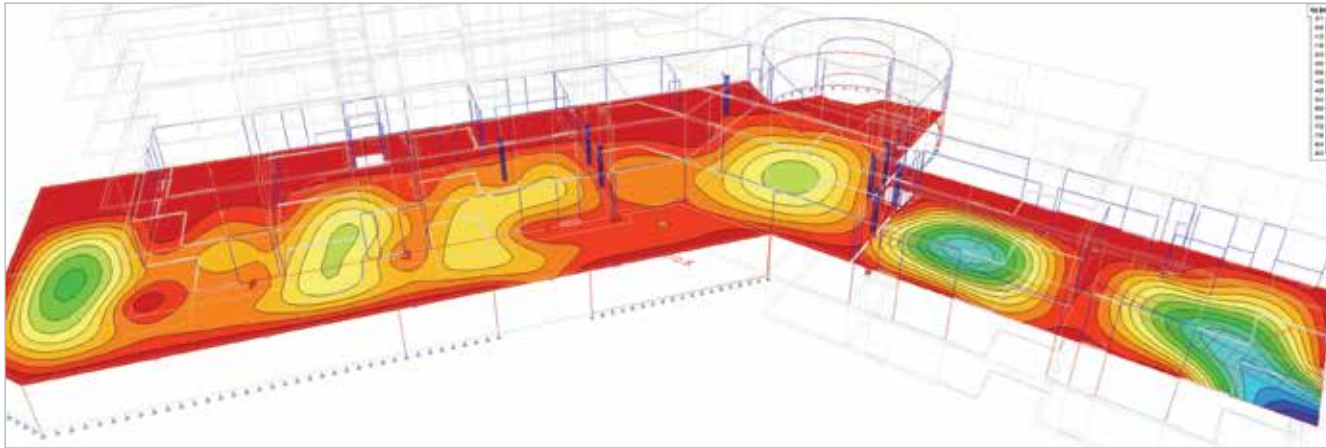
Specialized in structural design, we are experts in composite steel/concrete and wood/concrete construction, cellular beams ACB, seismic design as well as fire engineering. With advanced software, we are able to produce workshop drawing including site plan, construction drawing, assembly and details with 3D rendering.

Thanks to over 20 years of experience and knowledge, we can provide our clients with the most advanced solutions from a technical and economical point of view, while respecting architectural constraints.

Reference: World Archery Centre, Lausanne - Switzerland



Libre17 Building - Remaufens, Switzerland



Owner *RESA Holding SA*
 Architect *Dupont Architectes SA*
 General Contractor *R. Emonet SA*
 Engineering Office *OVALE & Partenaires Sàrl*
 Construction Period *05/2017 - 04/2018*

The project is a building of 6 levels, built on a sloping ground, with parking in the basement levels and access from the niv. 0 by a helicoidal ramp. Overall dimensions: L = 75 m, B = 20 m, H = 18 m. The supporting structure consists mainly of reinforced concrete, with a thick voided concrete slab (COBIAX).

The flexibility of the program for the graphical presentation of the different proposed solutions of the load bearing structure, the speed of modelling, and the capacity to design and analyse a complicated system of suspended walls in the central zone enabled us to meet the requirements and satisfy our client.

We tested the BIM functionalities of the program. We exchanged and retrieved several model types for the project, one of which was created with Autodesk Revit. This enabled us to set up an efficient strategy for the next project to be developed in collaboration with our client.

OVALE & Partenaires Sàrl

Contact *Eric Molleyres*
 Address *Ch. de Pra de Plan 25*
1618 Châtel-St-Denis, Switzerland
 Website *www.ovale-p.ch*



OVALE & Partenaires is an engineering office specialising in design and analysis of load-bearing structures.

Our main reason to exist is to develop ourselves in order to be able to build our future projects.

We love challenges, the projects in which we bring our added value in all authenticity, for the satisfaction of our customers.

We are landlords, we cultivate common sense and listening.

Zenklova Residential Building - Prague, Czech Republic

Owner Atelier P.H.A. Ltd.
 Architect Ing arch. Ondřej Gattermayer
 General Contractor P.H.A. Inc.
 Engineering Office Atelier P.H.A. Ltd.
 Construction Period 10/2016 - 12/2017

Building geometry and structural system: The foundations combine bored piles 10 m deep embedded into the bedrock and a foundation slab. The main bearing structure contains reinforced concrete columns and walls and cantilever balconies. The border walls and elevator walls were designed to provide adequate rigidity to the building. The floor slab was designed as a reinforced concrete slab, locally supported by columns. The part of the underground structure does not correspond to the rest of the upper structure. Therefore, very heavy beams and girders supporting the upper columns are designed.

Assessing the real behaviour of the load bearing structure including its response to variable soil properties requires several successive calculations with different modifications of the input data. Such a solution is possible by using the "Soil-in" module for the analysis of the interaction between the upper structure and subsoil. The structural model is made using BIM with 3D reinforcement design in Allplan and architecture in Revit.

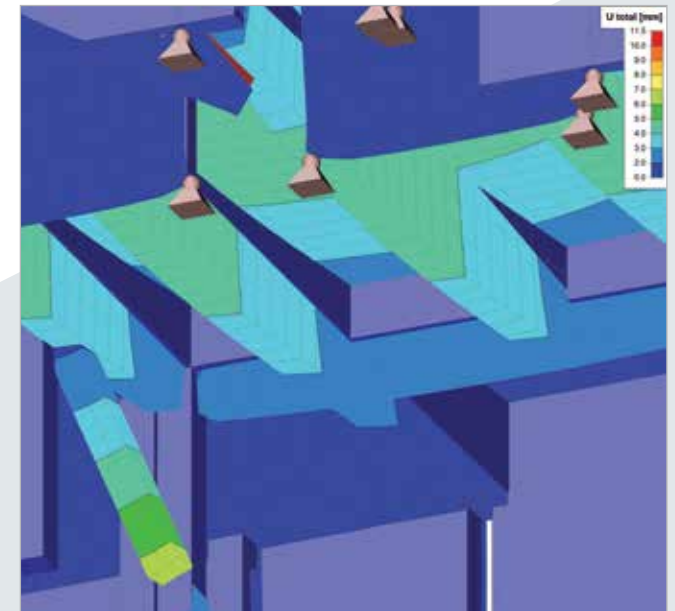
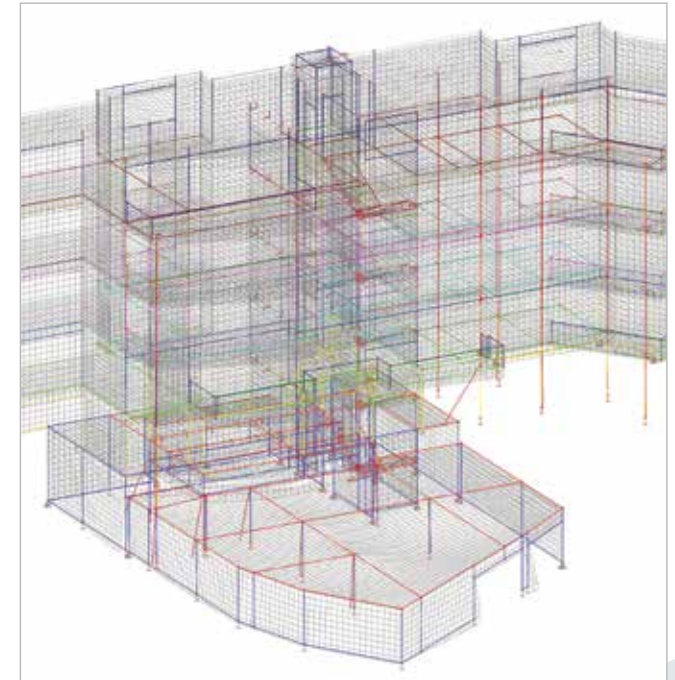
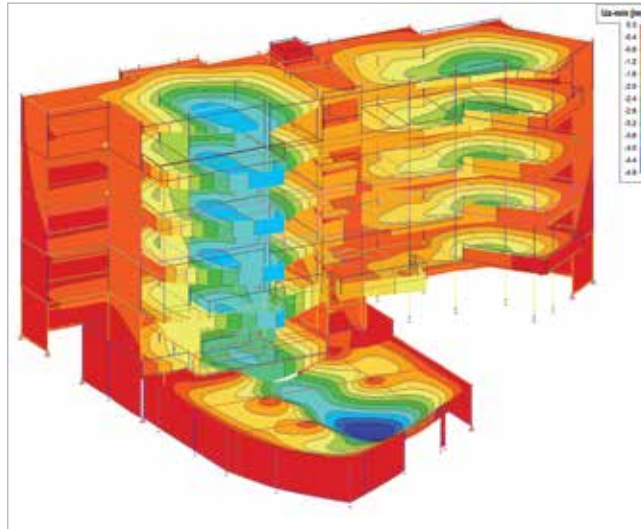
SCIA Engineer allowed the preparation of several alternatives of the structure. There were several designs in the process of the work according to client's and architect's demands. SCIA Engineer allowed us to design the cantilever building.

P-H-A Ateliér

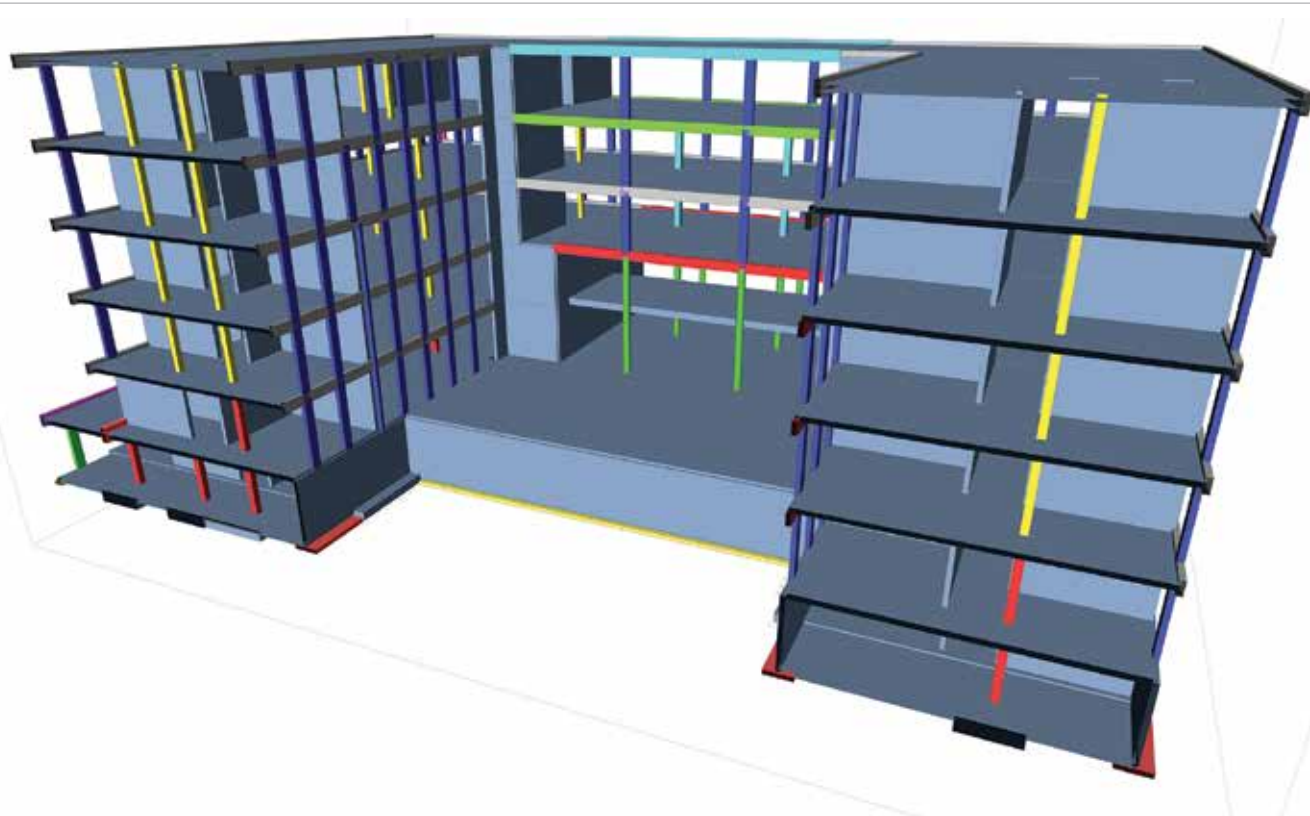
Contact Michal Škoch
 Address Gabčíkova 15
 18200 Praha 8, Czech Republic
 Website www.p-h-a.cz



Atelier P.H.A. was founded in 1990. It deals with design tasks, preparation and implementation of investment projects, engineering activities and is an expert in the field of construction and real estate investments. Participation in opinions on the condition and measures taken on load-bearing structures in industrial, high-rise apartment buildings, apartment building regeneration, opinions on the impact of emergency situations - like fires and flooding - on load-bearing structures, building passports during reconstruction etc.



HARIBO International Head Office - Grafschaft, Germany



Owner HARIBO GmbH & Co. KG
Architect Kohlbecker Gesamtplan GmbH/ PORR Design & Engineering
General Contractor PORR Industriebau GmbH
Engineering Office PORR Design & Engineering
Construction Period 04/2016 - 12/2017

Based on the design of the "Kohlbecker Gesamtplanung GmbH" office, PORR Design & Engineering (PDE) has taken over the execution planning for the new construction of HARIBO's international head office.

The six-storey building consists of a ground floor and five storeys and is divided to four building parts. The two wing structures are connected from the second floor up by two bridges. The buildings highlights are, on the one hand, the gallery that is about 19 m long and self-supported. Another structural highlight is the 9 m high concrete columns supporting the two bridges.

The great challenge of the project was that the building was generally planned in Revit, but the reinforcement plans were created in Allplan. Therefore, SCIA Engineer with its interfaces and variety of calculation modules offered the ideal tool for BIM-workflow. The 3D model for the analysis of wind and earthquake loads could be imported without much effort. SCIA Engineer's new reinforcement concrete module has been used to calculate the numerous columns and beams. Then this structural model was exported as an IFC-file to Allplan and the results of the slab analysis were utilised as the basis for the definition of reinforcement.

Looking back, this was the perfect way to plan the building efficiently and economically.

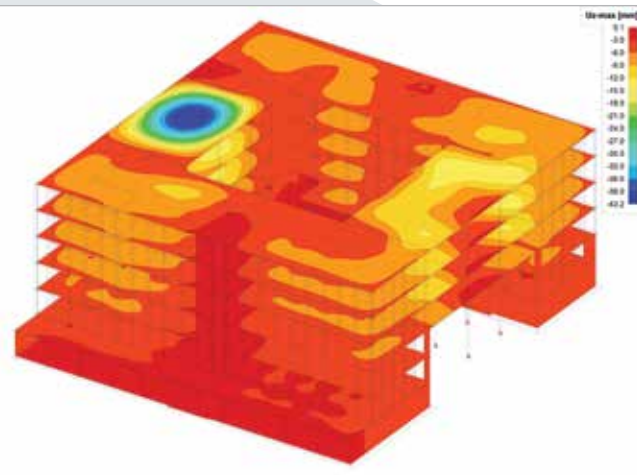
Porr Design & Engineering GmbH

Contact Hans Humpel
Address Absberggasse 47
 1100 Wien, Austria
Website www.porr-group.com



PORR Design & Engineering, PDE for short, combines the entire planning and calculation of the PORR Group with a focus on building construction. However, special expertise such as sustainability and building information modelling (BIM), which are relevant to the Group, are also located in the PDE.

As an independent subsidiary, the PDE was founded in June 2012 in Vienna, Austria. The founding of the German subsidiary in Berlin followed in November 2013. Today, PDE maintains further locations in Linz, Salzburg, Premstätten, Düsseldorf, Dresden, Munich and Warsaw. In 2015, with our nearly 300 employees, we generated a total turnover of around €30 million.



MySky Residential and Student Building - Vienna, Austria

Owner WBV-GPA, Strauss & Partner Development GmbH
Architect HNP architects
General Contractor PORR Bau GmbH
Engineering Office PDE PORR Design & Engineering GmbH
Construction Period 03/2015 - 02/2017

The residential tower "MySky" is a part of a skyscraper "district" on the outskirts of Vienna. In close collaboration with the renowned Viennese architect's office "hnp architects" a unique residential project was realised. This project connects all generations and life stages including a kindergarten, various types of apartments and community housing.

The tower is 21 storeys high. The four basements were constructed using the Low Impact Development strategy. They include parking space and technology rooms. The foundation is made as a combined pier-slab foundation with a total of 88 drilled piers.

Due to the very complicated building geometry the Revit-to-SCIA Engineer plug-in proved to be a big help with modelling. The exact 3D calculation model was generated from the architect's BIM model. As a result, it was possible to effectively and exactly analyse the vertical as well as horizontal load distribution due to wind and earthquake. Moreover, the calculated results on slabs were sent from SCIA Engineer to Allplan, where reinforcement drawings were produced.

The ability to analyse construction phases within SCIA Engineer were used within a frame of a research project focusing on monitoring of reinforced columns. With the support of the Vienna University of Technology, the aim of the project is to optimise the analysis model so that future building projects can be realised even more sustainably than already today.

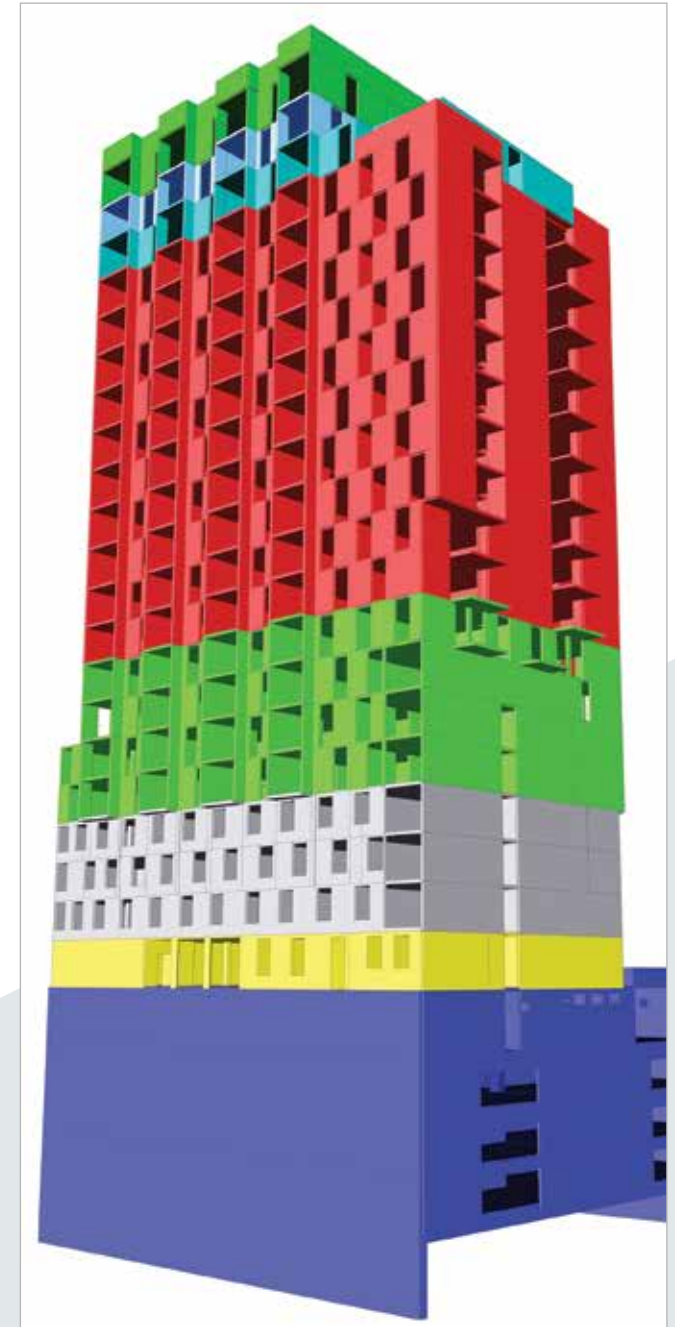
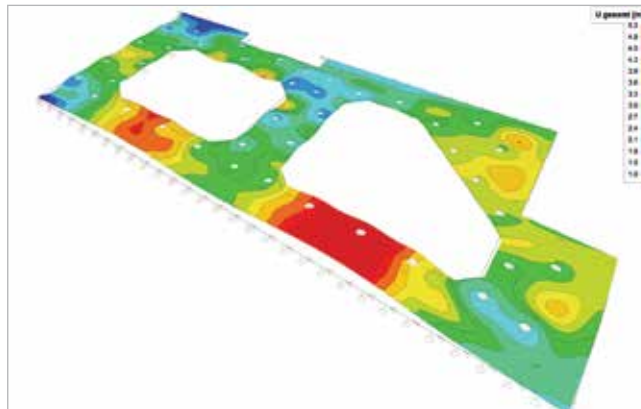
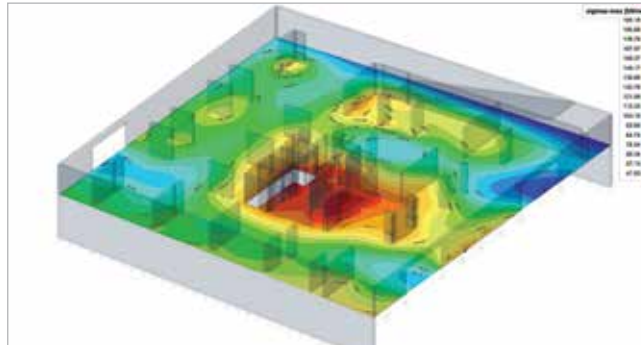
Porr Design & Engineering GmbH

Contact Hans Humpel
Address Absberggasse 47
 1100 Wien, Austria
Website www.porr-group.com

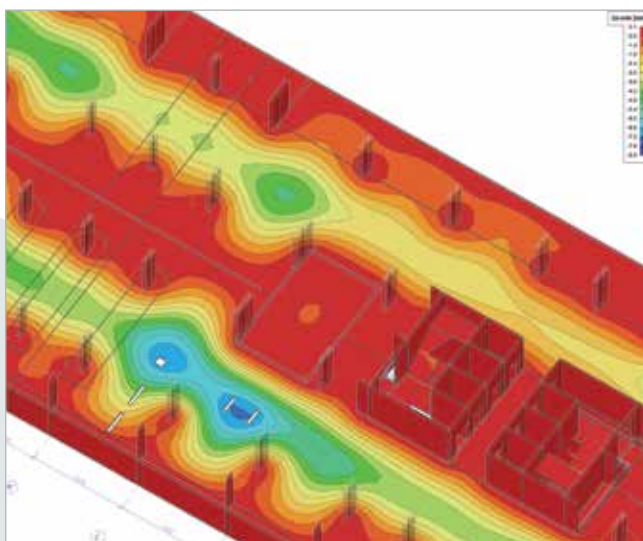
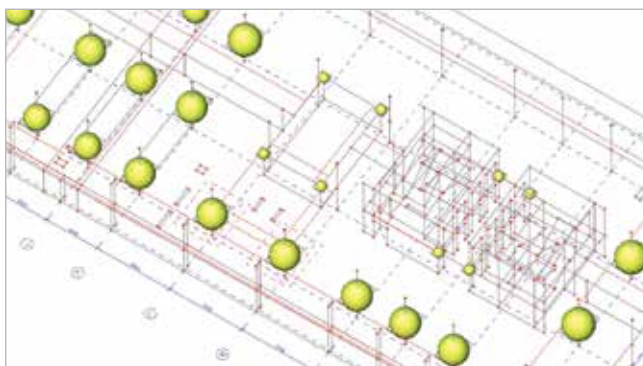
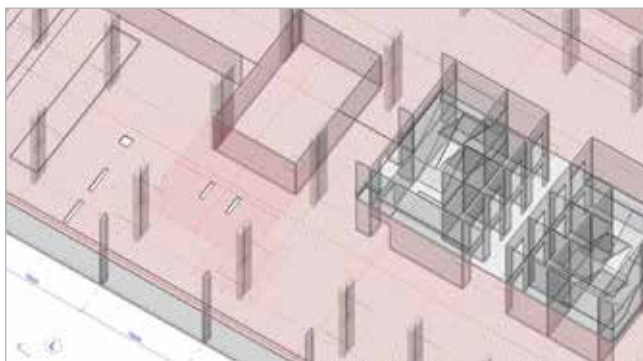
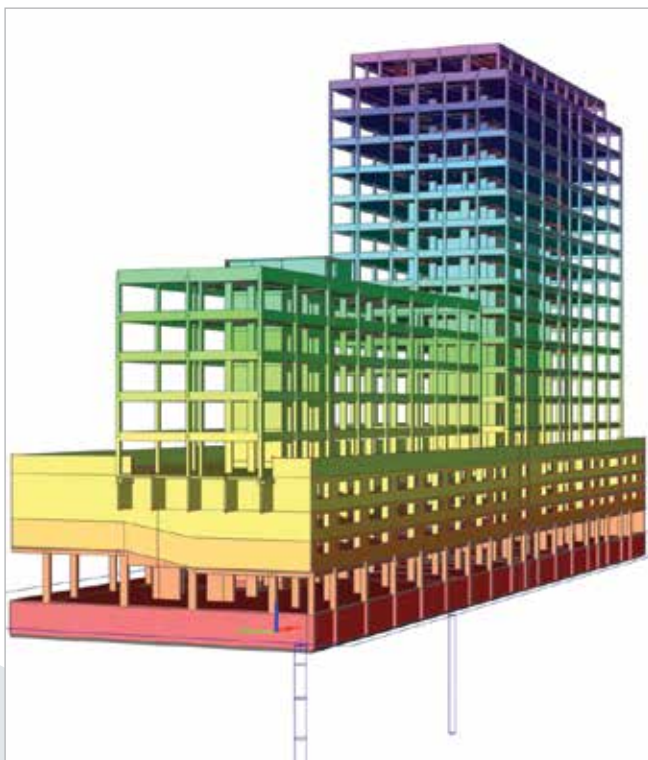


PORR Design & Engineering, PDE for short, combines the entire planning and calculation of the PORR Group with a focus on building construction. However, special expertise such as sustainability and building information modelling (BIM), which are relevant to the Group, are also located in the PDE.

As an independent subsidiary, the PDE was founded in June 2012 in Vienna, Austria. The founding of the German subsidiary in Berlin followed in November 2013. Today, PDE maintains further locations in Linz, Salzburg, Premstätten, Düsseldorf, Dresden, Munich and Warsaw. In 2015, with our nearly 300 employees, we generated a total turnover of around €30 million.



Einsteinova Offices - Bratislava, Slovakia



Owner IPD Internacional Property Development
Architect Siebert+Talaš, spol. s r.o.
General Contractor STRABAG Pozemné a inžinierske staviteľstvo s. r. o.
Engineering Office PRODIS plus, s.r.o.
Construction Period 07/2016 - 10/2017

The project is located on the city axis of Einsteinova, which is a major thoroughfare of Bratislava city. Both sides of the thoroughfare are gradually updated with new buildings of different size and function. The nature of the proposed project corresponds with the location; its mass constitutes a genuinely dominant environment. The project is an office building with flexible space. The position of vertical core in the middle of the ground plan allows for the maximum flexibility for working places located along the façade and it is in accordance with the strict local daylight regulations.

The central cores are suitably located, even in terms of dynamic loads acting on the structure, which were investigated using SCIA Engineer. In global model, the Soil-in module using flexible supports representing the piles of the slab-pile foundation was used. Through the adjusted co-operation of special foundation designer and structural engineer, the boundary conditions of the foundations were modelled. Averaging strips and local mesh refinement in combination with the detailed modelling of real reinforcement and the drop panels above the columns allowed for extremely optimal design of concrete reinforcement under strict safety criteria of European standards.

PRODIS plus, s.r.o.

Contact Juraj Štrbak
Address Racianska 71
 83102 Bratislava, Slovakia
Website www.prodis.sk



PRODIS – the studio for construction design and diagnostics was founded in 1991 by Dipl.-Ing. Vladimír Kohút as a design office of the authorized structural engineer. During the following years, it was gradually evolving and extending its field of activities. Nowadays, the company promoters as current partners are Dipl.-Ing. Juraj Štrbak (born 1981), Authorized structural engineer and Dipl.-Ing. Daniel Kóňa, PhD. (born 1982), Authorized structural engineer. The main activity of the company is the design of load-bearing structures and expert work in the field of structural and dynamic analysis of buildings.

Panorama City III - Bratislava, Slovakia

Owner Menolli, s.r.o., Dvořákovo nábrežie 10, Bratislava
Architect GFI, a.s., Brnianska 49, Bratislava
General Contractor STRABAG Pozemné a inžinierske staviteľstvo s. r. o.
Engineering Office PRODIS plus, s.r.o., Račianska 71, Bratislava
Construction Period 09/2016 - 10/2017

In the lucrative location of Bratislava city, on the Danube embankment, near the Slovak National Theatre and Eurovea shopping mall, the new epicentre of city life - the Panorama City multifunctional complex is growing. The Panorama Business III building is an ideal choice for companies looking for their new headquarters. Services on the ground floor, terraces, view of the city, restaurants and great location – the building has everything, while providing one of the most effective floor areas on the market. It offers 22,000 m² of rentable area, covering 15 above ground floors with about 380 parking places. It provides all the latest standards and it also has the ambition to obtain the Leed Gold certificate. The load-bearing structure is formed by the non-standard skeleton, with dominating exterior leaning columns of raw concrete of a height of three floors.

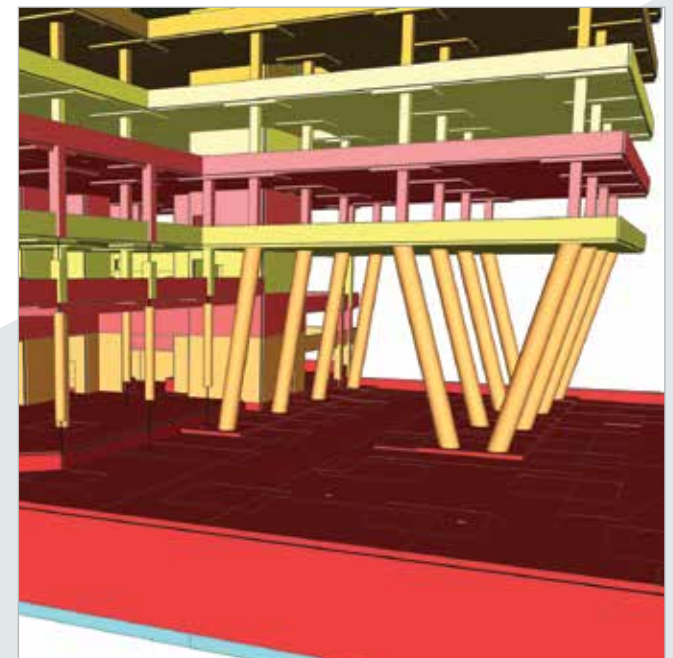
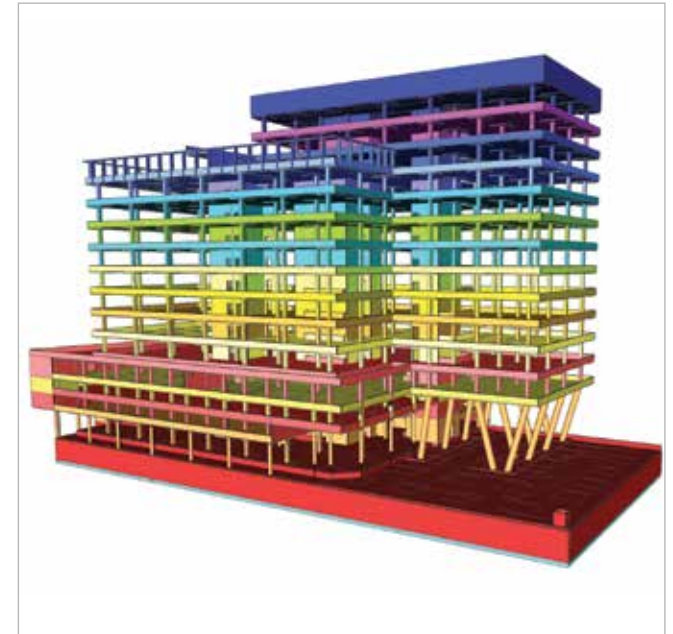
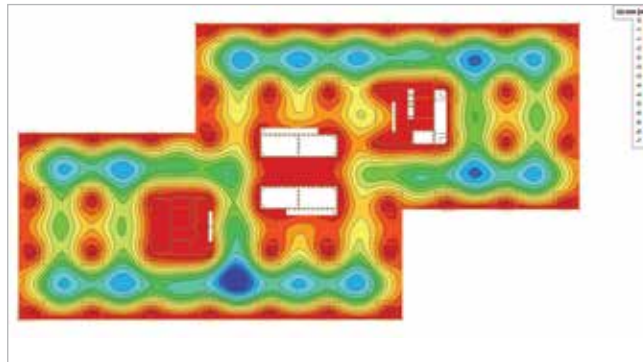
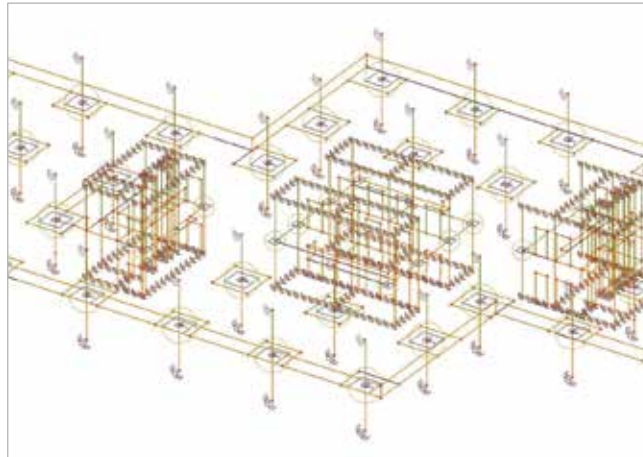
The difficult task during the design was to find the optimal amount of concrete reinforcement in ensuring the optimum thickness of the load-bearing members. The task was to optimise the structural design which was then subjected to a rigorous audit of safety and economy. The design of the load-bearing structure together with meeting the strict safety criteria of European standards was achieved by application of modelling tools like averaging strips, mesh refinement, together with the possibility of a precise geometrical modelling of load-bearing members, reduction of axial and bending stiffness during the global analysis as well as the modelling of the subsoil with piles.

PRODIS plus, s.r.o.

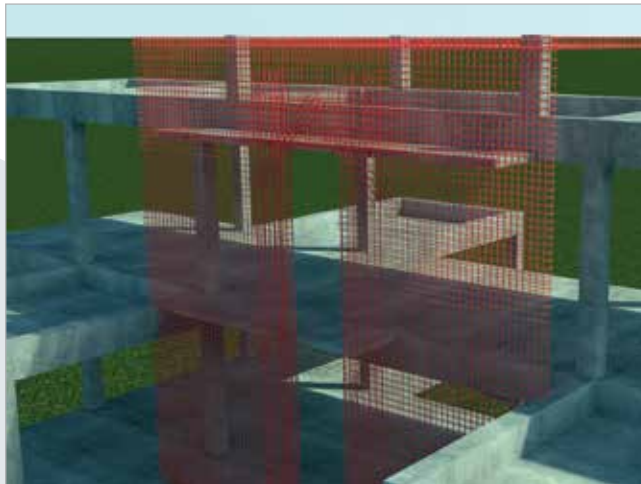
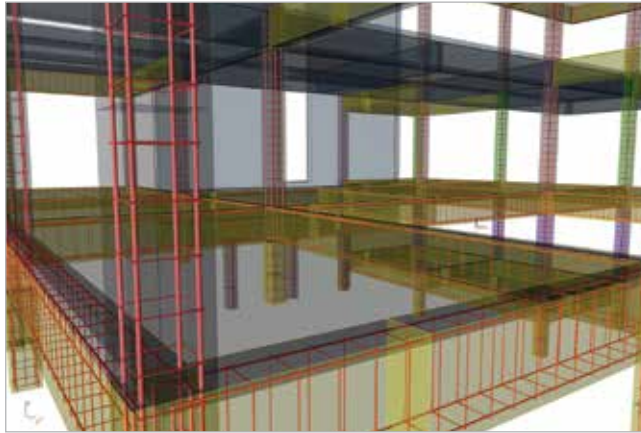
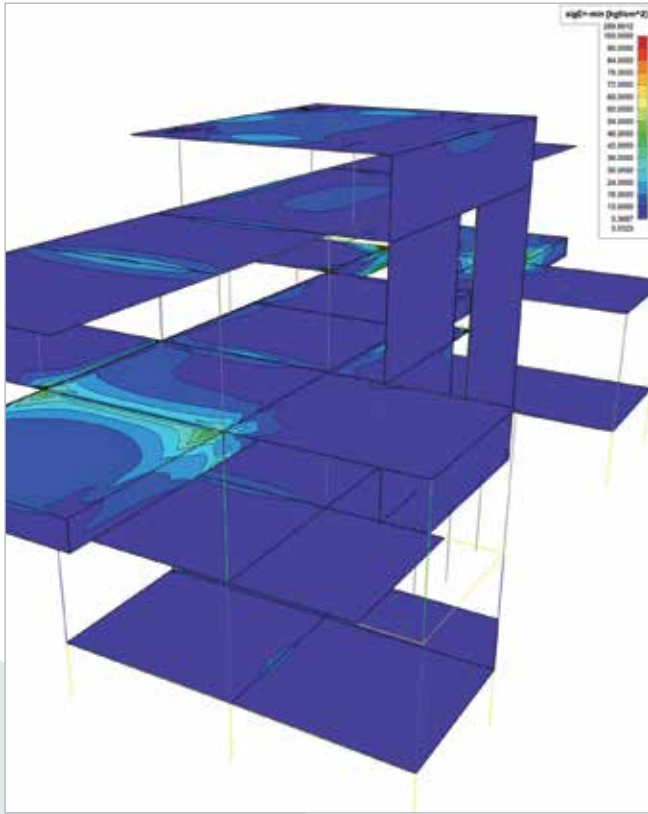
Contact Juraj Štrbák
Address Račianska 71
83102 Bratislava, Slovakia
Website www.prodis.sk



PRODIS – the studio for construction design and diagnostics was founded in 1991 by Dipl.-Ing. Vladimír Kohút as a design office of the authorized structural engineer. During the following years, it was gradually evolving and extending its field of activities. Nowadays, the company promoters as current partners are Dipl.-Ing. Juraj Štrbák (born 1981), Authorized structural engineer and Dipl.-Ing. Daniel Kóňa, PhD. (born 1982), Authorized structural engineer. The main activity of the company is the design of load-bearing structures and expert work in the field of structural and dynamic analysis of buildings.



Residential Building - Viçosa, Brazil



Owner **WESCLEY**
 Architect **ÁLVARO BRAGA**
 General Contractor **WESLEY**
 Engineering Office **ProSteel Consulting - Eng. Marcelo Fontes**
 Construction Period **03/2017 - 01/2018**

The presented project represents a single-family residence located in a condominium in the city of Viçosa / MG - Brazil. The structure is made of reinforced concrete with long cantilever beams.

The structure itself was a big challenge because it was necessary to keep the dimensions of the beams small. The solution was using double slabs composing a box. On the roof, a plain slab is supported directly by concrete pillars. The suite is completed with an architectural wall that also serves as a supporting structural element for the slabs.

The design was developed using SCIA Engineer, taking advantage of its great CAD modelling capabilities, perfectly representing the real positioning of individual elements. The model was exported to Allplan via the IFC file and all the detailing was done in 3D.

ProSteel Consulting

Contact **Marcelo Fontes**
 Address **R. dos Inconfidentes - 867 - 2o. andar
30140120 Belo Horizonte, Brazil**
 Website **www.prosteelconsulting.com.br
www.facebook.com/prosteelconsulting**



ProSteel is a company that values innovation.

The digital revolution started a new phase in structural engineering. The changes are so dynamic that they force professionals to keep up-to-date constantly. In this context, ProSteel is able to combine its high technical level with the latest technology, always at the forefront of engineering. BIM technology is a reality in our projects.

With experience in several segments, we already put our mark on projects in the areas of mining, steel industry, roof systems, building systems, vertical buildings.

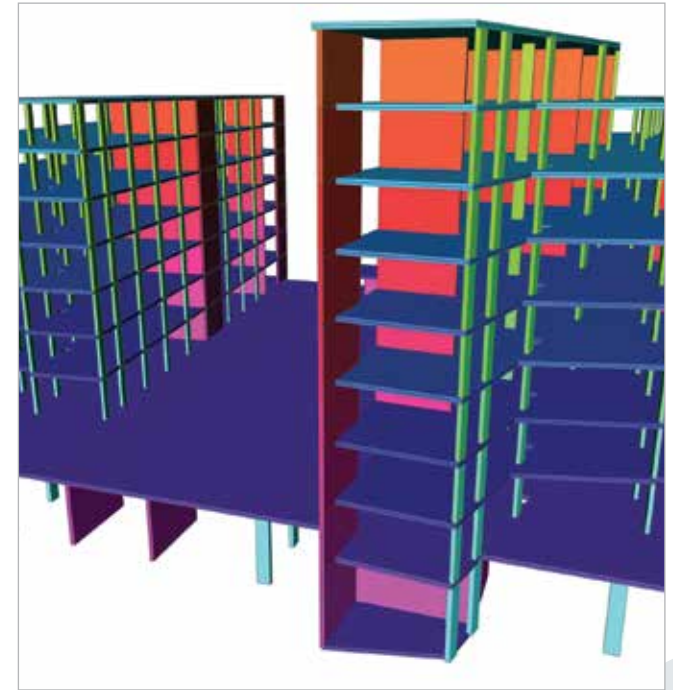
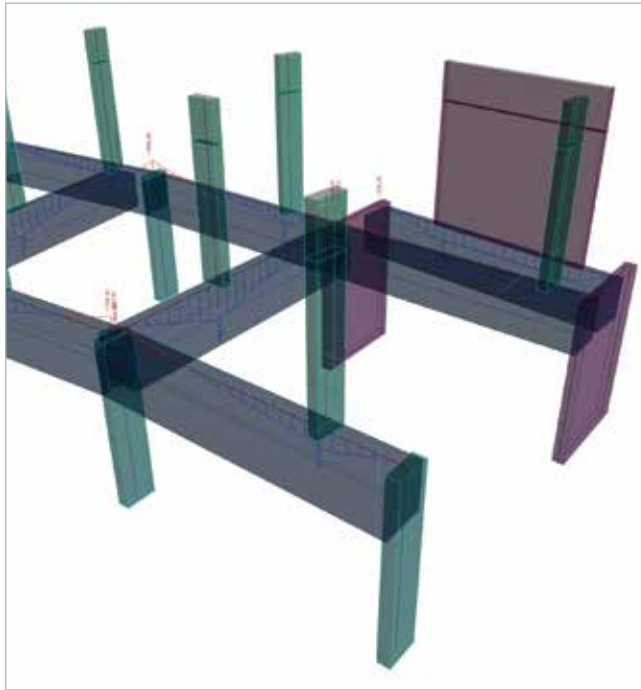
Bayscape - Cardiff, United Kingdom

Owner Cardiff Marine Group
Architect Rio Architects
General Contractor BECT Building Contractors Ltd
Engineering Office RVW Consulting
Construction Period 07/2016 - 03/2018

The Bayscape brief was to provide 115 executive apartments whilst maintaining a parking space for each below the building. This led to the main building being built of large transfer beams spanning between strategically placed columns, positioned to maximise car parking.

SCIA Engineer was vital in producing accurate load analysis of the structure which was critical for the design of the large transfer beams. Supporting up to 380 tonnes, SCIA Engineer was able to save 30% of reinforcement compared to traditional 1D analysis. The 70 x 65 m podium slab required a structural movement joint which was accurately modelled in SCIA Engineer. The detailed analysis led to a reduced specification of the shear connector at the tender stage. Code dependant deflections assessment was also carried out to establish long term displacements. SCIA Engineer was used to create the full FE model and generate the analysis output used in all aspects of the design.

We had to pay a lot of attention to the distribution of loads at podium level. Due to the additional stiffness from the transfer beams (ribs) in the model, load distribution around the floor plate was under particular scrutiny to ensure foundation loads were as expected.



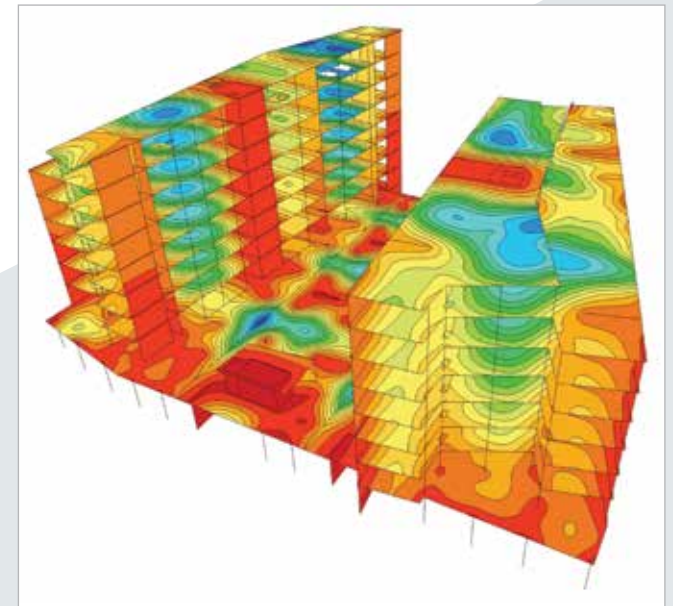
RVW Consulting Ltd

Contact Daniel James
Address 6 Neptune's Court, Vanguard's Way
Ocean Park
CF24 5PJ Cardiff, United Kingdom
Website www.rvwconsulting.co.uk

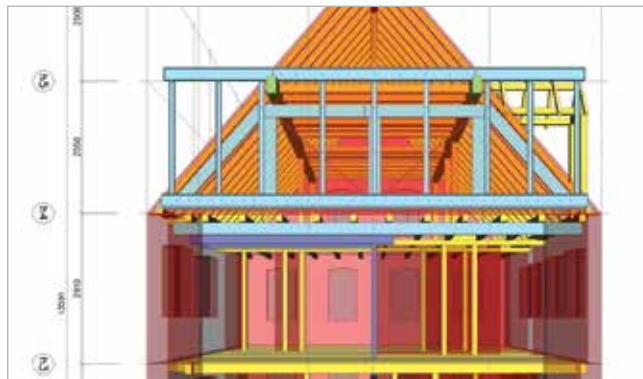
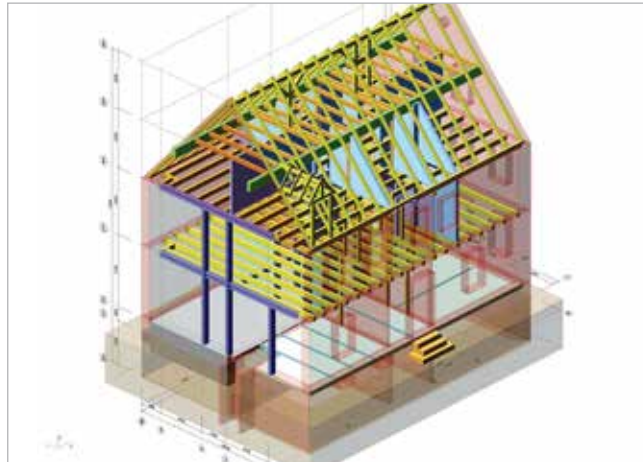
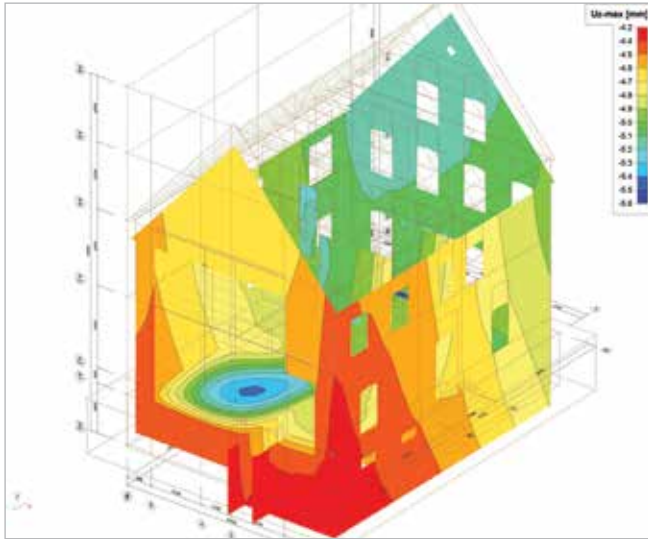


Principle disciplines include civil and structural engineering including project management. We provide an end-to-end service for clients extending from initial planning, through detail design to construction and fit out.

The diverse range and size of projects undertaken allows considerable cross-fertilisation of knowledge, expertise and experience. RVW Consulting's success is demonstrated by its considerable repeat business, client loyalty and by the many prestigious projects completed.



Residential House Renovation - Mannheim-Seckenheim, Germany



Owner Dr. Göbel
 Architect Architektursturm Peter Göhrig
 General Contractor Gerhard Wolf GmbH
 Engineering Office Ryklin Statik
 Construction Period 02/2014 - 05/2014

The old residential house in Mannheim had to be renovated. Additionally, next to renewing or strengthening of the inner substance due to new planning, the façade of the inner courtyard in the 1st and 2nd floor should be open to get more light inside. To achieve this, half of the house with the roof has to be pulled down and then build up again with the appropriate costs. The idea was to contain a part of the wall through steel claiming and use it as a load bearing part for the floors. Two variants were developed. The first one with the load bearing part outside was cheaper, but it may disturb the working on the façade. The second one with the load-bearing part inside was more complicated to build in, but more friendly for other work.

The project was processed in SCIA Engineer with structure-, 3D-free-modelling- and drawing tools with presentation of all details in the 3D-model directly. The calculations were done according to the second order theory. All the overviews, elevation, execution and detail drawings were processed and created in SCIA Engineer with the appropriate modelling and drawing tools. The production and execution of the steel claiming and new steel-glass facade was realised by the company Wolf, GmbH Lampertheim with casual engineering site controlling. The demolition work, required improvement and preparation of the ground structure was processed by the owner. The complete planning with execution took around 6 months.

Ryklin Statik

Contact Sergej Ryklin
 Address Liselottestrasse 17
 69123 Heidelberg, Germany
 Website www.ryklin.eu



Planning and optimization of Steel, Aluminium, Solid, Composite, Timber and Membrane Structures.

More than 1300 different projects processed, a. o. residential and industrial buildings, park decks, pedestrian bridges, swimming pools, silos, membrane coverings etc. for Daimler AG, John Deere AG, SAP AG, DB AG, Siemens AG, Henkel AG, BASF AG, Bridgestone AG, Roche AG, IKEA AG, ENBW and a lot of private clients.

The Philosophy of the Company is to offer the flexibility in planning due to integral 3D-Design with ability for finding feasible and low-cost solutions already on the draft stage.

Trade Center Garage - Bruchsal, Germany

Owner INWO Projektgesellschaft
Architect Planungsgemeinschaft Machmeier-Küpferling
General Contractor Stahlbau Alfred Müller GmbH
Engineering Office Ryklin Statik
Construction Period 10/2014 - 03/2015

This project deals with the covering of a parking space for the big Trade Centre in Bruchsal Germany. The covered area is about 70 x 220 m with an irregular curved ground plan. The position of the columns is predefined due to the parking places and given floor deck structure with spans of up to 20 m. Four solid stairwells have to be taken into account too. The whole area of the covering should be used for sun-collectors.

To satisfy these conditions, the bearing structure in the form of a spatial framework was chosen. The first big problem was to unify the framework structure to lower the production cost. The second, to consider the temperature load for the 220 m long building. The covering was built up regarding the already existing Centre solid structure in SCIA Engineer. With structure, 3D-free-modelling drawing tools and DWG/DXF interface it was possible to interact with the architect and client for the optimisation. The calculations were processed in SCIA Engineer using the 2nd order theory according to the Eurocode loading including earthquake. The results of the calculations gave feedback about the needed tolerances on the bearing points to avoid the temperature duress. The structure has no bracing. The stability is ensured with fixed columns and push-resistant roof trapezoidal-panels. All the views, elevations and detail drawings were processed and created in SCIA Engineer with the appropriate modelling- and drawing tools. The SCIA Engineer model was exported to Tekla Software to create connection details and production drawings.

Ryklin Statik

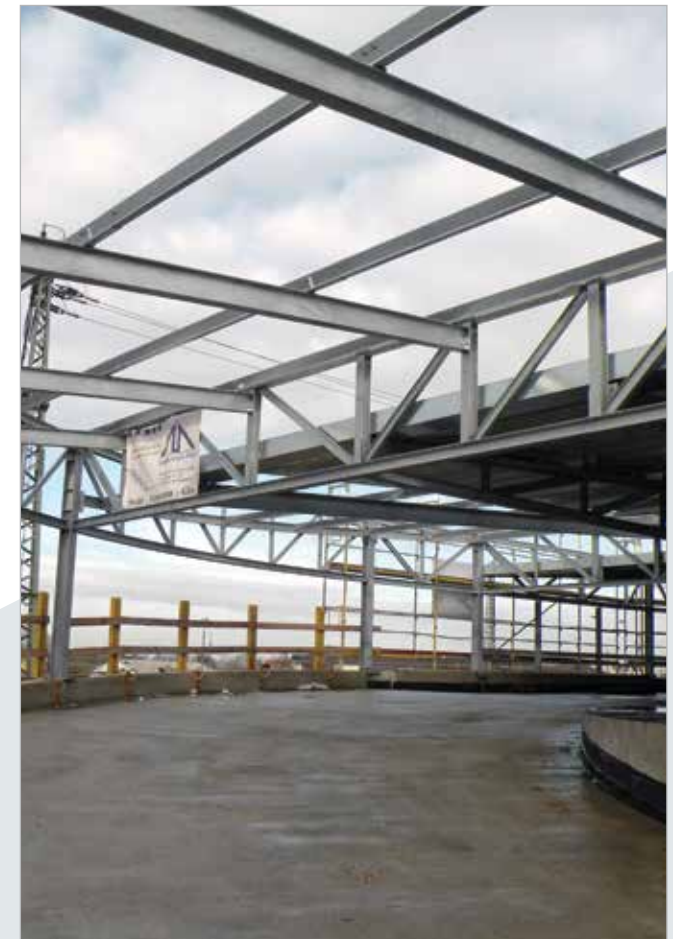
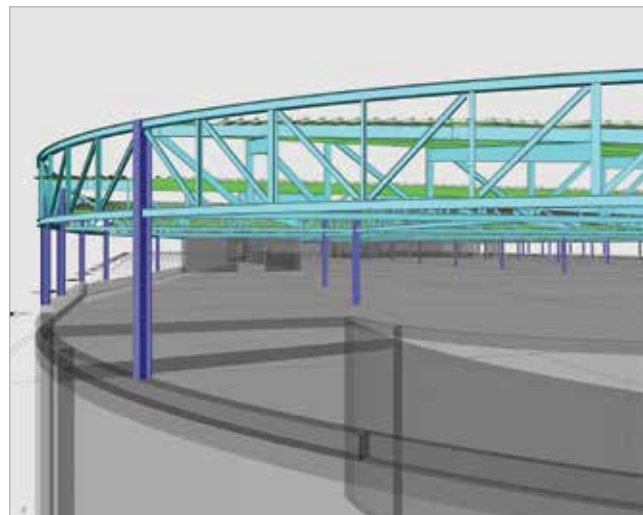
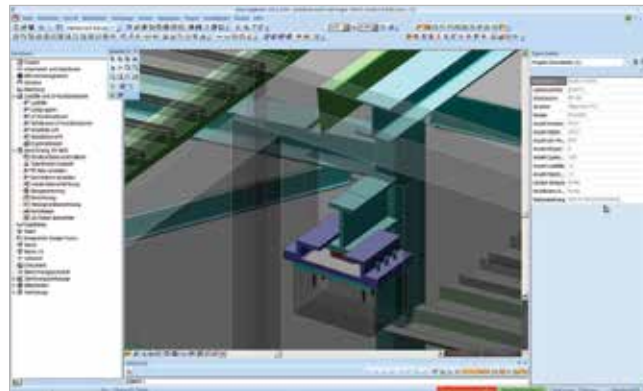
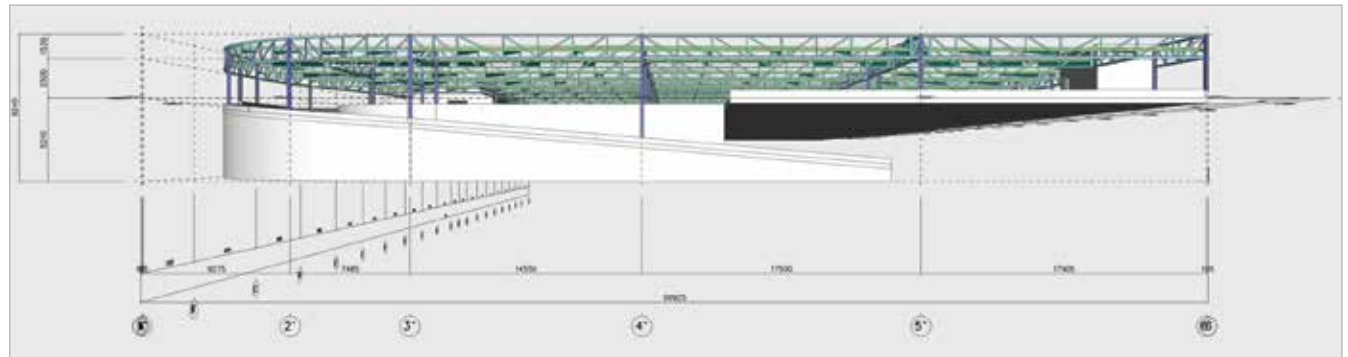
Contact Sergej Ryklin
Address Liselottestrasse 17
 69123 Heidelberg, Germany
Website www.ryklin.eu



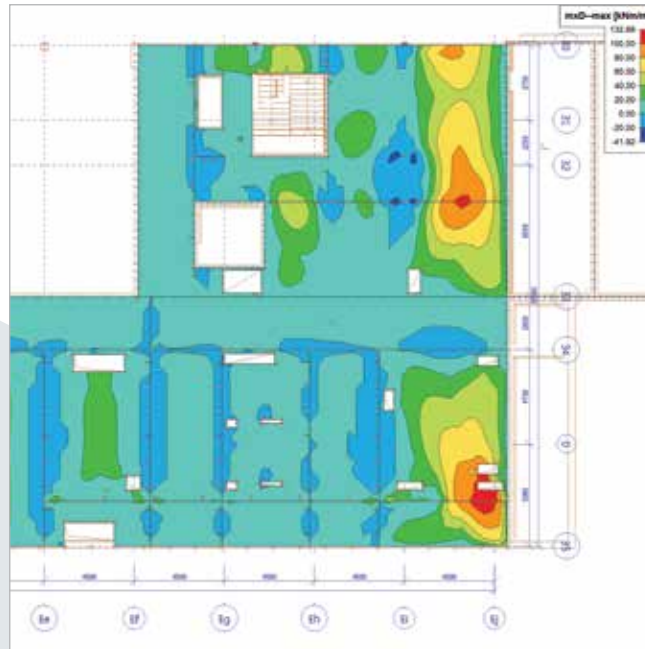
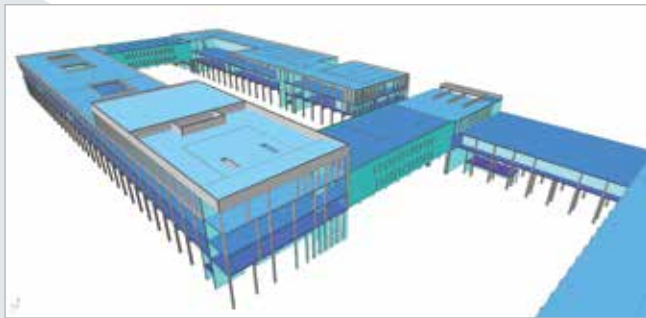
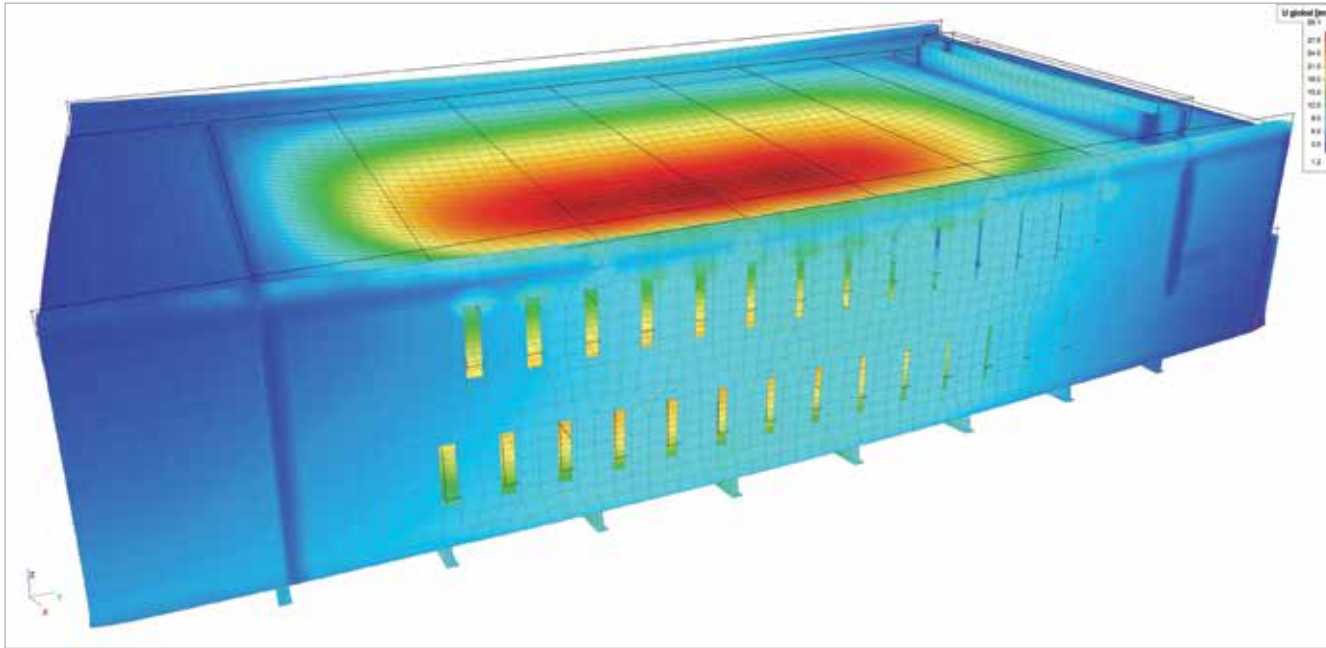
Planning and optimization of Steel, Aluminium, Solid, Composite, Timber and Membrane Structures.

More than 1300 different projects processed, a.o. residential and industrial buildings, park decks, pedestrian bridges, swimming pools, silos, membrane coverings etc. for Daimler AG, John Deere AG, SAP AG, DB AG, Siemens AG, Henkel AG, BASF AG, Bridgestone AG, Roche AG, IKEA AG, ENBW and a lot of private clients.

The Philosophy of the Company is to offer the flexibility in planning due to integral 3D-Design with ability for finding feasible and low-cost solutions already on the draft stage.



National Fire and Rescue Centre - Gasperich, Luxembourg



Owner Ville de Luxembourg
Architect Böge Lindner K2 Architekten Partnerschaft
General Contractor A.M. BAM-LUX / BAM-GALERE S.A.
Engineering Office Schroeder & Associés S.A.
Construction Period 09/2016 - 06/2018

The CNIS (Centre National d'Incendie et de Secours) is the most important intervention centre in Luxembourg, containing fire brigade, safety brigade, brigades control centre, several training units, residential schools, terraced audience room, sport room, offices and records, kitchen and restaurant, garages and parking areas. The global dimensions of the buildings are 225 x 85 m.

The centre consists of multiple buildings and 2 bridges with a span of 36.50 m between the buildings. The main construction material is reinforced concrete; some parts with large loads and large spans are designed with composite beams and columns; the main structures of the bridges are post-tensioned concrete elements.

The whole buildings are modelled in SCIA Engineer using slab and beam elements. This enables a complete and quick estimation of the loads on foundations; there is no need to export loads/reactions from one model to another (avoiding errors); all engineering can be done in one complete model. A simplified non-progressive collapse analysis is studied for the part of the building including the brigades control centre. The behaviour of the buildings and bridges especially regarding deformations can be well analysed in the SCIA Engineer model. Complete engineering report for slabs are established in SCIA Engineer.

Schroeder & Associés

Contact Michel Rodesch
Address 8, rue des Girondins
 1626 Luxembourg, Luxembourg
Website www.schroeder.lu



The engineering office Schroeder & Associés, founded in 1961, operates in four fundamental departments: building and structural engineering, road system, networks, urban and landscape design. Relying on its more than 50 years of experience and 288 employees, as well as on foreign specialised partners, the office offers its services, experience and know-how to its customers.

The challenge consists in providing activities answering the demands of the customers and increasing their satisfaction by completing the missions in an effective way.

OASSIS PEC 2 Building - Crissier, Switzerland

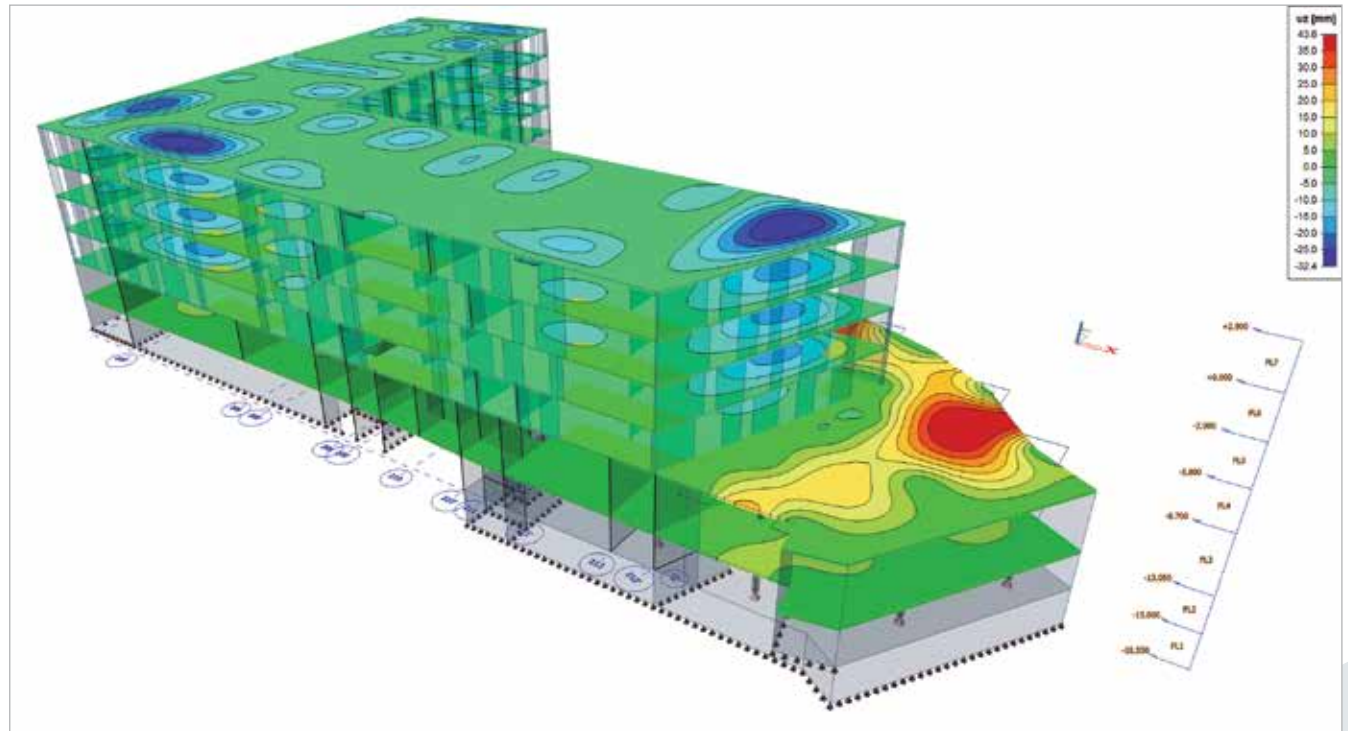
Owner *Patrimonium Residential Opportunity I SA*
Architect *Bauart Architectes et Urbanistes SA*
General Contractor *Losinger-Marazzi*
Engineering Office *SD Ingénierie Lausanne SA*
Construction Period *01/2017 - 12/2017*

The PEC 2 building is one of seven buildings of the OASSIS project in Crissier – Canton of Vaud - Switzerland.

Patrimonium Residential Opportunity I SA and its General contractor Losinger-Marazzi (Group Bouygues) commissioned to SD Ingénierie Lausanne SA the structural and construction design for 6 of 7 buildings.

Several type 2 ULS and SLS structural analysis verifications of the building were performed.

A 3D modelling of frame and shell elements was carried out in SCIA Engineer. Several complete and partial models were made to check the static and seismic design. The challenge was to handle the torsional displacements induced by the non-favourable L-shape of the building.



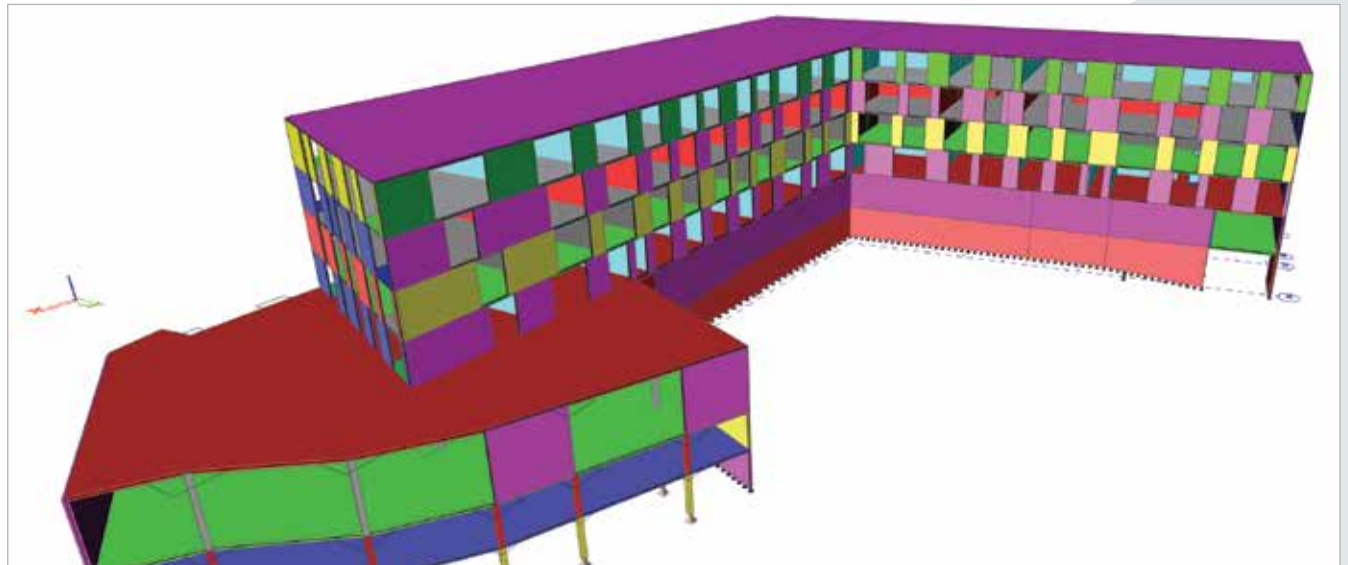
SD Ingénierie Lausanne SA

Contact *Alessio Salerno*
Address *Place Chauderon 3*
1002 Lausanne, Switzerland
Website *www.sdingenierie.com*

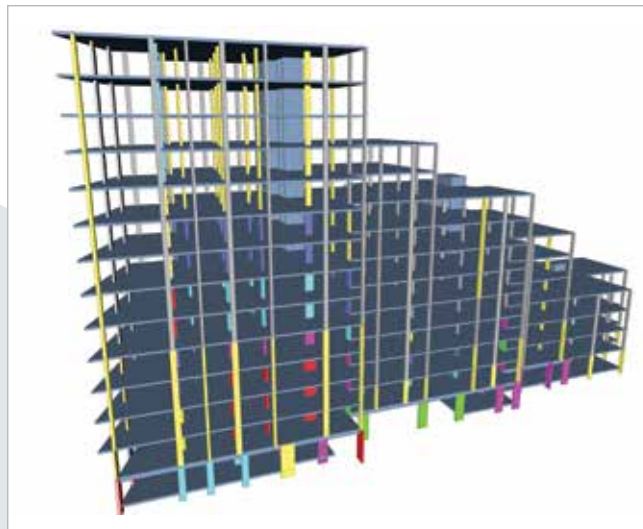
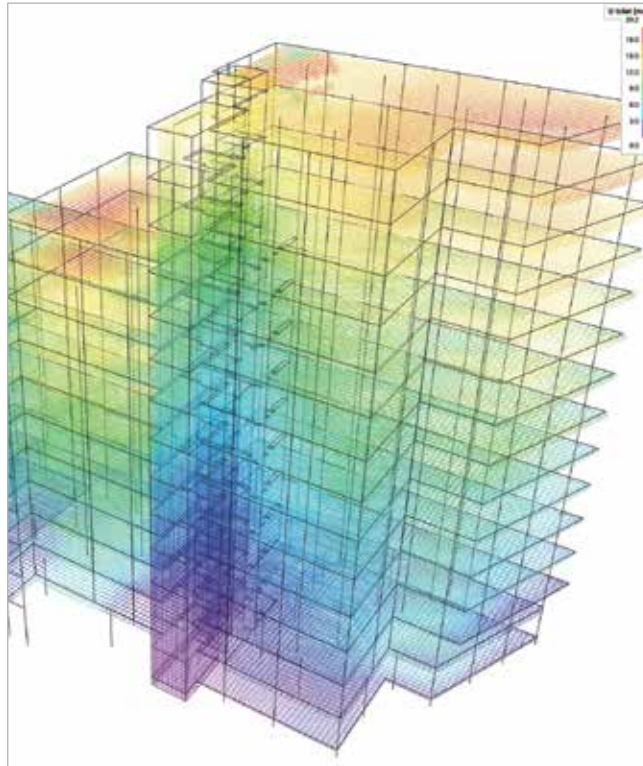
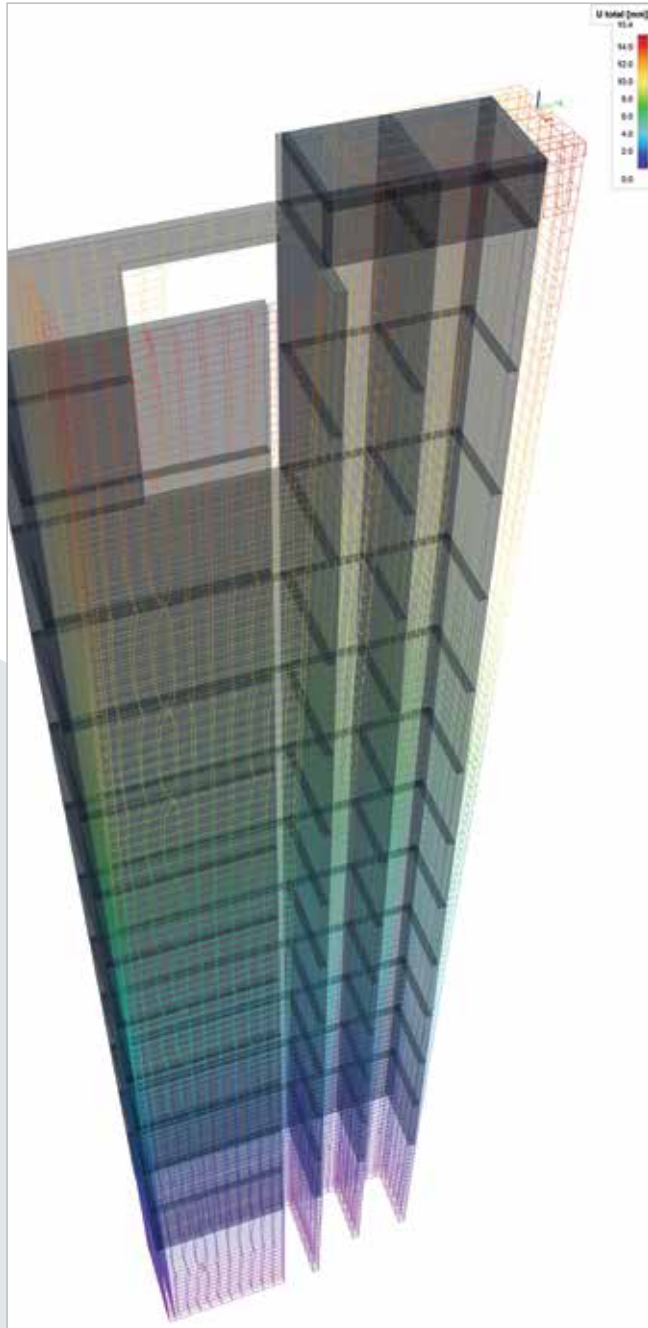


SD Ingénierie Lausanne SA was founded in 1955 and has about 40 employees. The firm is a diverse engineering, development and management consultancy delivering innovative solutions for public and private clients in Switzerland. Annually we are responsible for more than CHF 1 billion of construction projects. Our structural engineer capabilities cross different sectors: railways, roadways, infrastructures, buildings, hydraulic, environment and sport floors.

SD Ingénierie Lausanne SA is engaged in all parts of the design and construction process.



Hampden Road Block A - London, United Kindgom



Owner *Fairview New Homes*
 Architect *Formation Architects*
 General Contractor *Fairview New Homes*
 Engineering Office *Structa LLP (London Office)*
 Construction Period *2017 - 2019*

Structa have been instructed to create the structural design for Hampden Road Block A. This is a reinforced concrete frame structure comprising 14 storeys in total, excluding the basement. The building will host 14 storeys of residential accommodation, with a commercial unit on the ground floor where the basement is located beneath.

SCIA Engineer was used to develop a full FE analytical model for the whole building analysis, generated a mesh for the structure which produced zero small mesh nodes therefore eradicating the possibility of singularities within the model. Extract models for transfer slab were produced for refined analysis with mesh refinement around the nodes which produced a target error of 11% therefore producing reasonably accurate results. A basement piled raft supports the model as springs to give a realistic simulation of the pile/soil interaction. 2nd order non-linear analysis was used to review the code dependant deflections for the transfer deck. Blast analysis for the transfer deck was also conducted for the extracted model.

The transfer deck is supporting 13 storeys of residential units. The transfer deck had to be sufficiently stiff to support the upper floors without exceeding the global deflection limits and provide sufficient headroom to the commercial units below.

Structa LLP

Contact *Hadi Hamza*
 Address *6th Floor*
15-19 Imperial House
WC2B 6UN London, United Kingdom
 Website *www.structa.co.uk*

structa
 engineering environments

Formed in 2004, Structa LLP is a leading practice of Consulting Engineers. We are passionate about engineering, problem solving and producing cost effective sustainable design solutions. We design and specify engineering works and developments, from ground investigations and environmental assessments through to the detailed design and verification of major civil and structural engineering projects. We have grown to over 80 technical staff. This success and growth has been achieved through the dedication of our people, who have a collaborative and proactive approach to anticipate and solve complex problems with simple solutions.

Barco One Campus - Kortrijk, Belgium

Owner Barco
Architect Jaspers Eyers
General Contractor Cordeel NV
Engineering Office Technocon bvba
Construction Period 2014 - 2016

The engineering office Technocon was responsible for the complete structural design, the calculation and detailed engineering of the steel construction part of this project. This includes the façade, the roof structure as well as the mezzanine. Considering the building, this was a significant challenge. The architectural design stands or falls with the remarkable bent steel shapes. The clever diamond meshes are the connectors within the impressive complex.

"Of course, the form was the main challenge. The inclined columns below the mezzanine and the bent diamond structure within which the glass is connected, asked for special attention for the structural stability ..." explains Peter Van Nevel, chief engineer and project manager for the Barco-offices within Technocon.

The design of the steel construction, the stability calculations and the execution reports – including the 3D drawings for the main contractor – had to take into account all the necessary requirements, among others the fluctuations in temperature and the rigidity.

"The choice of the profiles from the diamond mesh completely depends on their weldability. This resulted in the choice for hot-rolled normalized hollow sections ..." according to welding engineer Van Nevel.

The Barco headquarter is a beautiful reference project for Technocon. "The positive cooperation between the builder, the architect, the contractor and Technocon resulted in this eye-catching steel construction."

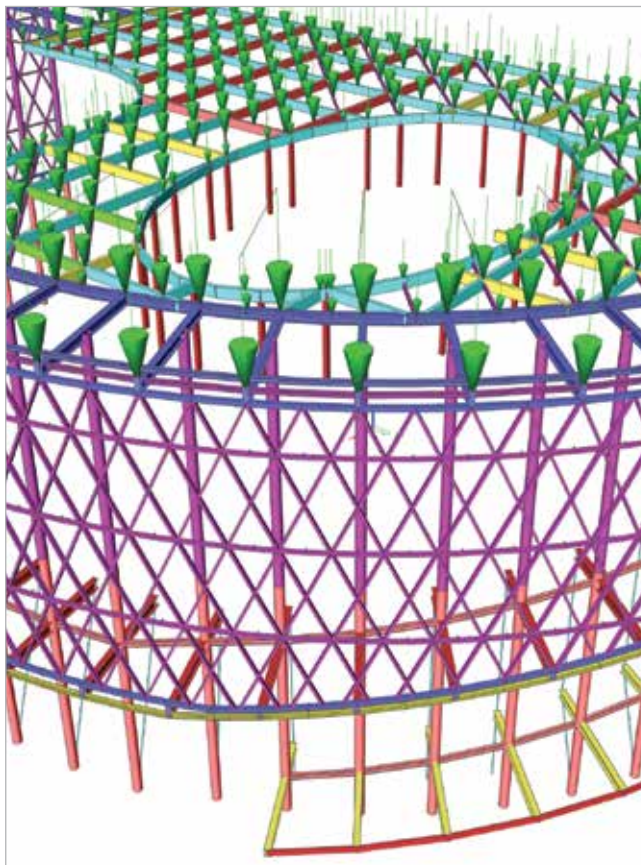
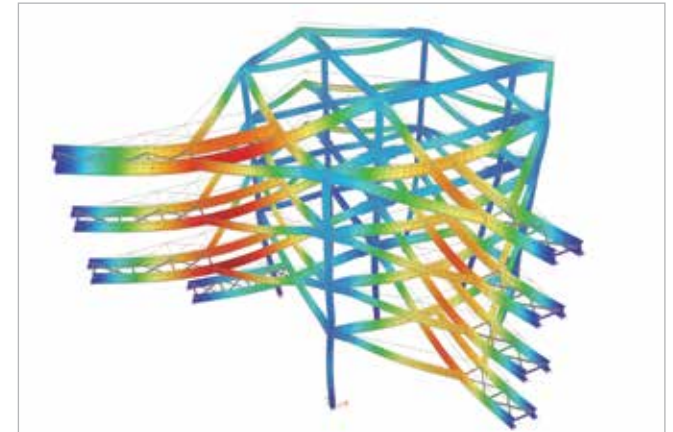
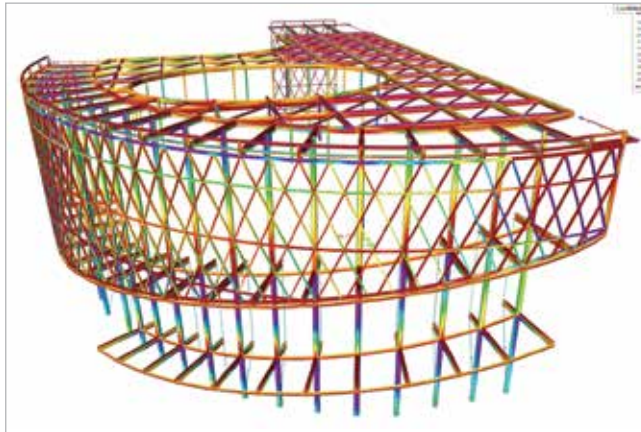
Technocon bvba

Contact Peter Van Nevel
Address Groendreef, 91
9880 Aalter, Belgium
Website www.technocon.be

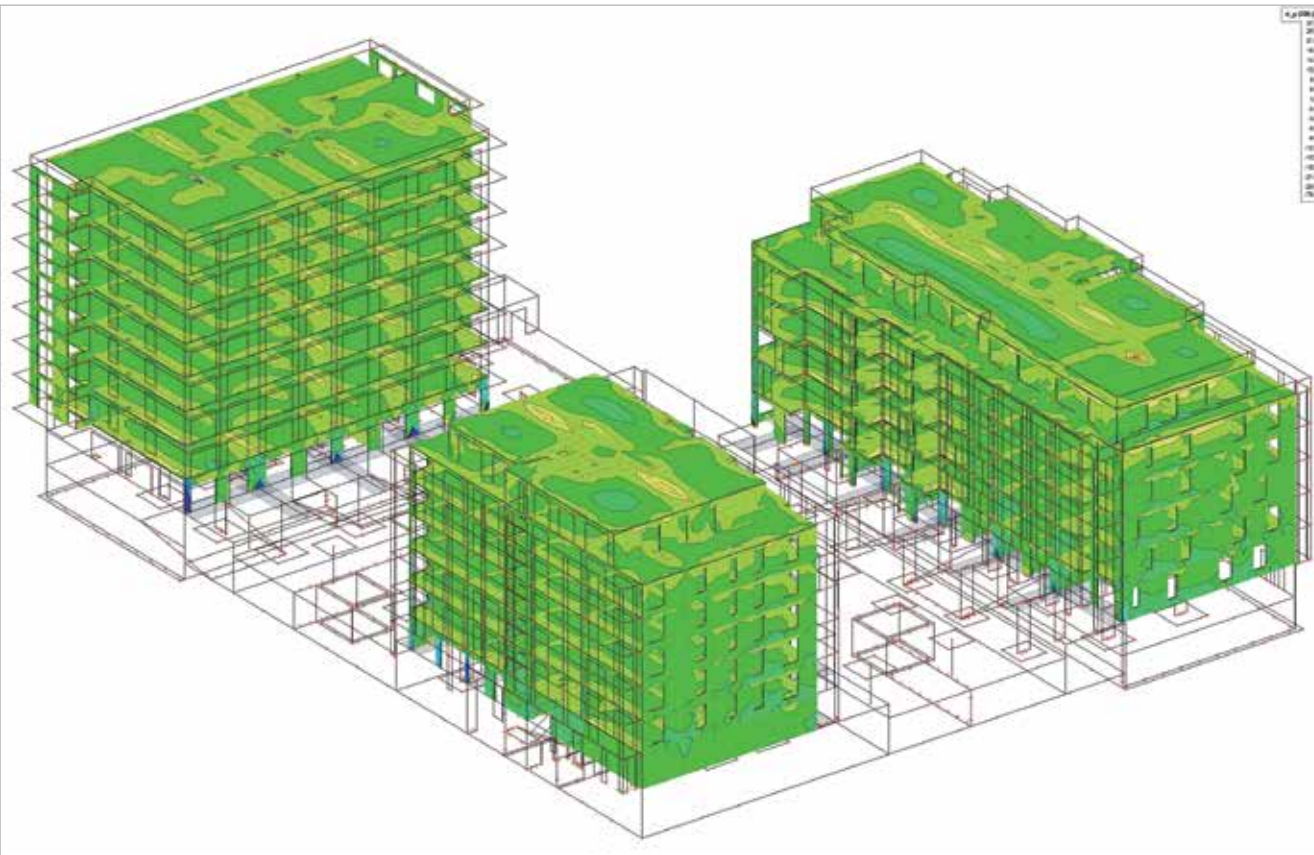


Technocon BVBA, founded in 1994, is an engineering office specialized in the engineering and in the design-to-construction process of steel structures and concrete structures of industrial projects.

With the highly qualified Technocon team and with the best quality software programs like SCIA Engineer, Tekla Structures, and others, we ensure that we can calculate and draw the steel and concrete constructions according to today's required international standardisation!



Ahoj Park Residential Complex - Bratislava, Slovakia



Owner *Ahoj Development, s.r.o.*
 Architect *Compass Atelier*
 General Contractor *HBH a.s.*
 Engineering Office *VISIA, s.r.o.*
 Construction Period *08/2016 - 12/2018*

Residential complex Ahoj Park is located on the Sliachská Street in Bratislava, Slovakia. It consists of three buildings with a rectangular shape. The buildings are 6, 7 and 8 storeys, the last floors are intentionally reduced. Between them, there is a green Park with a zone for relaxation. Under the park and buildings, there are two underground floors for parking and with cellar premises. The first floors contain units for commercial purposes, we can find shops, cafes or restaurants there. Flats are situated on upper floors. All flats include a balcony or terrace.

The structure is made from reinforced concrete and consists mainly of walls, columns, beams and slabs. The Foundations consist of a combined slabs-pile construction.

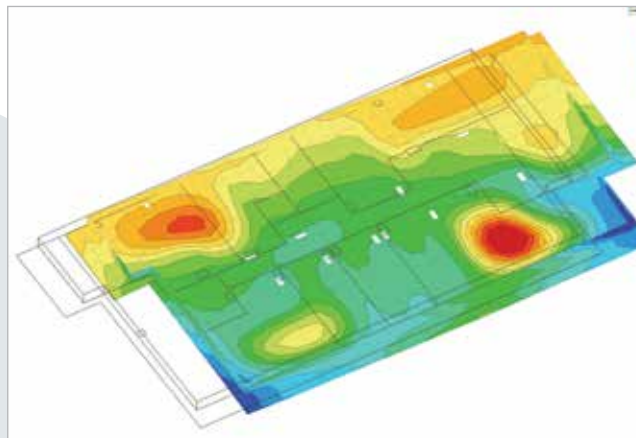
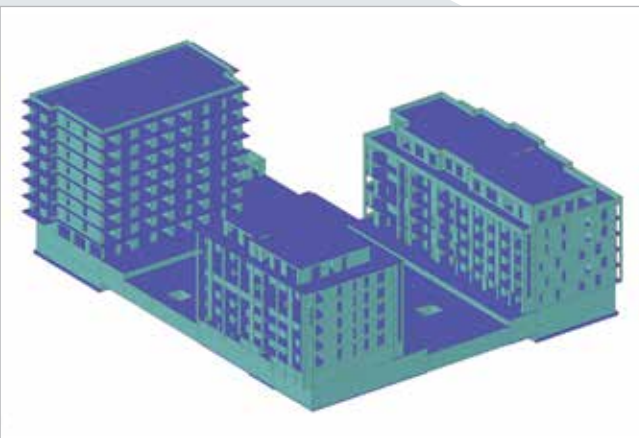
Due to the complex interaction of structural members the building had to be analysed as a whole. SCIA Engineer was used to create the full 3D model and generate the analysis output used in the design. Due to the changes of the foundation system, it was very beneficial to model the interaction of the structure with the subsoil – by Soil-in module.

VISIA s. r. o.

Contact *Dušan Vajda*
 Address *Sládkovičova 2052/50A*
92701 Šaľa, Slovakia
 Website *www.visia.sk*



VISIA is complex architectural and engineering office, that actively designs within the BIM in domain of structural and civil engineering and architecture. The main challenge of the company is to provide virtual twin of the building with all features (reinforcement, building services...) within BIM (e.g. in *.ifc format). VISIA elaborates all levels of project documentation and deals with almost all types of buildings – family houses, agricultural buildings, commercial buildings, industrial or residential complexes.



ALLPLAN FOR OPTIMIZED BIM WORKFLOWS

Allplan Engineering is the ultimate tool that supports the entire BIM process for engineering consultancies, structural detailers and contractors.

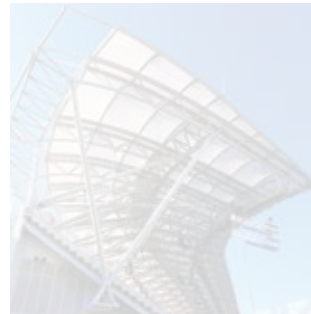
The software allows smooth and error-free BIM workflows ensuring a productive and profitable project.

SPEED UP YOUR WORK:

- > BIM automated modeling to make the complex easy
- > Powerful formwork and reinforcement deliverables
- > Fast production of quality drawings and schedules

allplan.com/allplan-engineering

Civil Structures 2



Category 2

Any type of structure that fits within civil engineering, designed using SCIA Engineer software. This includes any bridge type (beam, arch, cable-stayed, suspension bridge...), tunnels, bulkheads, locks, dams.

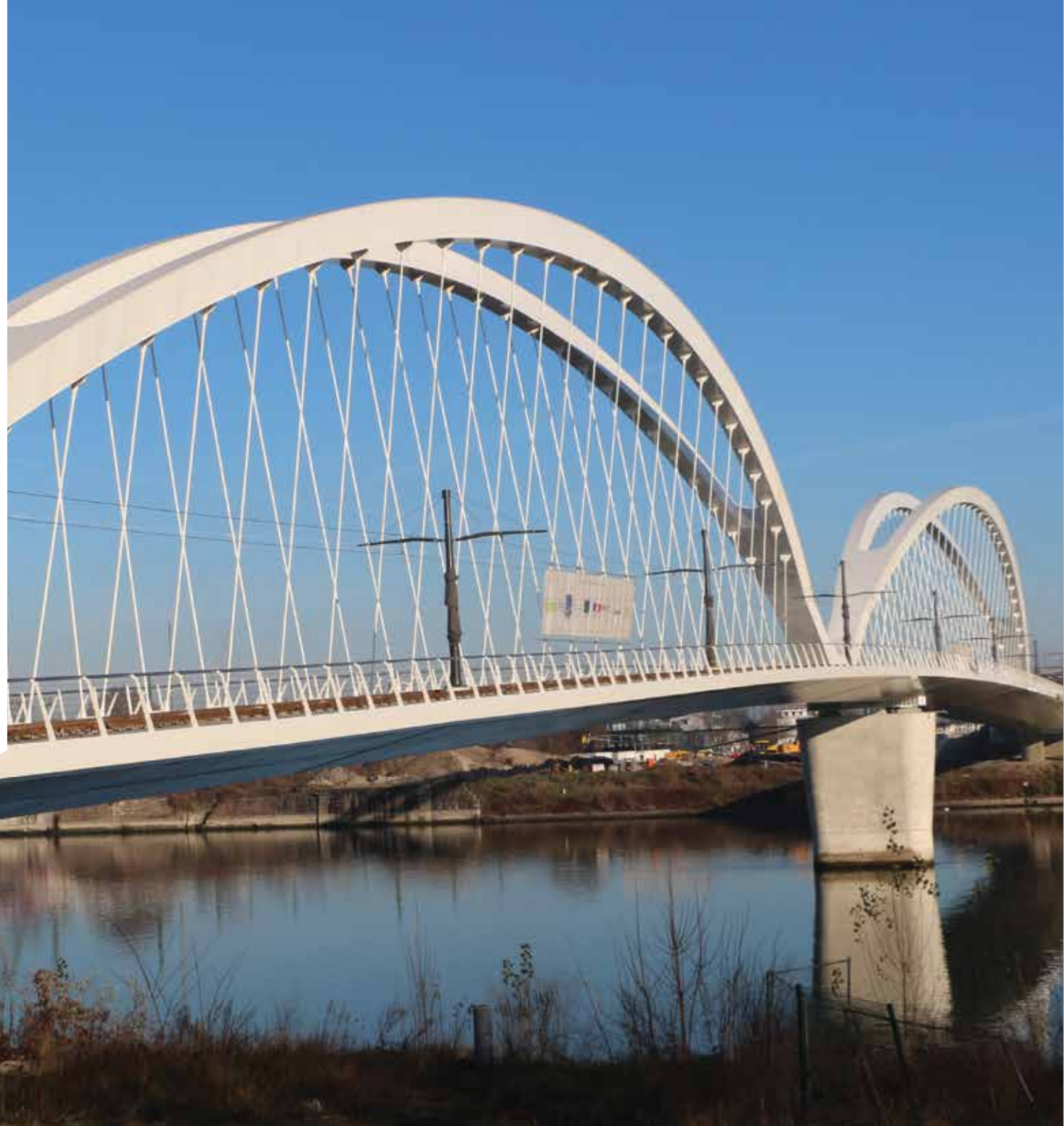
WINNER

Category 2: Civil Structures



"This country-connecting bridge between France and Germany was chosen by the jury because of the special approach used for this wide span steel structure with two double bow suspended decks and a total span of 290 m. The fact that there is no transverse bracing means that extra attention had to be paid to the stability and the dynamic influence of traffic and wind conditions during the design of the bridge. This meant application of second order calculation and consideration of structural buckling. Parts of the bridge were shipped to the construction site, assembled on-site and lifted completely onto the bearings."

Quote of the Jury



Bridge over Rhine River - Strasbourg, France / Kehl, Germany

Owner Compagnie des Transports Strasbourgeois (CTS)
Architect Marc Barani Architectes / Arcadis Strasbourg
General Contractor Victor Buyck Steel Construction N.V.
Engineering Office Ingenieursbureau Stendess N.V.
Construction Period 2013 - 2017

The bridge over the Rhine river was a part of the Est de la Ligne D du Tramway extension from Strasbourg to Kehl. The bridge has a tramway zone on one side of the arch and a zone for cyclists and pedestrians on the other side.

The whole bridge is 290 m long. It consists of 2 bowstring bridges measuring 145 m long, the deck is 15 m wide and has a weight of 1,450 tons in steel. The arches are 21 m high.

The deck was transported to the site by ship. The two bridges are built up on site, one after the other, and transported by pontoons to their final place.

SCIA Engineer was used for both the dimensioning of the bridge in the traffic situation and the erection engineering of the bridge.

From the engineering point of view, this project has several challenges.

Firstly, there was the bridge deck that has an important influence on the global behaviour of the bridge. The possibility to input and use graphical sections was a big advantage.

Secondly, there was the ability to generate the stability modes and use them for the second order analysis. This was useful for the check of the arches without an intermediate connection.

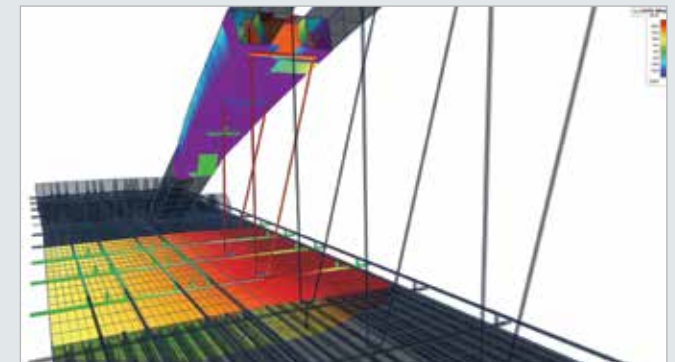
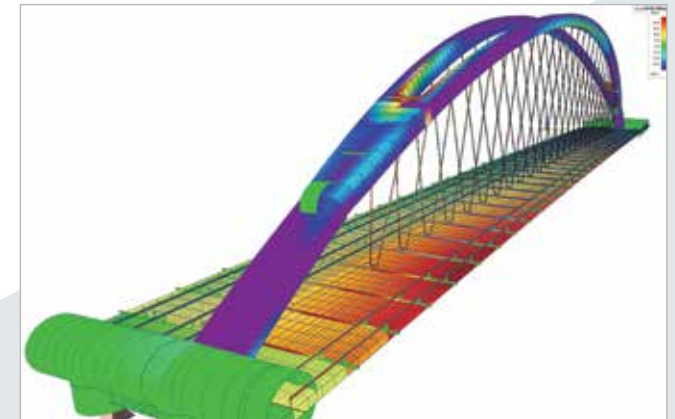
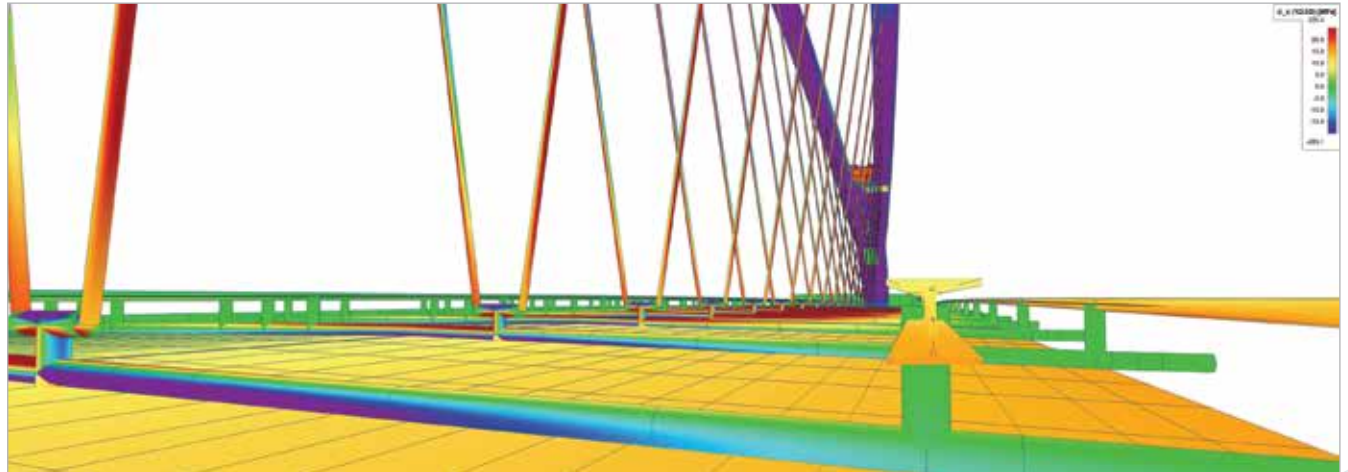
Thirdly, there was the dynamic check of the bridge under traffic and wind conditions.

Ingenieursbureau Stendess N.V.

Contact Jan Braeckman
Address Grote Baan 18
9920 Lovendegem, Belgium
Website www.stendess.com



Stendess calculates and draws complex steel constructions in a high quality and efficient manner while seeking economically responsible and substantial solutions for specific technical stability issues. Thanks to the integral service, where the design of the metal superstructure and the concrete substructure are calculated and drawn by experts in the same office. The building owner and principal contractor retain 100% control over the complete structure. References demonstrate the multidisciplinary knowledge and ability of our engineers and designers in the market of bridges, industry, utility and other projects located worldwide.



NOMINEE

Category 2: Civil Structures



Martinet Footbridge - Lausanne, Switzerland

Owner Town of Lausanne
Architect Town of Lausanne
General Contractor Marti Lausanne SA
Engineering Office Emch+Berger SA Lausanne and
 MCS Laboratory (EPFL)
Construction Period 11/2014 - 07/2015

The Martinet Footbridge is a part of a new pedestrian and bike path following the main railway line in the agglomeration of Lausanne, Switzerland. The UHPFRC (Ultra-High Performance Fibre Reinforced Cement-based Composite material produced from cement, additions (powders), hard fine particles, water, admixtures and high amount of relatively short steel fibres) structure is a girder of 15.3 m single span resting on two reinforced concrete abutment walls.

The asymmetric U-shaped cross-section consists of 2 main girders, an "organic" one and one with a full web. Both girders form a half-frame with the bottom plate that is stiffened with ribs in the transverse direction. In the longitudinal direction, the structure consists of 9 precast segments connected by straight post-tensioned cables.

Two models were established in SCIA Engineer: a strut and tie model and a model with beam elements and plates for the organic girder. The functions used in SCIA Engineer were: Import DXF, 2D and 3D frames, Graphical sections, Dynamics. The results from the SCIA Engineer model corresponded to the measured frequency on site.

The project challenges were: construction cost not higher than for a conventional structure, original aesthetic expression, minimum maintenance and minimum use of resources.

Emch+Berger SA Lausanne

Contact Rita Galrito
Address Ch. d'Entre-Bois 29
 1000 Lausanne, Switzerland
Website www.emchberger.ch

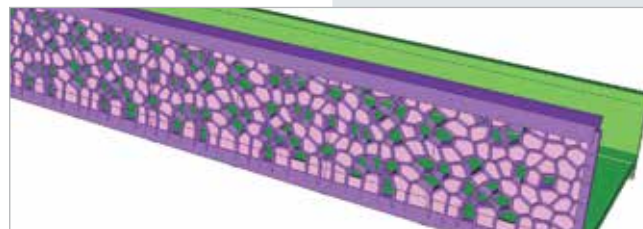
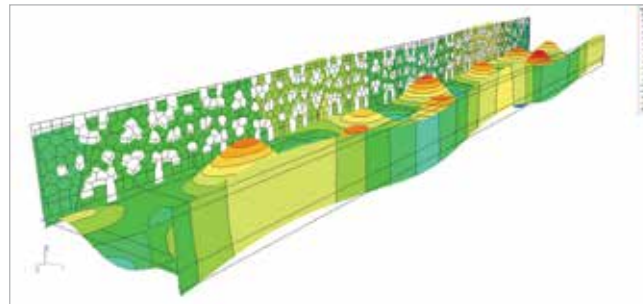
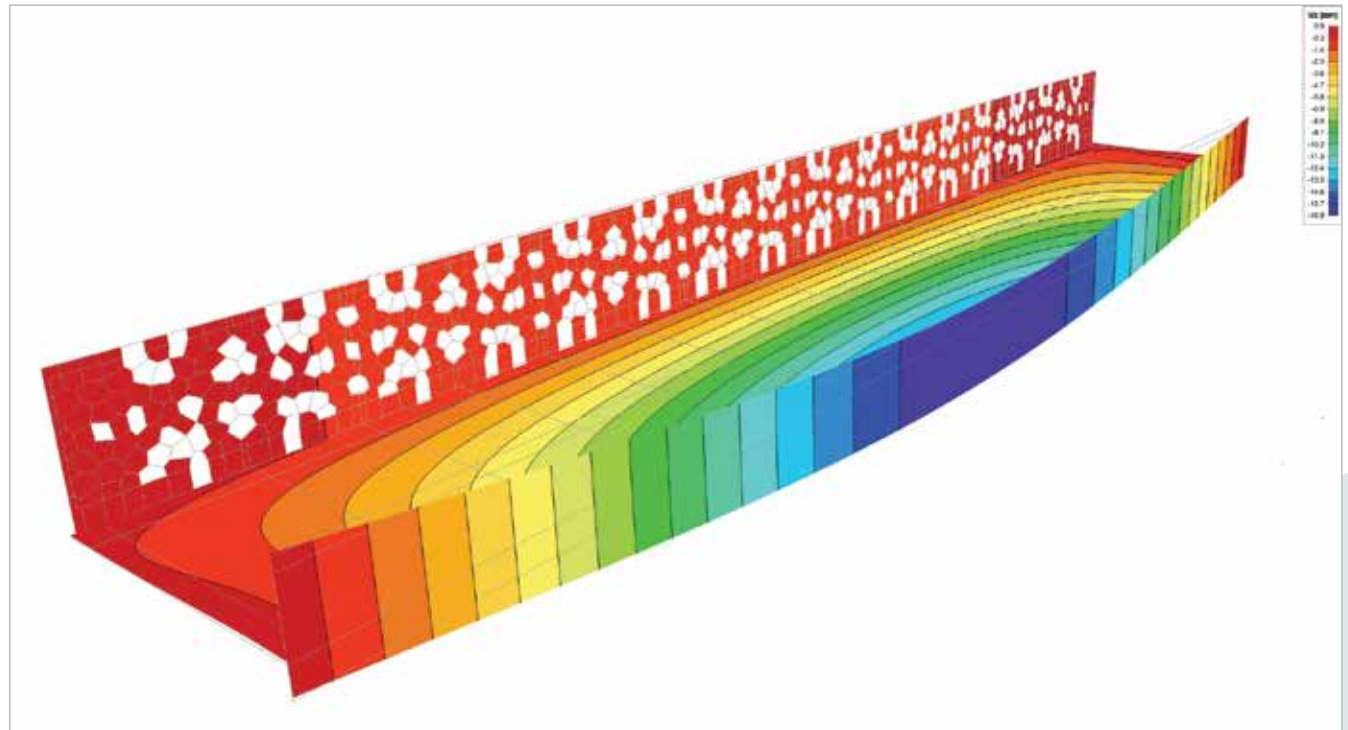


Emch+Berger SA in Lausanne is a structural engineering consultancy active in bridges, buildings and underground structures.

The office employs 25 civil engineers and draughtsmen, who show engagement, competence and confidence.

Our projects are generally characterised by quality and optimisation, sustainable and economic solutions and corresponding to our vision of civil engineering.

The MCS Laboratory at the EPFL – Swiss Federal Institute of Technology is a research institute active for more than 15 years in the domain of UHPFRC technology.



NOMINEE

Category 2: Civil Structures



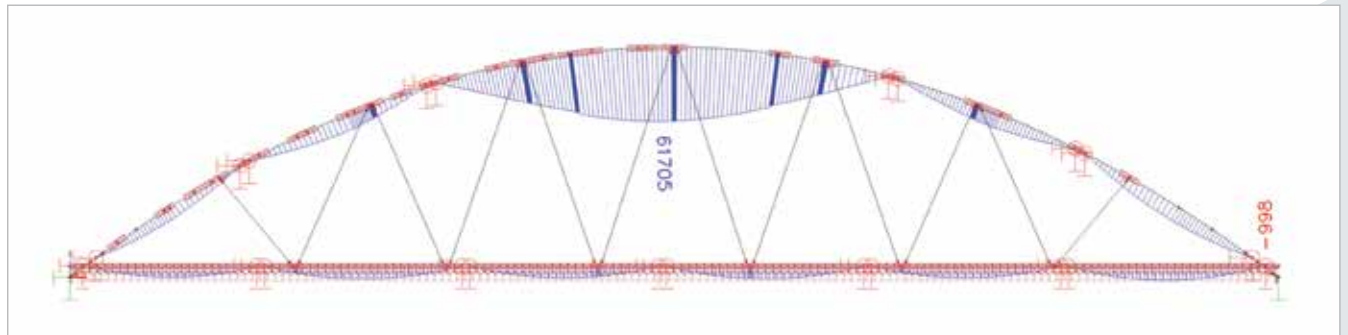
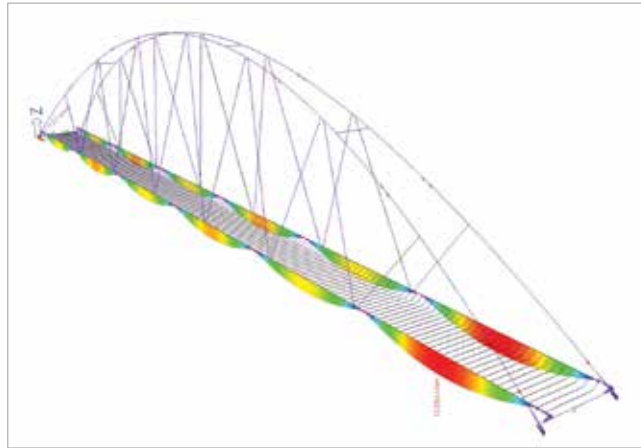
Zandhazen Bridge - Muiderberg, Netherlands

Owner ProRail
Architect Zwarts & Jansma Architects
General Contractor SAAone (VolkerWessels, Boskalis, Hochtief, DIF)
Engineering Office Iv-Infra
Construction Period 01/2014 - 08/2016

To enable the widening of the A1 highway, a new, large double track railway bridge is being constructed near Amsterdam in the Netherlands. This new structure is a part of the SAA project, a large infrastructural project that aims to increase the road capacity of the Schiphol-Amsterdam-Almere corridor, to alleviate the current traffic congestion and improve the environmental quality of the area.

The superstructure comprises a steel arch bridge with a diagonal hanger configuration. With the span length of 255 m, the bridge is considered to be the largest railway arch bridge in Europe. Due to the required necessity to minimise the hindrance of the road and railway traffic, the erection of the bridge has proven to be the most challenging aspect during the design process. Steel grade S460 is chosen because of limitations of the bridge weight during transport and installation.

SCIA Engineer was used in all design phases of this steel and concrete railway bridge for linear and non-linear static calculations. An important aspect of the bridge is the construction method, because this has a large impact on the forces and deformations of the bridge. With the use of the Construction Stages module in SCIA Engineer all erection stages were analysed and the bridge has been completed with success.



Iv-Infra

Contact Walter Langedijk
Address Trapezium 322
 3364 DL Slidrecht, Netherlands
Website www.iv-infra.nl



Active worldwide, comprehensive technical know-how, specialised in complex projects, over 800 dedicated professionals – these are the keywords that characterise the Dutch engineering company Iv-Groep. We offer a broad range of services in eight key markets: Infrastructure, Energy, Industry, Transport & Logistics, Water, Maritime, Leisure & Landmarks and Buildings. Iv-Infra is the division that is fully specialised in the design, construction and maintenance of infrastructural projects. Iv-Infra also offers full services (such as risk analysis, systems engineering, contract management and asset management) and specialist services (such as terrestrial 3D laser scanning and construction supervision).



NOMINEE

Category 2: Civil Structures



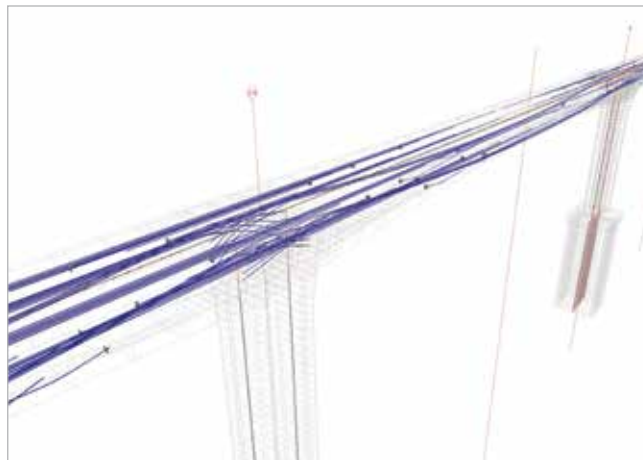
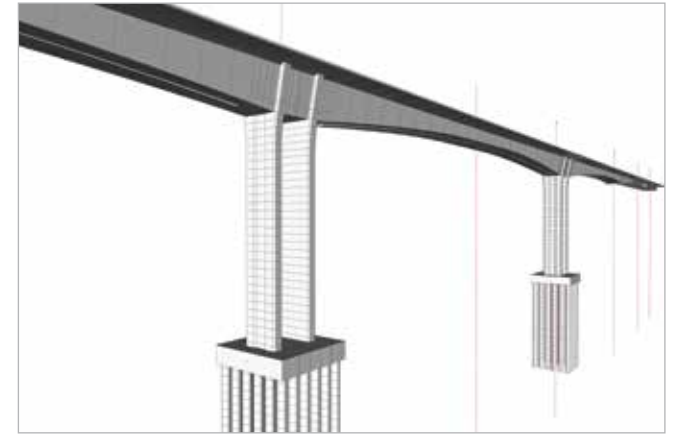
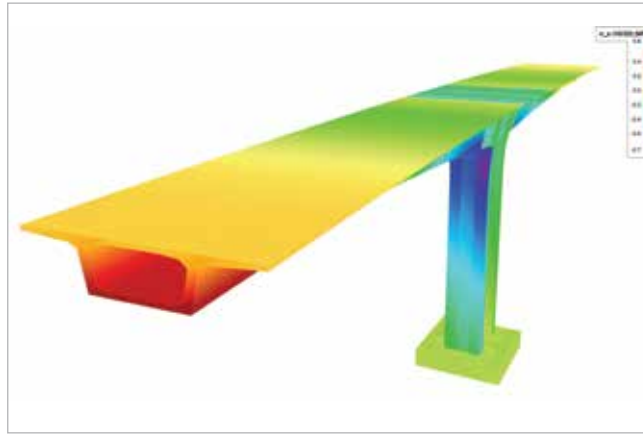
Bridge over Chomutovka River Valley - Velemysleves, Czech Republic

Owner RSD - National highway directorate
Architect Lukáš Vráblík
General Contractor Silnice Group
Engineering Office Novak & Partner, Ltd.
Construction Period 09/2014 - 11/2016

The most important part on a new road bypass of Velemysleves town in northwest part of the Czech Republic is a bridge structure over a wide and deep valley of the Chomutovka river. The total length of the structure exceeds 538 m. The maximum height of the road above the ground level is about 36 m. The superstructure is designed as a continuous beam, the middle part as a continuous frame with a rigid connection between the piers and the superstructure. The length of the main span is 120 m and the lengths of the adjacent spans are 90 m, 65 m, and 45 m, respectively. The structure was erected using the balanced cantilevers method combined with a classical construction on a formwork.

SCIA Engineer was used for complex simulation of the pre-stressed concrete structure behaviour. The construction stages and TDA modules were used for prediction of long term deflection and evaluation of internal forces, and also for pre-cambering during the construction process. A model based on shell elements was used for the analysis of distribution of internal forces and stresses respecting shear lag and shear deformation of box girder walls. The nonlinear and stability analysis of cantilevers during the construction phase was also used.

The structure was fitted with gauges to obtain the time development of strain in the structure during the construction period. The results from gauges are very close to the computational prediction produced by SCIA Engineer models.



Novak & Partner, Ltd.

Novák Partner

Contact Lukáš Vráblík
Address Perucká 5
12000 Prague 2, Czech Republic
Website www.novak-partner.cz

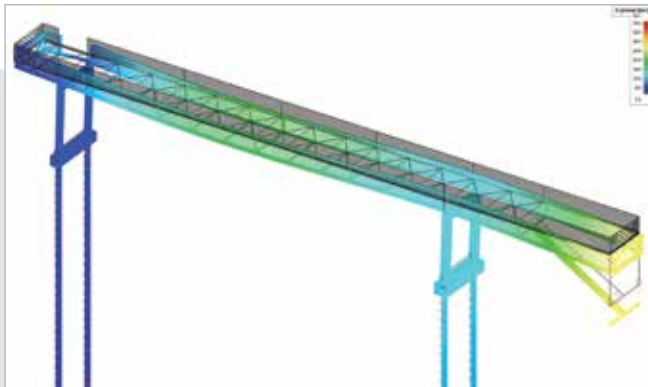
Novak & Partner Company provide full design and engineering services from concept preparation up to tender documentation and detail design documentation. It also provides author's supervision, engineering activities, negotiation with public authorities, expert, consulting and bridge inspection services.

In recent years, we provided our services to customers from the Czech Republic, Slovakia, Germany, Denmark, the Netherlands, Austria, the USA, Russia, Sweden, Ukraine and Singapore.

Since 2003 the company is a member of VALBEK Group.



Gust Romijn Bridge - Rotterdam, Netherlands



Owner Port of Rotterdam
 Architect ipv Delft
 General Contractor Wallaard Noordeloos
 Engineering Office Adams Civil Advies
 Construction Period 03/2015 - 03/2016

The Gust Romijn bridge connects the Rotterdam city with the port. This 45 metre long bridge consists of a steel deck structure and supporting steel cut fences. The fences and the deck co-operate as a U-shaped construction. The load bearing fences consist of flanges and a body which features diamond-shaped perforations over the entire length. These diamond shaped cut-outs vary in size, reflecting the size of shear forces in the fence. The perforations are small at the supports and extend to the maximum size in the middle of the field and at the overhang. The deck has the main span of 29.4 m, followed by an overhang of 12.6 m on the east side.

With the SCIA Engineer model consisting of 22,000 bars built to reproduce the diamond-shaped perforations. Only with such a detailed model, we could optimise the construction to a high level. The second order calculation and the dynamic analysis were made to ensure the reliability of the construction.

This pedestrian bridge can be realized as a lightweight structure. The biggest challenge of this project was to schematise the supporting, perforated steel plate fence into a manageable and reliable calculation model.

Adams Civil Advies

Contact Rob Arts
 Address Van Heemstraweg 123f
 Postbus 75
 6650 AB Druten, Netherlands
 Website www.adamsbouwadvies.nl



Adams Civil Advies is the civil engineering department of Adams Bouwadviesbureau. We specialize in the engineering of bridges. Our challenge lies in proposing solutions that fulfil customer demands in an effective way.

Adams Civil Advies is part of Adams Bouwadviesbureau; an engineering office with over 25 consulting engineers with a passion for technique. Adams provides consultancy services in the area of structural engineering and building management. Adams is revolutionary in the area of BIM.



Burgemeester Gabriel Theunis Bridge - Antwerp, Belgium

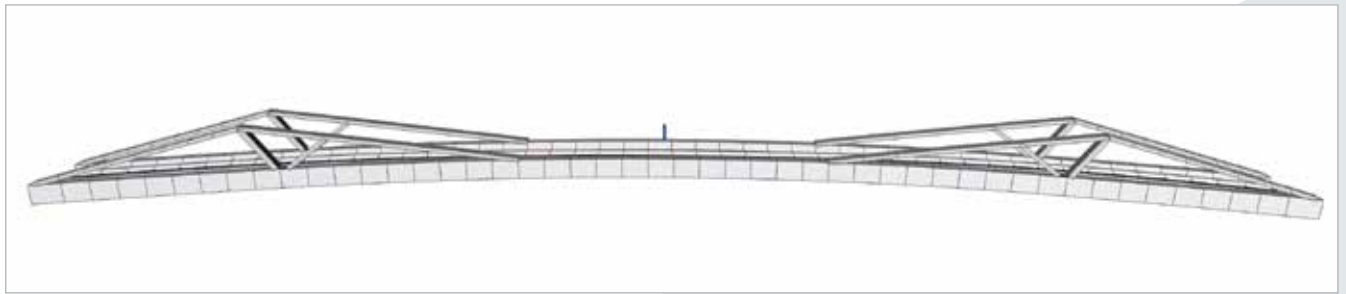
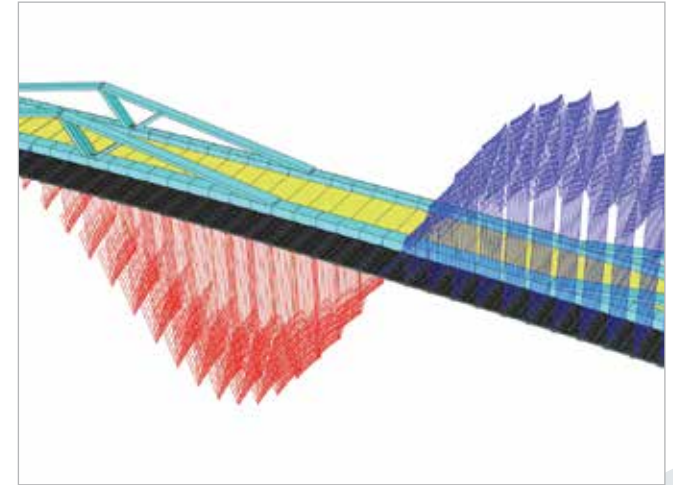
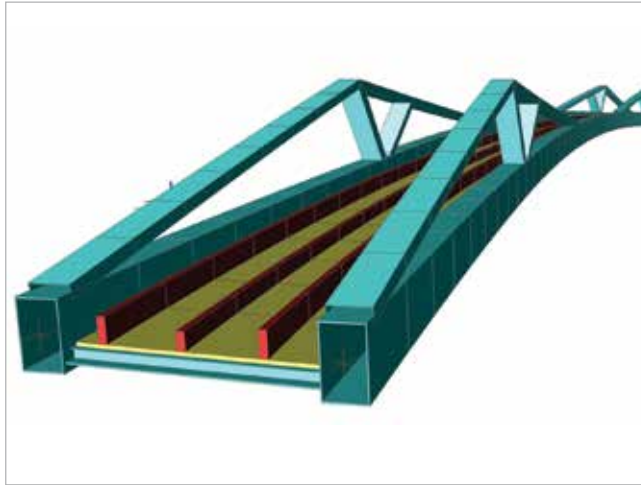
Owner Waterwegen en Zeekanaal NV
Architect Zwarts & Jansma Architects
Engineering Office Arcadis
Construction Period 2018 - 2020

The present Theunis bridge will be replaced by three new bridges, two road bridges with cantilever bicycle lanes and a tram bridge, to allow for four-layer container transport on the Albert Canal. The Theunis bridge can be seen from the Antwerp ring and is situated close to Sportpaleis, one of the largest concert halls in Belgium. The bridge is designed in such a way that each element follows the flow of forces that hold the bridges in place. The three bridges are curved in two planes and span a total length of 170 m, divided into three spans of 32.5 m, 105 m and 32.5 m.

Due to the complexity of the bridge geometry, SCIA Engineer was used to check the statics and stability of each element as well as the dynamics of the bicycle lanes and the bridge resistance against fatigue.

For the tram bridge, a special model was made to calculate the rail-bridge interaction, due to the transversal movement at expansion devices had to be limited to 2 mm. SCIA Engineer was used to perform non-linear calculations to determine the correct relative displacements of the rails.

As the side spans are short in comparison to the main long span, the reaction forces in abutments directed upwards. It was decided to work with reverse abutments so that simple supporting devices (working mostly in compression) could be used.



Arcadis

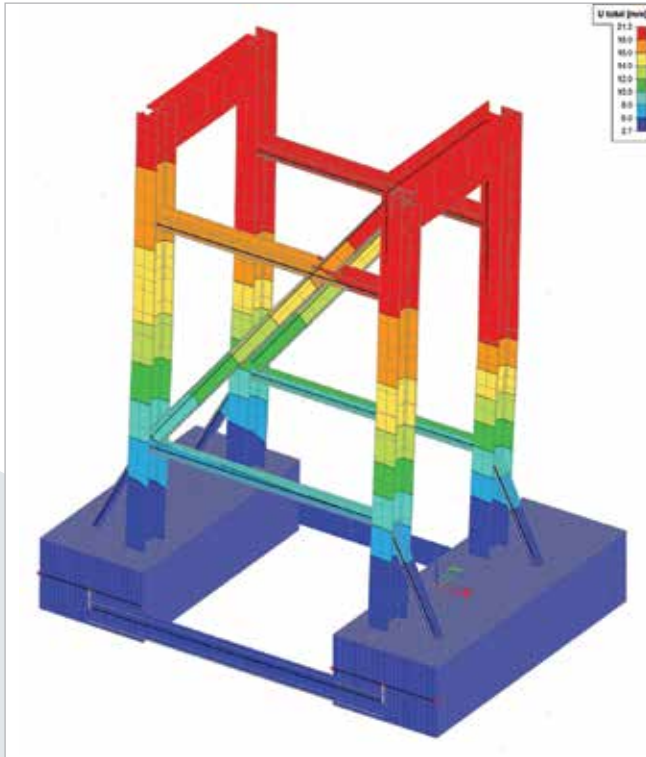
Contact Karen Troen
Address City Link
Posthofbrug 12
2600 Antwerpen, Belgium
Website www.arcadis.com



Arcadis is the leading global Design & Consultancy firm for natural and built assets. It is a worldwide engineering and consultancy company which delivers design, engineering, consulting and management services in the infrastructure, water, environment and building sectors. Arcadis was established in 1888 and now has over 350 offices in over 40 countries around the world and a revenue of €3.4 billion. The company is active in projects in more than 70 countries and gives clients access to a 27,000 people strong pool of knowledge and resource.



Metro Viaduct Pier Reconstruction - Paris, France

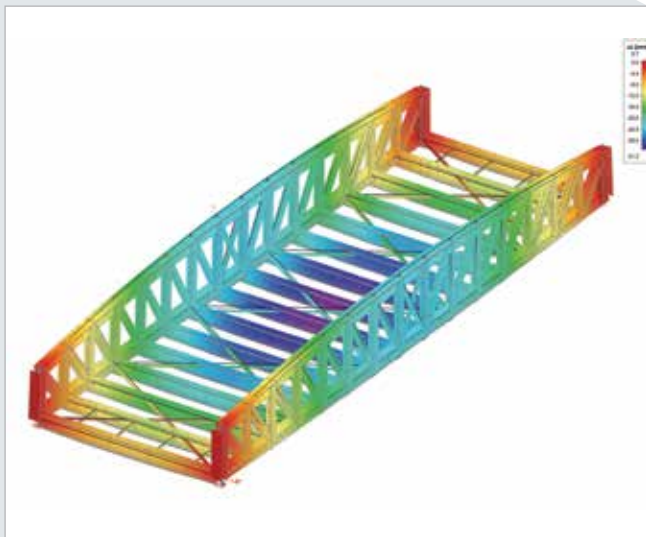


Owner *RATP*
 Architect *RATP*
 General Contractor *Freyssinet France*
 Engineering Office *Eurometaletudes*
 Construction Period *11/2016 - 06/2017*

The metro viaduct between the stations "Bercy" and "Quai de la Gare" in Paris was built at the beginning of the 20th century (designed in 1916). Each span is about 20 m long and supported by cast iron columns or masonry piers. After a century of operation, one of its masonry piers was extremely cracked and needed to be demolished and re-built.

In order to be able to remove the old bearings and masonry structures to create the new ones, we studied the jacking of the spans on both sides of the pier, including the temporary steel structure founded on concrete footings laid on micro-piles. Mobile load functionality in SCIA Engineer was used to carry out the rechecking of the span structures and to calculate the vertical loads on the final bearing structure. Then the new concrete structure was designed with shorter dimensions to allow for kerb-stone disposal and installation of new bearings.

The main challenge in this project was to design a free-standing temporary structure on foundations which could be used both during the jacking phase and normal operation. The new concrete pier is founded on a beam with the span of 5 metres between the foundations of the jacks.



Eurometaletudes

Contact *Frédéric Jouanneau*
 Address *14-16 rue Soleillet*
BL43
75020 Paris, France
 Website *www.eurometaletudes.fr*



Eurometaletudes is an engineering company, specialised in steel structure design for complex structural projects (new constructions, refurbishments, temporary structures and site works equipment), including jacking and prestressing reinforcements.

We can bring solutions to our clients for every structural project!

Jaagpad Bridge - Avelgem, Belgium

Owner Waterwegen en Zeekanaal Afdeling Bovenschelde
Architect Mobiliteit en openbare werken Expertise beton en staal (EBS)

General Contractor Artes Depret N.V.
Engineering Office EBS/ Ingenieursbureau Stendess N.V.
Construction Period 07/2014 - 05/2015

The Jaagpadbrug, called the 'Ijzerwegbrug', is a new bridge for cyclists and pedestrians over the Boven-Schelde river at Avelgem.

The bowstring bridge is 92 m long and consists of a midspan of 70.3 m and two ramps of 10.85 m. The orthotropic deck is 3 m wide. The bridge has a weight of 166 tons. It is a butterfly bridge because of its open covered arches. Between the arches there are no horizontal connections or bracing.

The bridge was bolted on site. The bridge was assembled to his final place with two cranes and a pontoon in one day.

SCIA Engineer was used for both the dimensioning of the bridge under traffic load and erection engineering.

From an engineering point of view, this project has several challenges.

First, there was the bridge deck that has an important influence on the global behaviour of the bridge. The possibility to input and use graphical sections was a big advantage.

Second, it was possible to combine stability and second order analysis to check the arches without intermediate connection.

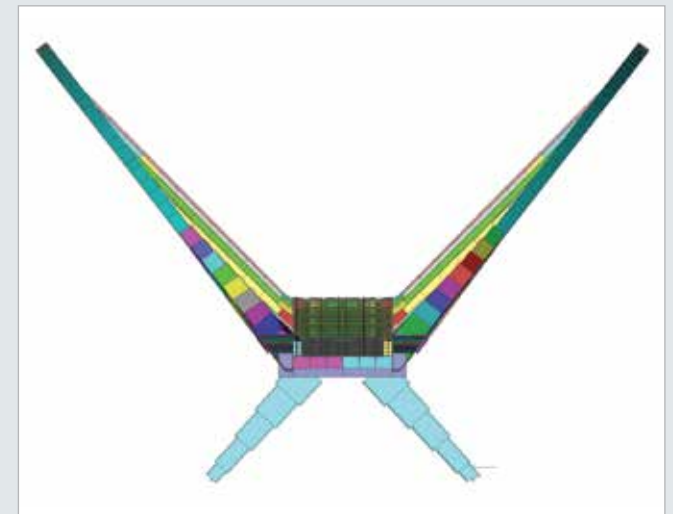
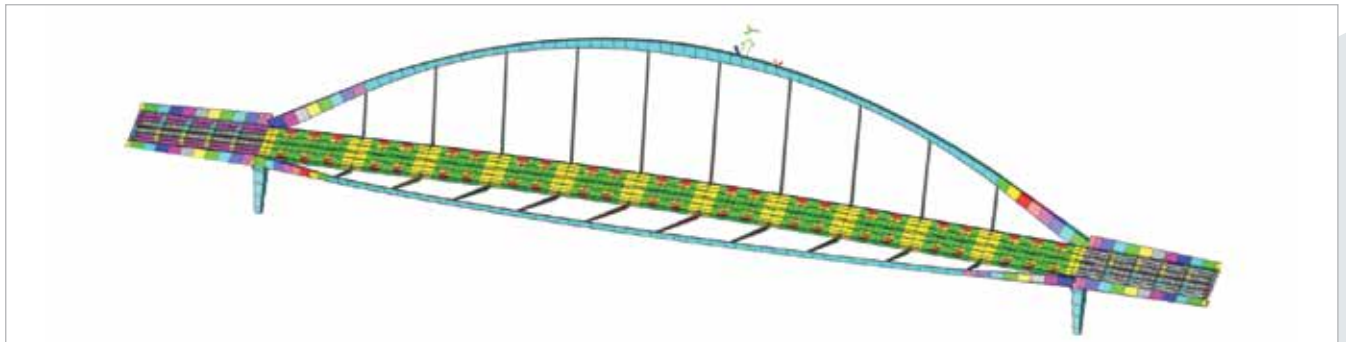
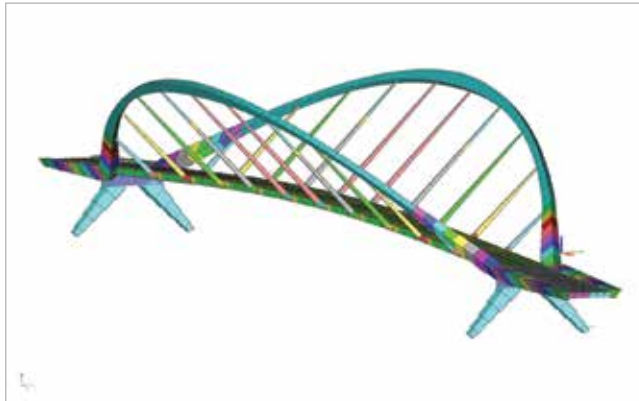
Third, the dynamic analysis of the bridge exposed to the traffic and wind load was made.

Ingenieursbureau Stendess N.V.

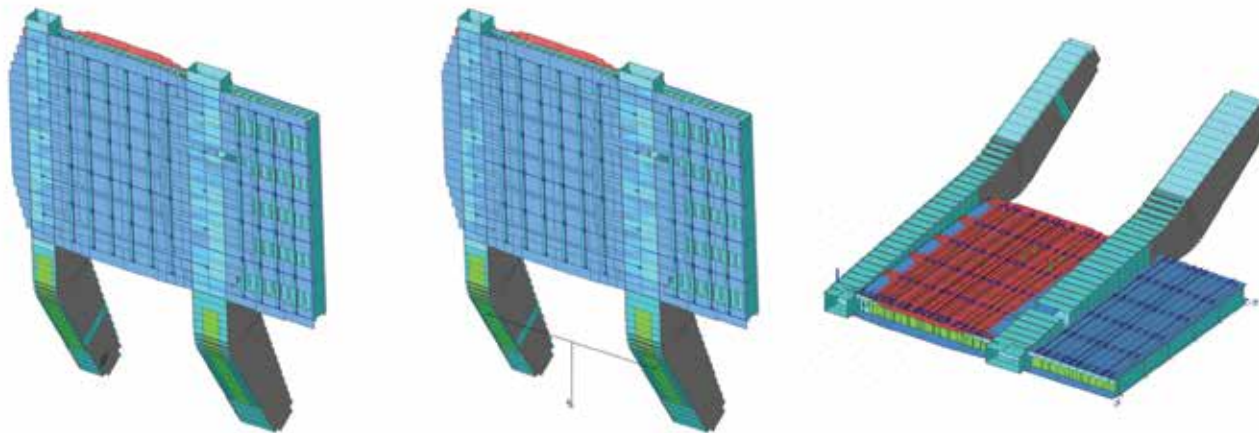
Contact Jan Braeckman
Address Grote Baan 18
9920 Lovendegem, Belgium
Website www.stendess.com



Stendess calculates and draws complex steel constructions in a high quality and efficient manner while seeking economically responsible and substantial solutions for specific technical stability issues. Thanks to the integral service, where the design of the metal superstructure and the concrete substructure are calculated and drawn by experts in the same office. The building owner and principal contractor retain 100% control over the complete structure. References demonstrate the multidisciplinary knowledge and ability of our engineers and designers in the market of bridges, industry, utility and other projects located worldwide.



Koningin Maxima Bridge - Alphen aan de Rijn, Netherlands



Owner *City Alphen aan de Rijn*
 Architect *Grontmij N.V.*
 General Contractor *Mobilis TBI steel Hollandia Infra BV*
 Engineering Office *Ingenieursbureau Stendess N.V.*
 Construction Period *2014 - 2016*

The "Koningin Máximabrug" is an energy-neutral modern double bascule bridge (tail bridge) with a bridge opening of 14.2 m. It has 2 x 2 lanes and a cycling/pedestrian lane, which towers above the Oude Rijn. The bridge is moved by means of approx. 400 t of ballast. The larger Oostbrug weighs 280 t and the smaller Westbrug 230 tons. In total, both decks are 35.5 m wide, the Oostbrug is 21 m and the Westbrug 14.5 m. The movable section of the "Koningin Máximabrug" consists of two parallel tail bridges, one of which also has a cycling/pedestrian lane. The so-called tails can be found on both sides of the mechanised bridge sections, with the outer tail being wider than the inner tail. The tails contain the counterweight that ensures the smooth opening and closing of the bridge. The typical feature of a tail bridge is the high position of the hinge above the bridge deck. The high tails give the bridge a unique profile.

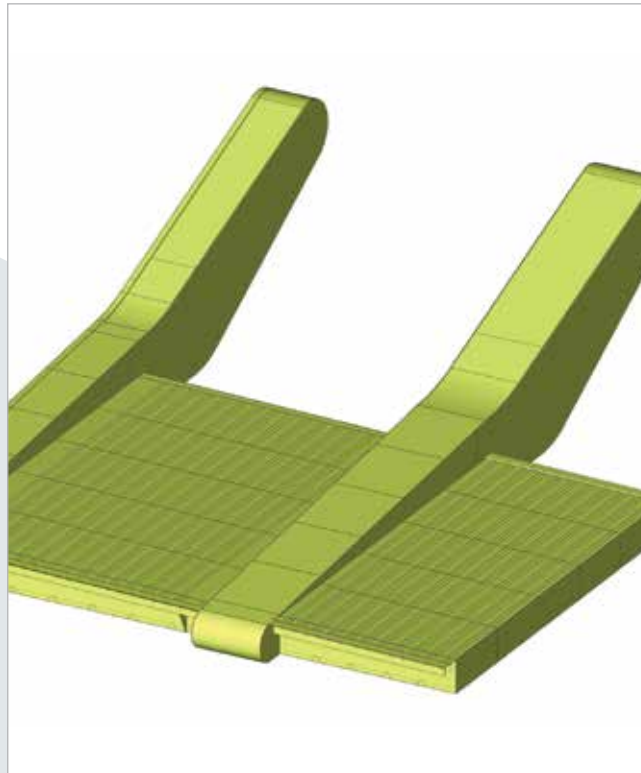
Firstly, there were the different states of the bridge to be studied. The possibility of creating different states in one model was a big advantage towards calculation. Secondly, there were the curved and continuously changing cross-sections of the tails. The possibility of input and use of a graphical section was a big advantage. Thirdly, special attention was paid to the stability around the opening created in the tails for the connection of the main centre of rotation and hydraulic cylinders. A second order calculation was needed for the check of the tails based on a stability calculation. Also, the dynamic behaviour of the cycling/ pedestrian lane was checked.

Ingenieursbureau Stendess N.V.

Contact *William De Leener*
 Address *Grote Baan 18*
9920 Lovendegem, Belgium
 Website *www.stendess.com*



Stendess calculates and draws complex steel constructions in a high quality and efficient manner while seeking economically responsible and substantial solutions for specific technical stability issues. Thanks to the integral service, where the design of the metal superstructure and the concrete substructure are calculated and drawn by experts in the same office. The building owner and principal contractor retain 100% control over the complete structure. References demonstrate the multidisciplinary knowledge and ability of our engineers and designers in the market of bridges, industry, utility and other projects located worldwide.



Passerelle Dieren - Dieren, Netherlands

Owner Buitting Staalbouw Almelo BV
Architect Onyx
General Contractor Reef Infra
Engineering Office Ingenieursgroep Romkes BV
Construction Period 01/2016 - 05/2017

The project is named "Passerelle Dieren" and consists of two walkway-bridges with a span of approximately 24 m which connect 3 train-platforms to each other but also Dieren-North with Dieren-South. Together with Buitting Staalbouw BV Almelo and based on the order by Reef Infra / Prorail we designed and constructed the total steel-, glass- and timber construction of the Passerelle (design by Onix Architects).

Both main- and detail- calculations were performed using SCIA Engineer 16. The main steel construction of the Passerelle consists of 2 walkway-bridges. These bridges are suspended on 3 different support structures each with one or two stairs and an elevator. The walkway-bridges are welded I-profiles which are welded to the bottom floor-beams. Buckling of these slender I-beams was verified using the rotation-stiffness of the bottom floor-beams. The shape of the 3 support structures were taken from the architectural design and were constructed as X- and Y-shaped structures. Together with the stairs and the elevators, these X- and Y-support structures deliver the global stability to the whole structure. Each bridge is designed with a horizontal dilation (parallel with the span) to prevent internal stresses due thermal loads (fixed in the other directions). Both deformations, dynamics (comfort for walkways) and each installation phase were verified using SCIA Engineer 16.

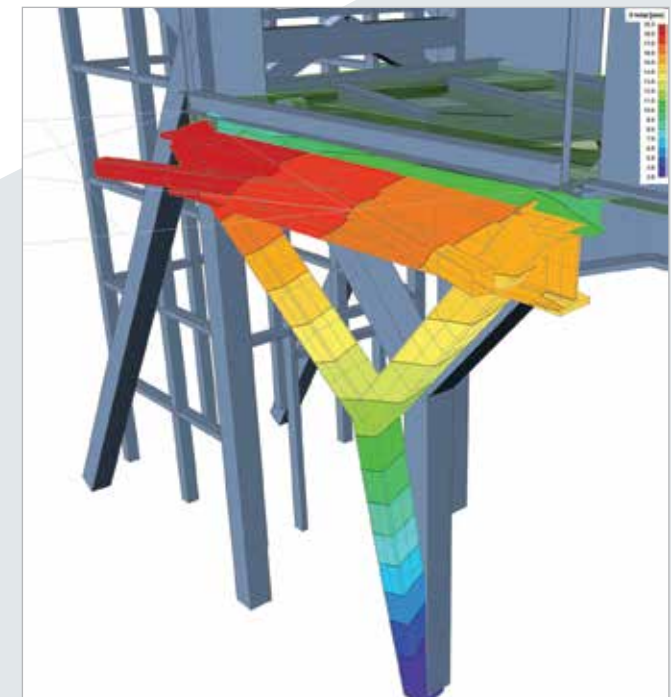
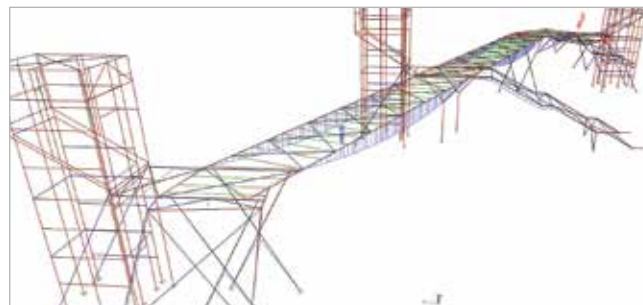
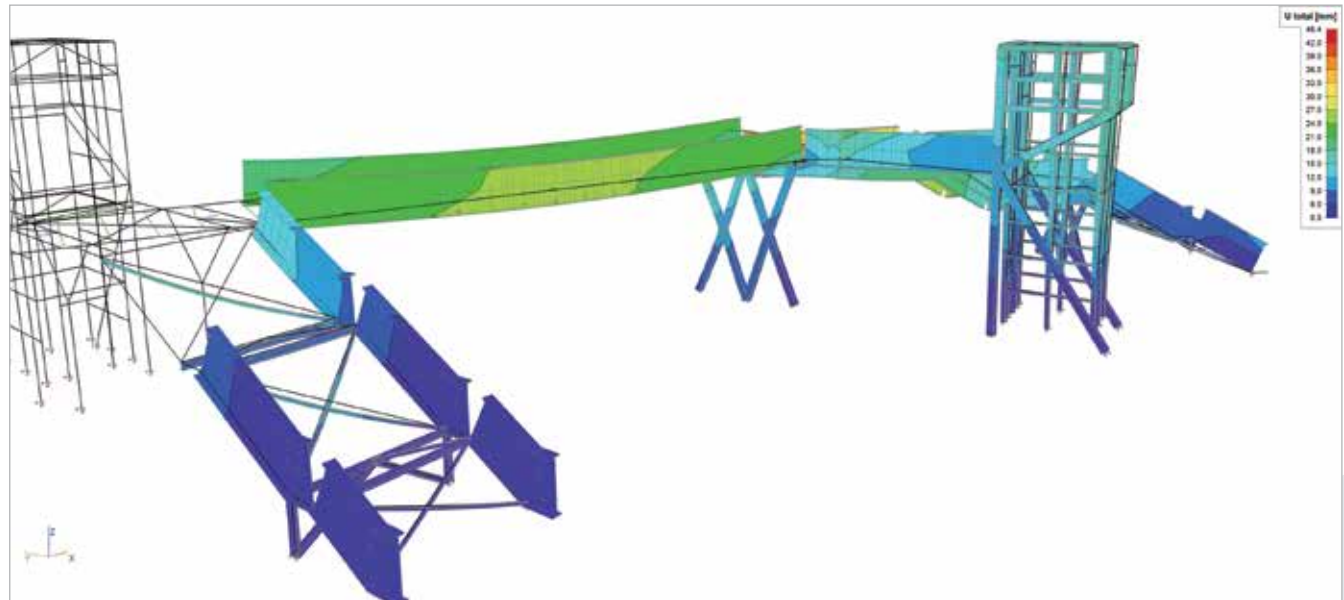
Ingenieursgroep Romkes BV

Contact H.H. Kuipers
Address Industrieweg 7
 8521 MB Sint Nicolaasga, Netherlands
Website www.igromkes.nl

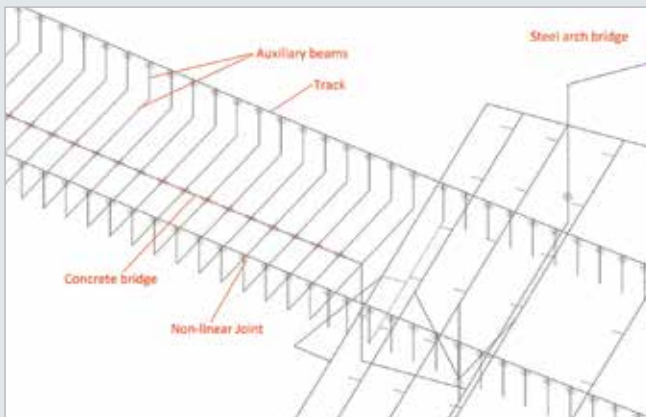
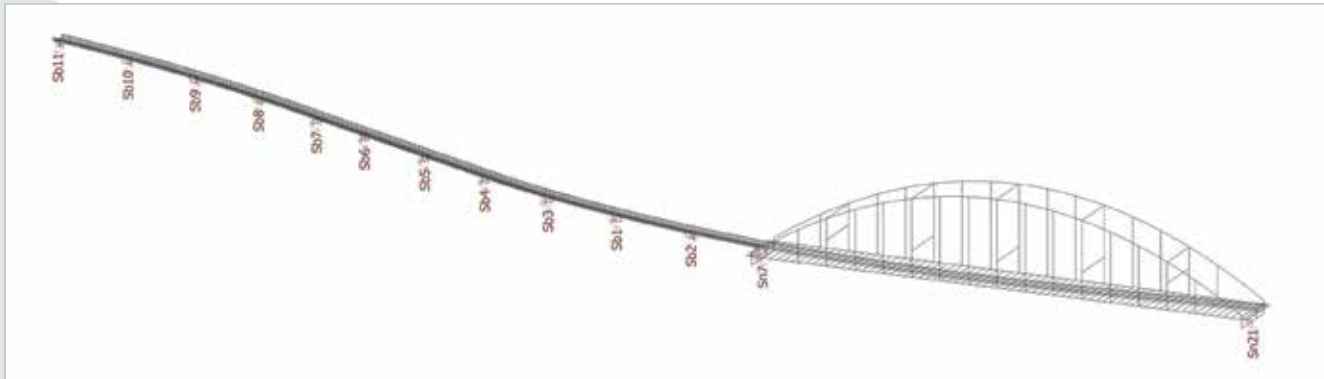
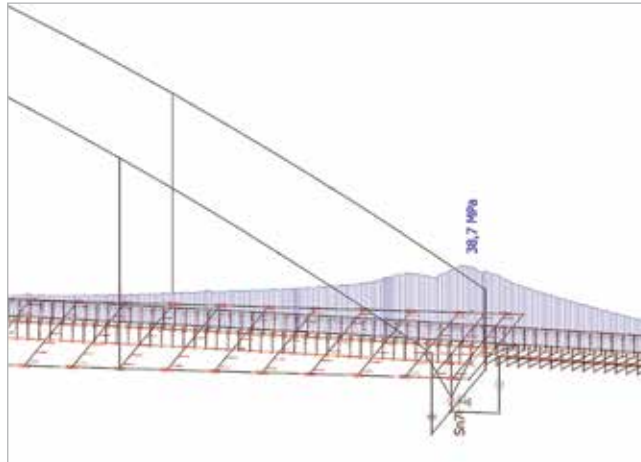
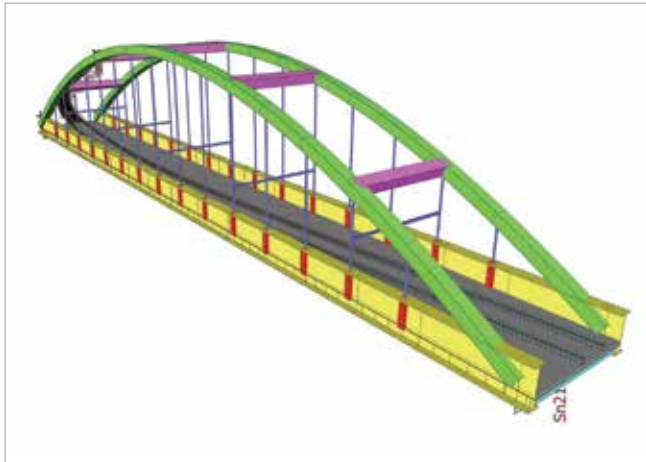


Ingenieursgroep Romkes BV is a consultancy office for residential, commercial, industrial and special constructions. Since 1988 Ingenieursgroep Romkes BV have been developed as a consulting firm which is characterized by a horizontal organisation with the aim of providing a reliable and economically advise.

This includes engineering and coordination of all disciplines (design, engineering, workshop-drawings, detail calculations), for steel, concrete, timber and special constructions (machines, machine support structures etc.). All calculations are performed using the latest Eurocodes and project-specific regulations (BRK-regulations, F.E.M., Hivoss, Lloyd's).



Arch Bridges - Rotterdam, Netherlands



Owner *Prorail*
 Engineering Office *Movares Nederland*
 Construction Period *2018 - 2020*

For the project of Theemswegtracé, two new arch bridges had to be engineered. These bridges are both railway bridges for freight trains. These steel arch bridges have the span of 156 m and 176 m. On both bridges the track is placed in a curve.

These bridges are, among other things, checked for strength, stability, fatigue and the combined response of structure and track to variable actions. This means a check of longitudinal stresses and displacements due to the temperature change, braking and acceleration forces and vertical displacement of the bridge. For this calculation, a model of the entire bridge was made including the track and additional 300 metres of the track were added (including its substructure). The track is modelled at the real height above the bridge deck and coupled by auxiliary beams with non-linear joints. A non-linear joint is used to ensure that the track can slip from its sleeper when the force becomes too high.

To get this model working we did several tests. With this we were able to get this model working the right way. We checked the construction for stresses in the track and displacements of the track and the bridge. Beside this, we also determined the force distribution over the substructure.

Movares Nederland

Contact *Arjen Steenbrink,
 Sander van Alphen*
 Address *Daalseplein 100
 Postbus 2855
 3500 GW Utrecht, Netherlands*
 Website *www.movares.nl*



Movares is an engineering consultancy providing solutions in the fields of mobility, infrastructure, building and spatial planning. Usability, future value and sustainability play a major role in the designs we produce. We contribute to accessibility through our unique combination of expertise.

Infrastructure is the backbone of development, both for society and the economy. Movares plays an active role throughout the entire consulting and engineering process. Our combination of knowledge, expertise and innovativeness is summed up in our motto: 'Giving shape to mobility'.

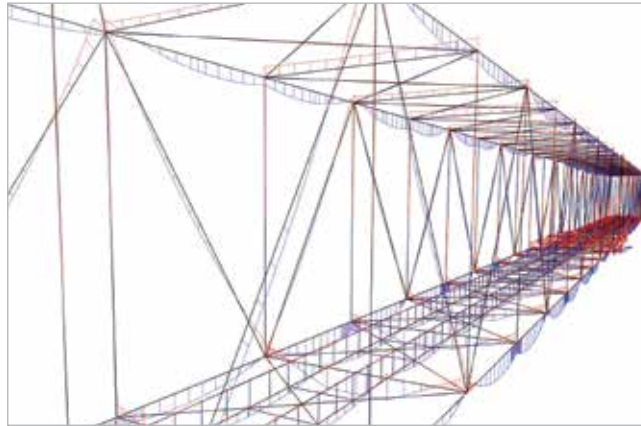
ProLife Bridge over River Waal - Netherlands

Owner ProRail
Engineering Office Movares Nederland
Construction Period 01/2016 - 12/2018

This project is based on three distinguishing ideas: composite action, strengthening and box action in I-girder bridges, each of which has a potential for saving a large sum of money for the European community. Furthermore, saving old bridges reduces both the environmental impact and traffic disturbance for trains and cars passing over the bridges. Within this project, we are examining the existing bridge over the river Waal.

The existing bridge was modelled in SCIA Engineer and the results were compared with the measurements made in-situ with a real traffic. The FE-model was then calibrated to match the measurements. This was made by replacing the beams with plate elements and creating an area for the support. Moreover, the rail was modelled at the right height and was coupled with auxiliary beams using non-linear joints. Finally, the second bridge was added.

More accurate evaluating of stresses in the structure using a refined model is very important for a detailed analysis when the strengthening of the existing structure is realised. With a simple FE-model some effects may be over- or underestimated, especially when stiffness of connections dictates the distribution of forces. Site measurements with a subsequent update of the finite element model are a good tool to make an accurate FE-model needed for strengthening of a bridge.



Movares Nederland

Contact Arjen Steenbrink,
Mark van der Burg
Address Daalseplein 100
Postbus 2855
3500 GW Utrecht, Netherlands
Website www.movares.nl

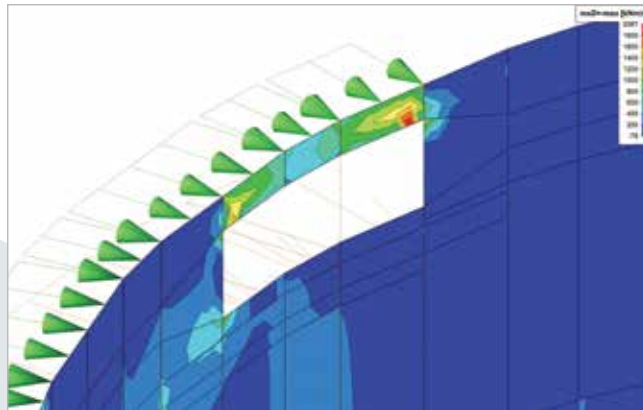
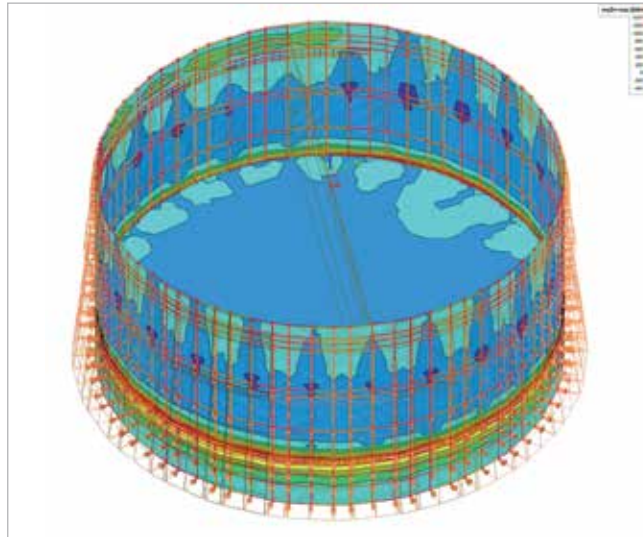
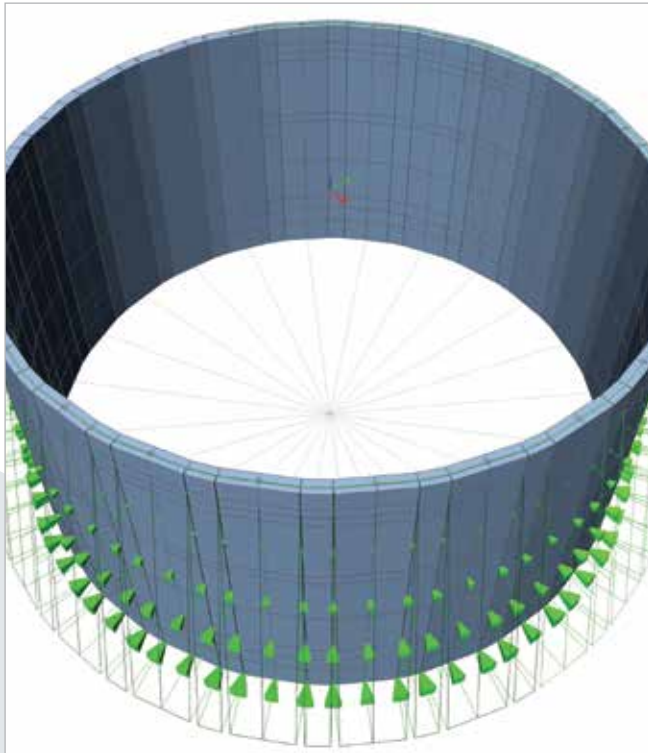


Movares is an engineering consultancy providing solutions in the fields of mobility, infrastructure, building and spatial planning. Usability, future value and sustainability play a major role in the designs we produce. We contribute to accessibility through our unique combination of expertise.

Infrastructure is the backbone of development, both for society and the economy. Movares plays an active role throughout the entire consulting and engineering process. Our combination of knowledge, expertise and innovativeness is summed up in our motto: 'Giving shape to mobility'.



Lammermarkt Underground Parking - Leiden, Netherlands



Owner *Gemeente Leiden*
 Architect *JHK*
 General Contractor *Dura Vermeer - Besix*
 Engineering Office *Royal HaskoningDHV*
 Construction Period *11/2014 - 04/2017*

The parking has 7 stories, is over 22 m deep in total and is the deepest parking garage of the Netherlands. The structure is a circular concrete diaphragm wall with a diameter of 60 m and thickness of 1.2 m. The 30 m long wall of the garage is built without temporary supports. The structure has been constructed using 24 diaphragm curved elements, cast in 3 parts. Next to the pit there is an excavation for the entrance and a hillock with an ancient mill. They disturb the symmetrical radial soil pressure on the wall.

The FEM model has been built using plate elements. The 24 curved elements are modelled each using 3 plate elements with rigid connections. The 24 elements are not perfectly round, so the soil pressure causes not only axial forces but also moments and shear in the wall. The bending and shear are increased by the eccentric load. Without continuous tangential rebar, the moment and shear capacity is determined by the axial load. The joint between the 24 curves is a hinge when there is no axial force and acts like a moment spring.

The main challenge in the modelling was to model the connections between the plate elements. The stiffness of the joint depends on the axial force. SCIA Engineer does not provide non-linear moment springs for plate elements. This has been solved by manual determination of the joint stiffness.

Royal HaskoningDHV

Contact *Dennis Woudenberg*
 Address *George Hintzenweg 85
 3068 AX Rotterdam, Netherlands*
 Website *www.rhdhv.com*



We are an independent international engineering and project management consultancy leading the way in sustainable development and innovation. We are driving positive change through innovation and technology, helping clients use resources more efficiently and creating solutions which connect with people to make their lives easier, happier and safer. We are connected through a passion to work on projects that matter and to engineer solutions for our clients that go beyond the original brief. We are connected through work that is enhancing society, contributing to a more sustainable future for our children and our children's children.

Lateral West Way Bridge - Lancy / Genève, Switzerland

Owner Canton of Geneva
Architect SD Ingénierie Genève SA
General Contractor Induni - Bosquet - ZM
Engineering Office SD Ingénierie Lausanne SA
Construction Period 04/1995 - 07/1996

The Lateral west way is a composite (steel-concrete) bridge which carries 2 traffic road lanes over the CFF railway in Lancy, GE, Switzerland.

It's an existing 6-span bridge with a total length of 168 m and a 10.40 to 13.90 m wide concrete slab deck. The pillars are 1.20 m circular concrete columns.

We checked the type 2 rare SLS for the bridge to verify the interaction with the new CEVA railway station, which will be connected to the bridge walkway.

A 3D modelling of frames and shells elements was carried out in SCIA Engineer.

A global model has been built to calculate the strength, stiffness and displacements of the structure. Furthermore, dynamic calculations were made to analyse the seismic behaviour at the interface between both existing and new structures: movement amplitude and frequency.

SCIA Engineer proved to be very flexible with input and output data. Maximum displacement amplitude was finely analysed to minimize expansion joint requirements.

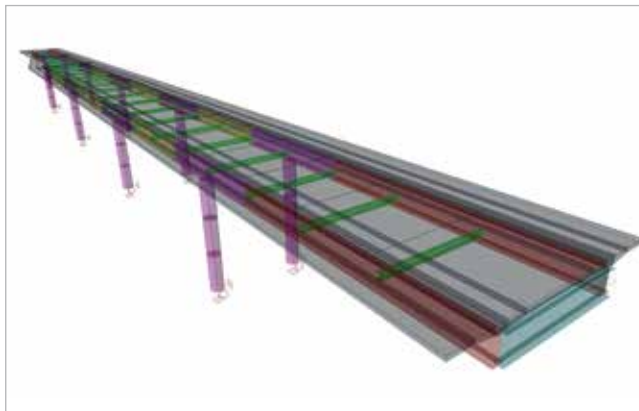
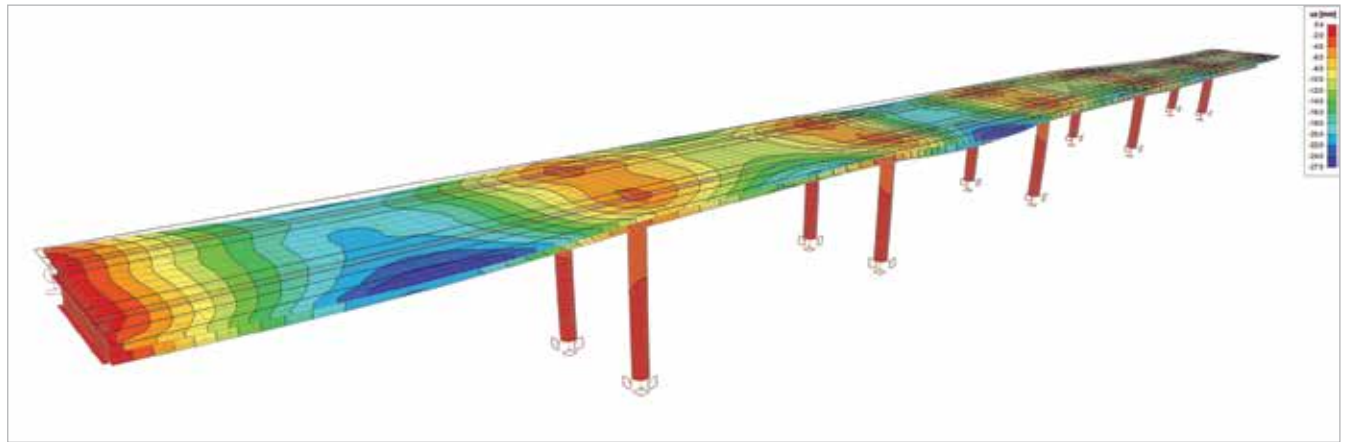
SD Ingénierie Lausanne SA

Contact Alessio Salerno
Address Place Chauderon 3
1002 Lausanne, Switzerland
Website www.sdingerierie.com

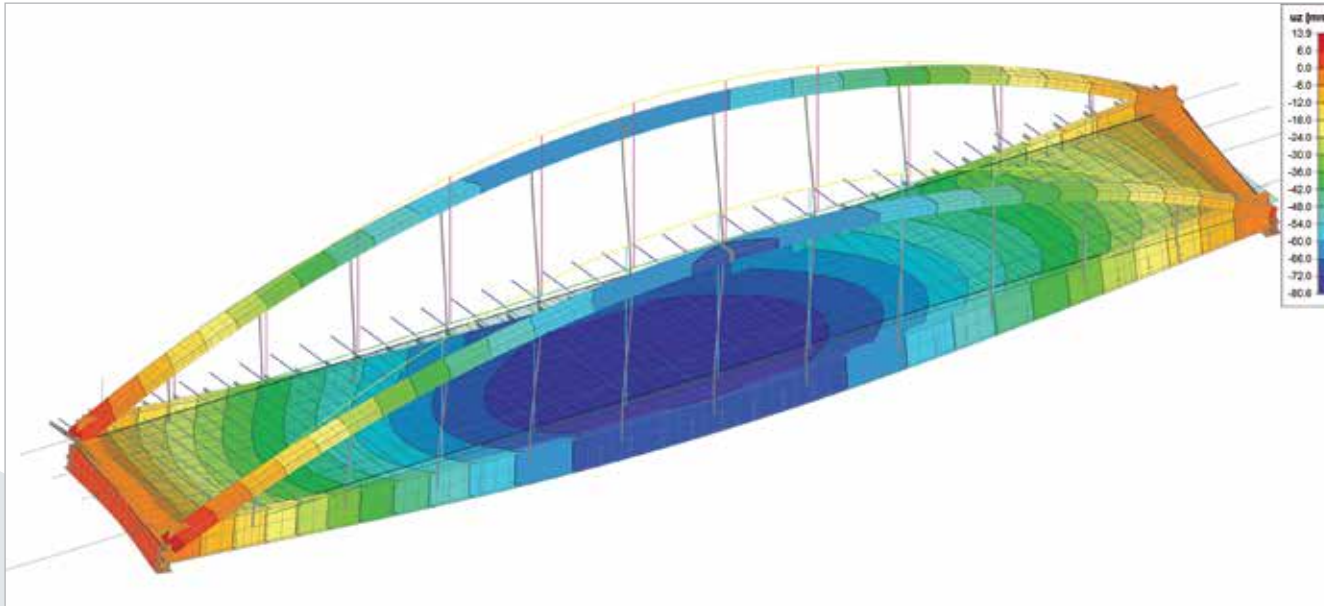


SD Ingénierie Lausanne SA was founded in 1955 and has about 40 employees. The firm is a diverse engineering, development and management consultancy delivering innovative solutions for public and private clients in Switzerland. Annually we are responsible for more than CHF 1 billion of construction projects. Our structural engineer capabilities cross different sectors: railways, roadways, infrastructures, buildings, hydraulic, environment and sport floors.

SD Ingénierie Lausanne SA is engaged in all parts of the design and construction process.



Saint-Triphon Bridge - Saint-Triphon, Switzerland



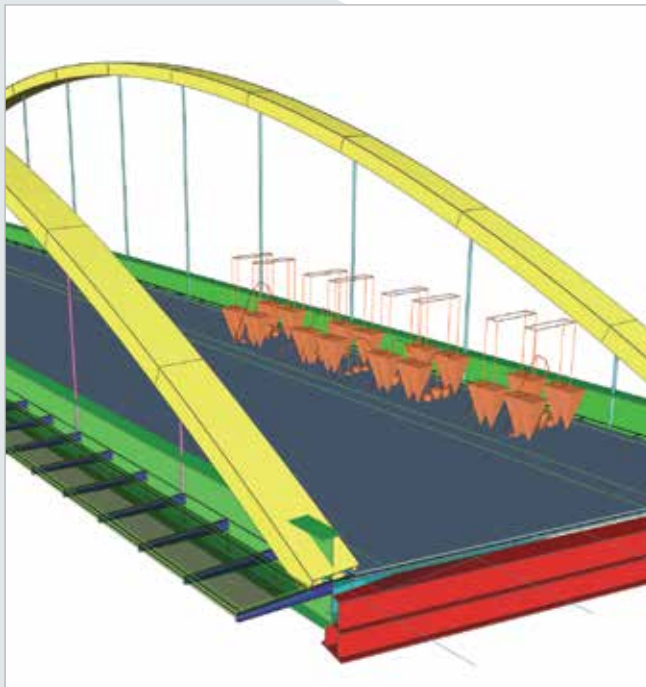
Owner *Canton of Valais*
 Architect *Kurman + Cretton*
 General Contractor *ZM - Zwahlen & Mayr SA*
 Engineering Office *SD Ingénierie Lausanne SA*
 Construction Period *1985 - 1986*

The St-Triphon bridge, which carries 2 traffic roadways and 1 traffic railway across the Rhône river, is an existing bow-string steel arch bridge with a single span of 88 m and a 22 cm post-tensioned concrete slab deck.

Canton of Valais ruled a type 2 and type 4 ULS structural analysis verification of the bridge. We have also checked the remaining fatigue life of the bridge using the rain-flow analysis method to calculate the damage accumulation in the hanger connection.

A 3D modelling of frames and shell elements was carried out in SCIA Engineer. A global model has been built to calculate strength, stiffness and fatigue of the steel structure. The arch stability was checked using the second-order stability analysis.

SCIA Engineer proved to be very flexible with data input. The challenge of the calculation of remaining fatigue life was faced using the load train module.



SD Ingénierie Lausanne SA

Contact *Alessio Salerno*
 Address *Place Chauderon 3*
1002 Lausanne, Switzerland
 Website *www.sdingenierie.com*



SD Ingénierie Lausanne SA was founded in 1955 and has about 40 employees. The firm is a diverse engineering, development and management consultancy delivering innovative solutions for public and private clients in Switzerland. Annually we are responsible for more than CHF 1 billion of construction projects. Our structural engineer capabilities cross different sectors: railways, roadways, infrastructures, buildings, hydraulic, environment and sport floors.

SD Ingénierie Lausanne SA is engaged in all parts of the design and construction process.

IJsselbrug Composite Bridge Elements - Doesburg, Netherlands

Owner Rijkswaterstaat
Architect Composite structures
General Contractor CT de Boer
Engineering Office Tauw
Construction Period 01/2016 - 03/2016

For maintenance reasons, the concrete deck of the bridge in Doesburg was replaced. The new concrete deck was heavier than before. To compensate this weight, the concrete decks for the pedestrian/cyclist lane are replaced with composite bridge decks. The weight of the bridge decks is smaller than the vertical wind load!

The bridge decks were not modelled as 2D plate elements but as a 3D construction, existing of a top and bottom plate connected by stiffeners. In this manner, we were able to read out all the stresses in the material on any surface. As the deck is supported on a line support (rubber strip) and vertically the deck is supported by node supports (bolts), the nonlinear module in SCIA Engineer was used.

The main challenges in this project, as far the modelling goes, were to avoid high local stresses in nodes. As the composite that was used is a non-plastic material, local peak stresses in nodes are unacceptable. The modelling of the temperature load was one of the bigger challenges, because the element did not consist of one 2D element, a variable temperature over the height of the construction could not be modelled without generating great stresses in the connection between elements. Therefore, the deformation of the element was calculated as if not restrained, this deformation was modelled as a translation of a support.

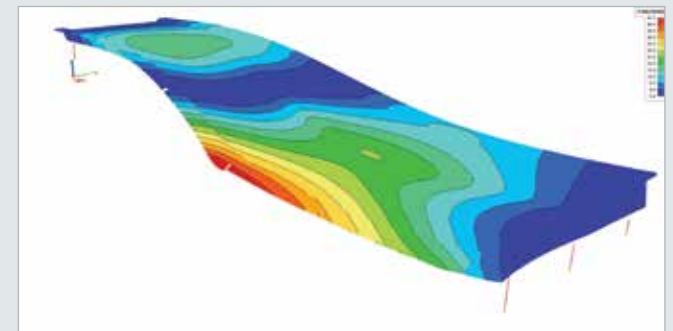
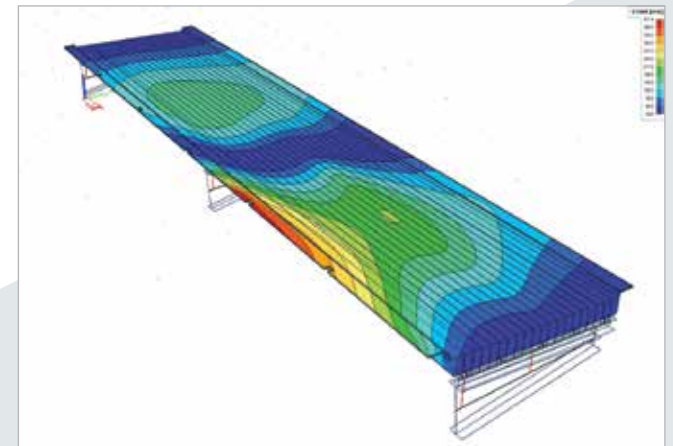
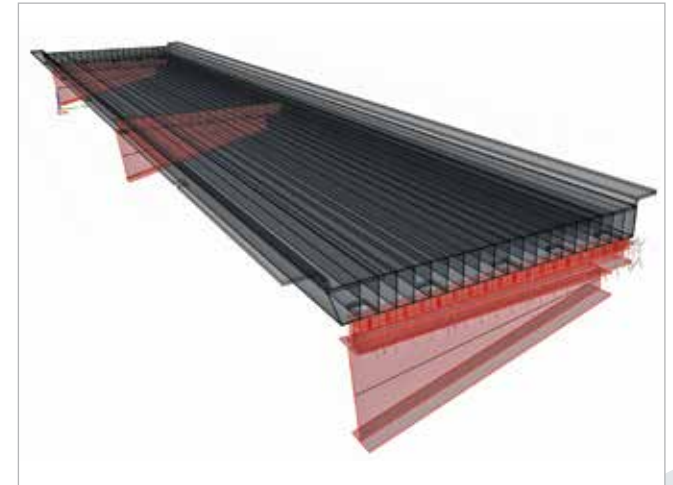
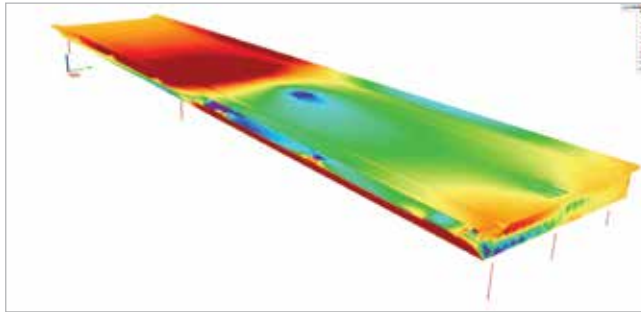
Tauw

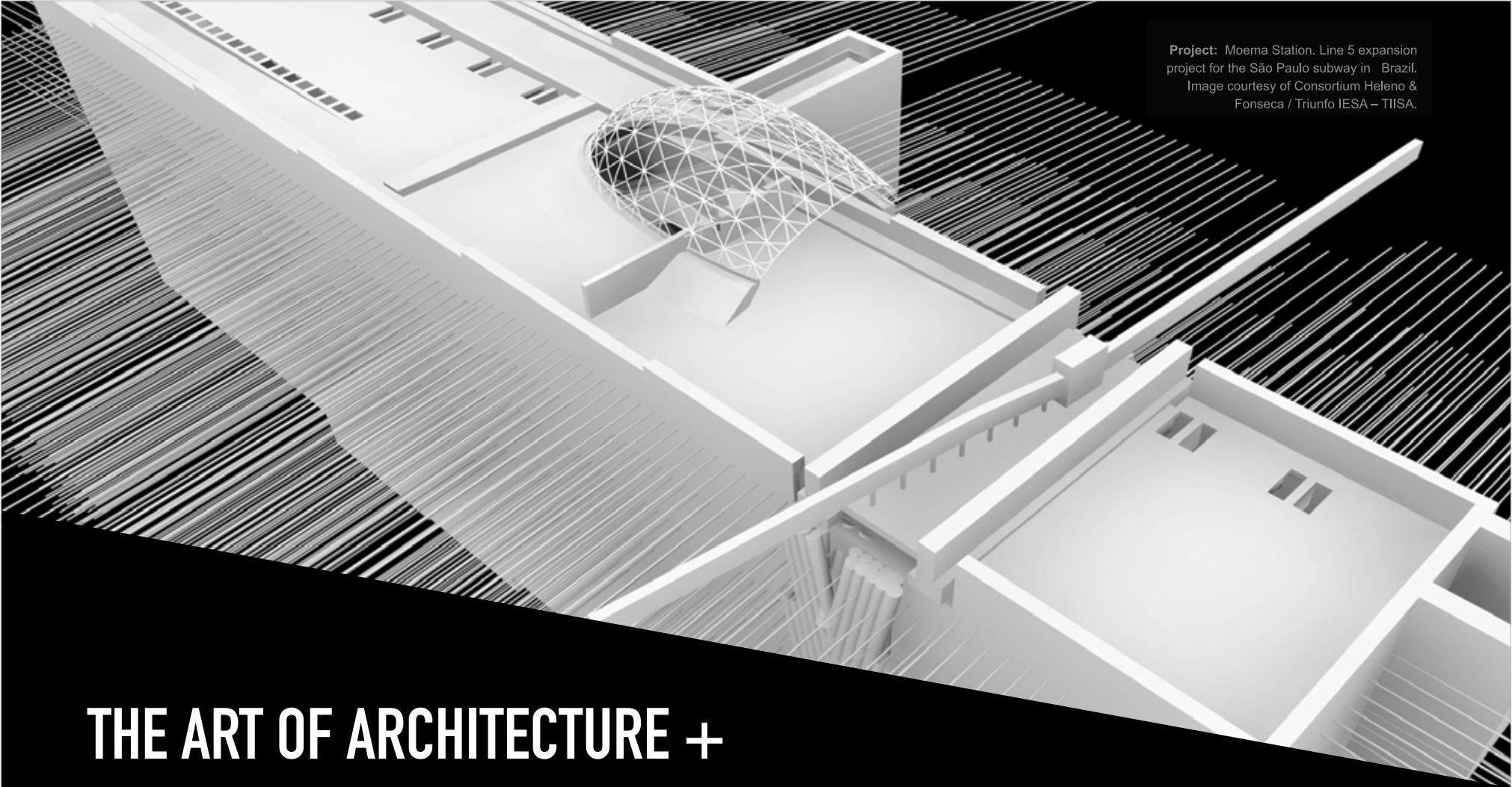
Contact Kasper Kerkhof
Address Handelskade 37
7417 DE Deventer, Netherlands
Website www.tauw.nl



Tauw Group is an international firm of consulting engineers with branches in the Netherlands, Belgium, Germany, France, Spain and Italy with over 1,000 employees. We support our clients in a responsible way with clear recommendations taking into account all aspects in the field of the environment, infrastructure, safety, energy, water and the living environment.

Sustainable solutions for a better environment





Project: Moema Station, Line 5 expansion
project for the São Paulo subway in Brazil.
Image courtesy of Consortium Heleno &
Fonseca / Triunfo IESA – TIISA.

THE ART OF ARCHITECTURE + THE SCIENCE OF ENGINEERING

Develop coordinated BIM models with Vectorworks that can be leveraged by SCIA Engineer for structural analysis and design. The result? A powerful, integrated A/E BIM workflow. See for yourself with a free 30-day trial.

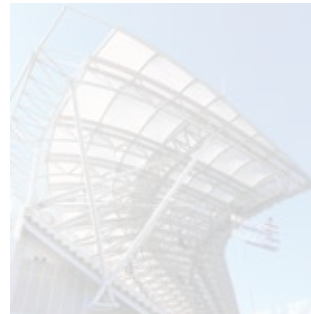
[VECTORWORKS.NET/ARCHITECT](http://vectorworks.net/architect)



VECTORWORKS
A NEMETSCHEK COMPANY

Industrial Buildings and Plants

3



Category 3

Design of general steel or concrete structures, power plants, frame structures, large span halls and hangars, pre-engineered buildings... for which SCIA Engineer software has been used.

WINNER

Category 3: Industrial Buildings and Plants



"This project combines several requirements. First, we have the analysis of different influences, such as seismic, dynamic loads and wind vibrations. Second, the American standards for the check of the structure were applied. Furthermore, the combination of 1D and 2D members was a big advantage to proof the complete construction and to optimise the weight of the steel structure."

Quote of the Jury



Shoaiba II Power Plant - Shoaiba, Saudi Arabia

Owner Saudi Electricity Company
Architect CMI Energy
General Contractor Daelim Industrial Co.
Engineering Office I.d.d. Engineering
Construction Period 11/2011 - 01/2014

The power plant is a raw-oil plant. The electricity is made by burning raw oil. The cylinder is 60 m high and its diameter is 4.6 m. The ground surface at the bottom of the transition piece is $26 \times 13 \text{ m}^2$. In total, the analysed structure is constructed 10 times on site. The building contains heavy equipment such as boilers and a lot of piping. The internal furnace structure is modelled in a separate SCIA Engineer project. The building meets seismic requirements (0.30 g) and the eigenfrequency of the main structure is designed to comply with the wind vibration mode of the American standards.

SCIA Engineer is used with steel check according to the American standards. Seismic analysis, general vibration for wind vortex, plate elements and stability check are used to verify that the model meets all the above given criteria. The structure of the cylinder and its transition piece is modelled with 2D-plates and stiffening beams. The general stability check is also used for some parts.

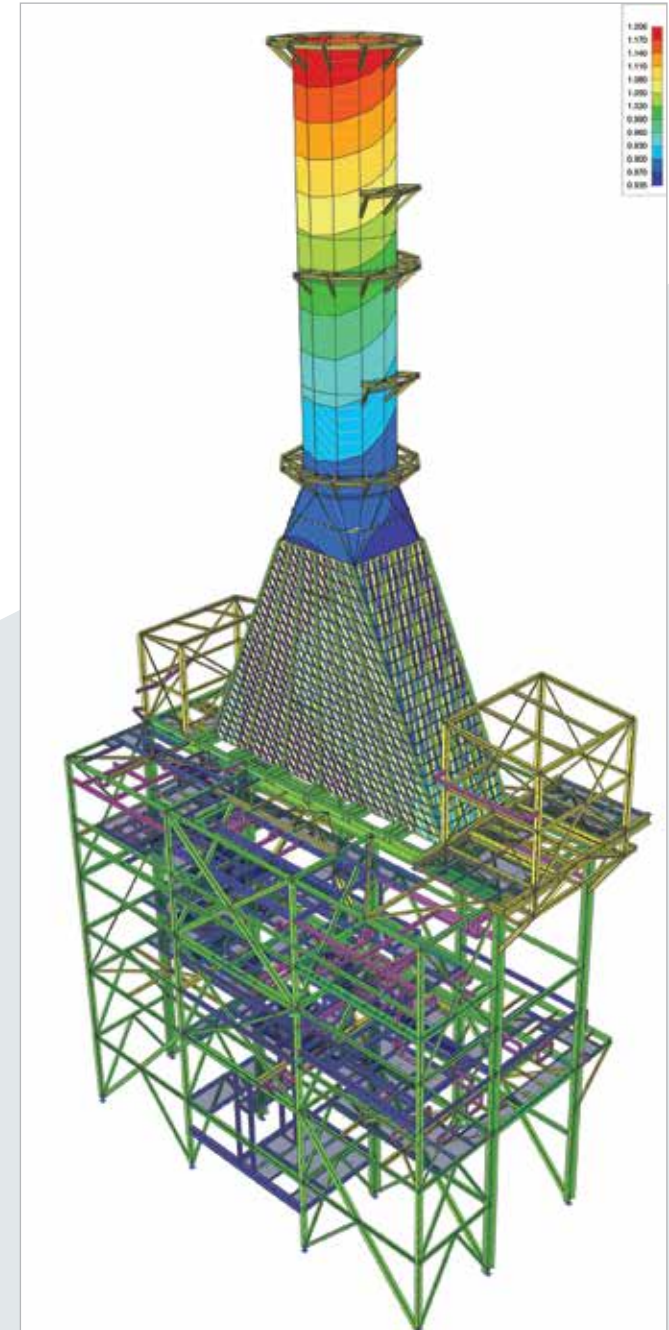
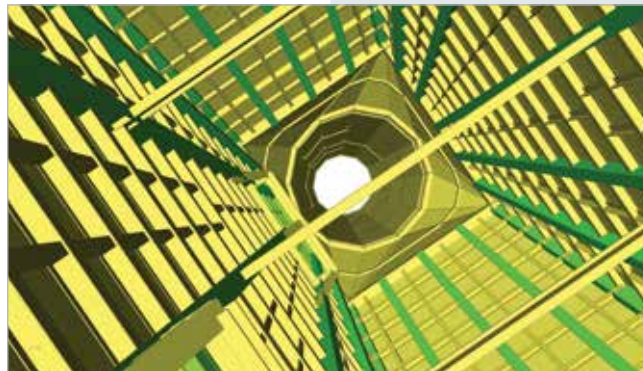
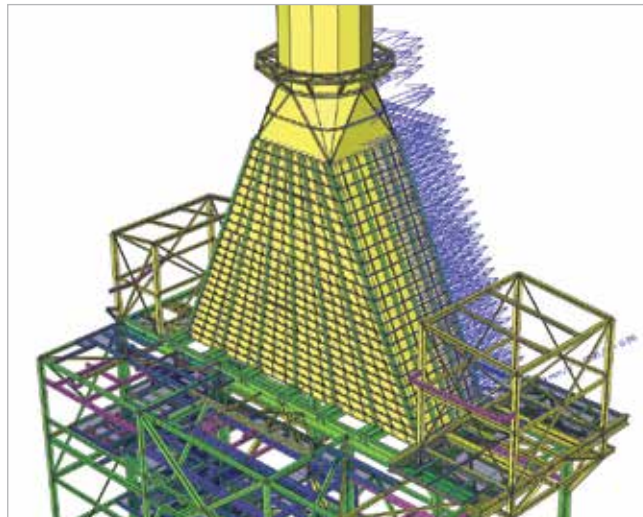
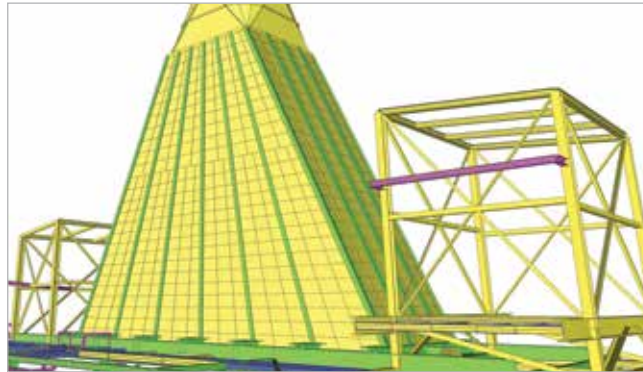
The difficulty is the buckling effect of the plated transition piece which is self-supporting and takes the weight of the cylinder on top of it. Another challenge is to have all the connection details matching together. The client reached a 30% reduction in the weight of steel thanks to a good optimization of the upper shell plate thickness.

I.d.d. Engineering

Contact Dries Decloedt
Address Hoogkouterbaan 1
9450 Haaltert, Belgium
Website www.facebook.com/pg/iddEngineeringbvba



I.d.d. Engineering bvba is an engineering office near Brussels specialising in steel and concrete structures and foundations. The study presented contains a detailed engineering of connections and general stability. I.d.d. Engineering is specialising in industrial plants and civil structures such as bridges. The company was established in 2010 and has designed many structures all over the world, such as in Africa, Asia, Australia and the Middle East.



NOMINEE

Category 3: Industrial
Buildings and Plants



Ammonium Nitrate Production - Novomoskovsk, Russia

Owner NAK AZOT Novomoskovsk
Architect Jan Zmelik
General Contractor NAK AZOT Novomoskovsk
Engineering Office Casale Project a.s.
Construction Period 02/2013 - 07/2015

The construction site is located in Novomoskovsk, Russia. The planned production of the new plant is 1,800 tons of ammonium nitrate per day. There are several steel structure units in the complex – ammonium nitrate production and evaporation, absorption unit, additives preparation, air cooling with ammonia, drying, cooling and classification, installation of absorption, prilling tower, pipe and cable racks.

The structural engineering software SCIA Engineer was used for the design of all steel structure models using the Russian hot-rolled profiles. After the climate and technological loads were applied, the structures were analysed according to the Eurocodes.

During the design and loading process, the steel structure designers co-operated closely with other professions – piping, equipment and electrical. The import/export files into/from software Aveva and Advancesteel were used. The results of the static analysis (reactions, anchoring design, global end connection forces, deformations, bearing capacity, unity check of steel) were presented in the Engineering Report and also in the common civil/mechanical 3D model using software Navisworks.

Casale Project a.s.

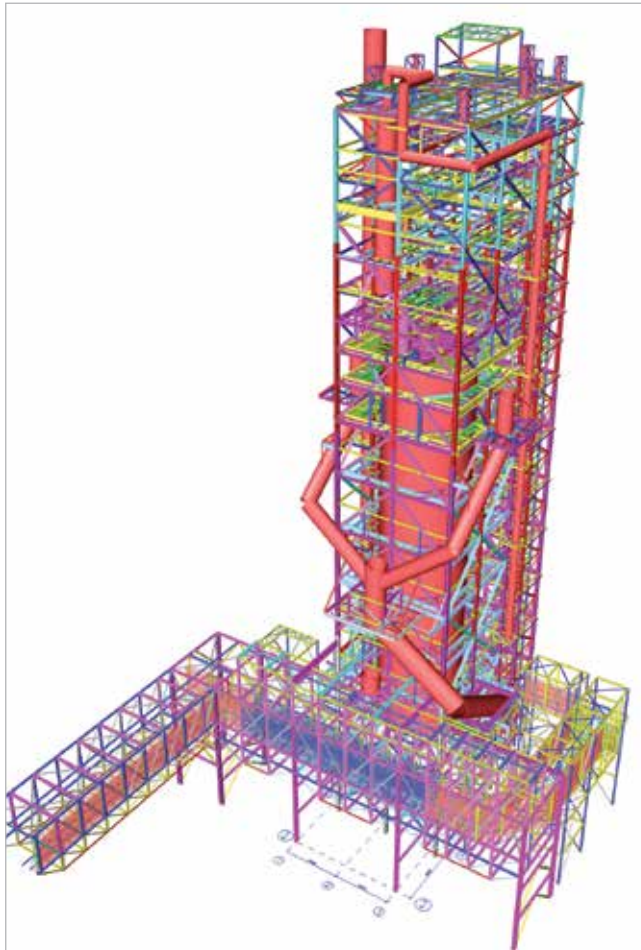
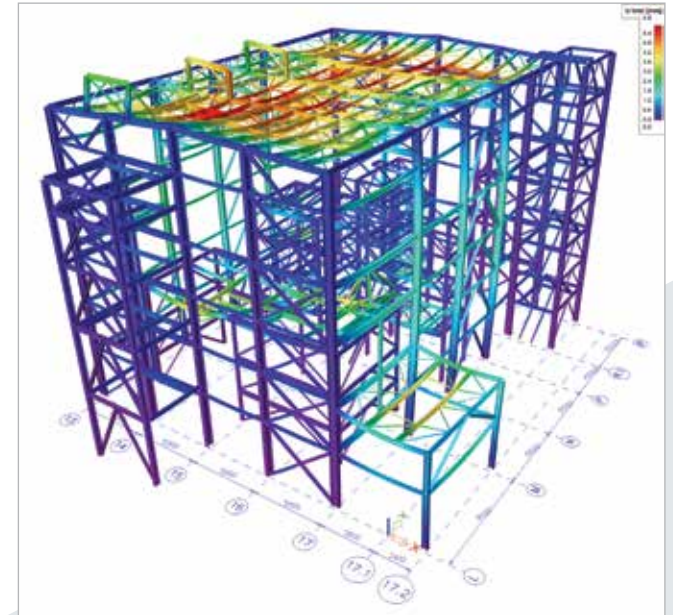
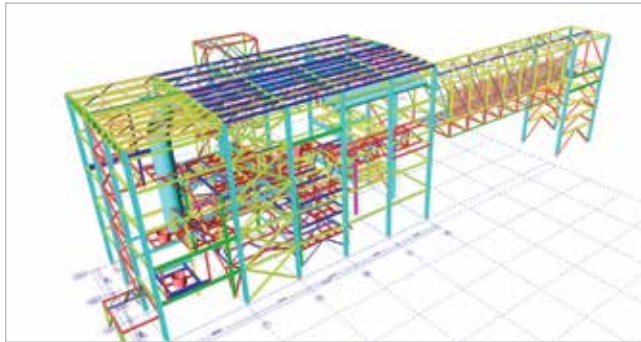
Contact Jan Zmelik
Address Sokolovská 685/136f
186 00 Prague, Czech Republic
Website www.casaleproject.cz



Casale is one of the oldest companies active in the field of synthetic ammonia production. Throughout its existence, Casale has been active in the construction of new plants.

Casale acquired in 2014 from Borealis (formerly GPN) the complete set of that company's proprietary process technologies for the production of nitric acid (NA), ammonium nitrate (AN), urea-ammonium nitrate solution (UAN) and multi-nutrient fertilizer products, including its granulation technology.

Urea is one of the most important agricultural fertilizers. A large part of the ammonia produced in the world is transformed into urea in plants installed downstream of ammonia production units.



NOMINEE

Category 3: Industrial
Buildings and Plants



Membrane Gasometer Supporting Structure - Biasca, Switzerland

Owner Consorzio Depurazione Acque Biasca e Dintorni
Architect TBF + Partner AG
General Contractor Syngas Swiss AG
Engineering Office Officine Ghidoni SA - Technical Department
Construction Period 01/2017 - 03/2017

Commissioned by Syngas Swiss AG for the new biogas treatment plant at the CDA Biasca, the structure has a cylindrical body (D x H = 9.8 x 11.5 m) and a pavilion roof with 16 flaps, equipped with an overpressure vent chimney designed to support the gasometer membrane.

The main structure is composed of four sway frames with tension only bracing on the perimeter.

The Table Input-to-Excel interface in SCIA Engineer has allowed for a fast wind load definition consistent with the distribution for circular cylinders of EN 1991-1-4. The steel code & connections check was used to optimise the frame, immediately reducing the quantity of steel and identifying the combinations of load critical for the design. The subsequent plastic shells analysis with a reduced number of load combinations has allowed us to optimise the connections not defined in the Eurocode as well as the base plates by reducing the distance of the anchors from the edge of the foundation. Structural elements and graphics performance tools have allowed the generation of highly faithful rendering. The interface with Bocad has accelerated the start of production.

Officine Ghidoni SA

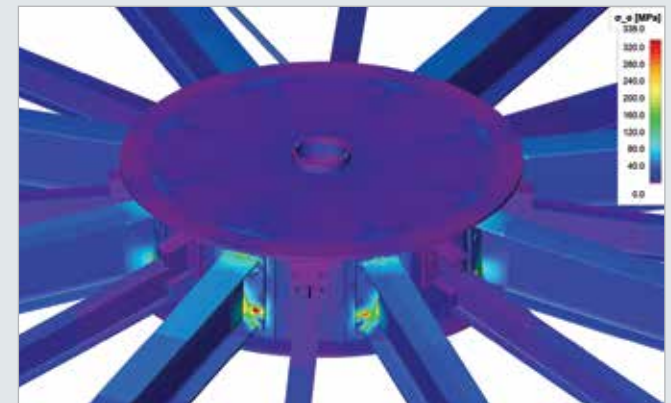
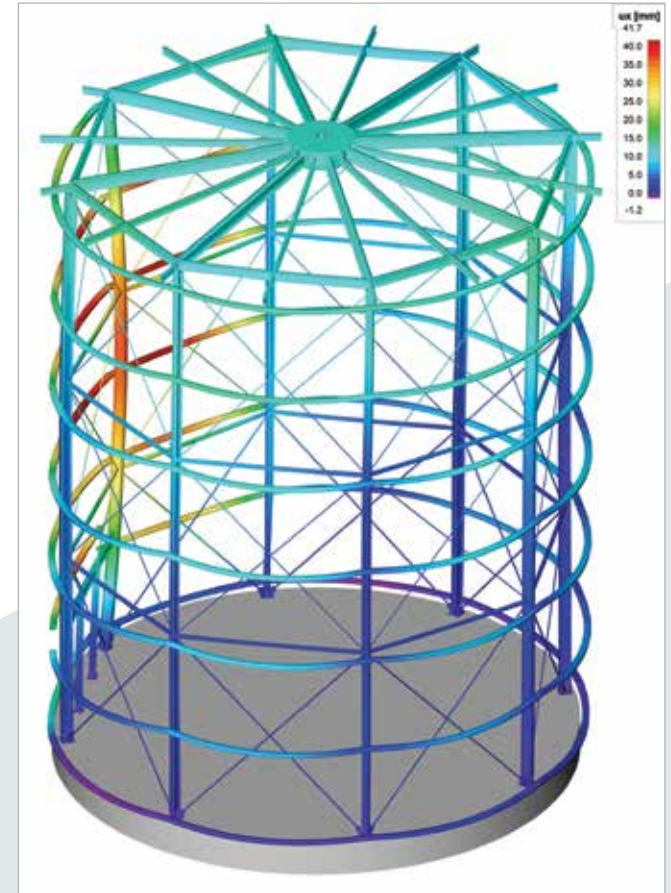
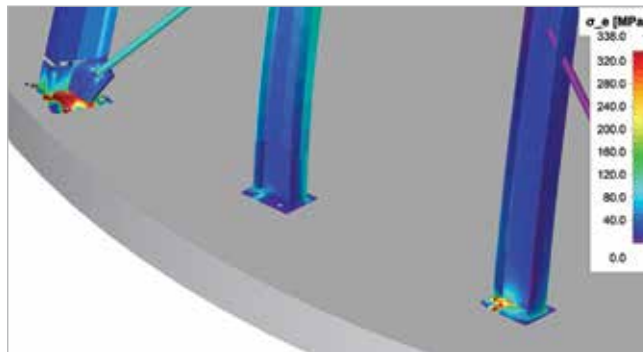
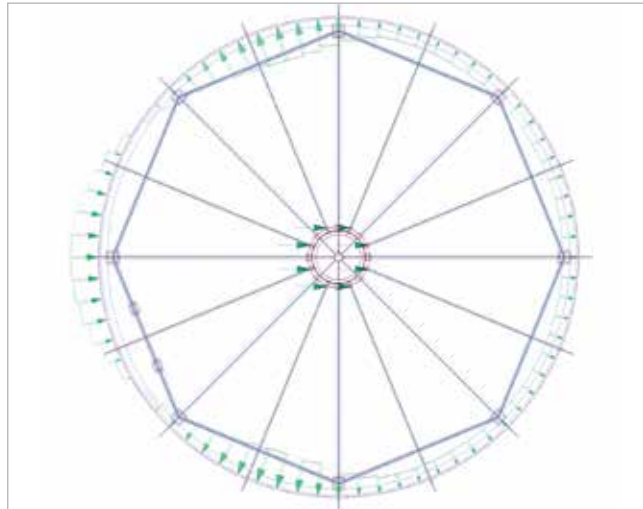
Contact Franco Rastelli
Address Via al Pizzante 9
 6595 Riazzino, Switzerland
Website www.officineghidoni.ch

OFFICINE
GHIDONI
RIAZZINO

Officine Ghidoni SA is the leading company in the heavy metal carpentry industry in the Canton of Ticino, that is its primary target market, and it diversifies its production including metal carpentry, prefabricated warehouses, tanks, containers and welded manufactures.

We are convinced that quality must remain a dominant theme of our economy. Accordingly, the company has attained the following certifications: EN 1090-1, EN 1090-2 (production & design in the class EXC4), ISO 9001, EN 1090, ISO 3834, OHSAS 18001, ISO 14001.

We completed all of the most important steel structure projects carried out in Ticino and we have been given several awards (Prix Acier 2009 & 2011).



NOMINEE

Category 3: Industrial
Buildings and Plants



Hydraulic Structure - Želiezovce, Slovakia

Owner MVE Želiezovce, s.r.o.
Architect Vodotika, a.s.
General Contractor Metrostav, a.s.
Engineering Office Vodotika, a.s.
Construction Period 07/2014 - 08/2016

The hydraulic structure near the town of Želiezovce (Nitra region) is located by the river Hron. It was designed as a multi-purpose construction serving several functions (water management, energy, environmental).

The construction consists of three main parts:

- hydropower plant (installed power capacity – 2800 kW, 2 x Kaplan horizontal turbines, designed gross head – 5.95 m),
- fish ladder (salmon leap with 72 fish chambers),
- weir with overpour radial gate (three fields with a bridge).

The load bearing structure of these parts is designed from massive reinforced concrete elements.

SCIA Engineer has been used for creating the 3D analysis models of the hydropower plant and the weir. Internal forces and displacements were calculated using the finite element method and reinforcement for 2D elements was designed according to EC2. The loading capacity of the foundation soil and some chosen load bearing elements were calculated separately too.

SCIA Engineer helped us understand the composite action between the massive elements especially in the hydropower plant, analyse the behaviour of the whole structure for each load case and combination and to calculate global displacements.

VODOTIKA, a.s.

Contact Miroslav Malast
 Ján Cigánek
Address Bosákova 7
 85104 Bratislava, Slovakia
Website www.vodotika.sk

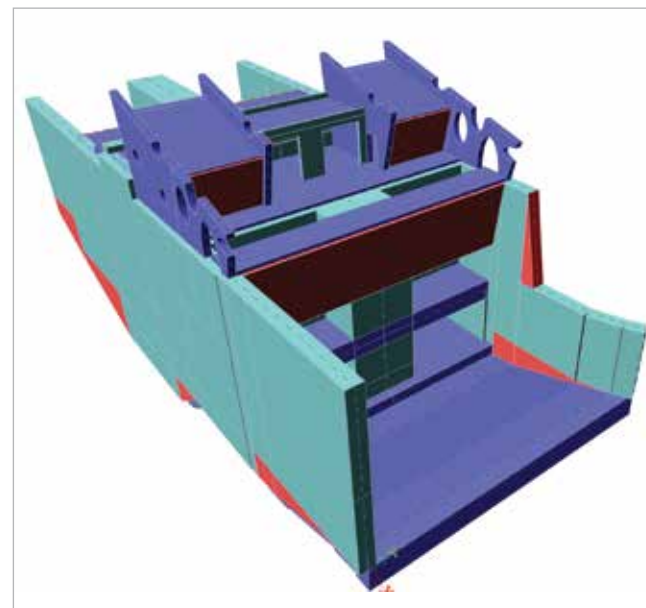
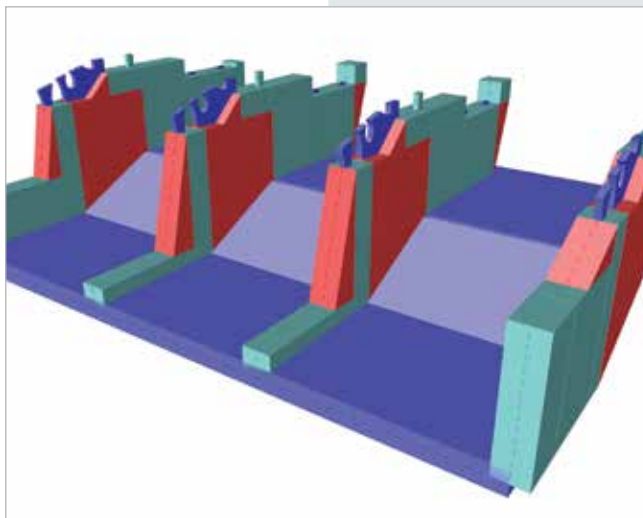
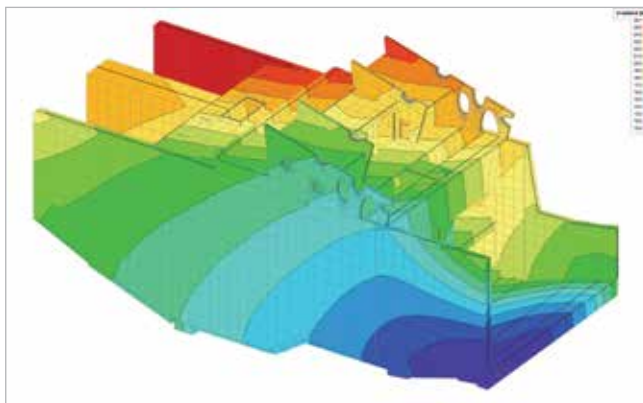
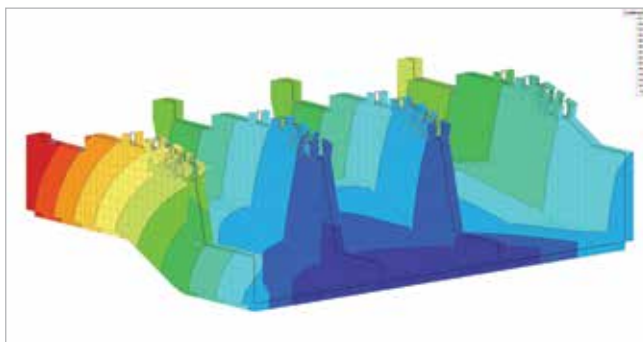


Vodotika a.s. is a design engineering studio focusing on engineering design, consulting and supplier services in the field of civil engineering and land architecture, especially hydro and water construction.

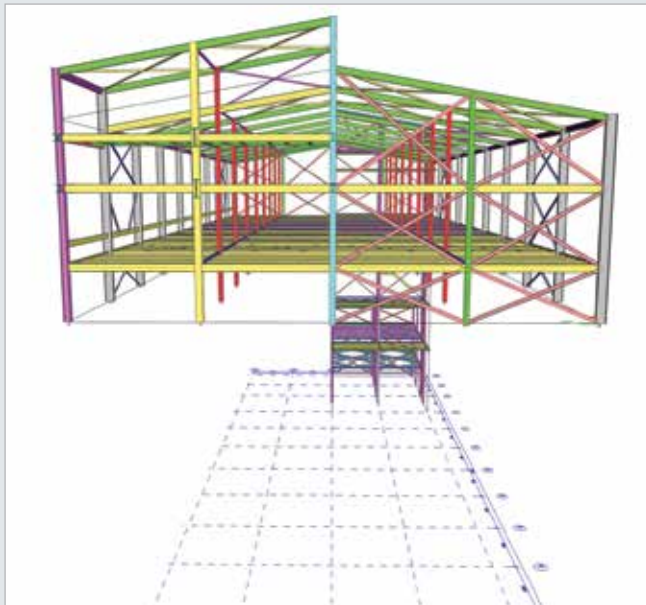
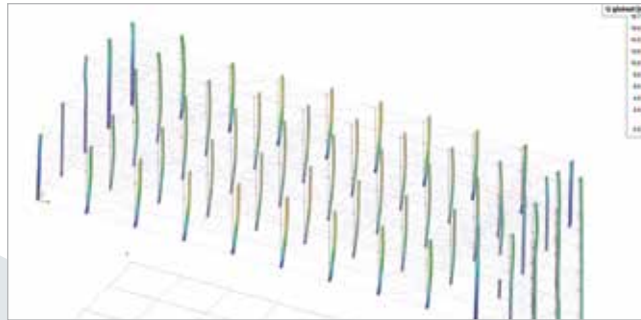
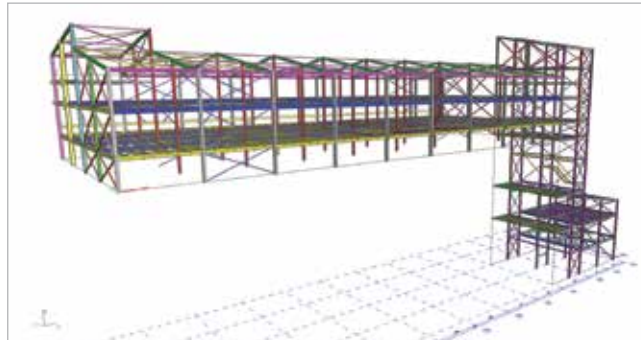
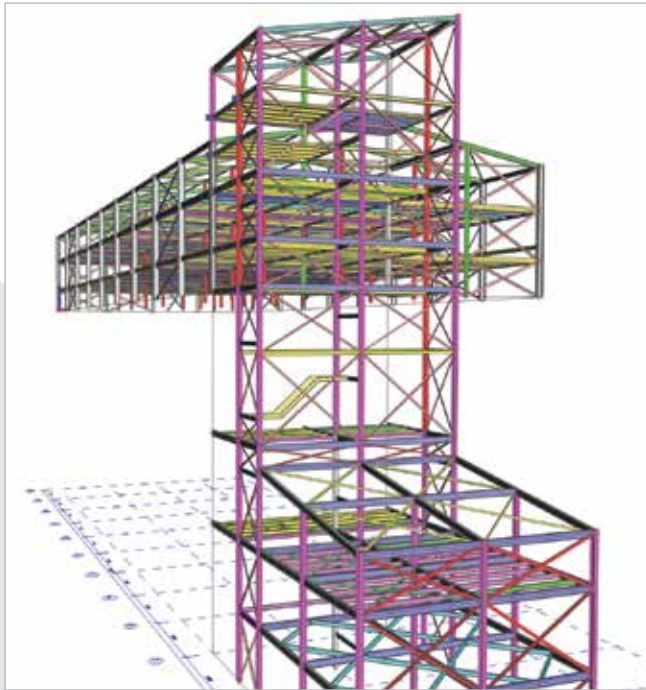
The main company activities are divided into two parts and cover all design stages (from concepts with defining its function to detailed documentation):

- engineering design of civil constructions (small hydropower plants, protection dams, polders, flood protection),
- architecture and design of building constructions (apartment blocks, multifunctional buildings, blocks of flats).

The company is ISO 9001 certified.



Siam Factory - Bangplakot, Thailand



Owner *Merry Rice*
 General Contractor *Siam Indica*
 Engineering Office *Abicon nv*
 Construction Period *01/2016 - 09/2017*

The project is a new factory for rice production. Large silos are used for storage of the waste during the production of the rice. The factory itself with all of the transport lines is above the silos.

A 3D model was made in SCIA Engineer with all the columns and beams. Then load panels were added so that we could get all the reactions and internal forces in the beams and columns. Deformations of the columns were due to the wind and deformations of all of the beams were obtained. Lastly the model was used to calculate the steel connections.

In this project, we needed to consider earthquakes in the calculation. Due to the large height of the building we had to take very good care in relation to the horizontal stability of the building.

Abicon nv

Contact *Stijn Breye*
 Address *Marialoopsesteenweg 2H*
8700 Tielit, Belgium
 Website *www.abicon.be*



Abicon nv is an independent engineering company, our core business is constructions with concrete and steel. We work out a project from A to Z. Most projects are new buildings to be used as offices, residential buildings and homes but we do also a lot of industrial buildings.

We also have the know-how to make precast designs for every building or construction, set ready for production.

Power Regeneration Facility - Grati, Indonesia

Owner Doosan
 Architect CMI Energy HRS
 General Contractor PT. Indonesia Power
 Engineering Office Allcons Industry s.r.o.
 Construction Period 01/2017 - 05/2017

The Grati vertical heat recovery boiler project is a power regeneration facility with a capacity of 150 MW. The design includes three boilers with advanced highly efficient technology for heat recovery which helps to increase the energy production.

The challenge was to design the structure with maximal material efficiency on site and considering dynamic effects such as earthquakes and vortex shedding. The whole boiler with an integrated stack is 50 m high, 31 m x 15 m wide. There are no bracing beams inside the casing where the flow of hot gas passes through the group of 855-ton heavy heat exchangers. The main drum platform which supports two heavy steam drums is located above the corner columns. The combination of boiler dimensions – high and narrow in shape – together with heavy heat exchangers and the earthquake loads leads to the complicated design task that requires the utilisation of high cross-sections to ensure adequate stiffness and strength.

With SCIA Engineer we were able to create a powerful calculation model where all members were designed with respect to IBC standards and requirements over the structure lifetime. Moreover, with BIM interfaces we were able to make drawings faster and much more easily in comparison with traditional methods.

Allcons Industry s.r.o.

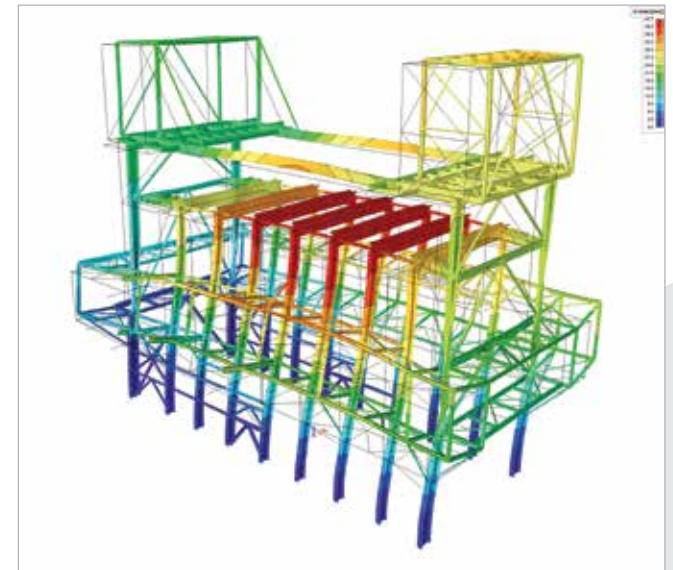
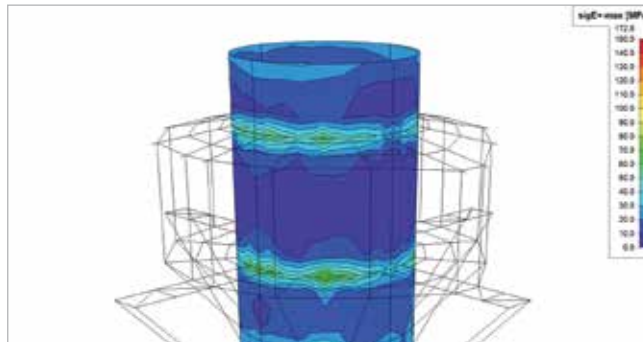
Contact Jan Vopička
 Address U Bulhara 3
 11000 Praha, Czech Republic
 Website www.allcons.cz



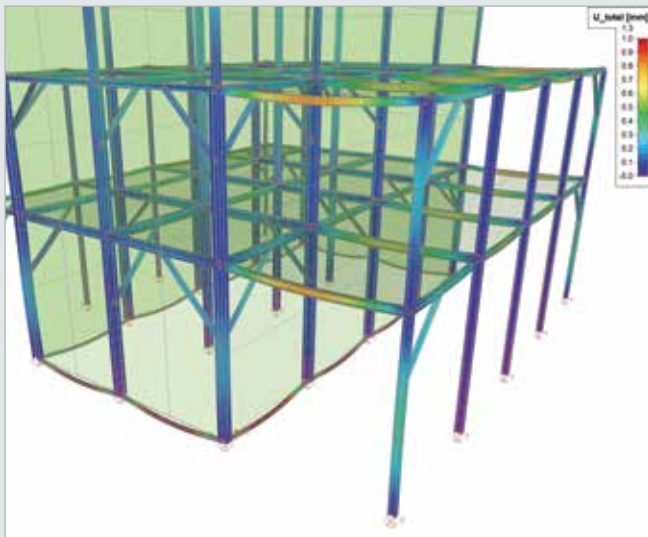
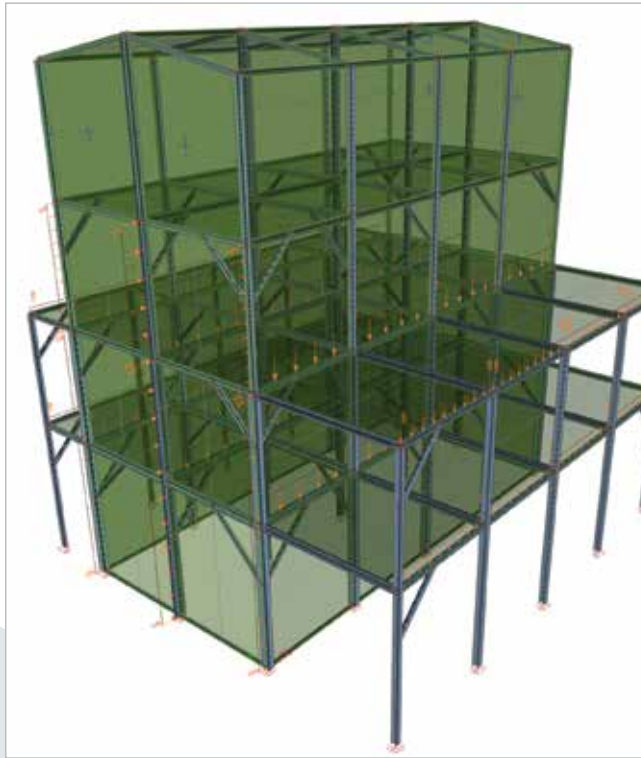
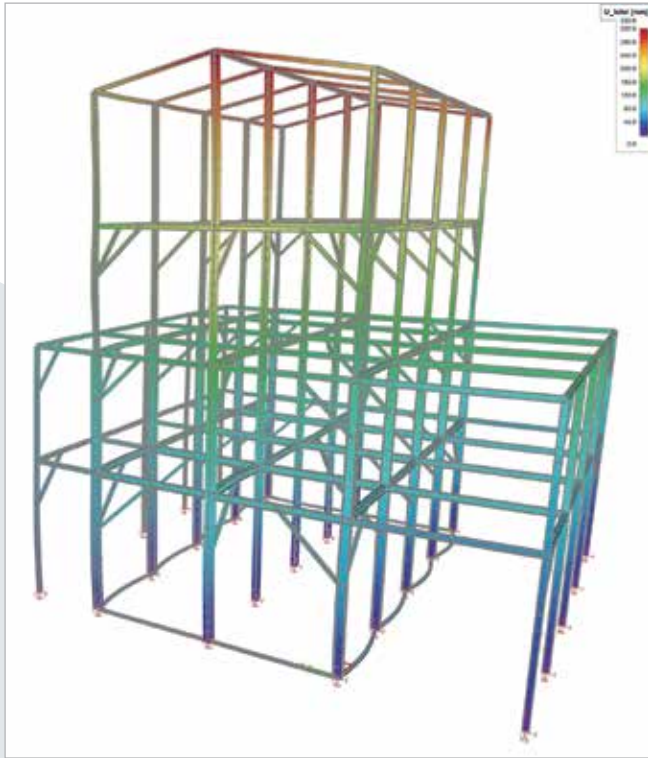
Allcons Industry s.r.o. is an engineering company engaged in the field of steel structures.

The main sphere of its activities is the preparation of design and structural documentation for steel structures of civil buildings, technological structures for power generating industry, chemical and steel industries.

The activities of the company include all works from the preparation of studies up to the creation of workshop documentation, including simulations of structural behaviour, manufacturing of steel structures as well as manufacture and designer supervision.



Lambiotte & Cie - Marbehan, Belgium



Owner *Lambiotte & Cie*
 Architect *B.A.E. Bernard Willaime*
 General Contractor *Houyoux s.a.*
 Engineering Office *B.G.S. sprl*
 Construction Period *09/2016 - 04/2017*

The project consists of a three-floor building dedicated to chemical processing. The steel tower, with an open-space work platform, is 22 metres high.

One of the structural challenges was to allow for replacement and maintenance of the production line during the building's operational life. Therefore, cross bracing could not be used. Moreover, the roof and floor structures were both divided into removable frames.

SCIA Engineer was used to calculate internal forces in the elements, to evaluate the lateral stability of the building and to calculate deflections in an overall analysis. It was helpful to quickly compare different solutions to find the most efficient one and optimise that solution. Also steel connections were designed with SCIA Engineer.

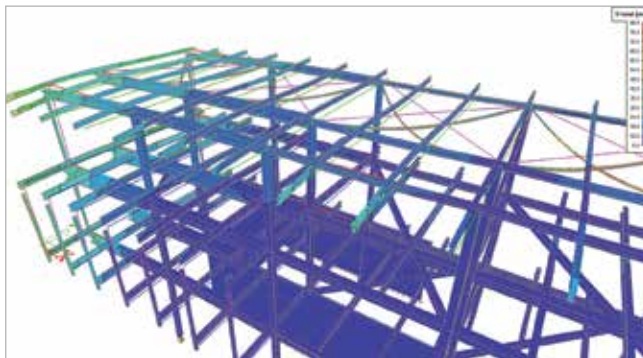
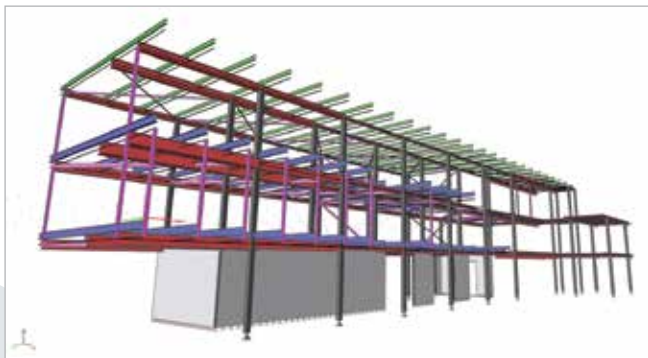
B.G.S. sprl

Contact *Loupe Sébastien*
 Address *17, rue de Vance
6720 Habay, Belgium*
 Website *www.bgns.be*



Established in 1995, BGS is an engineering company based in 3 locations in Belgium that works on projects mainly realised in Belgium, Luxembourg and France. We offer an integrated approach covering not only structural and HVAC design, but also ground surveys for public and private projects.

Mithra Pharmaceuticals Production Plant - Flemalle, Belgium



Owner *Mithra Pharmaceuticals*
 Architect *Valentiny Architectes scprl*
 General Contractor *SM Wust Moury*
 Engineering Office *Bureau d'Etudes Lemaire sa*
 Construction Period *09/2014 - 06/2017*

The Mithra Pharmaceuticals project consists of the construction of a new production site in Liège. The project is composed of six different buildings with distinct functions: production, research and development, logistics, warehouses and offices. The total useful surface is about 15,000 m².

The main structures of the project are made of concrete precast elements assembled on site but the offices are made of a very complex steel structure to respect the ambitious architectural choices.

Each building is based on a concrete foundation slab that has been modelled with SCIA Engineer. During the earthmoving process, some mine shafts have been discovered under the production building and we had to reinforce the foundations slab with piles. In fact, the design of the foundations had to allow the appearance of a mine shaft under the slab and the loss of a few piles. This case has been integrated in the modelling.

The office building is made of a 3D steel structure. This structure was totally designed with SCIA Engineer. This part of the project includes a two-floor overhanging of five metres. The main steel beams that compose the overhanging needed a predefined deflection to balance the slab's deformations under dead loads. This measure has been defined thanks to SCIA Engineer.

Bureau d'Etudes Lemaire sa

Contact *Cédric DECROLIÈRE*
 Address *Route du Condroz, 404*
4031 Angleur (Liège), Belgium
 Website *www.belemaire.be*



Founded in 2000, the Bureau d'Etudes Lemaire is an engineering office providing complete services for all construction projects: structural design (concrete, steel and wood), technical installations (HVAC, electricity,...), BIM management and energy & environmental performance. Our projects include office buildings, hotels, health establishments, commercial and industrial buildings, residential constructions, schools and sports installations.

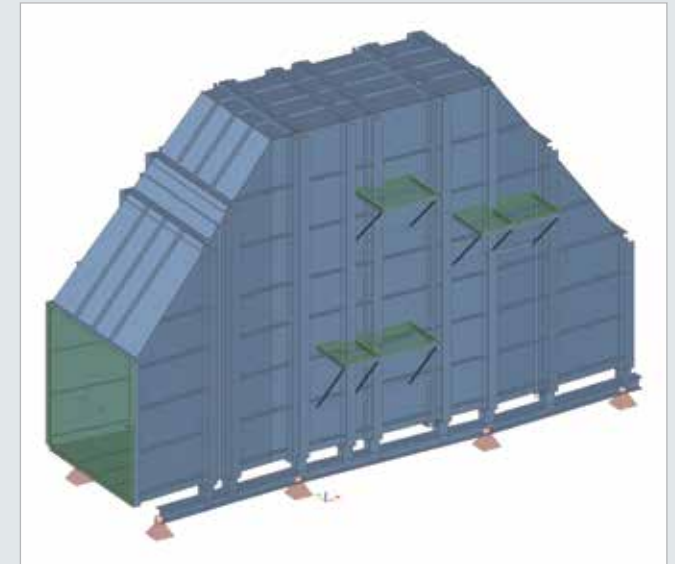
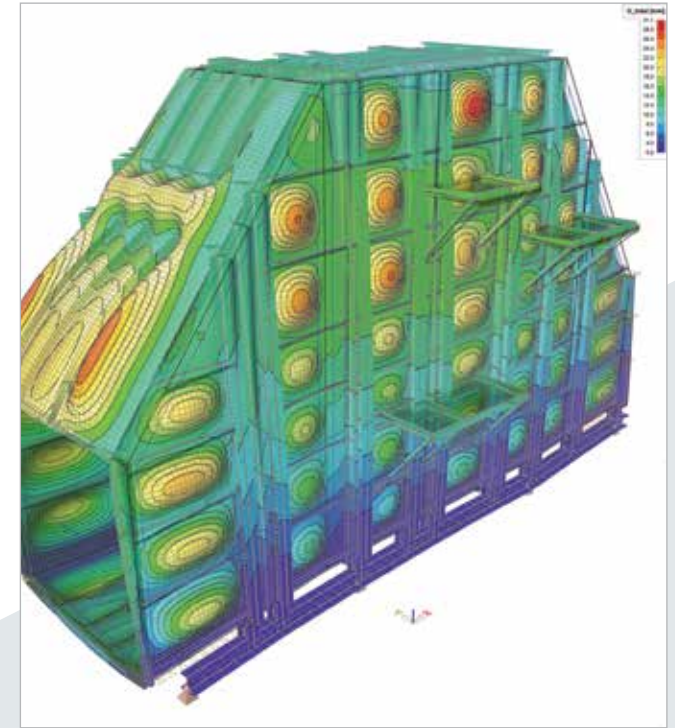
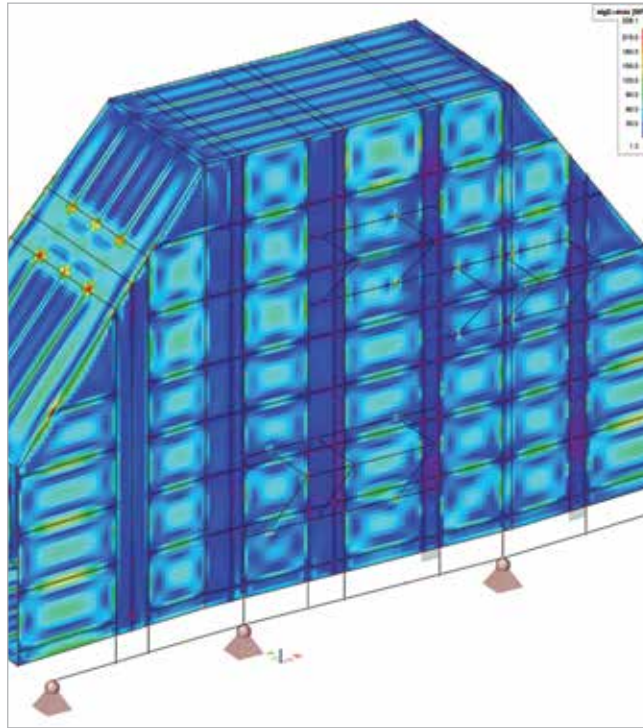
Our 50 engineers and designers are ready to find the most adapted solution for your project.

Selective Catalytic Reduction System - Barrow-in-Furness, United Kingdom

Owner Centrica
Architect Innova
General Contractor Innova
Engineering Office Calcinotto & Associates
Construction Period 01/2017 - 06/2017

The primary purpose of the system is to reduce NOx and CO emissions and to safely discharge the hot exhaust gases into the atmosphere. The system consists of a horizontal duct and an exhaust stack, separated by a flexible expansion joint. The horizontal duct is 16.5 m long with a 9.6 m maximum height and a 4.5 m maximum width. The floor is elevated 0.94 m above the base.

SCIA Engineer was used to carry out the structural analysis and design of the SCR duct casing (modelled using 2D plate elements) and the supporting framing system (modelled using 1D members). The duct is designed to be supported by nine moment resisting frames with eighteen short legs. The member-end fixity allows for free movement of short legs in the desired direction along the grade beams which represent the movement slot joints with slip membrane between the short legs and the top of the grade beams. 3D wind generator was used to generate the wind loads in accordance with the code. Linear analysis results of the Von Mises stress in the plate were checked against the capacity.



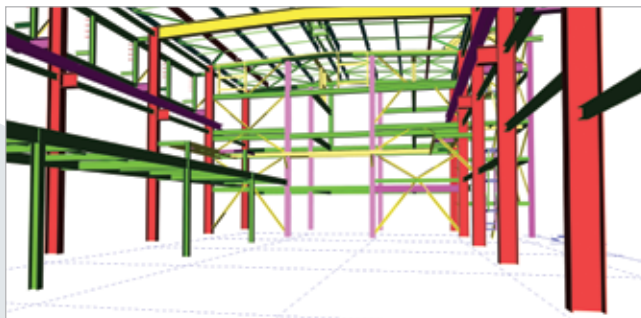
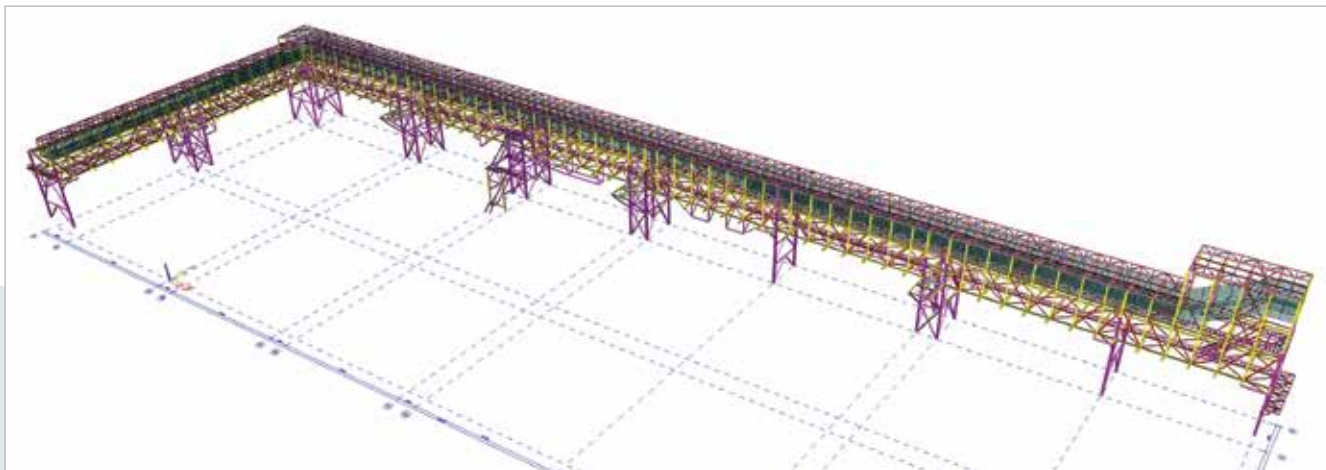
Calcinotto



Contact Jacob James
Address 43 Commercial Rd,
BH14 0HU Poole, United Kingdom
Website www.calcinotto.co.uk

Calcinotto is a company of engineers, designers and consultants producing a varied and diverse range of services to our clients. The company prides itself on providing clients with a professional service giving imaginative innovative solutions that are often a feature of today's modern approach to design. Equally as important are historical, environmental and conservation designs that incorporate sensitivity towards re-generation restoration and preservation. Using sophisticated analytical software, the company can tackle the most complicated engineering problems. Our commitment to or clients is to provide a service that realises your requirement.

Granulated Urea Production - Tcherepovets, Russia



Owner Fosagro Tcherepovets, Russia
 Architect Jan Zmelik
 General Contractor Fosagro Tcherepovets, Russia
 Engineering Office Casale Project a.s.
 Construction Period 03/2015 - 08/2016

The construction site is located in Tcherepovets, Russia. The planned production of the new plant is 1,500 tons of granulated urea per day. The complex is comprised of several steel structure units – compressor house, urea production, granulation, pump station, electrical substation, pipe and cable racks.

The structural engineering software SCIA Engineer was used for the design of all steel structure models using Russian hot-rolled profiles. The models were subject to climatic and technological loads and the structures were analysed according to Eurocodes.

During the design and loading process, the steel structure designers co-operate closely with other professions – piping, equipment and electrical. The import/export files into/from software Aveva and Advance steel are used. The results of static analysis (reactions, anchoring design, global connection forces, deformations, bearing capacity, unity check of steel) are presented in SCIA Engineer using Engineering Report and in a common civil/mechanical 3D model in software Navisworks.

Casale Project a.s.

Contact Jan Zmelik
 Address Sokolovská 685/136f
 186 00 Prague, Czech Republic
 Website www.casaleproject.cz



Casale is one of the oldest companies active in the field of synthetic ammonia production. Throughout its existence, Casale has been active in the construction of new plants.

Casale acquired in 2014 from Borealis (formerly GPN) the complete set of that company's proprietary process technologies for the production of nitric acid (NA), ammonium nitrate (AN), urea-ammonium nitrate solution (UAN) and multi-nutrient fertilizer products, including its granulation technology.

Urea is one of the most important agricultural fertilizers. A large part of the ammonia produced in the world is transformed into urea in plants installed downstream of ammonia production units.

SYRA 4 Plant - Köping, Sweden

Owner: YARA AB, Köping, Sweden
Architect: Jan Zmelík
General Contractor: YARA AB, Köping, Sweden
Engineering Office: Casale Project a.s.
Construction Period: 10/2015 - 02/2017

The construction site is located in Köping, Sweden. Köping has two nitric acid plants and two technical ammonium nitrate plants. The site also produces chemicals for technical and industrial use (DeNOx, water treatment). The planned production in the new plant SYRA 4 is 685 tons of nitric acid per day. There are several steel structure units – compressor house, nitric acid process unit including PGC house, pump station, potable and demineralisation water System, nitric acid tanks, electrical substation, pipe and cable rack.

Structural engineering software SCIA Engineer was used for the design of all steel structure models using European hot-rolled profiles. After climate and technological loads have been applied, the structures were analysed and evaluated according to the Eurocodes.

During the design and loading process the steel structure designers co-operated closely with other professions – piping, equipment and electrical. The import/export files into/from software Aveva and Advance steel were used. The results of the static analysis (reactions, anchoring design, global end connection forces, deformations, bearing capacity, unity check of steel) were presented in the Engineering Report and in a common civil/mechanical 3D model using software Navisworks.

Casale Project a.s.

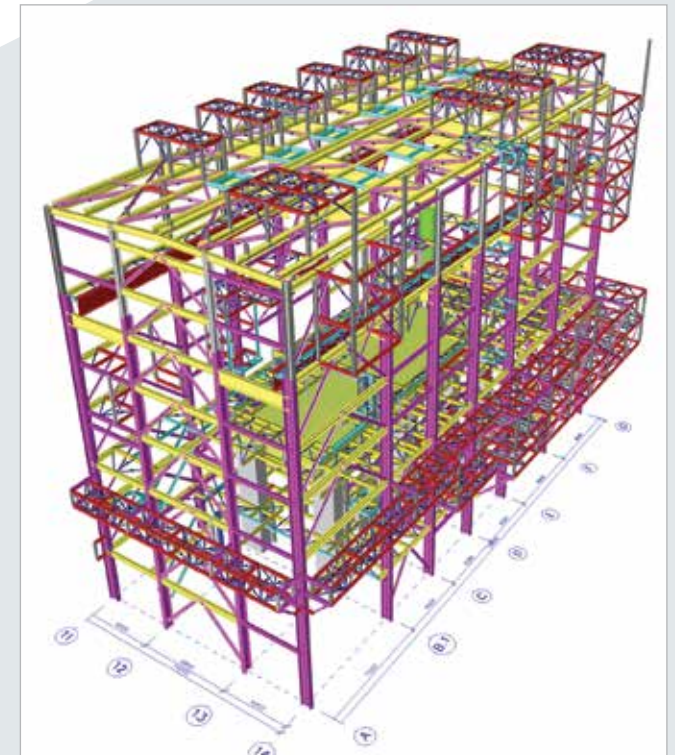
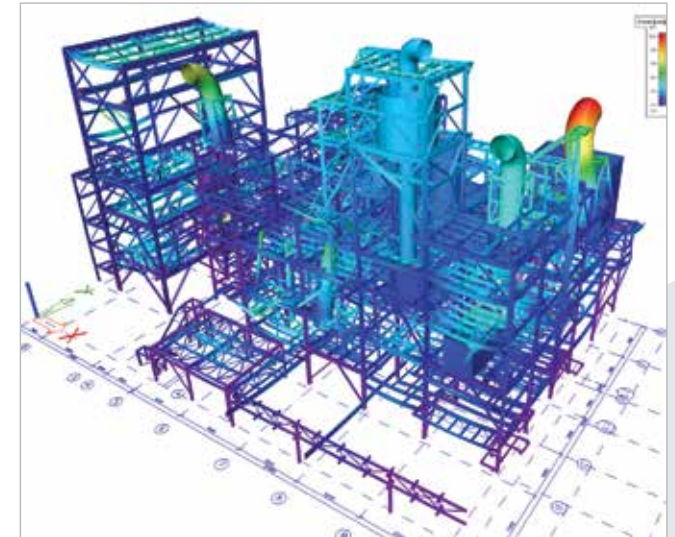
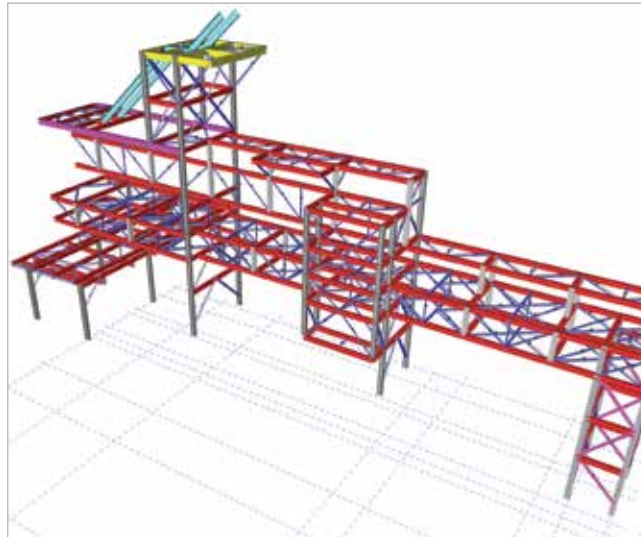
Contact: Jan Zmelík
Address: Sokolovská 685/136f
186 00 Prague, Czech Republic
Website: www.casaleproject.cz



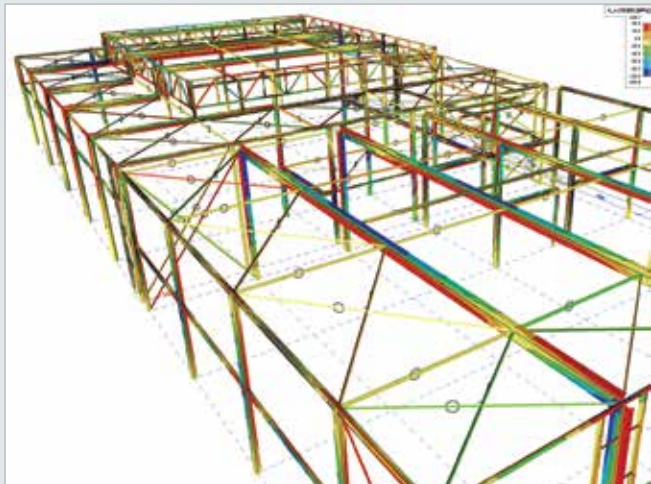
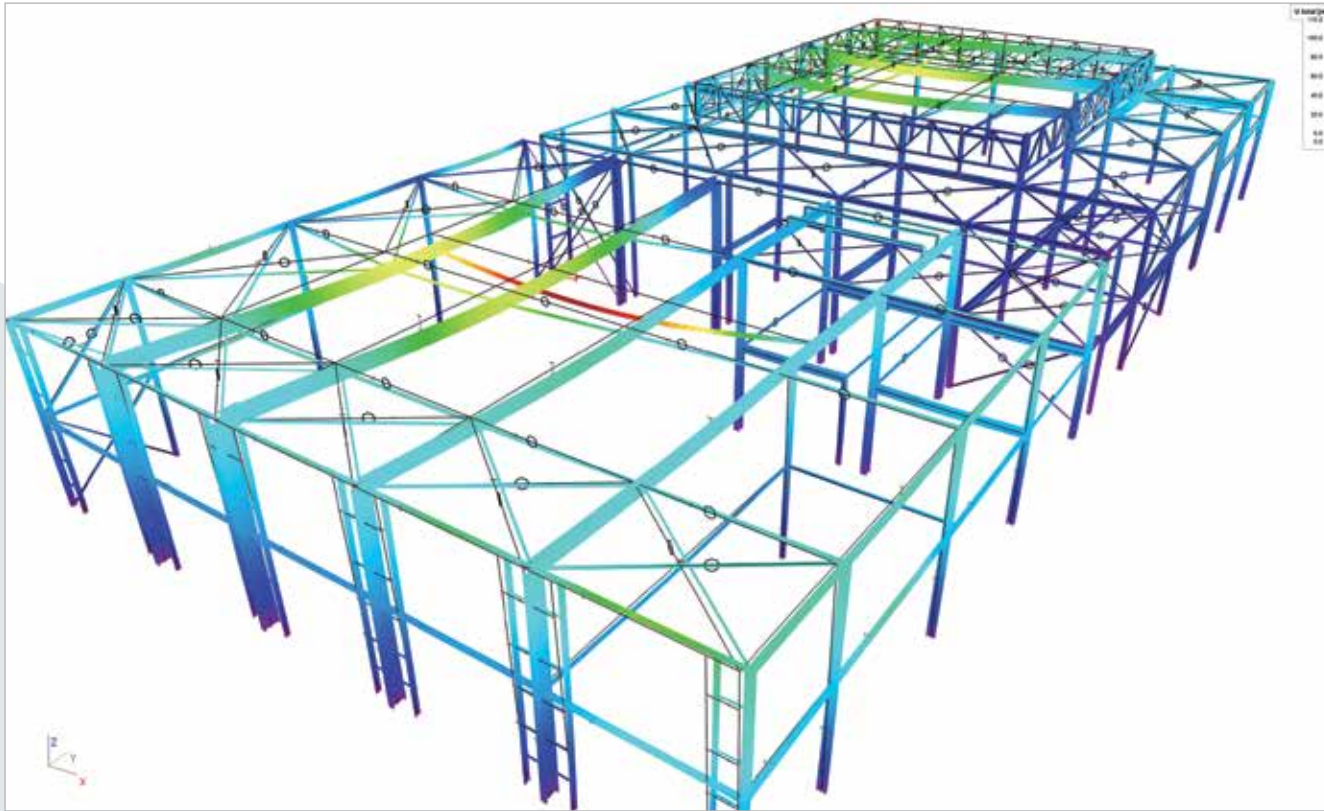
Casale is one of the oldest companies active in the field of synthetic ammonia production. Throughout its existence, Casale has been active in the construction of new plants.

Casale acquired in 2014 from Borealis (formerly GPN) the complete set of that company's proprietary process technologies for the production of nitric acid (NA), ammonium nitrate (AN), urea-ammonium nitrate solution (UAN) and multi-nutrient fertilizer products, including its granulation technology.

Urea is one of the most important agricultural fertilizers. A large part of the ammonia produced in the world is transformed into urea in plants installed downstream of ammonia production units.



Paesmans - Bree, Belgium



Owner Groep Paesmans
 Architect architect-nburo
 General Contractor edibo nv
 Engineering Office edibo nv
 Construction Period 01/2016 - 09/2016

The Paesmans autogroep built a "pit stop" in Bree. It contained a showroom and a maintenance hall which were separated from each other for fire safety.

The showroom was designed as a very open and bright space. More than half of the facade was made of glass. The roof had an extra elevation that was completely encircled by glass.

It was very important to calculate the wind-loads in detail to make sure that the structure would not bend too far. Deformations in the structure could cause the glass in the facade and roof to crack. To preserve the open feeling of the building, the bracing were placed in a few closed spaces in the facade. The roof was also calculated to spread out the forces occurring in the building due to the wind. SCIA Engineer was used to calculate the needed materials and to create a realistic model that could show the architect and owner how what the building will look like.

This project showed that a building with an open feeling can be difficult to calculate, but worth the effort when it is put in use.

edibo nv

Contact Jens Canaerts
 Address Maatheide 1302
 3920 Lommel, Belgium
 Website www.edibo.be



Edibo is a general industrial building contractor with expertise in the automotive, logistics, industry, production and offices sectors since 1981.

As a construction partner for your industrial building, Edibo builds "turnkey" constructions, extensions and renovation projects in steel, concrete and laminated timber. Edibo has been constructing beautiful reference projects in various sectors for more than 30 years.

Rapid Freezing Chambers - Thessaloniki, Greece

Owner Michail Arabatzis S.A. "Hellenic Dough"
Architect Petridis Paschalis & Partners
General Contractor Frigostahl S.A.
Engineering Office Petridis Paschalis & Partners
Construction Period 08/2016 - 06/2017

Commissioned by "Hellenic Dough – Arabatzis S.A.", the new buildings meet the high quality standards set by the company's management. The project consists of new industrial units for the production of innovative dough and pastry products using fully automated, cutting edge machinery. Situated in the Industrial Area of Thessaloniki (Sindos), it consists of two independent constructions: a building of rapid freezing chambers with dimensions of 48 x 31 m and the building of production and preparation areas with dimensions of 79 x 48 m for a total area of 5,280 m².

SCIA Engineer was used for the analysis of the entire project. The structure has been completely modelled with more than 12,000 1D members. The cold formed module has been implemented for the check of thin walled sections Z and C used for purlins. Various loads, such as self-weight, permanent loads, variable loads, imposed loads due to freezing chambers, snow and wind loads were calculated by using the plane generator option. BIM modelling features were used, such as export to IFC 2x3 file, Tekla link and XML IO Document which helped link SCIA Engineer to IDEA Statica for the calculation of arbitrary connections.

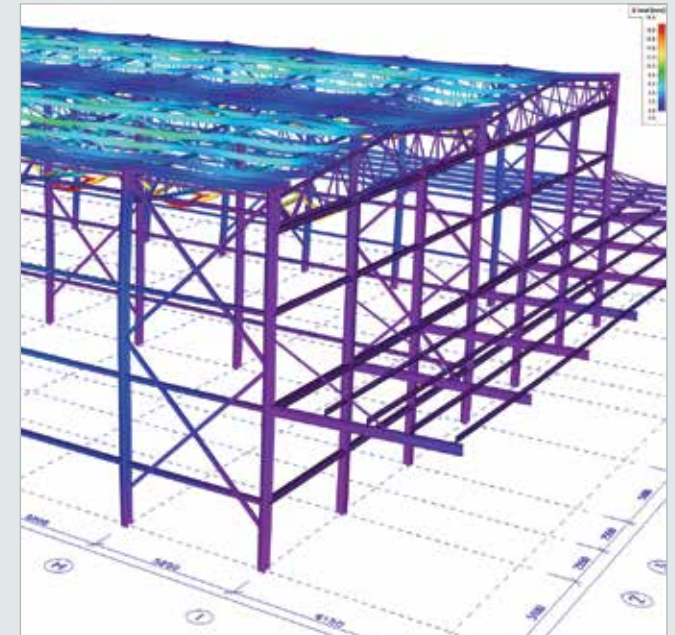
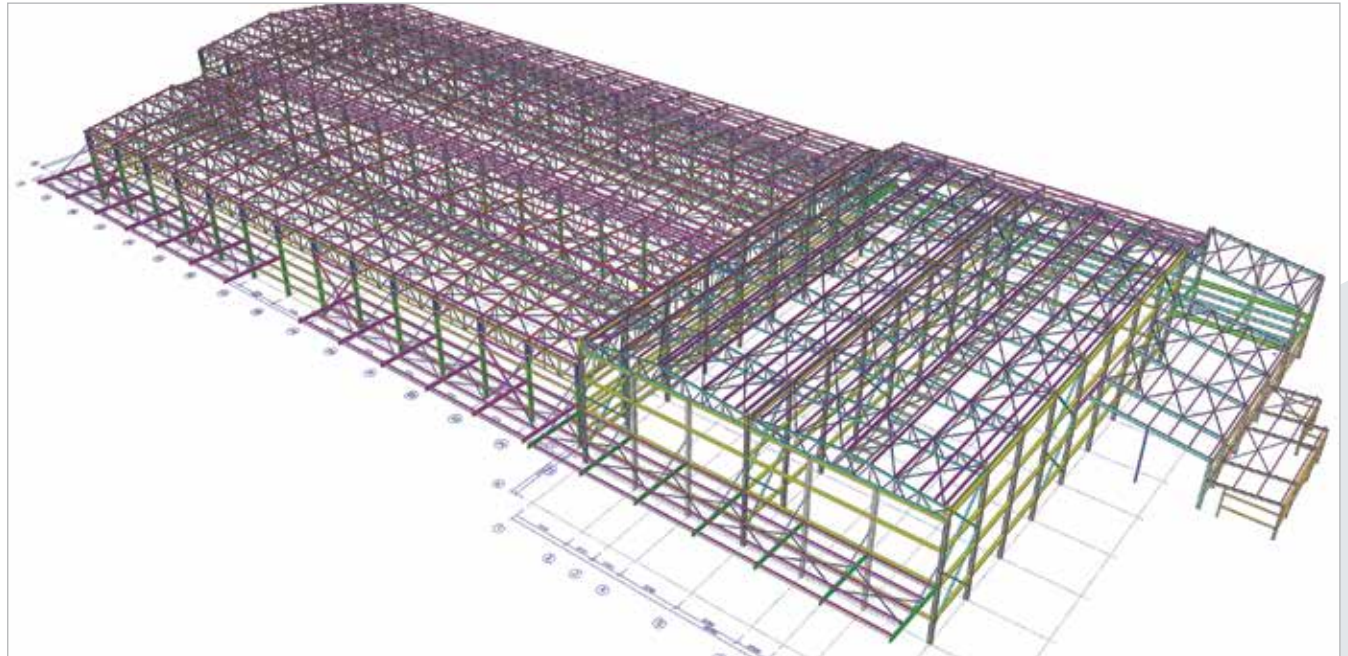
Because of the different elevations of the buildings, it was considered convenient to solve each building separately. Another challenge encountered was that, because of the existing constructions on the one side of the building, it was necessary to have asymmetric column-positioning which led to eccentric loading of the structure.

Ergo Design

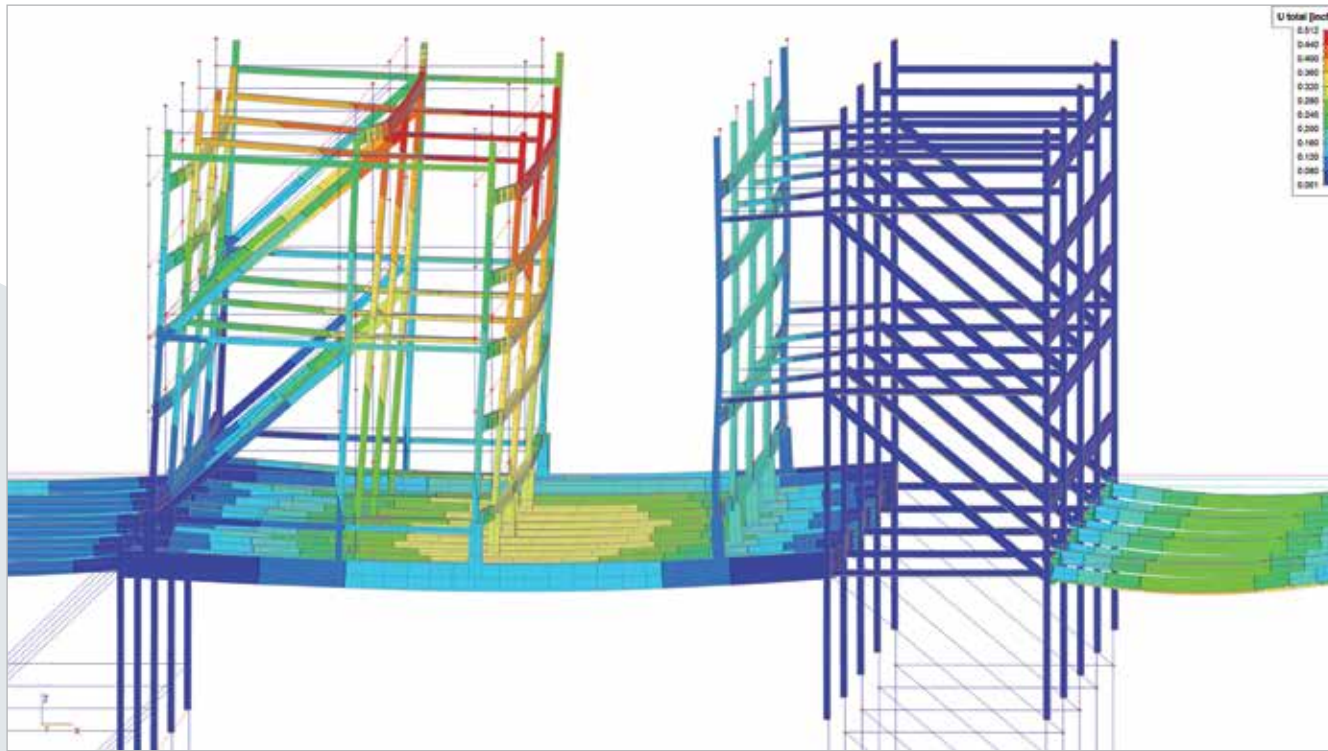
Contact Paschalis Petridis,
 Petridis Dimitrios,
 Karasoultanidou Maria,
 Maleros Eustratios
Address Mitropolitou Amvrosiou
 Moschonision 31
 55131 Kalamaria - Thessaloniki, Greece
Website www.ergodesign.gr



ERGO design was founded in 1994 in Thessaloniki - Greece. It is a leading company in the field of consultancy and management engineering, having facilitated the implementation of unique projects varying in size and complexity. With more than two decades of experience in structural design, the company's vision is to deliver innovative and budget saving solutions to the costumers and coach other engineers to act accordingly.



Grocery Facility - Henderson, Nevada, United States

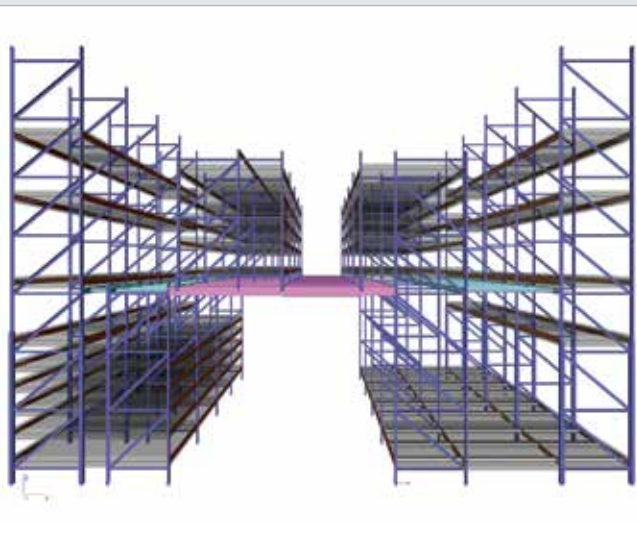


Owner Grocery Distributor
 Architect Malin Systems
 General Contractor Malin Systems
 Engineering Office Frazier Industrial Company
 Construction Period 04/2016 - 08/2016

This storage racking module and conveyor system are designed to meet the needs of a major grocery distributor. The rack module platforms allow workers to access large pallets and consolidate product orders into cases to be delivered to individual stores. There are three levels of order picking up to 30 feet above the floor slab.

A 3D analysis model was created using SCIA Engineer. The seismic forces and product loads are applied by parameter variables coded into user templates. Load panels were used to represent the platforms and shelves. The stiffness of the beam-column connections was modelled directly based on testing. For analysis, the Engineering Report is kept up-to-date using live pictures, tables and Design Forms to represent the model inputs and track the results.

The module is designed to support case-flow racking on the top level. The case-flow attachment to the decking was of particular concern. Our 3D representation of 2D plans and specifications allowed the engineer to visualise and assess the load path from the case-flow to the main support structure. The model contains an equivalent cross-section representing the B-deck which transfers rack post loads and seismic demands into the main force resisting system.



Frazier Industrial Company 

Contact Nathan Bissonnette
 Address 1640 5th Street Ste 206
 90401 Santa Monica, CA, United States
 Website www.frazier.com

Integrator / Architect: Malin Systems
 Malin Systems engineers total material handling solutions that drive operational efficiencies. Malin's in-house design team utilizes state-of-the-art technology to provide comprehensive CAD services that ensure accurate designs and on-time project completion.
 Rack Manufacturer / Structural Engineer: Frazier Industrial Company
 Frazier Industrial Company has been providing structural steel storage solutions to the industry for over 65 years with 10 manufacturing sites across North America. Research and Development efforts allow Frazier to implement storage solutions that hold up in the busiest warehouse environments.

Testing Hall - Zwijnaarde, Belgium

Owner SOCF
Architect Archipl Architecten
General Contractor Algemene Bouwonderneming Wyckaert
Engineering Office I.d.d. Engineering
Construction Period 10/2016 - 04/2017

The building is a hall used by SOCF for testing steel products on their material properties. It is situated in the technology park in Zwijnaarde, near Ghent in Belgium. The building is 58 x 30 m large and contains multiple cranes. The floors feature the innovative Cofraplus steel-concrete beam concept.

SCIA Engineer was used for steel checks according to the Eurocode, incl. the Belgian National Annex. Furthermore, the non-linear calculation method with elements acting in tension only was used.

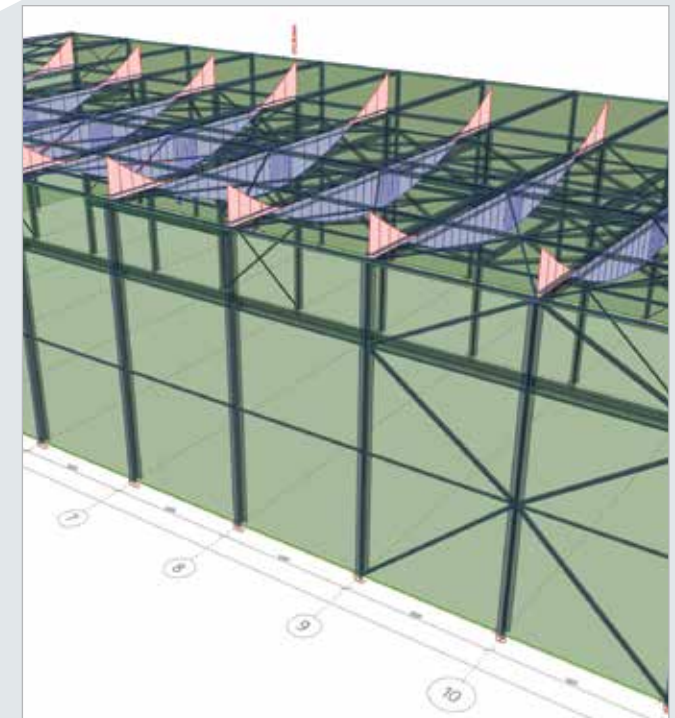
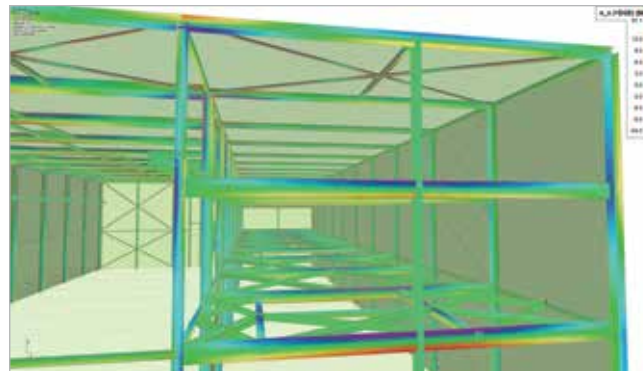
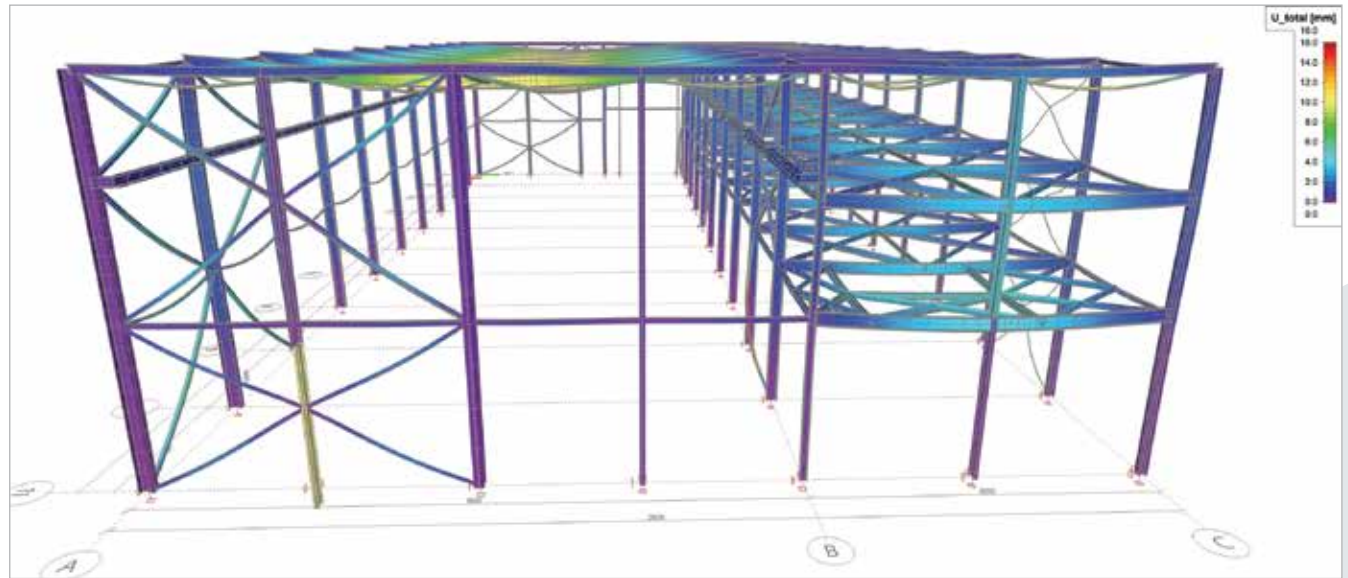
The main challenges were the composite steel-concrete structure and fire protection of the hall. The steel structure is optimised and meets the contractor's requirements for deformation and stability. The client received all of the connection details and beam dimensions from which the steel contractor can make shop drawings. A useful tool is the 3D-CAD export function in SCIA Engineer, thanks to which we could easily communicate with other parties.

I.d.d. Engineering

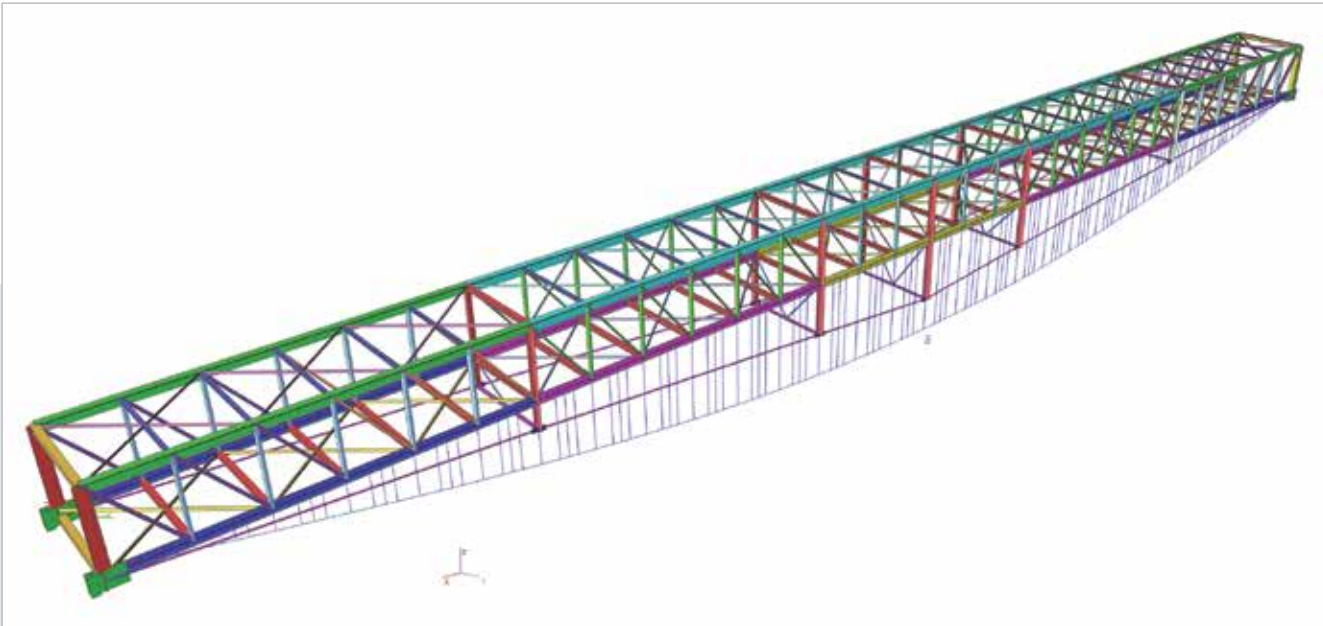
Contact Dries Decloedt
Address Hoogkouterbaan 1
 9450 Haaltert, Belgium
Website www.facebook.com/pg/iddEngineeringbvba



I.d.d. Engineering bvba is an engineering office near Brussels specialising in steel and concrete structures and foundations. The study presented contains a detailed engineering of connections and general stability. I.d.d. Engineering is specialising in industrial plants and civil structures such as bridges. The company was established in 2010 and has designed many structures all over the world, such as in Africa, Asia, Australia and the Middle East.



Conveyor Bridge - Molln, Austria



Owner *Bernegger GmbH*
 Architect *Horst Klabischnig*
 General Contractor *Bernegger GmbH*
 Engineering Office *Zeichenbüro Klabischnig, Bartonek Structure Engineers*
 Construction Period *08/2012 - 10/2012*

A conveyor bridge was a part of the extension of the gravel plant in Molln Austria. The conveyor belt moves sand to fill sand a large concrete storage silo (2 x 360 m³, 30 m high). The bridge is designed as a simple beam of 61.5 m span and a slope of 18°.

All surfaces are braced by angle section diagonals. The typical section has a 3.6 m width and a 2.8 m height. In the middle of the section the conveyor belt with a service platform on each side is located. There are seven stiff frames along the length of the bridge.

Each frame is a support for an extra prestress system helping to minimise the horizontal deformation and provide extra stiffness. Tensile bars are designed from Pfeiffer Tension Rod Type 860 with a diameter of 52 mm.

SCIA Engineer software was used for design and structural analysis according to Eurocode. The structure was calculated as a 3D system. There were multiple design variations from which we choose the best design thanks to the quick comparison in the software.



Ing. Jaromír Bartoněk

Contact *Radek Bartonek*
 Address *Srbska 2*
61200 Brno, Czech Republic
 Website *www.bartonek.net*



Bartonek Structural Engineers is a private engineering and consultancy office specialised in steel industrial structure. We provide solutions for structural design, structural analysis, structural optimisation, drawings from studies to shop drawings. The company was founded in 1994, since that the company has participated in a wide range of project mainly for the Austrian and the German market. We are a team of skilled and flexible specialists with long-time branch experience. We use the latest 3D computer systems for analysis and for drawings. The 3D virtual environment allows us to work on more complex solutions right in the project stage, this means no mistakes in the fabrication process and no collisions on construction site.

Tank Recalculation - Rotterdam, Netherlands

Owner Shell
General Contractor Fabricom
Engineering Office Movares Nederland
Construction Period 01/2016 - 12/2016

Based on the demands of the contractor we calculated several tanks. These tanks will store liquids in the harbour of Rotterdam.

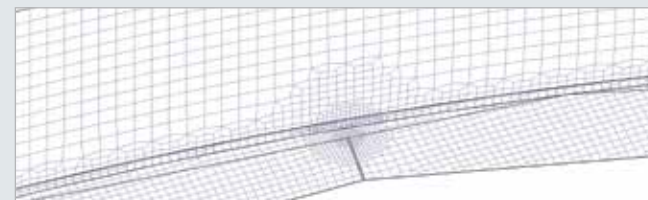
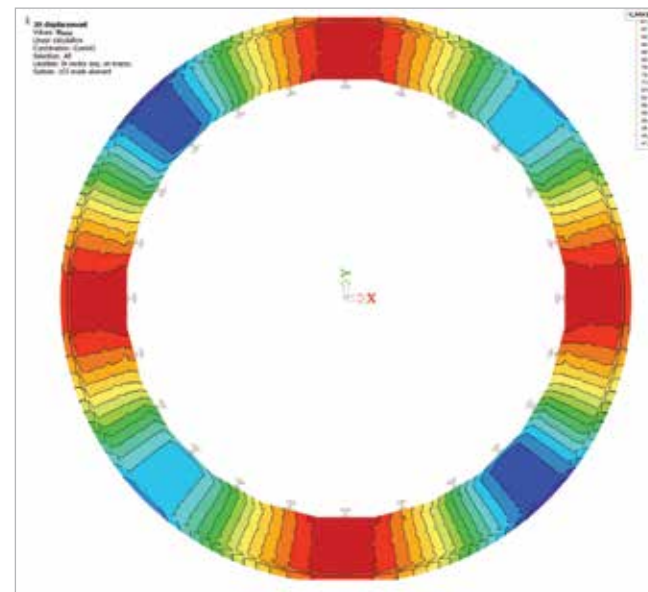
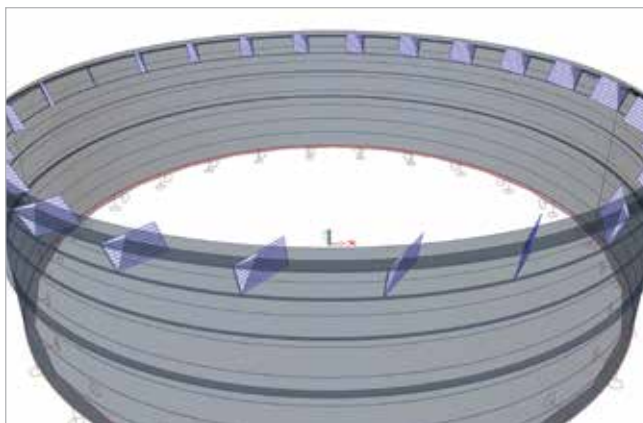
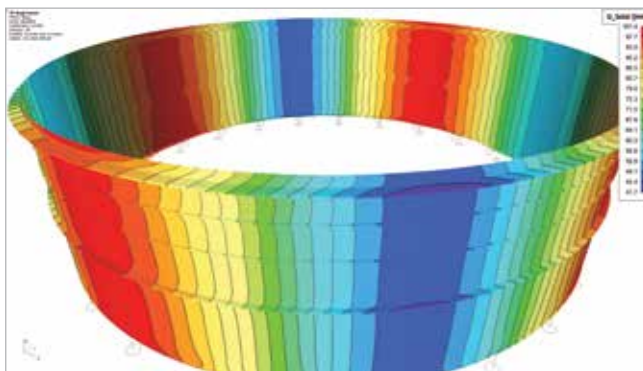
One of the tanks became, due to its maintenance, a bit of an ellipse. We determined the forces which were needed to make the tank circular again.

In another case, we looked at the possibility of lifting the tank using a geometric non-linear calculation. During lifting, the bottom plate could be used as a membrane.

In a third case, we looked at a tank that needed to be jacked to maintain the tank. This jacking system had to be placed at the site of the structure which is a very thin steel plate.

As this type of tank is always made of very thin steel plates, a lot of effort is needed to make a precise model in order to get the right forces and stresses in the structure. The geometric non-linear analysis is one solution. In other cases, the aim is to get the real size of areas to distribute the acting force.

Due to the thin plates used, it is difficult to see that the structure will withstand all the intended operations. Therefore, the use of the right software is necessary.



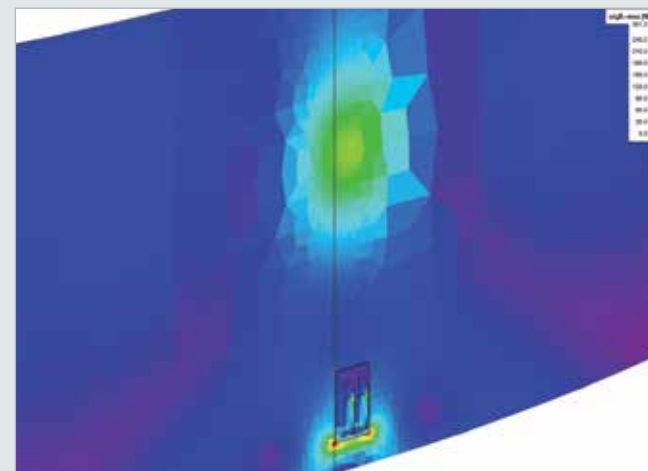
Movares Nederland

Contact Arjen Steenbrink
Address Daalseplein 100
Postbus 2855
3500 GW Utrecht, Netherlands
Website www.movares.nl

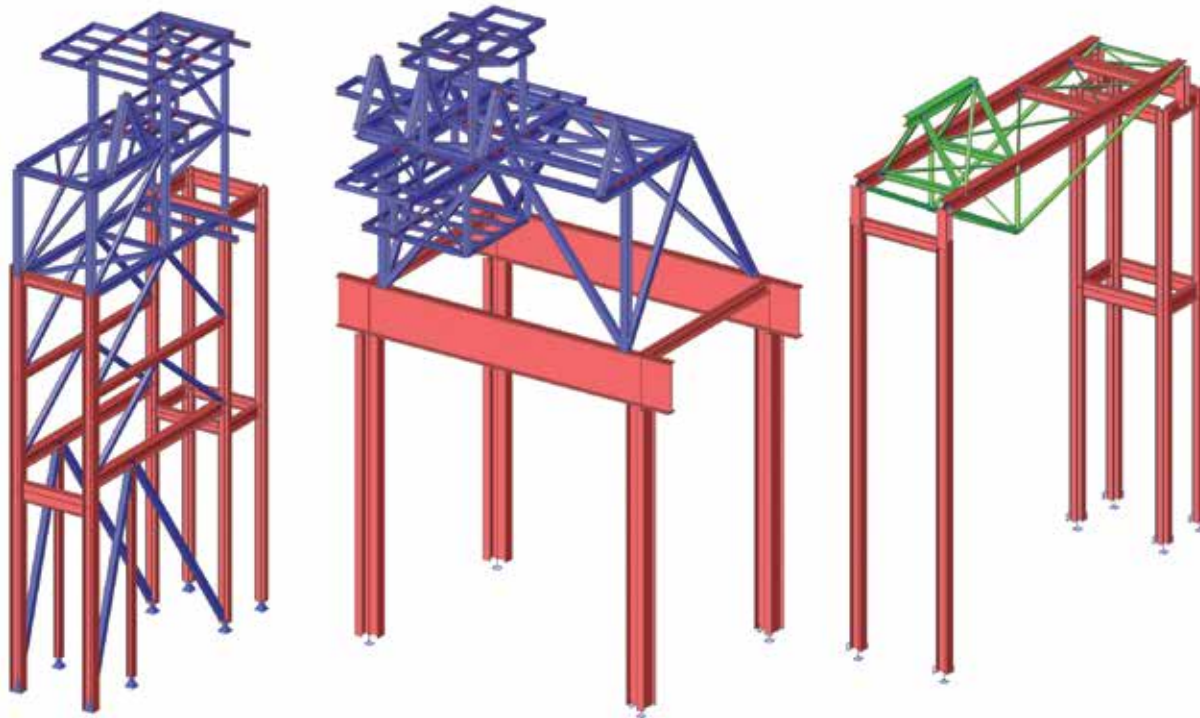
Movares
adviseurs & ingenieurs

Movares is an engineering consultancy providing solutions in the fields of mobility, infrastructure, building and spatial planning. Usability, future value and sustainability play a major role in the designs we produce. We contribute to accessibility through our unique combination of expertise.

Infrastructure is the backbone of development, both for society and the economy. Movares plays an active role throughout the entire consulting and engineering process. Our combination of knowledge, expertise and innovativeness is summed up in our motto: 'Giving shape to mobility'.



Blast Furnace Gas Pipe System - Ghent, Belgium



Owner ArcelorMittal Gent
Architect Jozef Coene
General Contractor AMC, Ferris, Real
Engineering Office MULTI
Construction Period 07/2015 - 10/2015

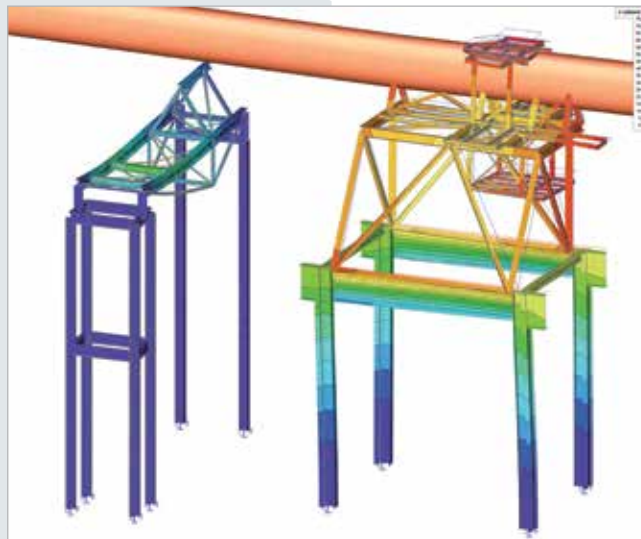
Due to the revamping of the gas pipe system of the ArcelorMittal Ghent blast furnace, a new 2800 mm diameter gas pipe had to be installed on the site between the existing structures and installations.

Therefore, 10 new towers were designed to support the pipe on the level of +20 m, supported partly by new foundations but also by existing structures that had to be reinforced. In order to define the geometry of the structures, a 2D layout drawing of the area was imported to SCIA Engineer. Furthermore, the complete SCIA Engineer model was combined with a 3D scan made on the site, which made it possible to find solutions very close to the existing structures without any clashes. For some towers, extra joints had to be installed to make the erection possible. To evaluate the effect of wind load, internal pressure and temperature on the pipe, the "towers + pipe" complex was modelled in SCIA Engineer.

The calculation model was used to hand over the information to the suppliers for the initial request for price.

Furthermore, it was used to provide all information for the detail calculations and for the workshop drawings.

The possibilities in SCIA Engineer to exchange the 3D model with other software packages was a great advantage for this project.



MULTI N.V.

Contact Rino Cerpentier
Address Orlaylaan 10
9140 Temse, Belgium
Website www.multi.engineering



MULTI enables customers to be successful.

That is the reason why we provide customised engineering services. That is also why we use skilled engineers and take care of their further development.

We serve 3 sectors: Industry, Building & Infrastructure and Maritime & Offshore.

MULTI offers expertise in 3 services: Projectsourcing, Design- and Engineering offices and Consultancy.

Industrial Hall - Valašská Polanka, Czech Republic

Owner Kovar a.s.
Architect Ing. Arch. Š. Jordánová
General Contractor Navláčil stavební firma s.r.o.
Engineering Office Navláčil stavební firma s.r.o.
Construction Period 04/2016 - 07/2016

This project is located on the East of the Czech Republic near the town of Vsetín. The main goal was to build a new hall between three existing halls. The demand from the investor was the roof slope of 15 degrees. Considering the fire resistance, the load bearing structure was designed as a precast concrete frame. Due to the steep roof slope, the girders have a tie rod. There were two 20 t cranes installed in the hall.

From the beginning, we used a BIM model to communicate with the civil engineers (through the IFC model). In this step SCIA Engineer is very useful. Next, to the static calculation like linear analysis or soil interaction, we had to perform seismic analysis as well. Also, load panels were handy. As the next step, a steel code check using the steel design module was carried out. At the end, we used Engineering Report to create the report.

There were two big challenges in this project. The first one was the right co-ordination of work with civil engineers, due to some of the special details. For this communication, the Open BIM with IFC import/export link was very helpful. The second one was the seismic load in combination with the crane load.

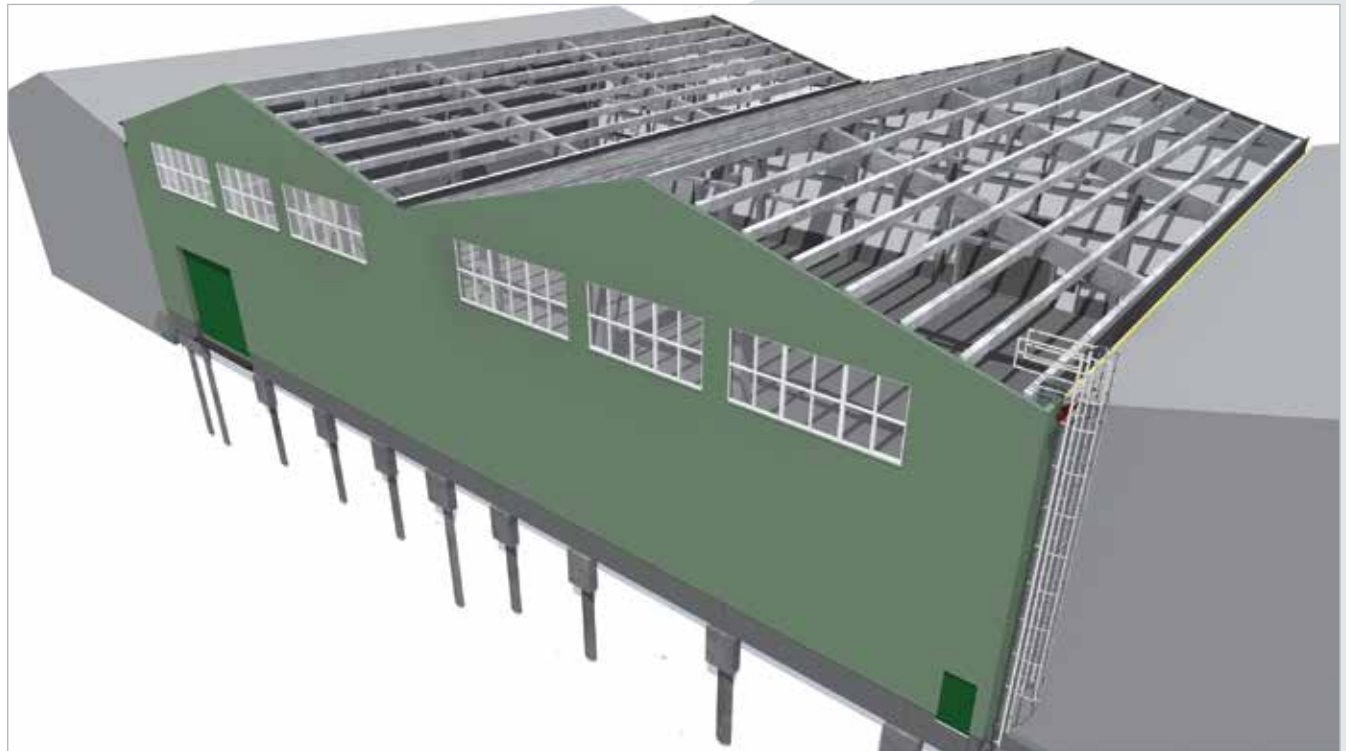
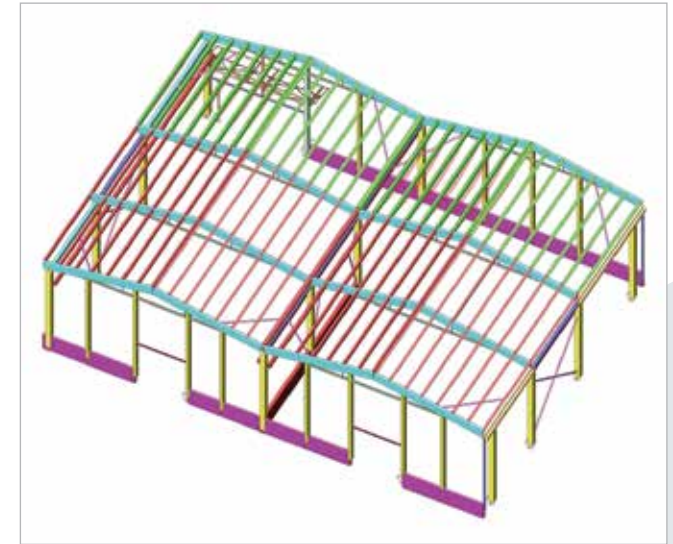
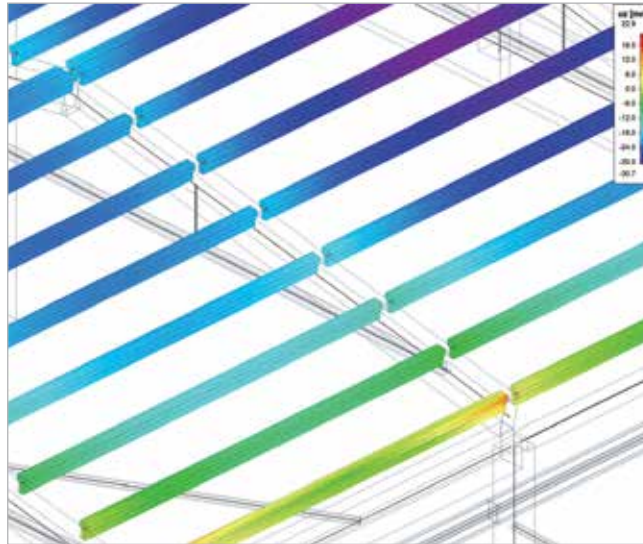
The new industrial hall was completed on July 2016. Nowadays it is fully in use.

Navláčil stavební firma, s.r.o.

Contact Michal Bezruč
Address Bartošova 5532
Moravská 4775
760 01 Zlín, Czech Republic
Website www.navlacil.cz



The Building Company Navláčil Ltd. was found in 1992 by Mr. Martin Navláčil senior. There are currently more than 200 employees. The company focus on construction and reconstruction of structures for business. This contains industrial buildings such as a production hall with an office block. We also construct housing development and family houses. Recently we are also providing drafting of the structures. Our essential idea is quality work. Due to this we keep up our motto: "build on references"



Category 3: Industrial Buildings and Plants



The digital revolution started a new phase in structural engineering. The changes are so dynamic that they force professionals to keep up-to-date constantly. In this context, ProSteel is able to combine its high technical level with the latest technology, always at the forefront of engineering. BIM technology is a reality in our projects.

With experience in several segments, we already put our mark on projects in the areas of mining, steel industry, roof systems, building systems, vertical buildings.

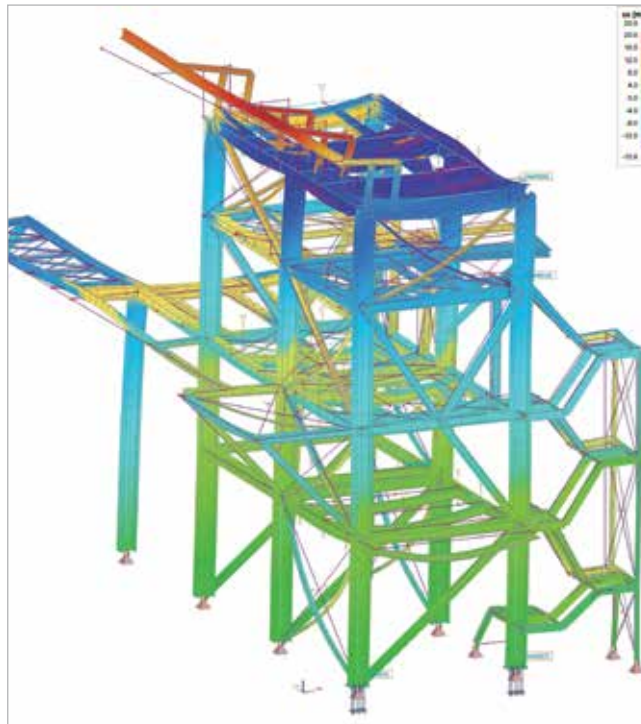
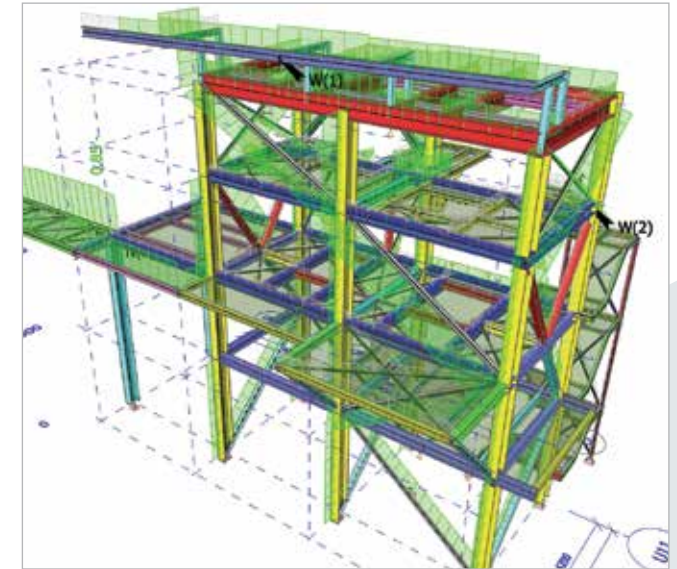
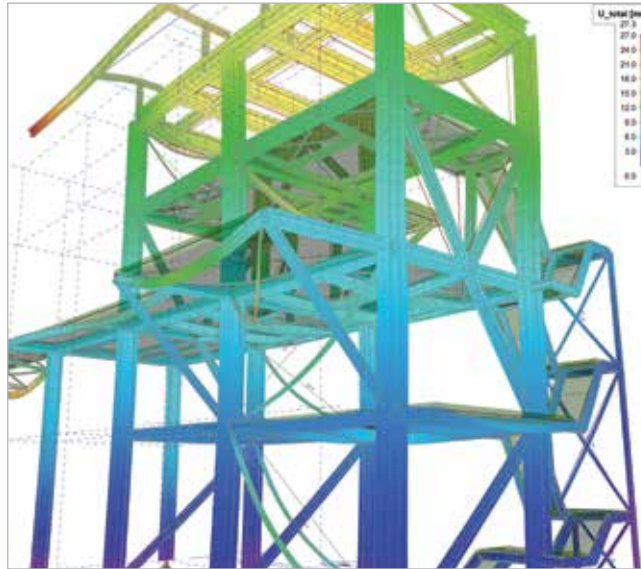
Tile Factory - Urmitz, Germany

Owner Kann GmbH Baustoffwerke
Architect UBO Engineering BV
General Contractor Ferross Staalbouw
Engineering Office Snetselaar Constructieve Ingenieurs
Construction Period 2016 - 2017

The project involves the engineering of a tile factory in Urmitz, Germany. The concrete mixer platform is one of the components of this manufacturing plan. The dimensions of the platform are approximately 14 x 4.3 m with a total height of 12.3 m. The total weight of the silos on top of the platform is 360 t with an extra height of 10.7 m, which makes the total construction very slender. There are various loads applicable, namely loads from: concrete mixing, lifting materials, crane rail, storage, earthquakes, persons and wind.

For this project, we used a non-linear static analyse in combination with the steel module for global sizing. We used modules: Geometrically non-linear frames and Dynamic frames module. The Dynamic module was particularly useful for the seismic analyses.

The challenge of this project was the complexity of the loads in different directions in combination with the design of the platforms. Through a step by step approach in combination with the use of SCIA Engineer, we managed to make this project a success.



Snetselaar Constructieve Ingenieurs

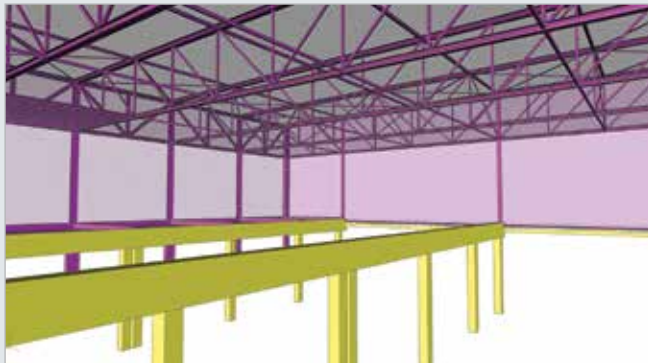
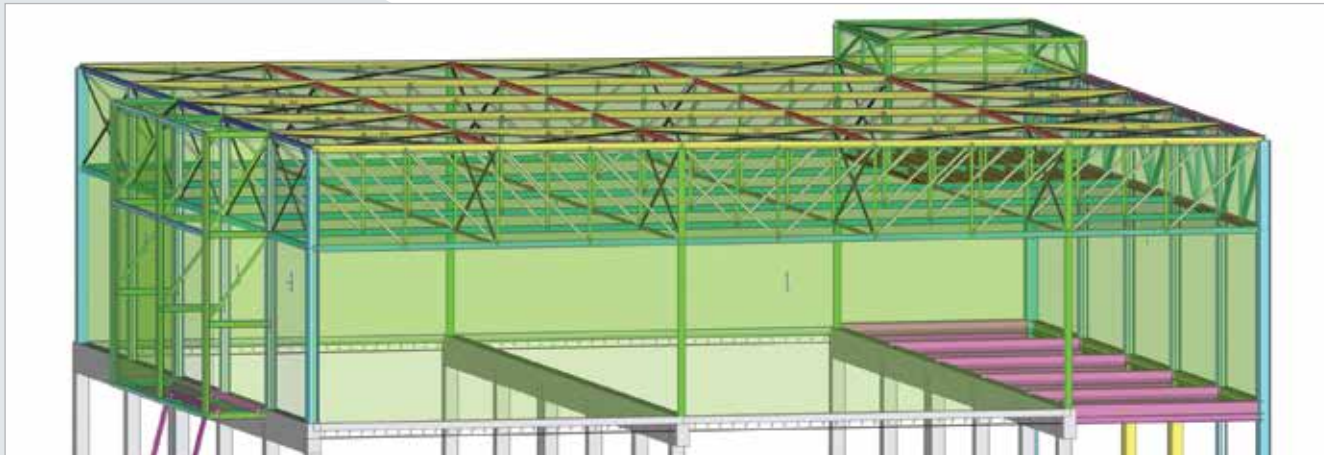
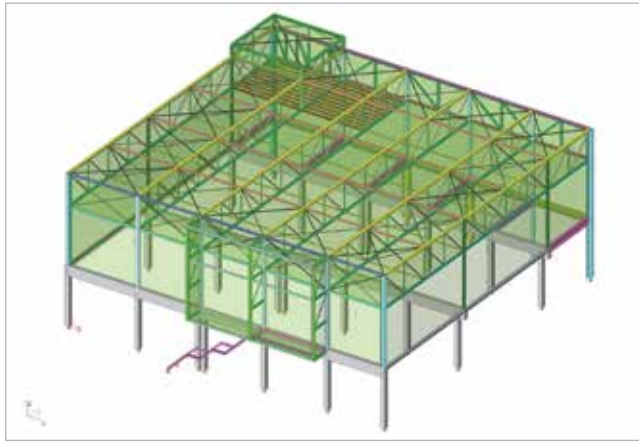
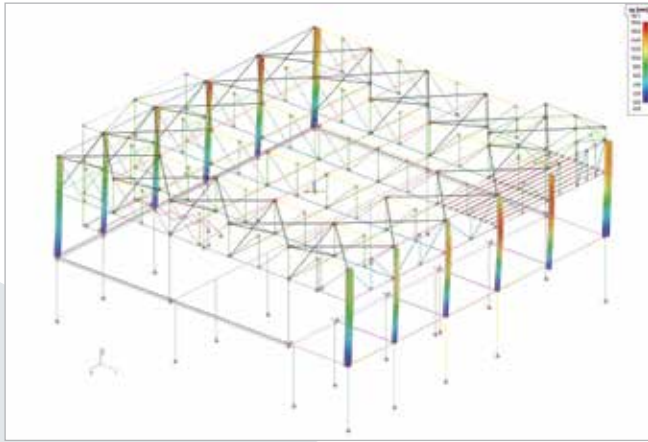
Contact Patrick Winkel, Peter van den Top
Address Galileilaan 36
 6716 BP Ede, Netherlands
Website www.snetselaar.nl



Snetselaar Constructieve Ingenieurs BV is an international independently operating engineering office with almost 20 years of engineering experience. Our agency is characterized by short communication lines between the client and the engineer. Our Engineering Team makes the difference by giving practical advice.

With our team of over 20 engineers and engineering draftsman, we offer the following service: the design, engineering and drawing of constructions (full 3D BIM). We are active in the following fields: buildings, industry infrastructure, civil structures and many more.

Food Processing Factory Expansion - Aalst, Belgium



Owner Belki NV
Architect Architectuur- en ontwerpburo Patrick Tas BVBA
General Contractor Alheembouw NV (General),
 Snoeck Gebrs NV (Steel)
Engineering Office Snoeck Gebrs NV
Construction Period 02/2017 - 03/2017

This project consists of an expansion of a food processing factory, by adding a steel structure on top of and partly next to the existing concrete structure.

For this project, the load panel feature was very useful to easily apply the different uniformly distributed surface loads on various zones in the building (technical floor between the roof trusses, existing concrete factory roof, etc.).

The use of the 3D wind generator significantly shortened the required time to model the wind loads fully according to the Eurocode, correctly taking into account the cantilevered parts of the building (for example the structure for stair-access into the building).

The use of transverse bracing between the trusses in the lower part of the steel building had to be avoided, thus welded sections (with stiffening profiles welded perpendicular to the column web adding to the rigidity along the weak side of the columns) together with secondary stabilizing elements in the top of the building between the trusses ensure the stability in this direction. The results, both EC3 profile checks as well as deformation checks, are easily accessible and very clear.

Snoeck Gebrs NV

Contact Steven Nachtergaele
Address Hooimeersstraat 10
 8710 Wielsbeke, Belgium
Website www.snoeckgebrs.be



Snoeck Gebrs NV is specialising in the production and assembly of steel constructions for industrial buildings and for the agricultural sector.

The state-of-the-art production workshop is certified in accordance with EN 1090-2 up to and including execution class III. The company also offers the expertise of its own engineering and drawing office.

By being an autonomous part of the larger Willy Naessens Group, Snoeck Gebrs NV can also anticipate on a wide range of prefabricated concrete elements, being able to provide a complete package for its customers.

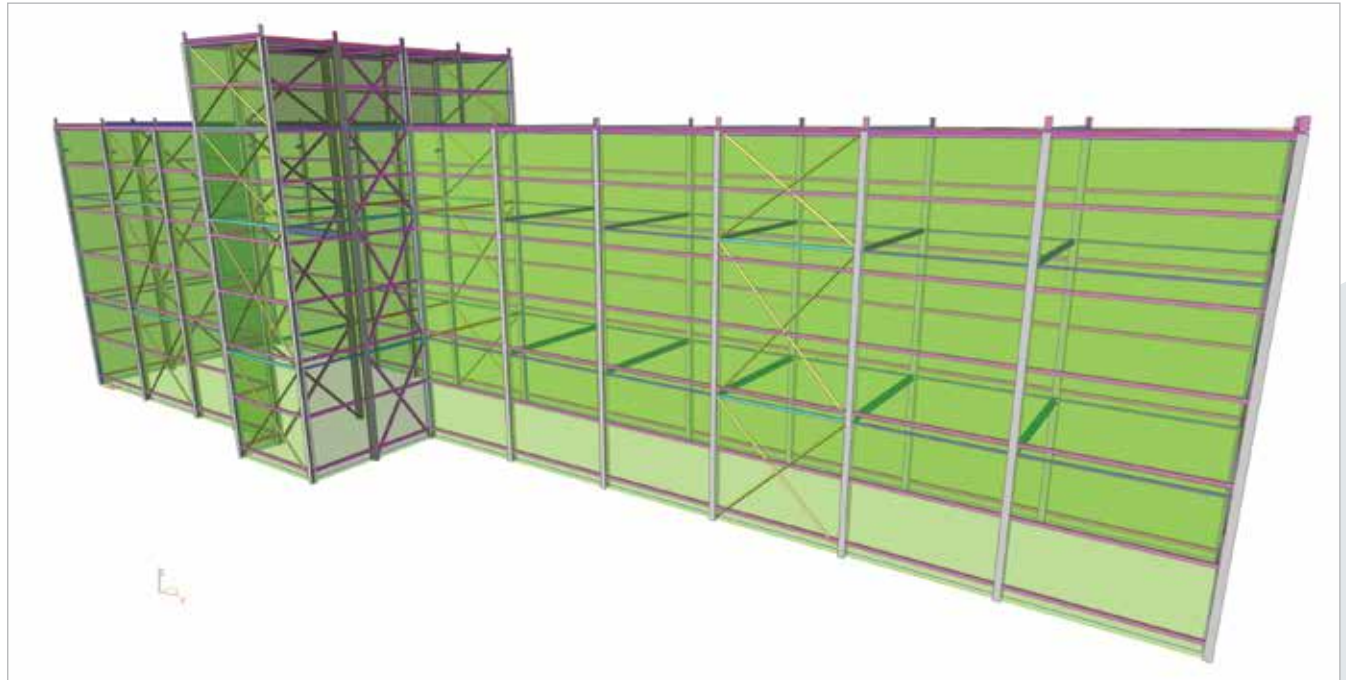
Concrete Batching Facility - Moeskroen, Belgium

Owner Decomo NV
Architect Wim Desloovere BVBA
General Contractor Alheembouw NV (General),
 Snoeck Gebrs NV (Steel)
Engineering Office Snoeck Gebrs NV, Predesign by Establis NV
Construction Period 11/2015 - 03/2016

This project consists of a steel structure for a new concrete batching facility with a height of 22 m. Inside this building, 38 large size storage silos are placed, each silo equipped with its own steel support.

For this project, the load panel feature together with the 3D wind generator significantly shortened the required time to model all apply loads fully according to the Eurocode, correctly taking into account the complete shape of the building. Also, the mobile/train load feature was used for the effects of the local hoisting cranes inside the building.

A non-linear static calculation was performed, correctly taking into account the effect of 'only tension' members. The EC3 steel and stability check was performed, together with a check of the occurring deformations. The model was then used for the design and calculation of the steel connections.



Snoeck Gebrs NV

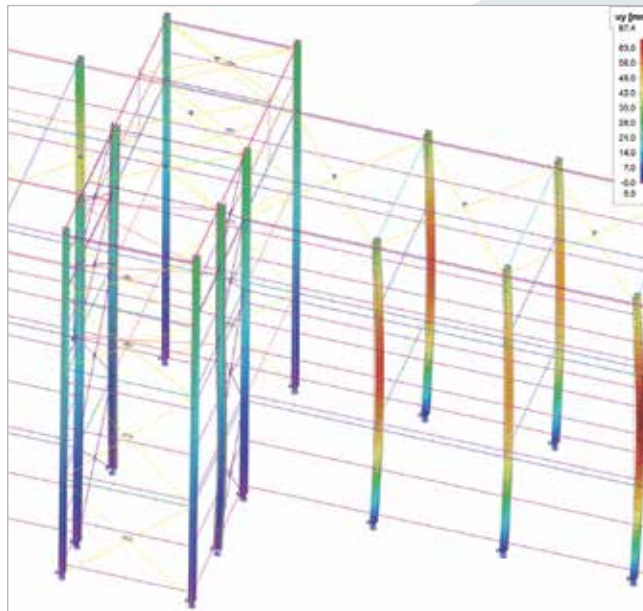
Contact Steven Nachtergaele
Address Hooiemeersstraat 10
 8710 Wielsbeke, Belgium
Website www.snoeckgebrs.be



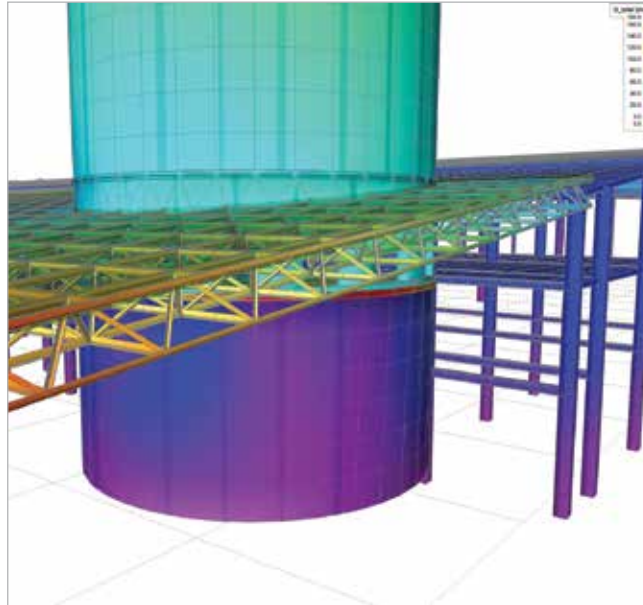
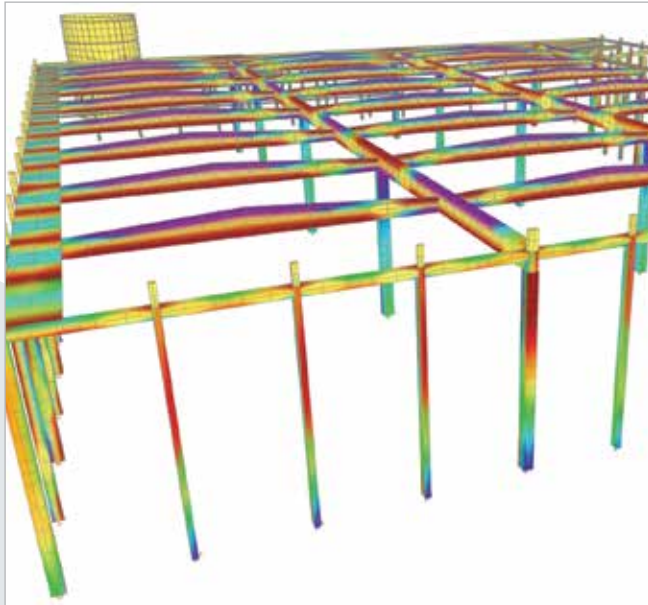
Snoeck Gebrs NV is specialising in the production and assembly of steel constructions for industrial buildings and for the agricultural sector.

The state-of-the-art production workshop is certified in accordance with EN 1090-2 up to and including execution class III. The company also offers the expertise of its own engineering and drawing office.

By being an autonomous part of the larger Willy Naessens Group, Snoeck Gebrs NV can also anticipate on a wide range of prefabricated concrete elements, being able to provide a complete package for its customers.



Santens Metaalwaren Building - Merelbeke, Belgium

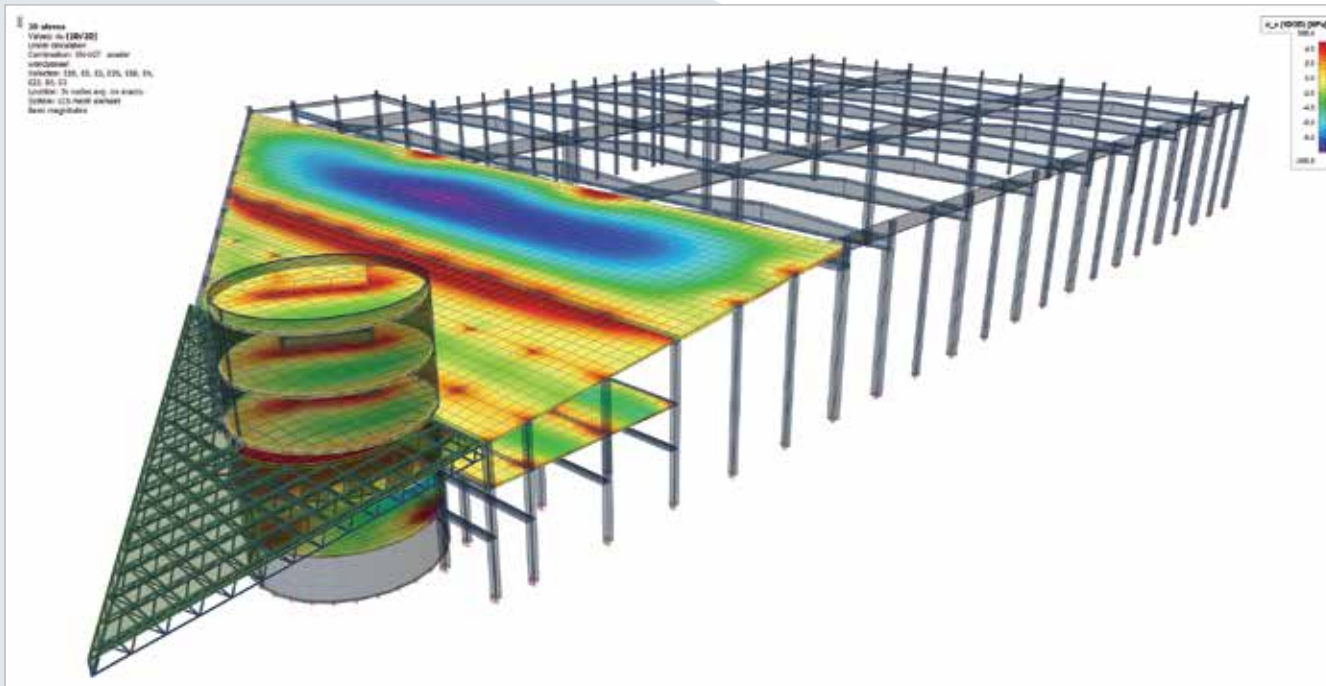


Owner *Santens Metaalwaren*
 Architect *Hugo Koch*
 General Contractor *Stadsbader*
 Engineering Office *Stadsbader*
 Construction Period *05/2017 - 10/2017*

The Santens Metaalwaren building combines a hall of 6800 m² and 3 office floors which represent about 2000 m² in total. The construction will be built next to the E40 highway. Its sloped roof with vegetation protruded by a circular entrance tower with 5 floor levels will dominate the building. The sloped roof is continued over a porch roof with a 20 m cantilever ending in a tip.

SCIA Engineer is used for 3D modelling of the complete building, using 1D members for concrete columns and girders and 2D shell elements for the circular tower building.

The big challenge of this project is the steel structure of the cantilevered porch roof and its anchorage on the circular tower building.



Stadsbader

Contact *Koen Vanderputten*
 Address *Kanaalstraat 1
 8530 Harelbeke, Belgium*
 Website *www.stadsbader.com*



NV Stadsbader, located at Harelbeke, Belgium, is a registered contractor with a strong reputation in public works and industrial projects. The core business is situated on road infrastructure projects, civil engineering, water treatment installations, infrastructure and industrial buildings.

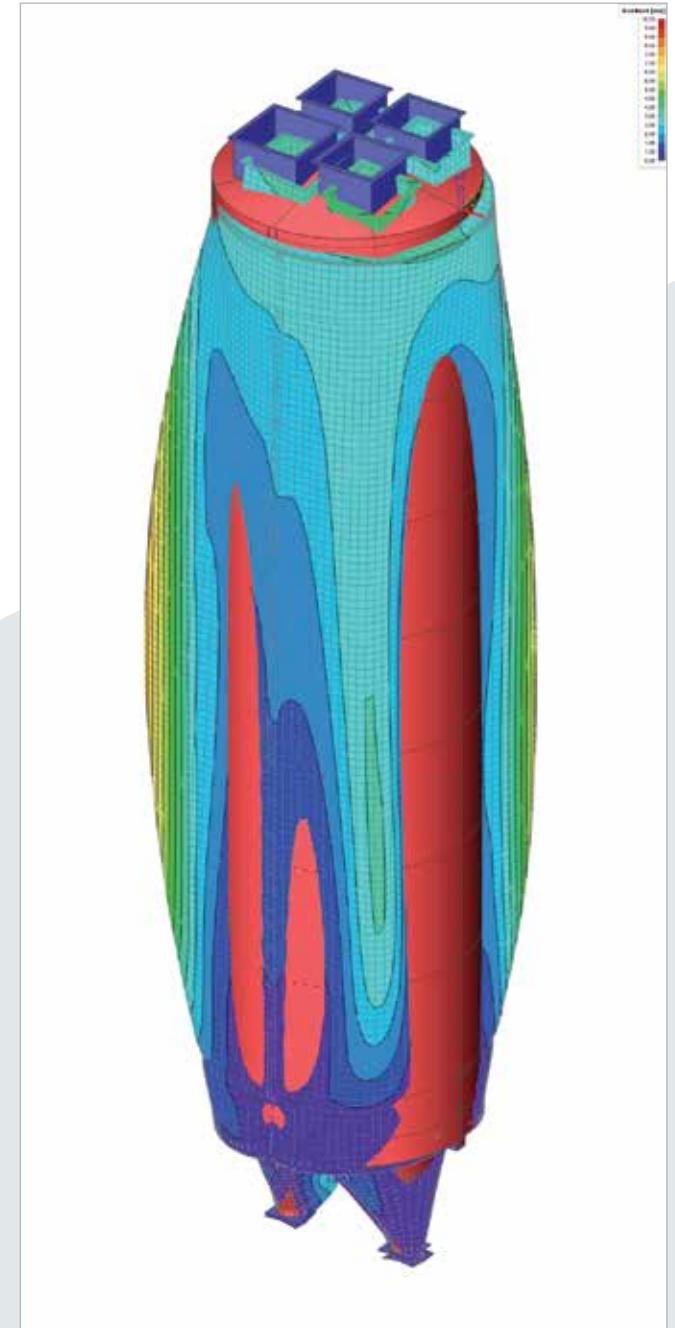
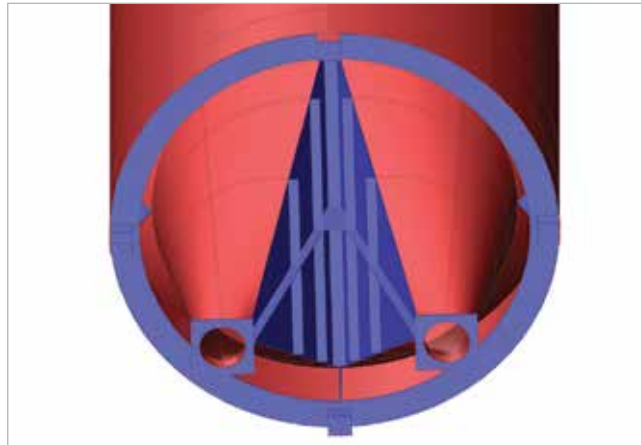
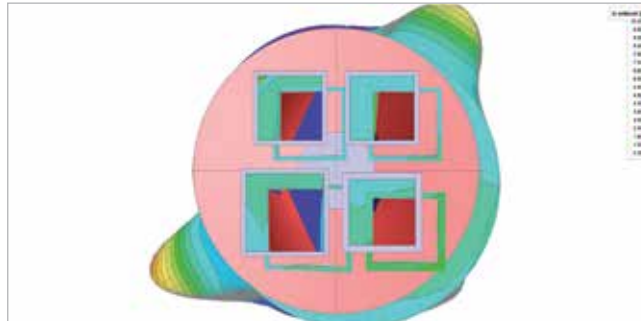
Throughout the large diversity of realised projects, Stadsbader acquired important experience, know-how and expertise and became an important player on the Belgian market.

Bicameral Silo - Niemegk, Germany

Owner Fels
 Architect Fels
 General Contractor ZKING s.r.o.
 Engineering Office Statika OK
 Construction Period 09/2016 - 10/2016

The bicameral silo with a diameter of 3.2 m is used for cement bulk storage in concrete mixing plant. The capacity of the steel silo is $2 \times 50 \text{ m}^3$. The structure consists of the internal bulkhead dividing the silo into 2 parts, 2 conical outlets and 4 filling openings. The main challenge of the modelling was the complicated geometry, the Eurocode defined load acting on silos, it is always laborious to assemble the nonlinear stability and plastic analysis. All of the difficulties were overcome using SCIA Engineer software, the especially great advantage is the very fast solver enabling us to perform geometrical and material nonlinear analysis with the dense finite element mesh relatively quickly.

The graphical outputs give fast orientation in the results of every type of the analysis used. Engineering Report streamlines the creation of great documentation.



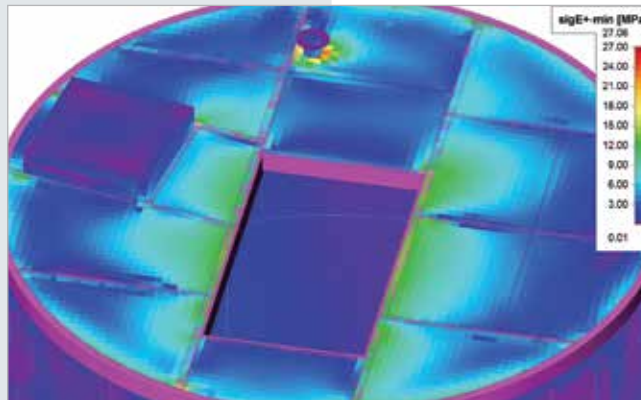
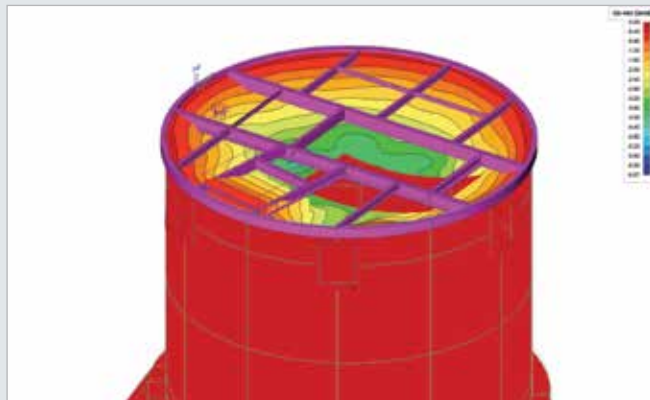
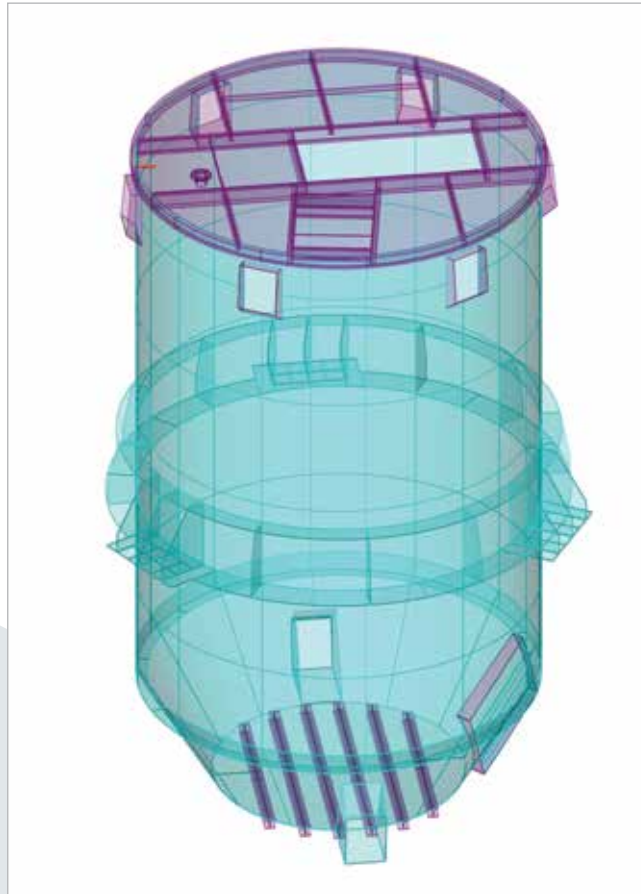
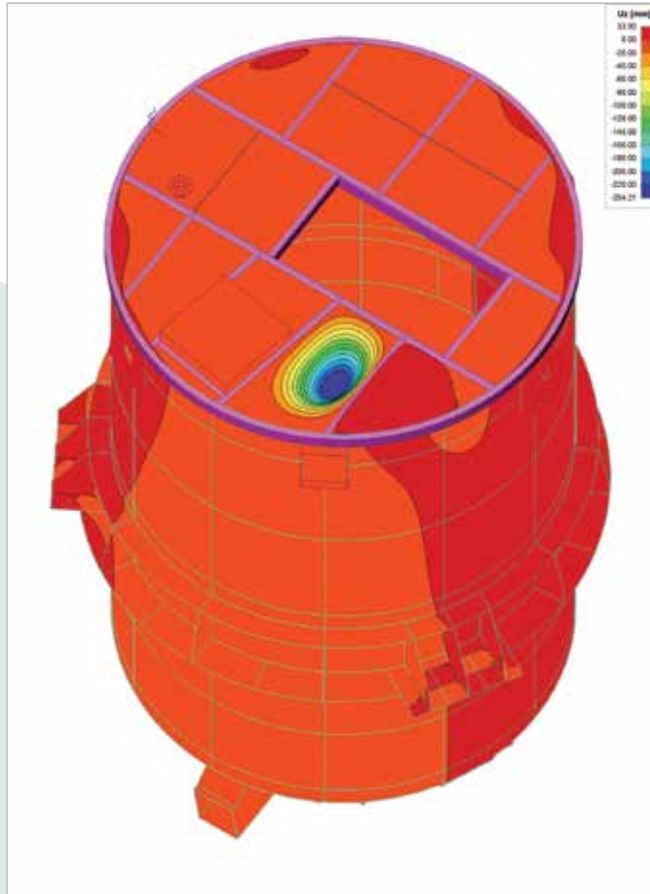
Statika OK

Contact Jan Blažík
 Address V Parku 181/6
 736 01 Havířov, Czech Republic

STATIKA OK
ing. Jan Blažík

STATIKA OK, ing. Jan Blažík is a design and engineering company founded in 1992. From the early beginnings the company focused on the common steel structures of any type, with the specialization of the technological ones – complicated bins, silos, tanks, hoppers and similar constructions for bulk storage and handling, petrochemical and gas industries.

Cement Plant Control Bin - Eskisehir, Turkey



Owner Cimsa Cimento
 Architect IBAU Hamburg
 General Contractor IBAU Hamburg
 Engineering Office STATIKA OK
 Construction Period 09/2016 - 10/2016

The control bin with a diameter 4.0 m is used in the process of the concrete production in concrete mixing plant.

The cylinder height is 5.7 m, cone height is 1.3 m.

The bin is supported on the three anchoring points. On the cone, two holes for the exit of the material are designed.

The main challenge of the modelling was the complicated geometry, the Eurocode defined load acting on silos is always laborious to assemble. All the difficulties were overcome using SCIA Engineer software, the especially great advantage is the very fast solver enabling us to perform geometrical and material nonlinear analysis with the dense finite element mesh relatively quickly.

The graphical results provide a fast insight into the response of the structure for every type of analysis used. The Engineering Report simplifies and speeds up preparation of the project documentation.

Statika OK

Contact Jan Blažík
 Address V Parku 181/6
 736 01 Havířov, Czech Republic

STATIKA OK
 ing. Jan Blažík

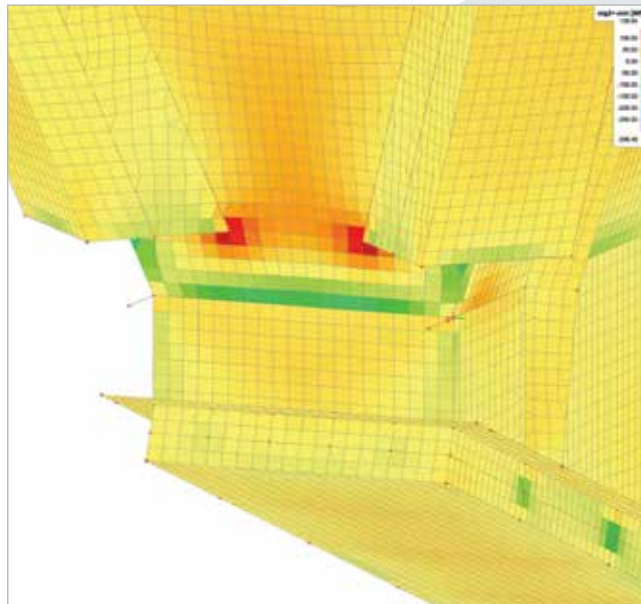
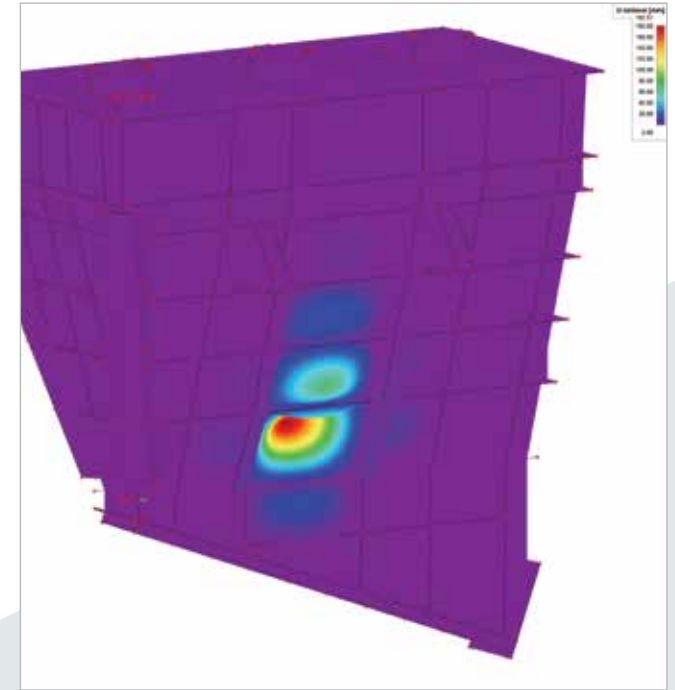
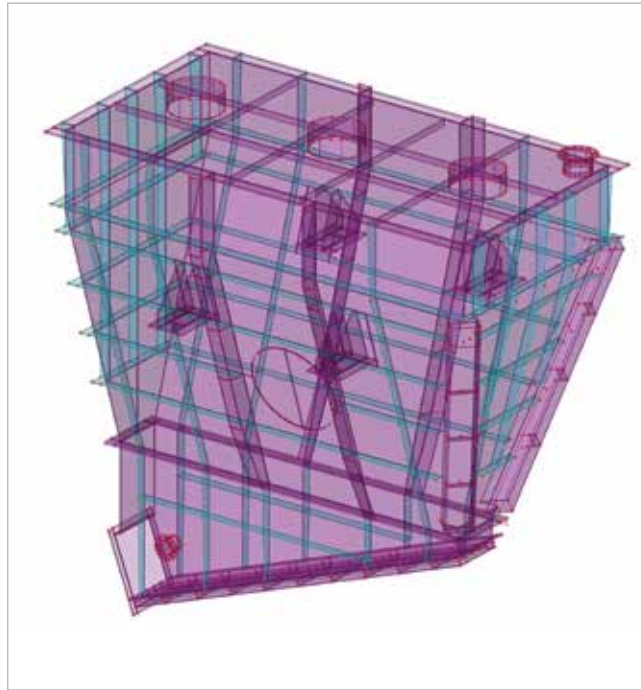
STATIKA OK, ing. Jan Blažík is a design and engineering company founded in 1992. From the early beginnings the company focused on the common steel structures of any type, with the specialization of the technological ones – complicated bins, silos, tanks, hoppers and similar constructions for bulk storage and handling, petrochemical and gas industries.

Discharge Hopper - Dunkerque, France

Owner Ecocem Materials Ltd.
 Architect IBAU Hamburg
 General Contractor IBAU Hamburg
 Engineering Office Statika OK
 Construction Period 02/2016

The discharge hopper ensures the transport of the material from the cement mixer. The plan dimensions are 1.7 x 3.4 m. The device is used in the cement production plant. The structure walls of the typical hopper shape are reinforced by the stiffeners. The main challenge of the modelling was the complicated geometry and the Eurocode defined load acting on hopper which is always laborious to assemble, nonlinear analysis was used for stability and plastic analysis. All the difficulties were overcome using SCIA Engineer software, the especially great advantage is the very fast solver enabling us to perform geometrical and material nonlinear analysis with the dense finite element mesh relatively quickly.

The presentation of results, especially the graphical interpretation on the 3D model, gave us a good insight into the response of the structure. In the second step, the Engineering Report helped us prepare the comprehensive project documentation quickly.



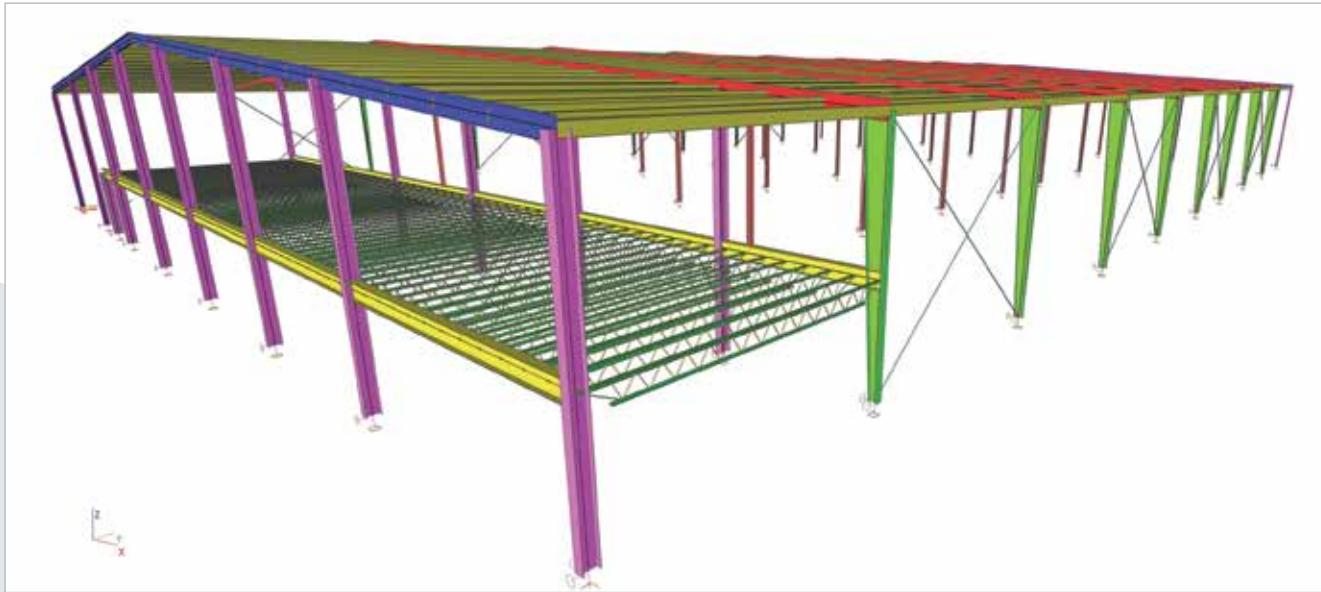
Statika OK

Contact Jan Blažík
 Address V Parku 181/6
 736 01 Havířov, Czech Republic

STATIKA OK
 ing. Jan Blažík

STATIKA OK, ing. Jan Blažík is a design and engineering company founded in 1992. From the early beginnings the company focused on the common steel structures of any type, with the specialization of the technological ones – complicated bins, silos, tanks, hoppers and similar constructions for bulk storage and handling, petrochemical and gas industries.

Retrofitting of Industrial Plant - Chania Crete, Greece

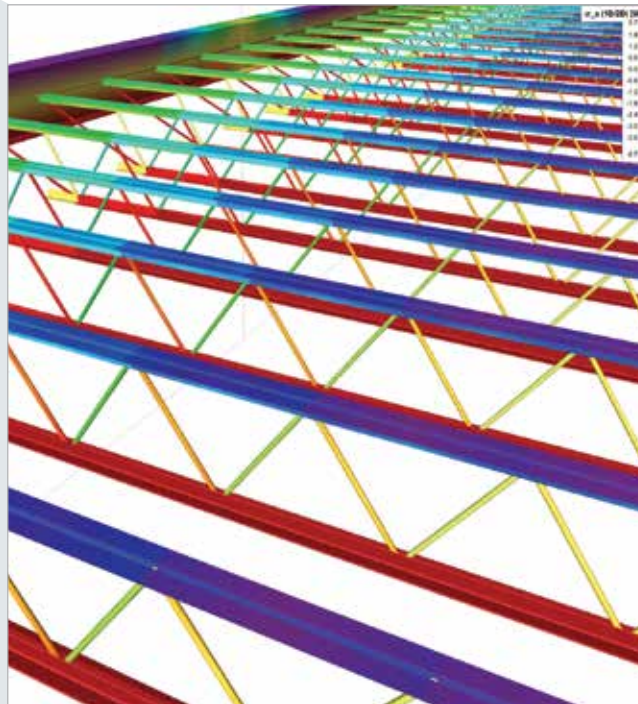
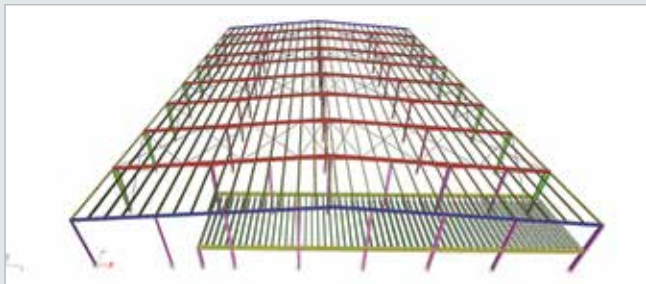


Owner Christodoulakis S.A.
Architect Lykourgos Kalogerakis
Engineering Office T.E. Consulting Engineer
Construction Period 09/2013 - 12/2013

This project includes an existing single floor industrial plant. The dimensions of the building are about 67.10 m x 45.60 m and the maximum height is about 8.20 m. The structure constitutes ten frames; each of them has five columns. All cross sections were welded and tapered. One part of the buildings constitutes a loft, about 230 m² constructed with truss beams and concrete floor. The plant was constructed during 1981.

We used SCIA Engineer to create a 3D model of this complex structure. First, we performed the stability analysis to calculate the α_{cr} factors. The next step was to perform the linear and non-linear analysis, including global imperfection, using the buckling shapes determined from the stability analysis. The seismic design followed, as well.

It was a challenge for us to model precisely the geometry of each member due to the welded and tapered cross-sections. Our aim was to redesign and retrofit the structure according to the Eurocodes.



T.E. Consulting Engineer

Contact Lefteris Tsolakis
Address Soudas Av. 23, Crete, Chania
73200 Chania, Greece



T.E., Consulting Engineer was founded in 2007 to provide the following civil engineering services:

- Technical advice for the development of new buildings.
- Technical advice for the restoration/upgrading of existing buildings.
- Structural design of new buildings (concrete, steel, composite, timber and masonry structures).
- Structural design and assessment of existing buildings.
- Supervision of civil engineering works.

Due to our experience and our knowledge, we can accomplish even the most exacting projects.

T.E., Consulting Engineer has managed over 100 projects in Greece.

Storage System - Spain

General Contractor *Meca Storage Systems*
Engineering Office *Tides Engineering bvba*
Construction Period *06/2016 - 10/2016*

Carton boxes, in this case filled with textile, can be stored in different ways. An automated storage and retrieval system was the ideal system in this specific case. This storage system is 14 m by 60 m wide and 28 m high.

As this storage system is equipped with an automated storage and retrieval system, the shuttle aisles must comply with the specifications of the shuttle manufacturers. For this reason, the accuracy of the installation needs to be very high.

The installation is designed to withstand the horizontal forces exerted by the shuttle and takes into account the high frame slenderness. Verticality and stability are obtained by bracing the racking both in vertical and horizontal planes. The entire installation has been executed in cold formed steel profiles. SCIA Engineer was a perfect tool to support us in the design of this specialised project.

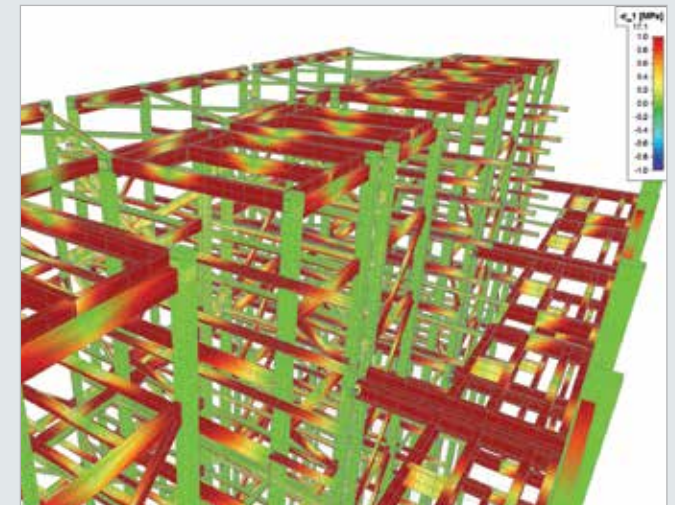
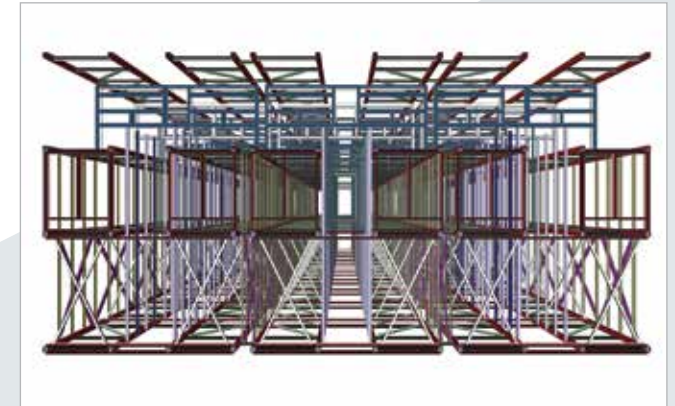
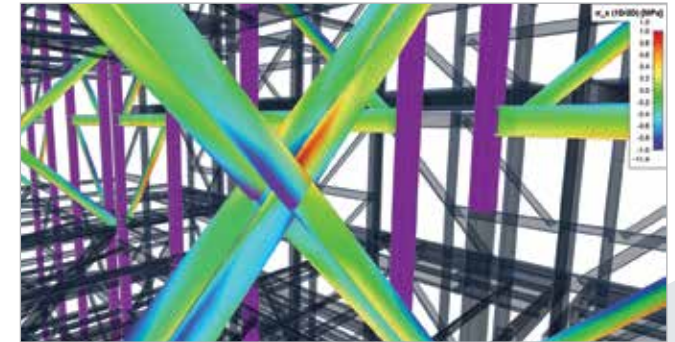
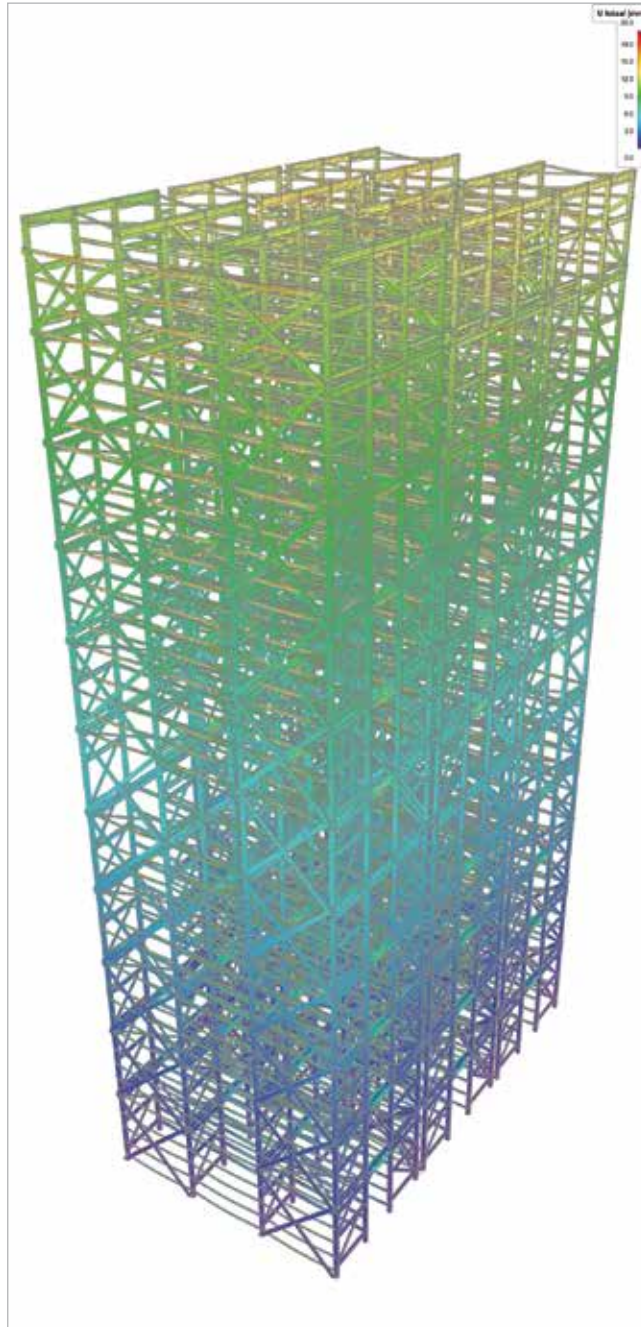
Tides

Contact *Maarten Tavernier*
Address *Pottelberg 171*
8510 Kortrijk, Belgium
Website *www.tides.be*



Tides is a multidisciplinary office that offers consultancy & advice in architecture & structural engineering. By integrated services – from consulting, design, engineering, coordination to long-term facility engineering – we accompany our clients at every stage of the process. We focus on what we do best: offices & industrial buildings for businesses & governments. From SMEs to multinationals, from town to region.

A modest and accessible team with considerable expertise. Tides is a dynamic team where the thirst for knowledge & innovation works contagious.



Support Structure for Cold-Air Ducting - Pengerang, Malaysia

Owner *NEM Industrial & Utility Boilers*
 General Contractor *Petronas*
 Engineering Office *Vicoma Engineering*
 Construction Period *2016 - 2017*

Vicoma Engineering has designed a supporting structure of ductwork and platforms for the Rapid-project in Malaysia. In co-operation with our client NEM Industrial & Utility Boilers, Vicoma has made the basic and detailed engineering of supporting steel structure, platforms, ductwork and inlet towers.

The steel structure supports the cold-air ductwork coming from (cold air) inlet towers and fans to the burners of the boiler. The cold-air duct, including by-pass, consists of carbon steel plate work supported to the steel structure with fixed and sliding supports. Several platforms allow for access to the maintenance areas and measurement points of the ductwork. At the top of the structure (elevation approx. 16 metres) a roof has been added above the burner equipment. The total plan dimensions of the steel structure are 32 m x 18 m.

The ductwork has been modelled in SCIA Engineer to introduce the load of the ductwork on the steel structure; dead loads, wind loadings, seismic loadings and temperature (thermal expansion) loads.

The design of the steel structure also comprised of the detail engineering of all connection details that also have been calculated in SCIA Engineer, using the Eurocode steel checks, using local beam sizes (JIS-standard) and steel qualities.

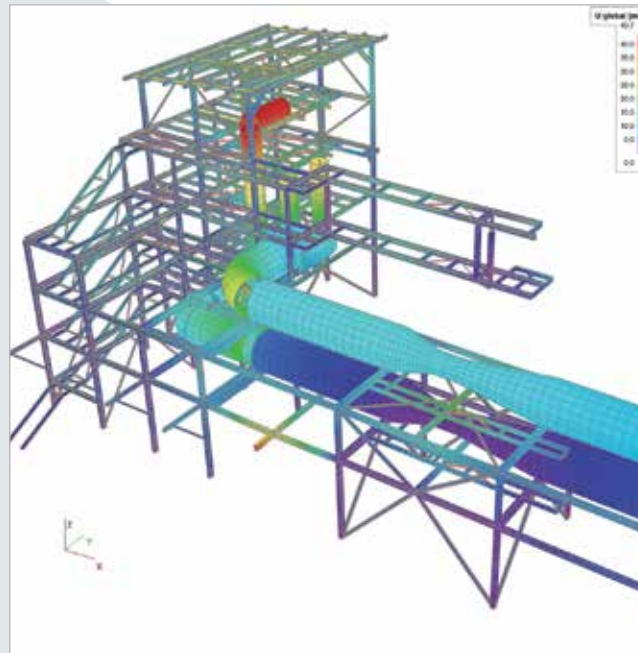
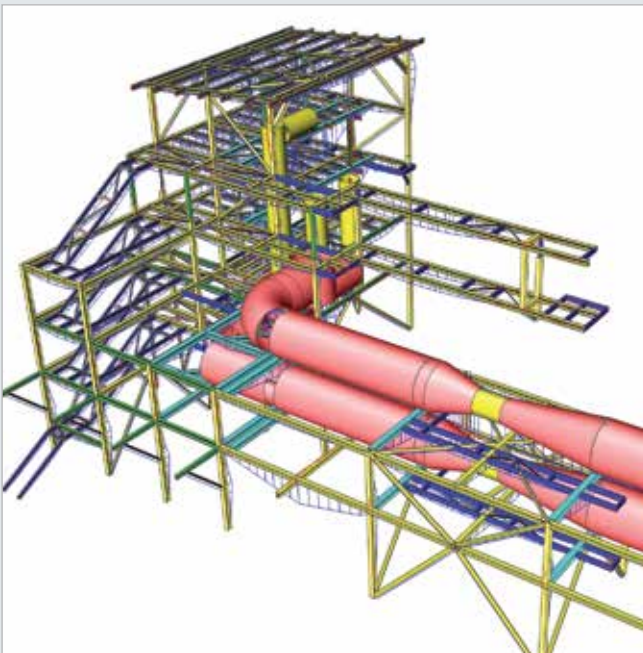
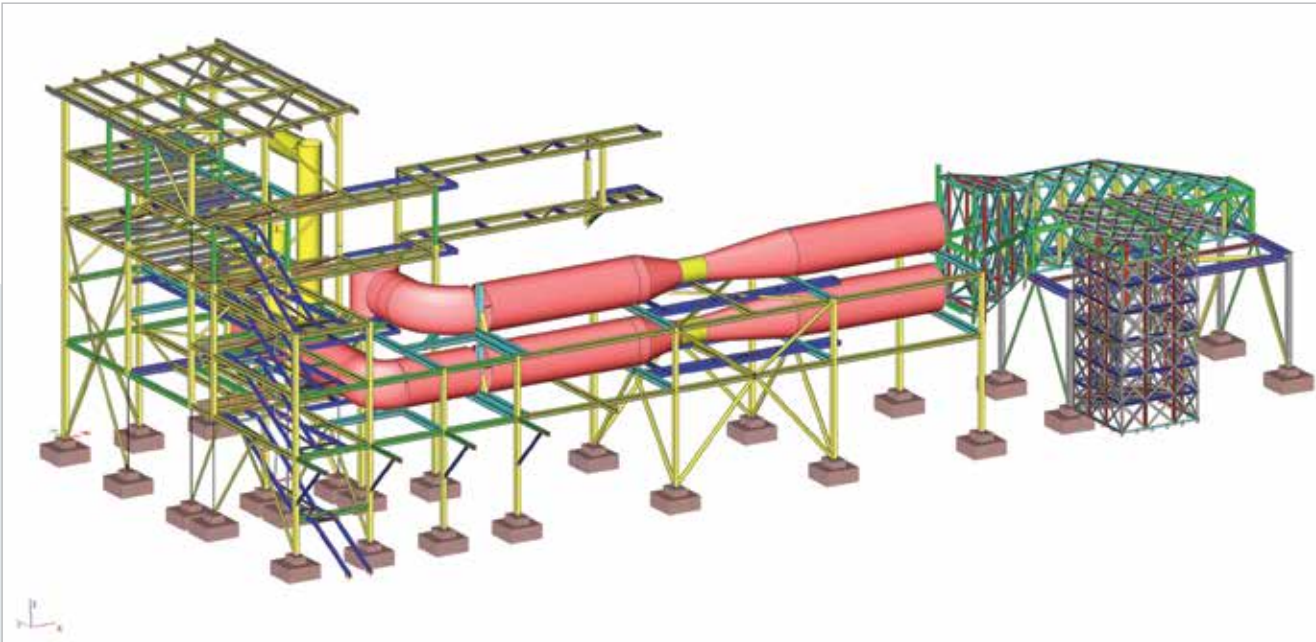
Vicoma Engineering

Contact *Erik Bruijn*
 Address *Industrieweg 43a
 2382 NT Zoeterwoude, Netherlands*
 Website *www.vicoma.nl*



Vicoma sets out the guidelines

Vicoma is an independent and pragmatic engineering firm. We help the industry in the Netherlands and beyond with solutions, support and achievement of (EPCM) engineering and consultancy services, both single and multidisciplinary. For this we have in-house engineers for all disciplines. We are a reliable and flexible partner for all your questions in the fields of maintenance, sustainability and renovation/new build. We never see our advice to you as an end. For us it is the first step to realise your goals.



SCiAENGINEER

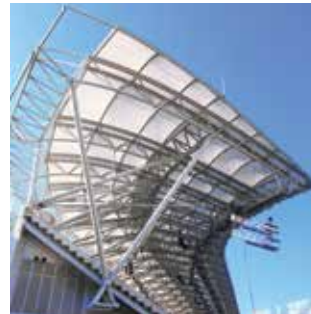
A photograph of a modern, curved building with a colorful, lattice-like facade. The building is reflected in a body of water in the foreground. The sky is a clear blue.

**FAST
ACCURATE
POWERFUL**

Get your free trial today. www.scia.net

Barco One Campus © Image Jaspers-Eyers Architects – photography by Mark Detiffe

Special Projects 4



Category 4

Specialty structures - sustainable, ecological and green structures – scaffolding – art work – mechanical equipment... Larger projects - storage tanks, conveyer belts, cold storage installations, supporting structures, playground equipment, cranes, tubular connections... As well as stadiums and spectacular roofs... analysed and designed in SCIA Engineer.

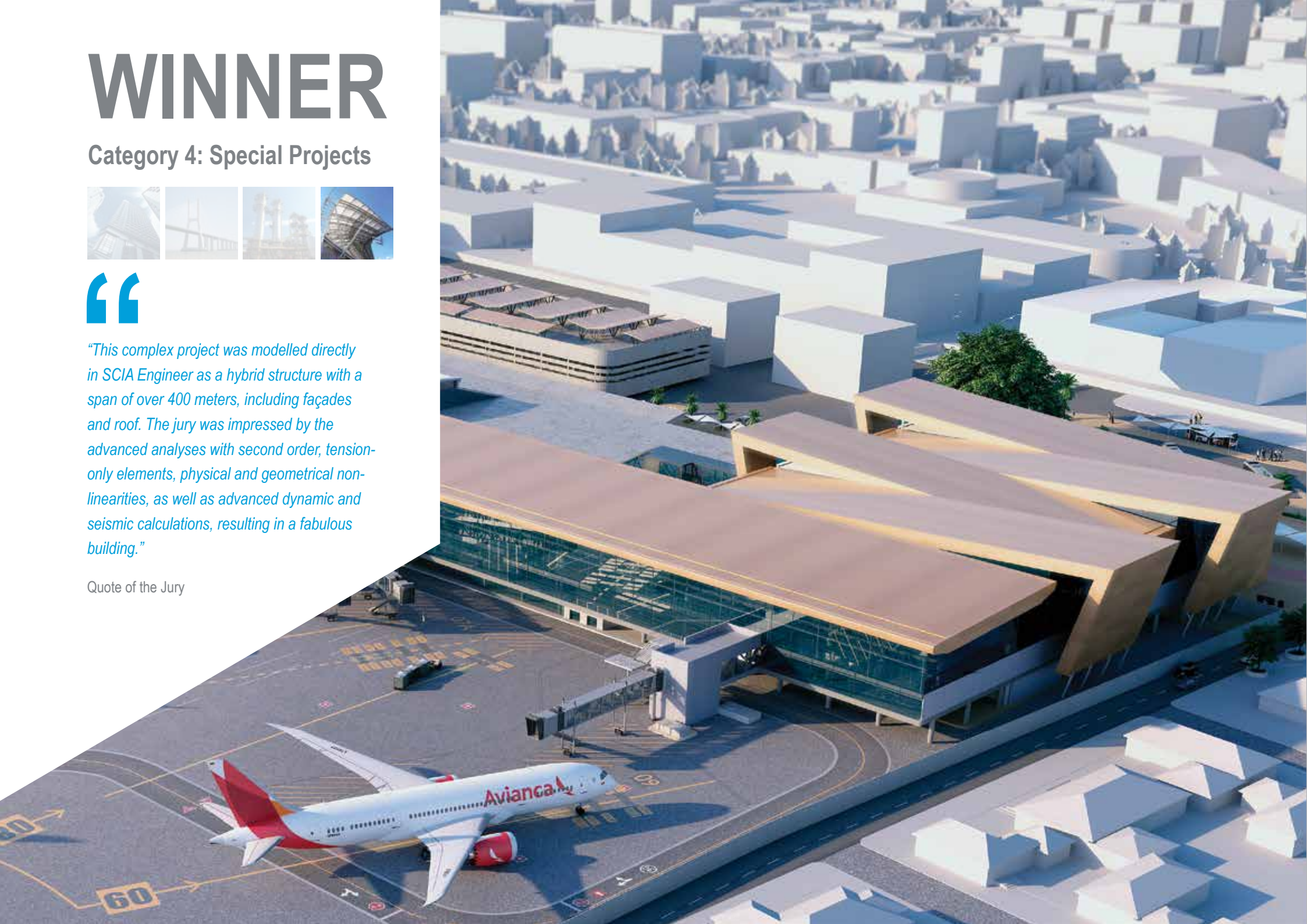
WINNER

Category 4: Special Projects



"This complex project was modelled directly in SCIA Engineer as a hybrid structure with a span of over 400 meters, including façades and roof. The jury was impressed by the advanced analyses with second order, tension-only elements, physical and geometrical non-linearities, as well as advanced dynamic and seismic calculations, resulting in a fabulous building."

Quote of the Jury



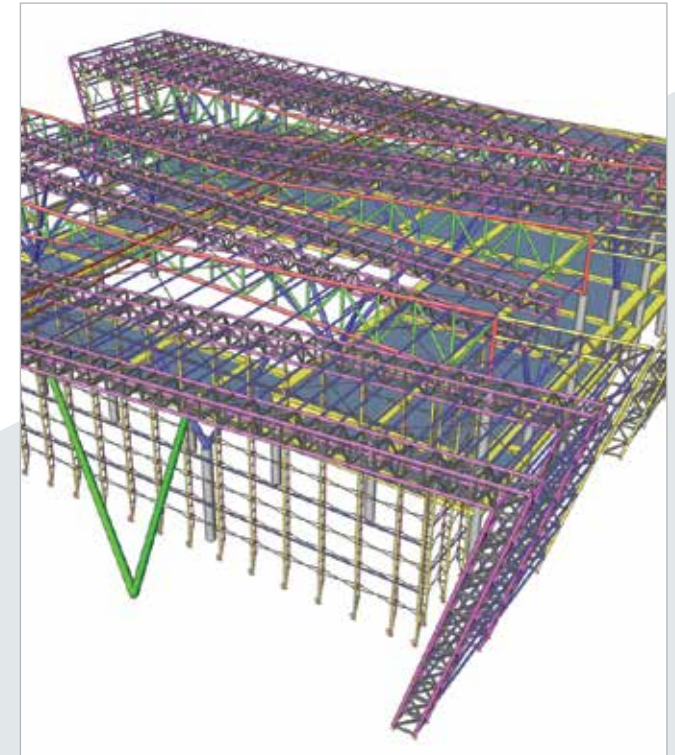
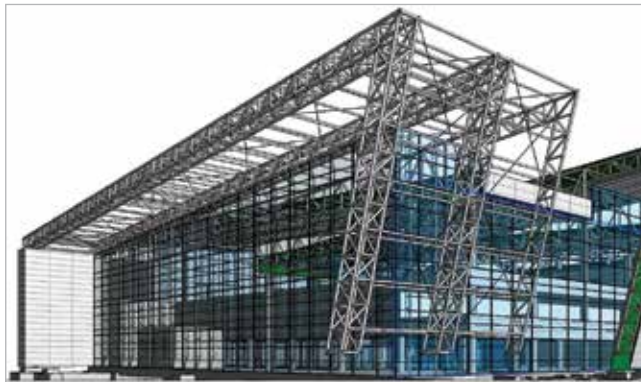
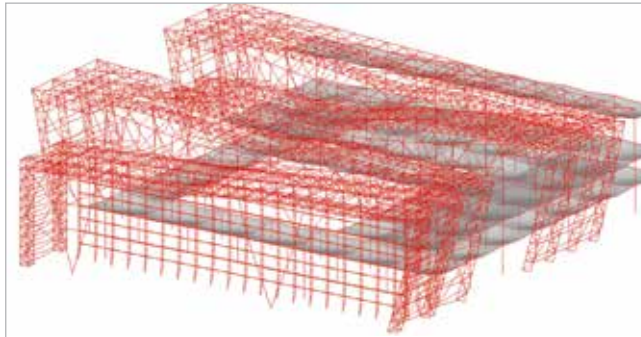
Rafael Núñez Airport Expansion - Cartagena De Indias, Colombia

Owner Sociedad Aeroportuaria De La Costa S.A
Architect Cemosá S.A
General Contractor Sociedad Aeroportuaria De La Costa S.A
Engineering Office Cemosá S.A
Construction Period 01/2019 - 01/2024

The expansion Project of the Rafael Núñez international airport in Cartagena de Indias, Colombia, has been designed to reach the processing capacity of 8.5 million passengers per year. For this purpose, a new building has been designed, the international terminal, connected with a new boarding pier which spans over more than 400 m. The total designed area of this new expansion is 27,000 m².

The principal structure modelled with SCIA Engineer is the new international terminal building, a single construction of more than 5,600 m². This building has a steel roof composed of several spatial and planar trusses made of tubular HSS sections, forming different inclinations on the roof. For the analysis, calculation and design SCIA Engineer was used. The complex steel structures, the roof and façade, were modelled directly in the software. Furthermore, advanced analysis with nonlinear considerations, second order, tension-only elements, physical non-linearity of the concrete material and advanced dynamics and seismic analysis were performed. The ACI and AISC normative verification of the steel and concrete designs has been made in the project.

SCIA Engineer proved to be very flexible with data input, obtaining more productivity than with any other structural software used in the company.



Estra Engenharia Ltda.



Contact Manuel Jesús Casanova López
Address Rua Barão do Triunfo, n°73 – 5° Andar. Campo Belo
São Paulo
04602-000 São Paulo, Brazil
Website www.estra.com.br

Estra Engenharia Ltda. is a Brazilian Engineering Consulting Company specialising in structural, foundation and underground projects, delivering innovative solutions for public and private clients world-wide. It was founded in São Paulo in 1981 and since 2011 it is integrated in the international engineering consulting group Cemosá Ingeniería y Control S.A.

In the recent years, our approach to resolve highly technical projects has been recognized by a Brazilian Structural Engineering Association ABECE thanks to the innovative construction method of a cylindrical underground station, designed by our Technical Director.



WINNER

Special Prize of the Jury



"To BIM or not to BIM was not the question in this interesting stadium. SCIA Engineer offered the central information model that was exchanged with other software, such as Allplan, Tekla, Peikko Designer and Hilti. Moreover, advanced calculations like dynamic effects and fire resistance were performed."

Quote of the Jury

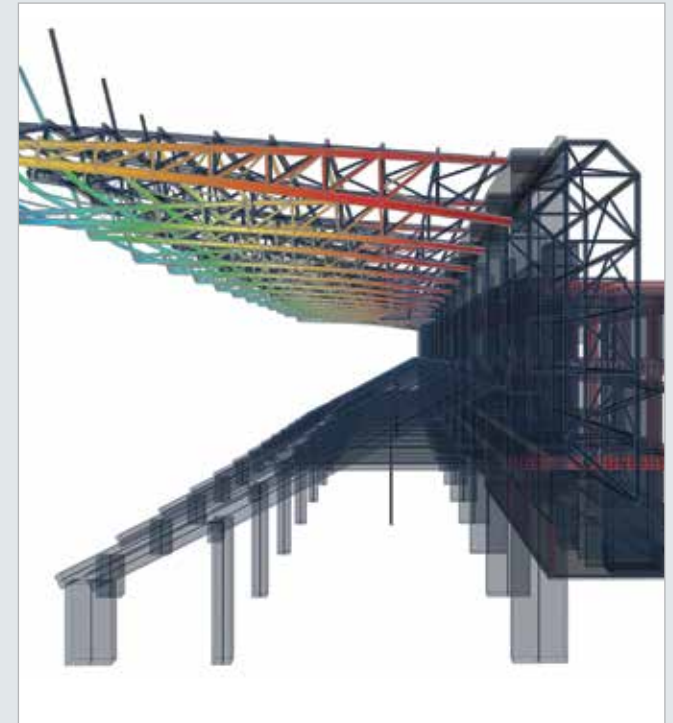
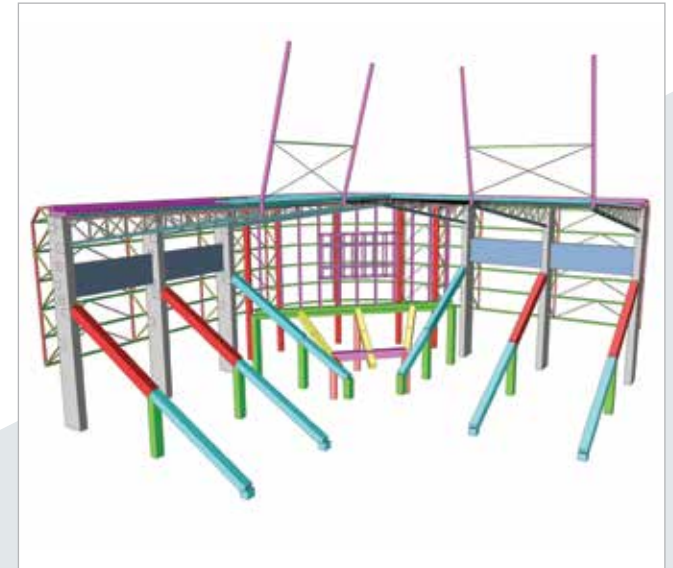
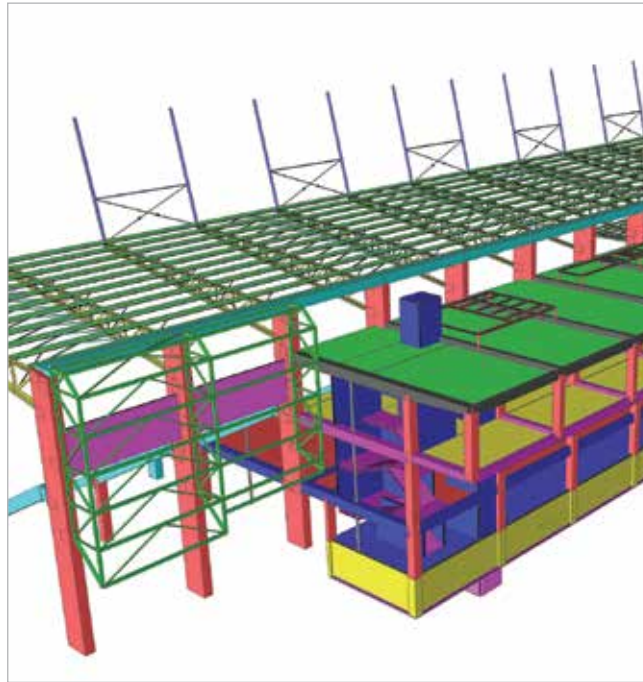


Football Stadium - Dunajská Streda, Slovakia

Owner DAC ARÉNA, a.s.
Architect ADIF s.r.o.
General Contractor AVA-stav s.r.o.
Engineering Office HESCON s.r.o.
Construction Period 2016 - 2018

This project includes a phased construction of a new football stadium combined with a partial renovation of the existing one. The new football stadium will replace the current FC DAC stadium. The construction started in the spring of 2016 with the first phase (stands B and C), the entire complex should be finished in 2018. The first phase has been already finished. The construction works on the second phase are just starting. The total capacity is 13,000 spectators. The DAC arena will meet UEFA category 4. The main structure of the stands and the main building are made of prefabricated reinforced concrete elements. The roof, facade and secondary structures are designed of steel elements. The length of stand C is 122.4 m and the length of stand B is 82 m. The width of the stands is 18.45 m.

SCIA Engineer was used to create a global static model. Models were created for static design and design review. As a part of the analysis in SCIA Engineer, not only the normative loads and effects were checked, but also dynamic effects, fire resistance and overall behaviour of the structure. Afterwards, a detailed design of reinforcement in concrete elements was performed and the elements were checked for both limit states. The steel components have been checked for both limit states as well. Workshop documentation was created in Allplan and Tekla Structures.



HESCON s.r.o.

Contact Erik Hrnčiar
Address Námestie sv. Anny 20C/7269 (Stará Tržnica)
 911 01 Trenčín, Slovakia
Website www.hescon.sk



HESCON, Ltd., a design and static office, was established in 2008 by the authorized civil engineer Ing. Erik Hrnčiar. After his long-term experience in the fields of design management, design and construction of load-bearing structures, he realised his idea to gather a strong team of designers and structural engineers, all of whom you can meet in HESCON, Ltd. today.

HESCON, Ltd. offers its clients services in consulting, design, engineering from initial study up to the workshop drawing. The main company specialization is the statics of structures.

NOMINEE

Category 4: Special Projects



Serpentine Summer Houses 2016 - London, United Kingdom

Owner Serpentine Galleries
Architect Asif Khan/Barkow Leibinger / Yona Friedman
General Contractor Stage One
Engineering Office AECOM
Construction Period 05/2016 - 06/2017

In 2016, the Serpentine Architecture Programme was extended to include four Summer Houses, designed by architects Asif Khan, Barkow Leibinger, Kunlé Adeyemi and Yona Friedman. Their brief was to design a 25 m² structure, remaining in-situ for the summer of 2016 providing a multi-functional space for public use, responding architecturally to Queen Caroline's Temple, an 18th Century Summer House.

The design of the Barkow Leibinger and Yona Friedman Summer Houses relied on engineering judgement more than code based design due to the choice of construction materials. Data from structural testing of samples was used to calibrate the analysis results of SCIA, allowing a stress-based design to be undertaken. Each Summer House was founded on 20 mm thick steel plates as opposed to traditional concrete foundations. In order to ensure the plates could distribute the forces from the superstructure, non-linear analyses were run with flexible supports, ensuring the structures above bore no ill effects of movements at the base.

The design of each Summer House was completed from concept to construction information in six weeks, therefore the ability of SCIA Engineer to quickly import and analyse complex geometry in tandem with the possibility to view both the raw analysis results, as well as the design output was crucial to the success of the project.

AECOM

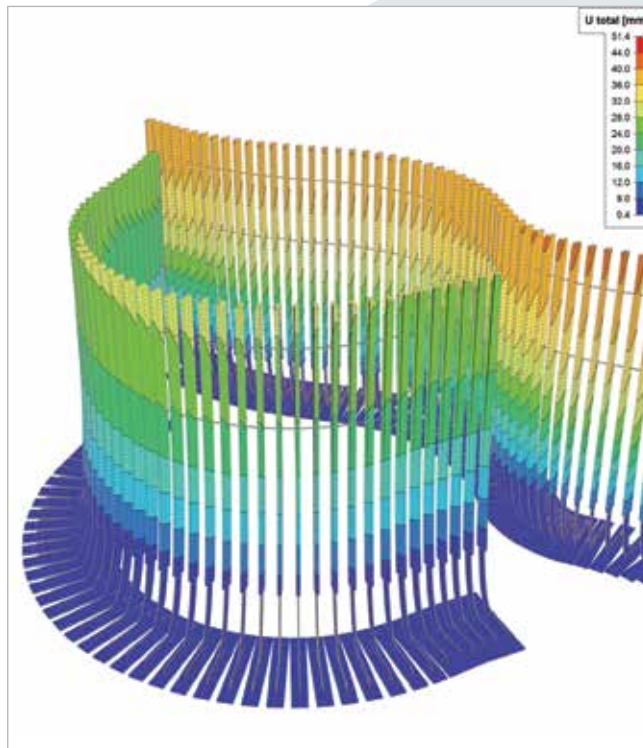
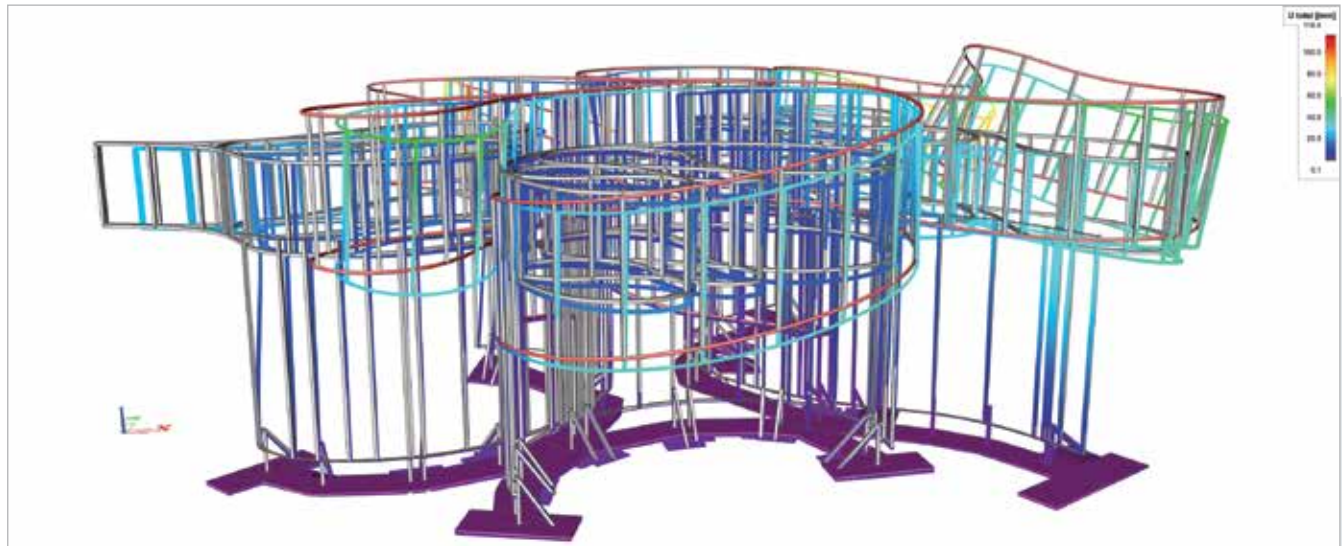
Contact Michael Orr
Address 2 Leman Street
 E1 8FA London, United Kingdom
Website www.aecom.com

AECOM

We are a global network of experts working with clients, communities and colleagues to develop and implement innovative solutions to the world's most complex challenges.

Delivering clean water and energy. Building iconic skyscrapers. Planning new cities. Restoring damaged environments. Connecting people and economies with roads, bridges, tunnels and transit systems. Designing parks where children play. Helping governments maintain stability and security.

We are AECOM. Built to deliver a better world.



NOMINEE

Category 4: Special Projects



Notre Dame Renovation Scaffold - Cholet, France

Owner Lefevre
Architect Comi Service
General Contractor Lefevre
Engineering Office Comi Service
Construction Period 06/2016 - 04/2017

For the renovation of this tall church, a large scaffold was necessary to provide the access to all parts of the monument.

To meet contractor's instructions, the scaffold is fixed to the stone up to the roof and is self-standing above it.

The scaffold is 68 m high, 12 m wide, 32 m long and weighs 232 tons.

The structure was designed according to the special scaffolding codes NF12810, NF12811, EN74 and the Eurocodes.

The specific scaffold's non-linear hinges have been defined precisely and a non-linear analysis using the iterative Timoshenko method was performed.

The model consists of a half symmetrical structure, contains 41,734 nodes, 23,775 beams and 30 non-linear combinations.

For structures of this height, wind is the most critical load. To find a suitable geometrical configuration for the scaffold was a very difficult challenge. SCIA Engineer's scaffold and steel checks helped precisely observe the load distribution and optimise the structure.

Comi Service

Contact Rémi Martin
Address Batiment A6 Europarc de Pichaury
13856 Aix les Milles, France
Website www.comi-service.com



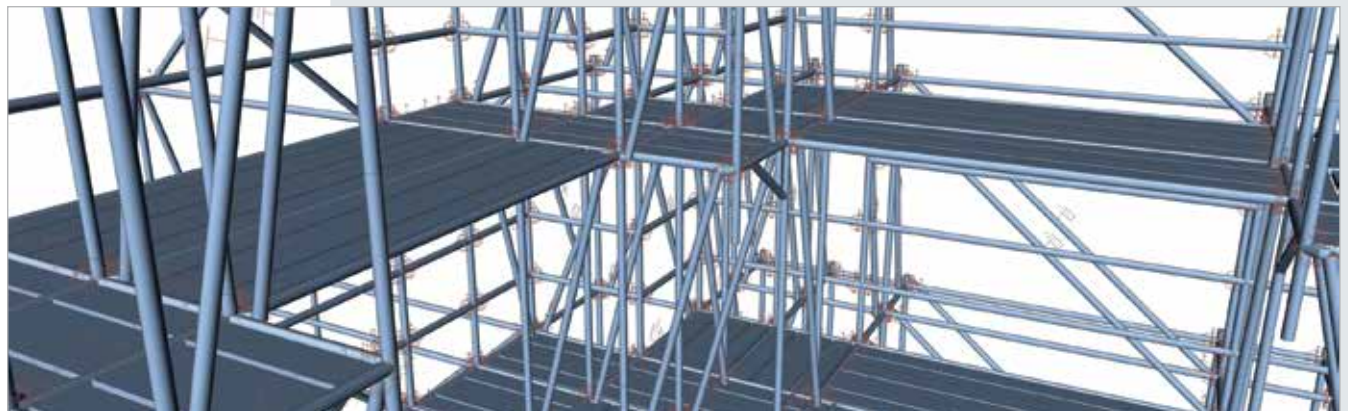
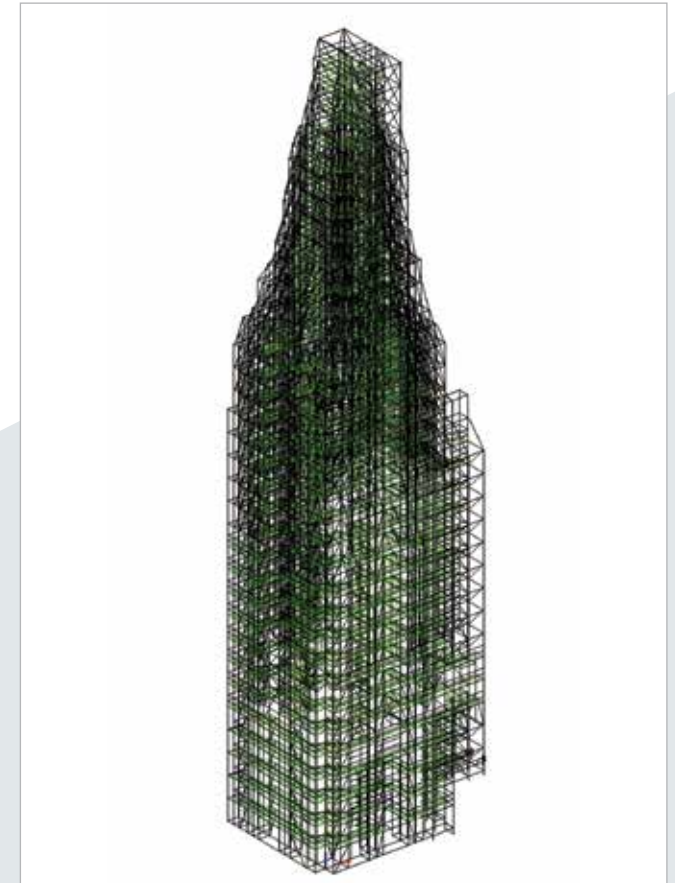
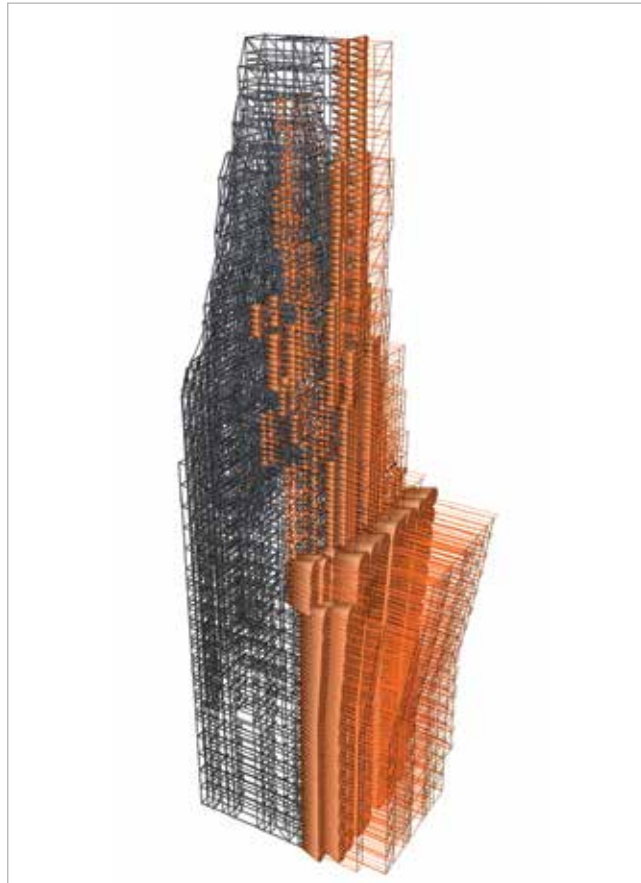
Subsidiary of the Altrad Group, Comi Service specializes in scaffolding.

Its engineering office handles the most technically challenging projects and its country-wide presence, with six agencies, allows us to intervene anywhere in the country.

Comi Service in figures:

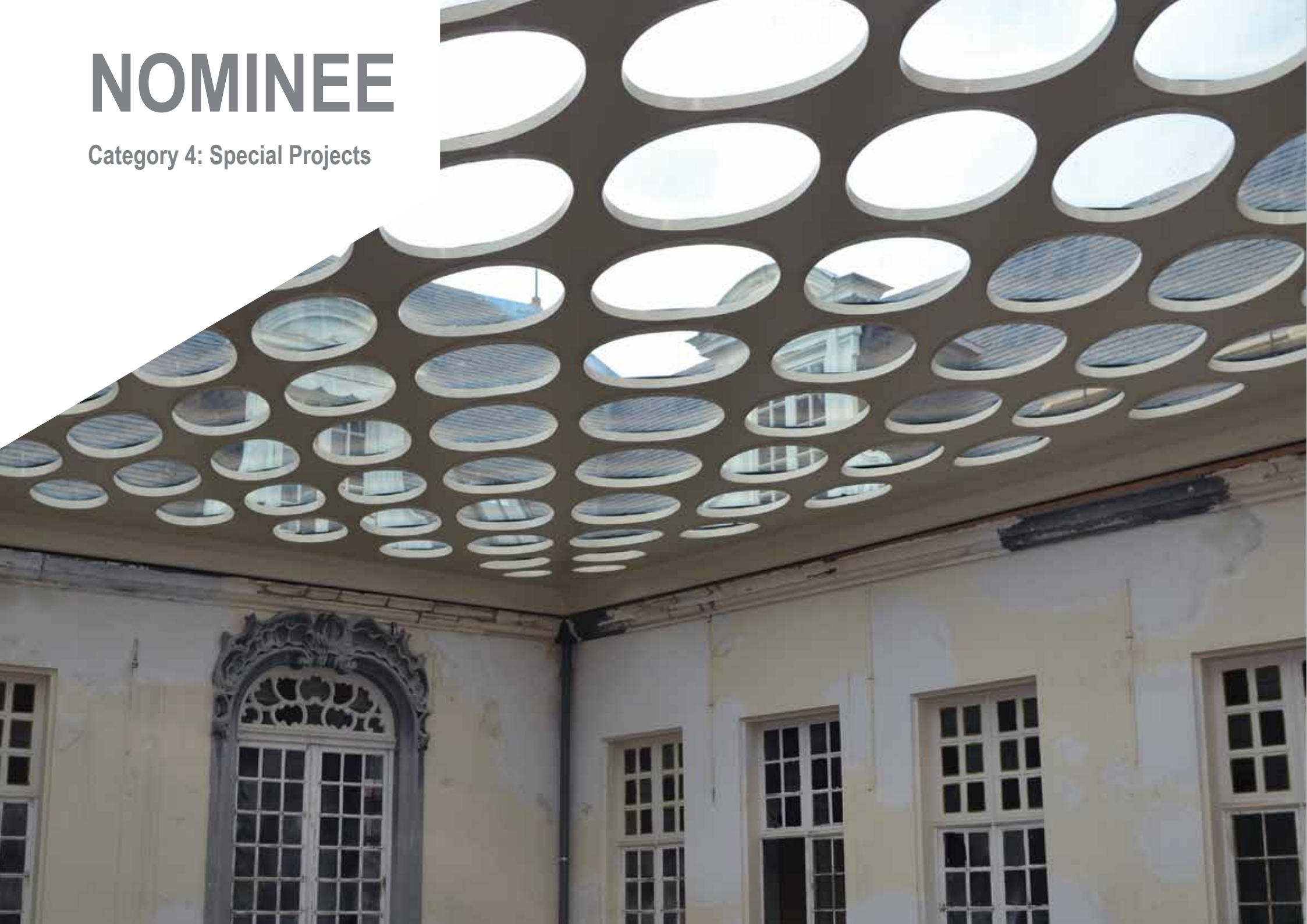
- 331 full-time employees.
- €40 million revenue.

A stock of 10,000 tons of multi-directional NF material of the Layher and Plettac brands.



NOMINEE

Category 4: Special Projects



Osterrieth House Glass Roof - Antwerp, Belgium

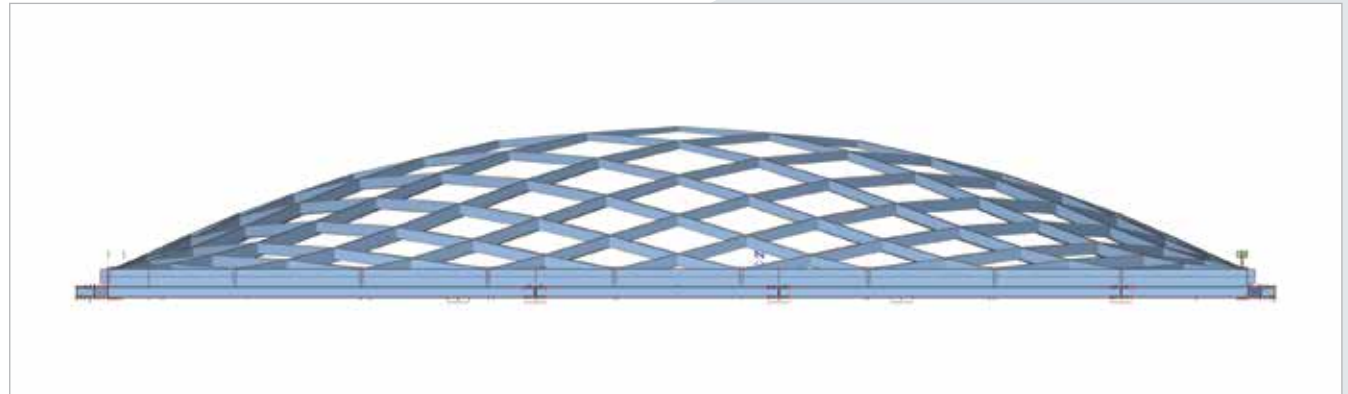
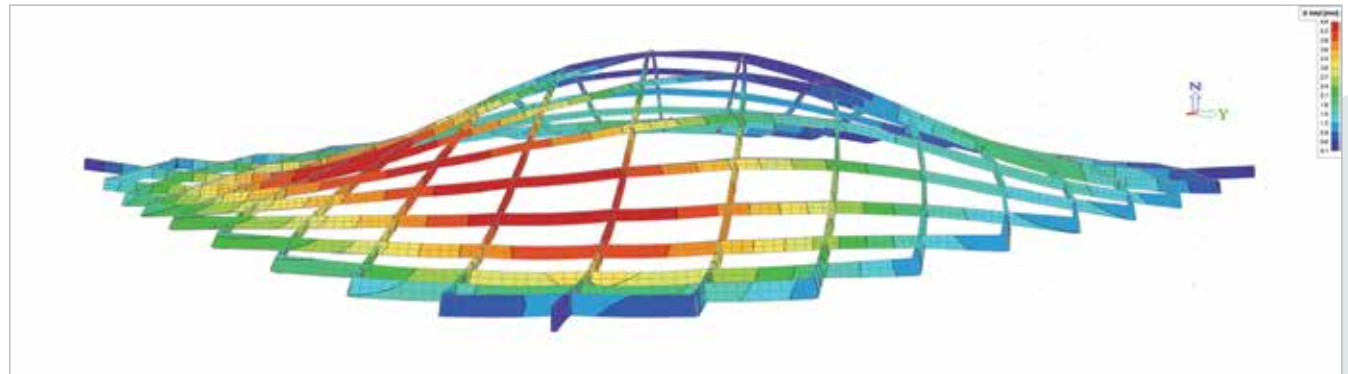
Owner Athelean
Architect Ney & Partners
General Contractor CSM Steelstructures
Engineering Office Ney & Partners
Construction Period 05/2016 - 12/2016

The new glazed roofs cover two inner courtyards of the historical Osterrieth House on the Meir in Antwerp, the most important shopping axis of the city. Based on the historical context and the important character of the courtyards, a specific architectural and structural design was paramount in the outcome of the project.

The first roof (10 x 15 m²) consists of a double curved shell with large openings following a rococo-inspired pattern. The openings are completely covered with glass panels. The second roof (14 x 15 m²) is made from curved beams, following a grid pattern based on the first roof. The glass is directly glued onto the steel beams, reducing the visible impact of the glass-steel connection.

SCIA Engineer was used to assign the different loads to the structural elements, to perform a linear and nonlinear analysis and to evaluate the stresses and instabilities. Also, the behaviour and resistance to fire were checked.

For the first roof, a 2D model was used based on a refined triangulation of the irregular shape of the shell. The second roof consists of beam elements with variable cross-sections.

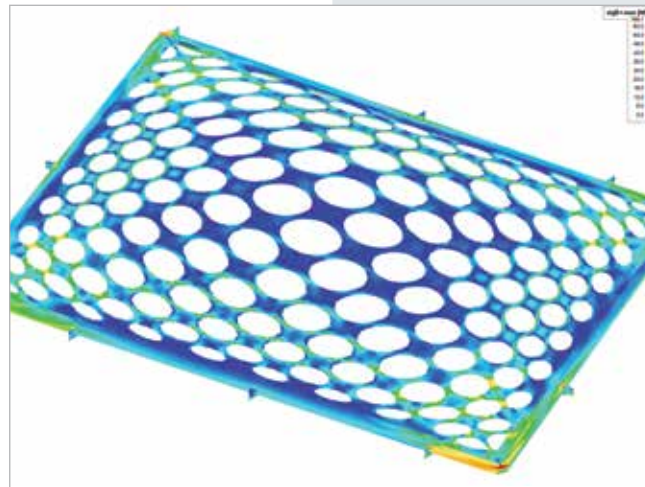


Ney & Partners

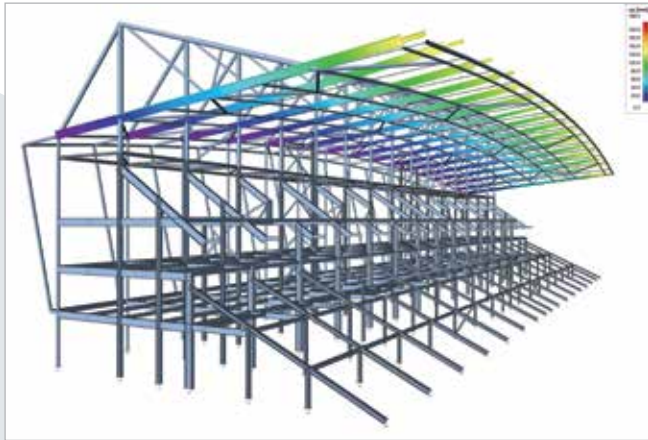
Contact Gersom Wursten
Address Terhulpensesteenweg 181/7
 1180 Watermaal-Bosvoorde, Belgium
Website www.ney.be



Ney & Partners is a structural engineering consultancy and architectural office. We are driven by an active vision of civil engineering that integrates different disciplines. The foundation of a successful project is the synthesis of all contextual elements. We do not view the boundary conditions as obstacles but as fuel for our creativity. We reach a solution that carefully take into account all of the requirements. We practice effective engineering that adds value by eliminating the nonessential. The innovative supporting structures, footbridges, bridges, canopies and constructions that we develop have therefore a unique identity.



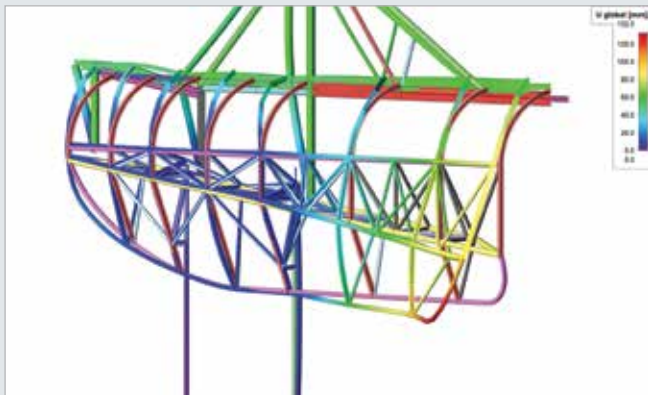
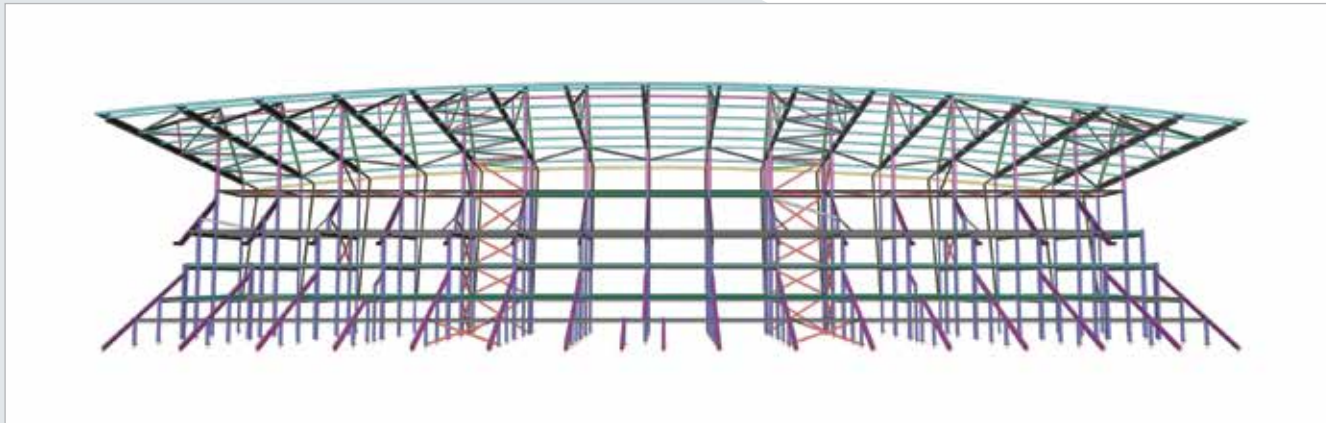
National Football Stadium at Windsor Park - Belfast, Northern Ireland



Owner Irish Football Association
 Architect Holmes Miller Associates
 General Contractor O'Hare and McGovern
 Engineering Office AECOM
 Construction Period 05/2013 - 01/2016

Windsor Park is the new 18,000 all-seater stadium. The development includes south and east stands, two large corners and a feature cladding enclosure (The Quaver). Each new building can be considered as a standalone unit separated via movement joints. The south stand is the largest section of the project measuring about 115 m in length. The structure of all stands is comprised of a steel frame with composite metal deck slabs. The roof concept is consistent across the stadium and consists of a cantilevered column and rafter system with stay support. At each bay a single mast with three stay members support cantilever rafter beams. The cantilever length varies between stands and is 26 m in the worst case.

The flexibility to input and manipulate geometry in SCIA Engineer's XML API access was instrumental in allowing a close collaboration with the sports architects. As a national stadium, the building had to be iconic, but in order to bring best value to the project, the structural design needed to be relatively understated. This meant combining rationalised structural design whilst also allowing for landmark features such as The Quaver. Such a design could only be completed in a versatile platform and SCIA Engineer was used across the board to design each stand in isolation and combined with Rhino to support a single output Revit model.



AECOM

Contact Madalina Aghiniei
 Address 2 Leman Street
 E1 8FA London, United Kingdom
 Website www.aecom.com



We are a global network of experts working with clients, communities and colleagues to develop and implement innovative solutions to the world's most complex challenges.

Delivering clean water and energy. Building iconic skyscrapers. Planning new cities. Restoring damaged environments. Connecting people and economies with roads, bridges, tunnels and transit systems. Designing parks where children play. Helping governments maintain stability and security.

We are AECOM. Built to deliver a better world.

Eagle Aviary - Brno, Czech Republic

Owner The City of Brno
Architect AND, spol. s r. o.
General Contractor ZOO Brno
Engineering Office B2K design s.r.o.
Construction Period 10/2013 - 06/2014

The aviary has an inverted truncated cone shape. The base of the aviary walls are the shape of an ellipse with dimensions of 32 x 22 and the top part of the walls are a circle with a diameter of 30 m. The ellipse and the circle are mutually eccentric, so the columns are oblique in different directions. The height of the aviary over sloping ground is above at the highest and lowest point 15.5 m and 11 m. The steel structure is partly based on the pads in the bedrock and partly on the downstream monolithic structures of the exposure prospects.

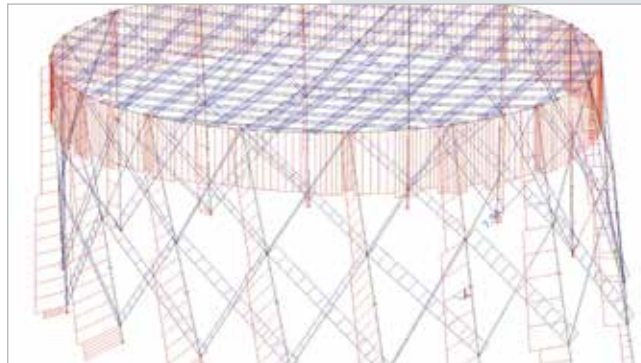
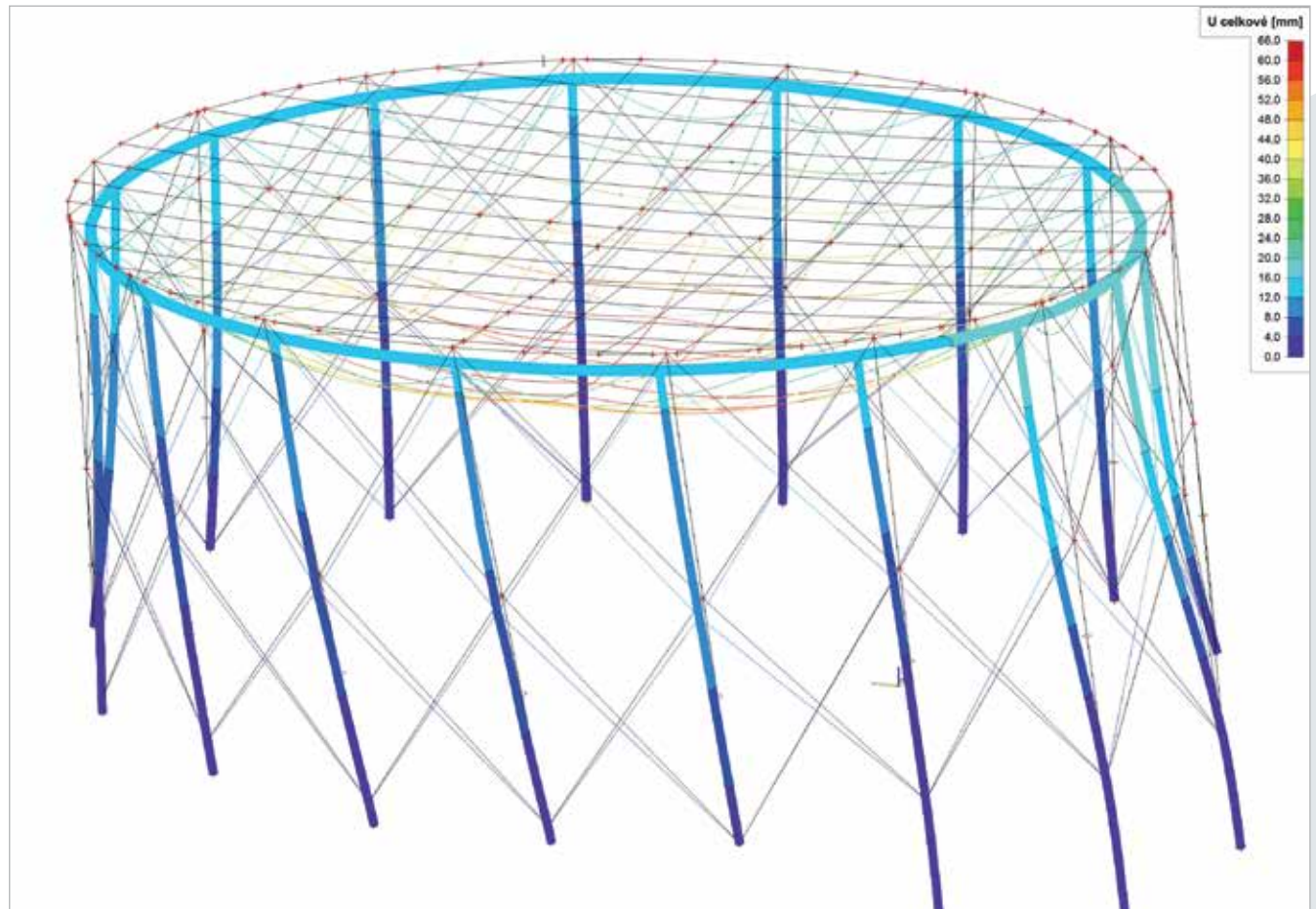
The aviary is designed as a welded steel construction, consisting of a compressed upper ring to which the steel cable grid is anchored in the shape of the orthogonal network of 2.0 x 2.0 m. The cables are connected at the crossing point by junctions which partly limit the mutual contact thus any disruption of the corrosion protection and further interconnect each other which allows the transfer of forces between adjacent cables. The ring is supported by 16 tube columns, which are pinned to the ground and braced by diagonal cables in the plane of the wall of the aviary.

B2K design s.r.o.

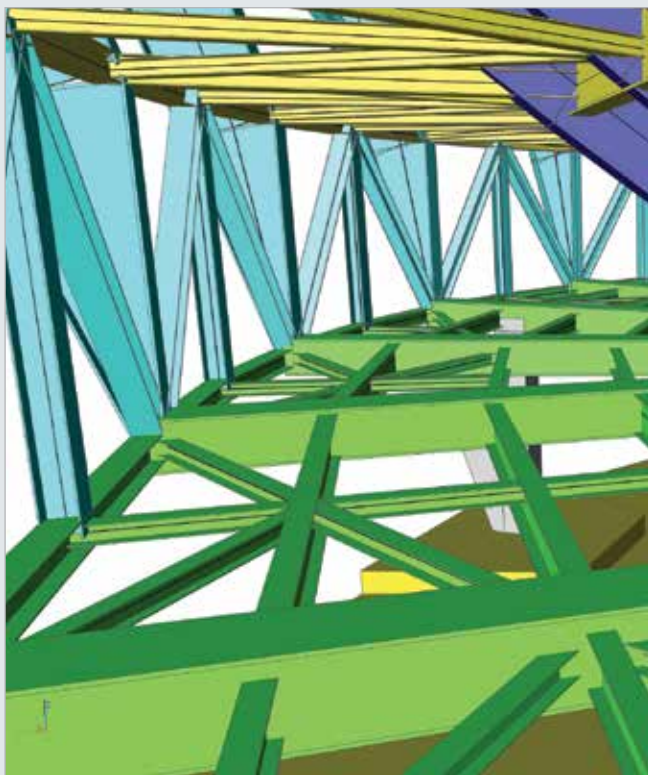
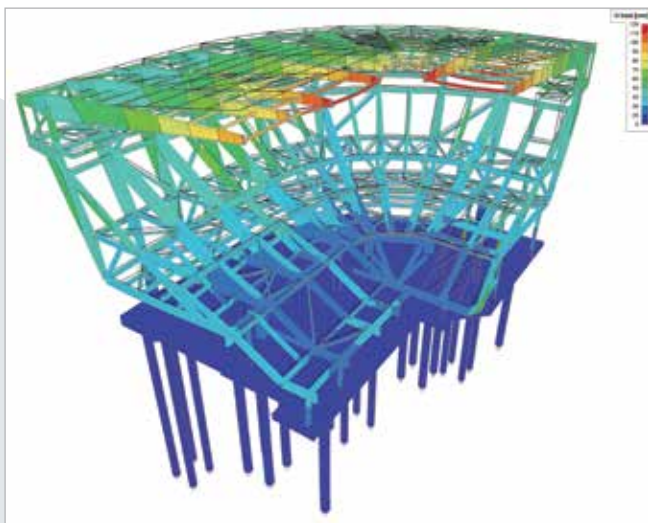
Contact Martin Beneš
Address Strážovská 17
15300 Prague, Czech Republic
Website www.b2kdesign.cz



B2K design s.r.o. is a design and engineering company founded in 2007. From the outset, broadly focused and handles projects from public and residential construction, through industry, agriculture to energy at all stages including consultancy and supervision on site. The company began as an engineering office and over time has expanded its services also to other professions. The company currently provides management of design work as chief designer. The company processes and designs, both in steel, concrete and wooden structures, including the foundations, but also constructions from aluminium and glass. We specialize in the design of supporting structures exposed to fire in co-operation with fire specialists.



Mayol Stadium Redevelopment - Toulon, France



Owner *Mairie de Toulon*
 Architect *Duchier Petra Architectes*
 General Contractor *Baudin Chateaufneuf*
 Engineering Office *Baudin Chateaufneuf*
 Construction Period *10/2015 - 05/2017*

The works on this project included studies, manufacturing, protection against corrosion and installation, mainly at night, of approximately 540 tons of steel framework and 570 m² of composite floor decks for the construction of an additional stand at the Toulon rugby stadium, the Mayol stadium.

The structure is complex because of its geometry in a ¼ of a circle and as all the loads are transferred to the very small number of load-bearing elements at the ground floor.

The assembly was realized on a very small urban site, at night.

A global 3D model was realized with SCIA Engineer. As the structure is located in a seismic zone, the seismic analysis was carried out on a general model in which the steel structure, the reinforced concrete foundations and the deep foundation piles were modelled in order to take into account the interaction between the soil and the structure.

The use of the stability analysis module made it possible to quantify the effects of the 2nd order on the structure. The use of the steel code check module, after the manual checking of the different critical lengths of the beams, resulted in a very significant time saving during the design of the framework while the planning constraints were very strong.

A modal analysis allowed the estimation of the vibratory behaviour of the floors due to live loads such as people walking.

Baudin Chateaufneuf

Contact *Cédric Ricaud*
 Address *CS 30019
 60 rue de la brosse
 45110 Chateaufneuf sur Loire, France*
 Website *www.baudinchateaufneuf.com*



Baudin Chateaufneuf was founded in 1919. Born in the production of electrical towers and farm sheds, the company is moving towards the construction of steel bridges.

In 1954, the company sought to diversify its activity. Its mastery of metal logically leads Baudin to the area of metal frames.

Nowadays Baudin offers a full range of services at the highest technological level in a lot of business areas: construction and renovation of civil engineering work, steel structures, mechanical engineering or general contractors.

Elysée Montmartre Reconstruction - Paris, France

Owner Julien Labrousse and Abel Nahmias
Architect Jérôme Friant
General Contractor Viitor Modular
Engineering Office BET Duberseuil
Construction Period 04/2014 - 10/2016

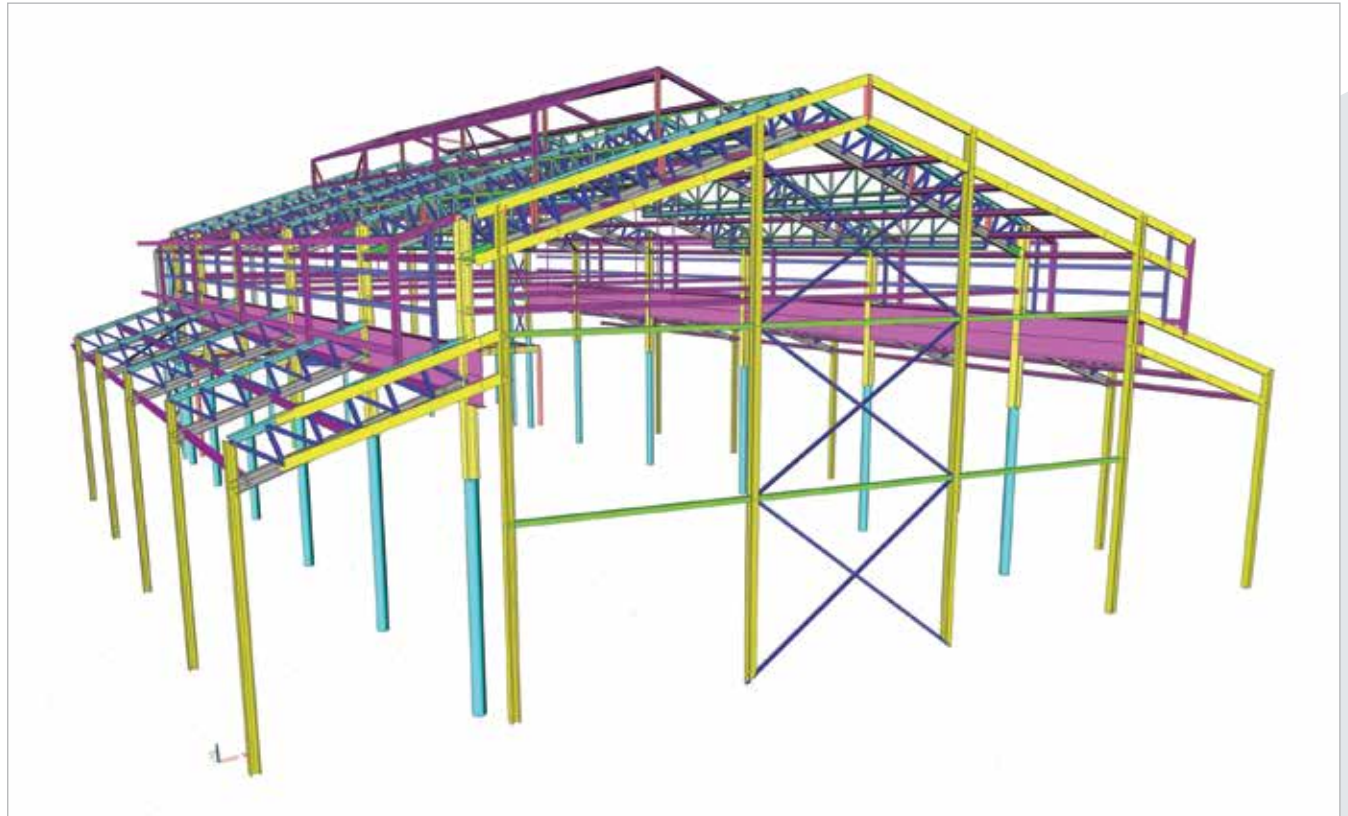
The original building "l'Elysée Montmartre" was built in 1807. On 22 March 2011, the structure was devastated by fire. The main room is unusable. The steel structure is deformed, the walls and roofs are destroyed, but the facade is intact. In 2014, studies of a new steel structure were entrusted to the Engineering office Duberseuil & Cie.

The old steel framework was classified as a "historical monument" since 1989. The new structure had to include the same architecture. However, the rules and standards of construction forced a reconsideration of the design of the new structure. A survey of the structural elements of the old framework was established. The building is 39 metres long by 22.5 metres wide and has a ridge height of 12.6 metres.

To compensate for the noise pollution caused by the operation of the site, a double framework was created in the roof spaced at 80 cm, allowing the installation of a double insulation and a vacuum between two of 60 cm. The columns are supported by anti-vibration base-plates to block any transmission of the vibrations in the vicinity. The natural frequency of the mezzanine was checked to respect 3 Hz.

The stage structure was designed to be removable by jacks on different levels. The roof structure takes into account the elements of lighting and sound diffusion as well as decorative elements.

All the structural elements were modelled and calculated with a buckling check and lateral torsional buckling check.



BET Duberseuil & Cie

Contact DUBERSEUIL Aurélien
Address 2, Squares les Clématites
95470 Survilliers, France
Website www.bet-duberseuil.com



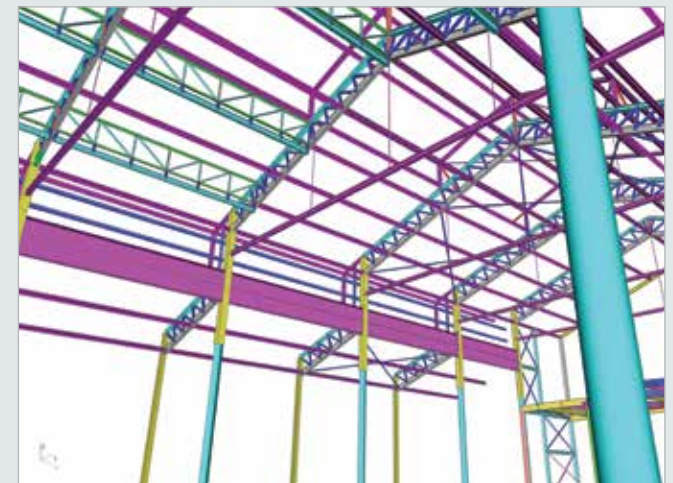
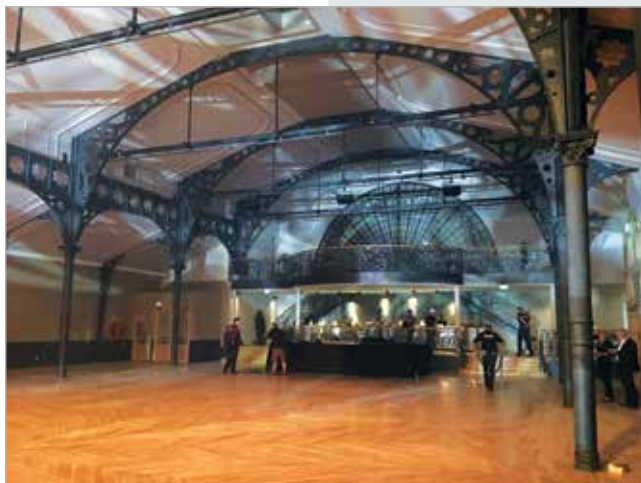
Since 1969, the engineering office DUBERSEUIL & Cie has been specialising in steel structures.

From conception to realization, all the studies, calculations, execution plans and tracing of various projects are carried out by a reactive and efficient team. The availability of engineers and designers and high-performance computing equipment, including 2 licenses of SCIA Engineer for 3D calculations, brings on a variety of works and reactivity appreciated by the contractors

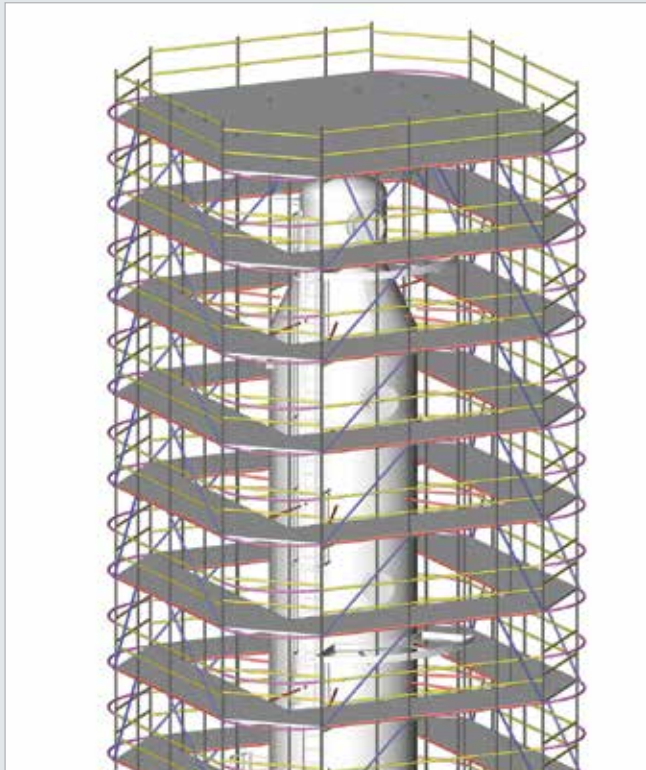
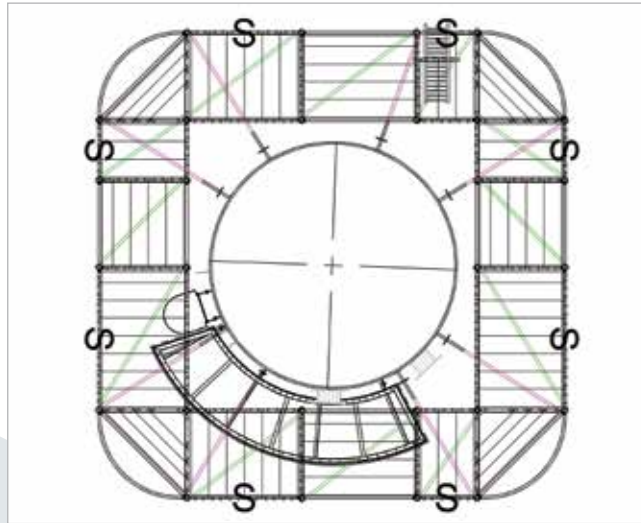
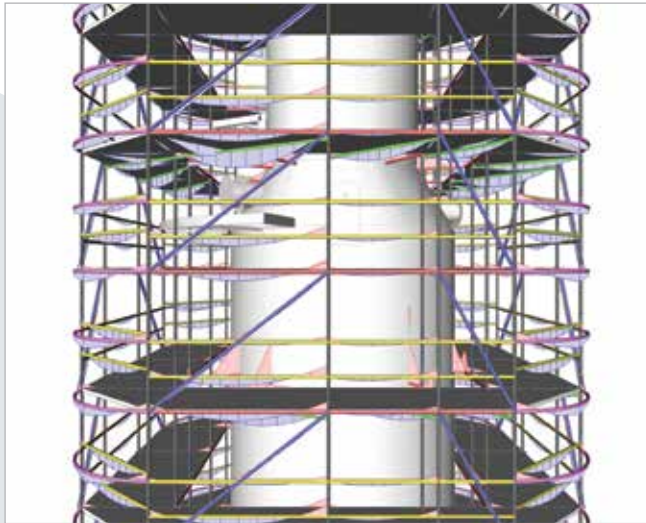
Approved OPQIBI and "Assurances Mutuel des Architecte Français".

Number of persons: 4

Turnover : 292 000€



Innovative Scaffolding Solution - Sluiskil, Netherlands



Owner Yara Sluiskil
 Architect Bilfinger Industrial Services
 General Contractor Bilfinger Industrial Services
 Engineering Office Bilfinger Industrial Services
 Construction Period 07/2016 - 08/2016

The Yara company needed to refurbish a 37 m high distillation column as a part of a CUI program at its Sluiskil site. A scaffold had to be built and completely fitted with a shrink-wrap foil.

An interesting challenge involved the relatively limited load bearing capacity of the column. A traditional scaffold with a square plan anchored to the column was not possible due to the large forces caused by extreme wind conditions. A large, freestanding scaffold would be an obstacle for normal production activities and would be very expensive.

The best solution, therefore, was an aerodynamic scaffold. Rounding-off the edges resulted in an enormous reduction of the wind load. Thanks to this reduction, the scaffold could be anchored to the column. We integrated standard "Layher" wedge head connections to bent scaffold tubes for easy assembly and the perfect solution was complete.

The scaffold was designed with SCIA Engineer using its scaffolding module. The dwg-file of the column was imported to make the most optimal design of the scaffold. Both the scaffold and the column were modelled to determine the interaction between the scaffold and the client's asset.

In summer of 2016, the scaffold was built and could be used for the CUI activities until the end of 2016. As a result, the desired goal was achieved: A fairly lean and innovative solution at a good price!

Bilfinger Industrial Services

Contact Gerben Schuurhuis
 Address Werfplein 5
 3238 BH Zwartewaal, Netherlands
 Website www.is-bnl.bilfinger.com



With 60 years of experience, Bilfinger Industrial Services is the benchmark for project and maintenance work to industrial assets for our customers in Belgium and the Netherlands. Our services cover: insulation, scaffolding, rope access, painting, tracing, asbestos removal, fireproofing and noise control. Quality, safety, efficiency and innovations are the cornerstones of the services we provide.

Our experienced engineering department is best equipped to guide the entire process of complex scaffolding, always striving for the best possible access solution to meet the needs of our customers.

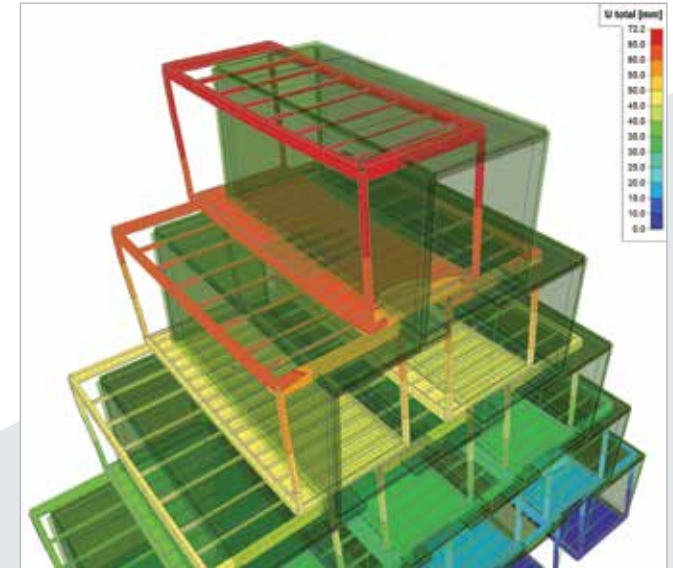
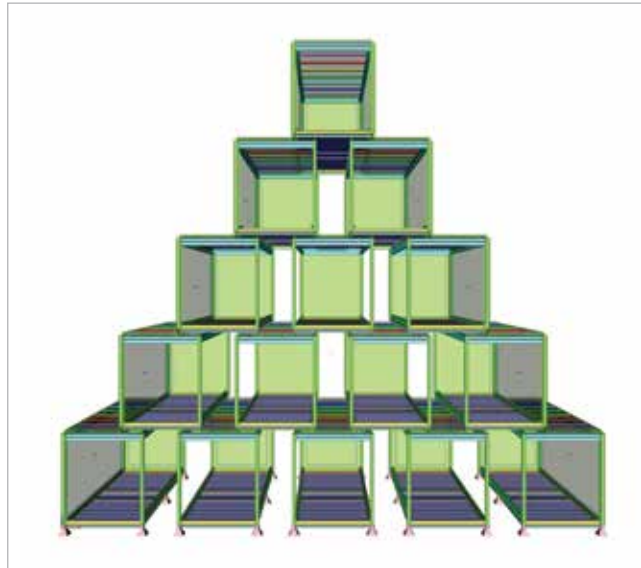
Temporary RBS Module Structure - Faulquemont, France

Owner Euromodules
Architect Euromodules
General Contractor Euromodules
Engineering Office Euromodules
Construction Period 11/2016 - 01/2017

Coming from the R&D office, the RBS module structure was designed to meet a wide range of needs for temporary buildings.

Made of galvanised folded sheets, the structure, optimised with SCIA Engineer, offers an unmatched resistance/mass ratio for this type of product. In addition to resisting the climatic constraints and the use of a conventional building, it is imperative to take into account the forces of the repetitive assembly/dismantling, transport and handling. It is also important to keep the modular aspect with the facades and the interior layout which can be adapted.

Assembled in one day, the real demonstration of the performance and the scope of all possible configurations for this new product, the structure presented during the Christmas holidays show the RBS module into a unique configuration. This set of 15 modules measures 15 metres in height, for a total weight of 20 tons, i.e. 1.33 ton per equipped module – the weight of a car.

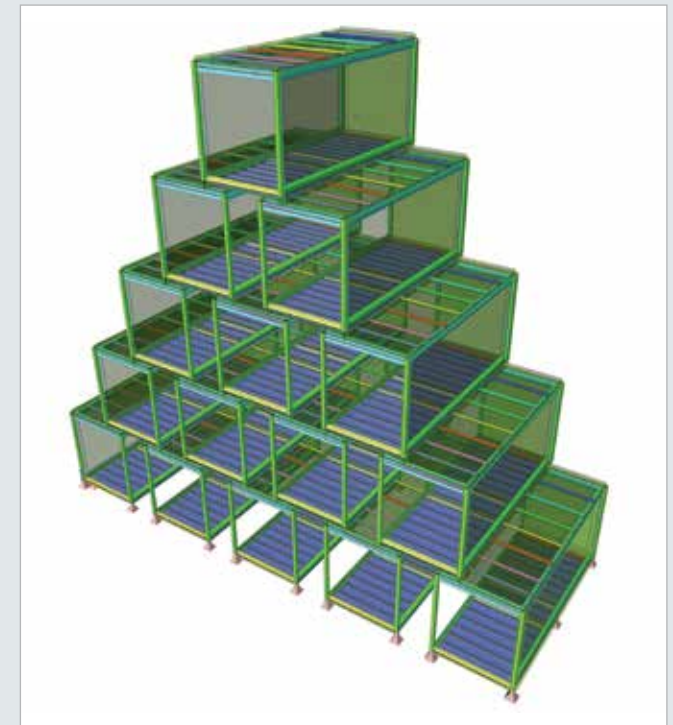


Euromodules

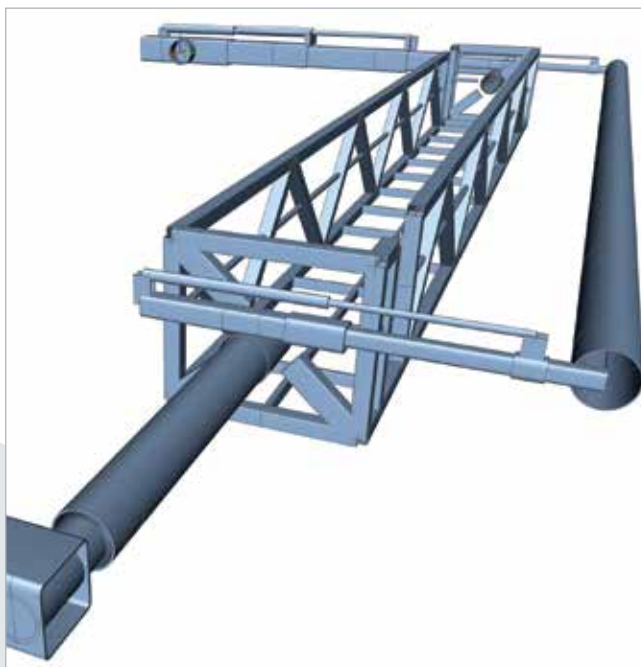
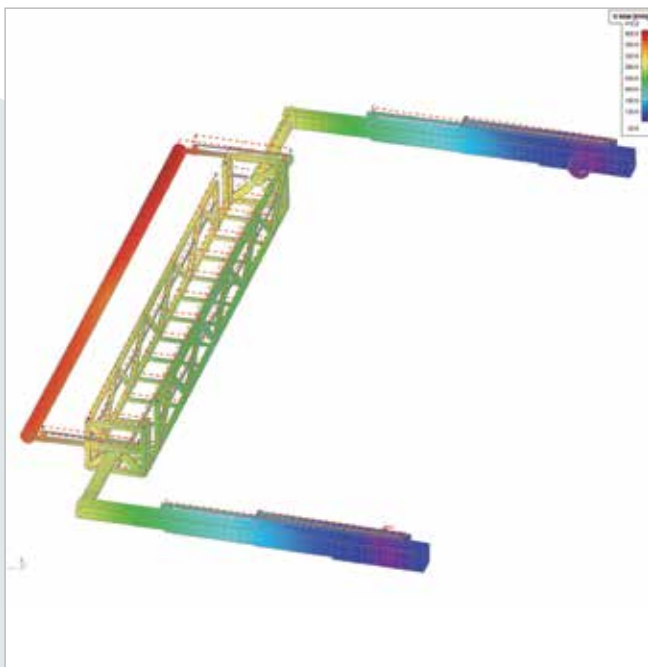
Contact Federico Moyano
Address Avenue du district - Voie Sud
 57380 Faulquemont, France
Website www.euro-modules.fr



Established near the German and Luxembourg borders, Euromodules is one of the modular building specialists. With resources to satisfy the rental needs of the customers, the company is primarily oriented towards atypical modules realized jointly with architectural firms. One of their last projects, the 58 hotel rooms of the OFF Paris Seine, is the first floating hotel in heart of Paris.



Portal Platform - Grängesberg, Sweden



Owner *Essverk AB*
 Architect *Daniel Forsman*
 General Contractor *Flexible Engineering*
 Engineering Office *Flexible Engineering*
 Construction Period *02/2016 - 12/2016*

The project presents a very complex portal platform for tunnelling work. The upper part of it, the most mobile part, that can sweep across the tunnel roof and walls to lay membrane and reinforcement nets, was analysed using SCIA Engineer. Membrane rolls and reinforcement nets are arriving on trucks, driving/stopping under the platform to be stored on the machine. The upper parts of the machine, analysed in SCIA Engineer, can then fetch rolls/nets and apply them while sweeping along the tunnel roof and walls. The machine can also drive around by itself. When the work is finished, the machine can be folded to a smaller size and driven away on a truck.

The portal platform in question was approx. 15 m long (along a tunnel), 3.5 to 7 m wide, depending on if it is folded to small size or not, and intended to reach 7 m height and to the extents over a 12.5 m wide tunnel. The membrane rolls to be applied weigh 1100 kg. 5 people can work on the platform simultaneously, along with 550 kg of equipment.

SCIA Engineer was used to quickly test and evaluate hundreds of different cross-sections and different ideas. It was also used to check the important beams according to the Eurocodes.

The project was a real challenge, especially as the loads and conditions changed several times during the project and that the number of possible load combinations was very large.

Flexible Engineering

Contact *Daniel Forsman*
 Address *Tiskbergsvägen 42B*
79153 Falun, Sweden



Flexible Engineering is a small consultancy company, working primarily with mechanical simulations and structural calculations. In recent years, the company has successfully analysed very advanced moving mechanisms like tap-changers with finite-element-models, and qualified several machines for use in tunnels and mines using different Eurocodes for cranes, platforms and general equipment. Having access to design and analysing expertise, the company has helped to solve complex problems in a cost-effective way.

Structures for Salone del Mobile 2016 - Milan, Italy and Pukkelpop - Hasselt, Belgium

Owner Ken Sprangers and Michael Lefeber
Architect ir. arch. Michael Lefeber
General Contractor Hexa Structures
Engineering Office dr. ir. Ken Sprangers
Construction Period 04/2016 - 08/2016

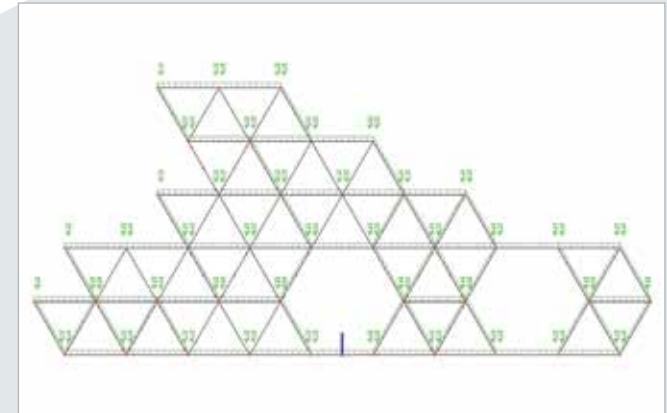
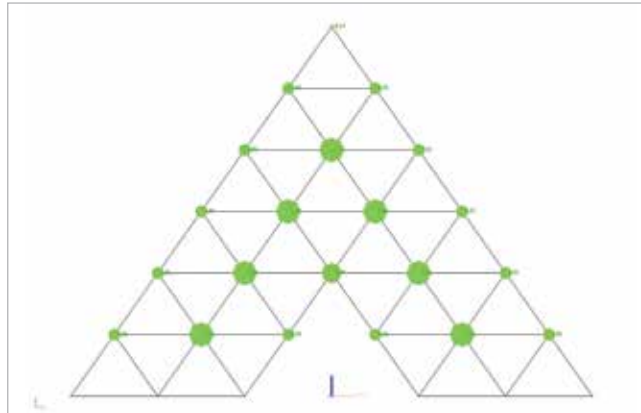
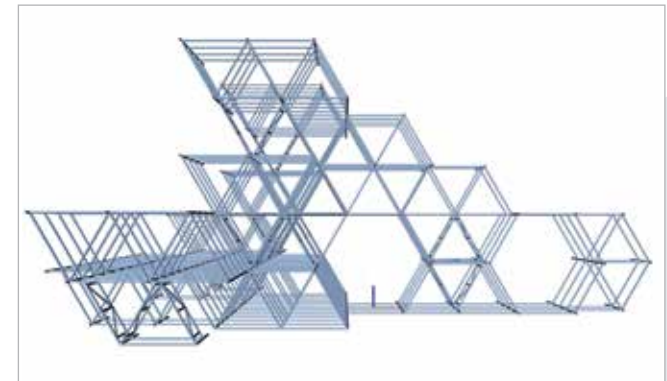
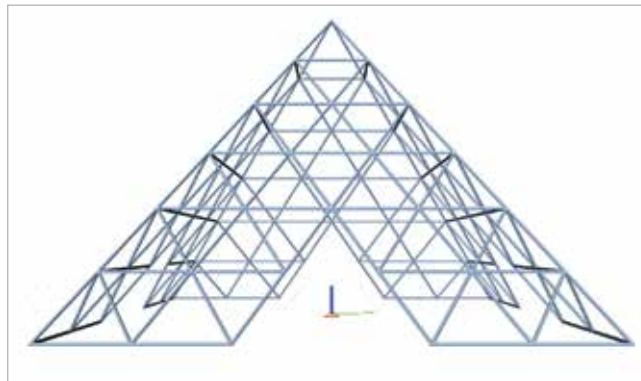
Two projects are presented here: Hexa Structures for Salone Del Mobile 2016 and Pukkelpop 2016. More information about this new design culture on www.hexastructures.com.

The three-dimensional structures are built up using standard steel scaffolding. These complex scaffolding structures are analysed using SCIA Engineer which allows us to include effects of non-linear behaviour such as the non-linear resistance of the joints and the effects of large deformations. Due to the large amount of steel members, the use of Steel and Scaffolding packages are essential to carry out global and local checks.

Thanks to its systematic approach and user-friendly interface SCIA Engineer allows us to analyse these complex "transient" structures with relative ease.

Versatile construction system using scaffolding and pallets.

This construction system is cheap and produces zero waste, installs the possibility of adaptation and co-creation of a design on site, due to its modular nature. It can thus provide infrastructure for different functions: an event stage artwork, an exhibition space, an urban bar, a public space appropriation tool, an urban camping dormitory and many more.



Hexa Structures

HEXA STRUCTURES

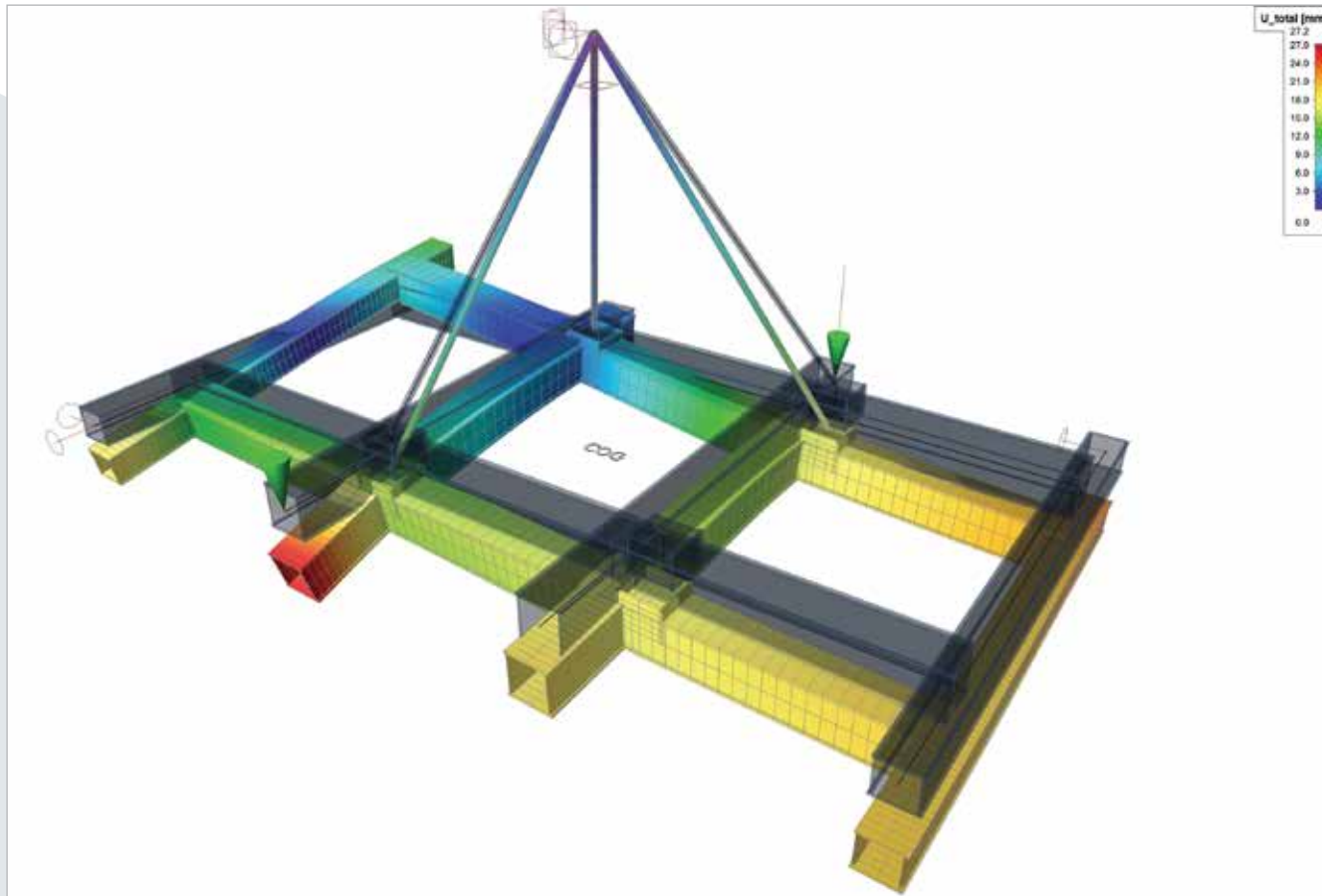
Contact dr. ir. Ken Sprangers
 ir. arch. Michael Lefeber
Address Sluis 283
 2400 Mol, Belgium
Website www.hexastructures.com

Hexa Structures is the current state-of-affairs of a new design culture, focussing on the need of design for deconstruction due to fast-changing contemporary requirements. Developing strategies that integrate time into design in order to support human needs, now and in the future.

Hexa Structures brought a new wave in the conception of artworks for music events all over the world.



Lifting Frame - Vietnam

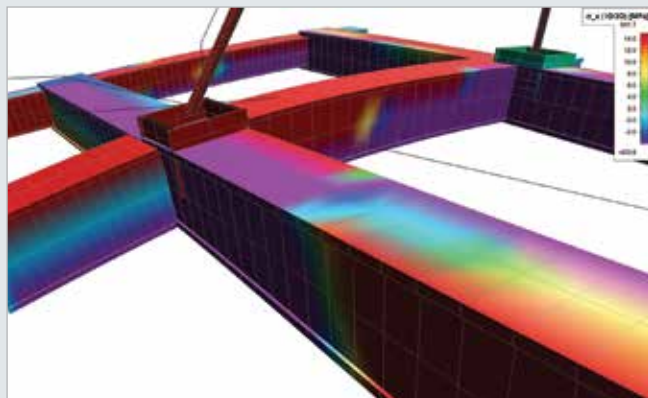


Owner CMI Energy
General Contractor CMI Energy
Engineering Office I.d.d. Engineering
Construction Period 05/2016 - 09/2016

The purpose of the lifting frame is to lift prefabricated steel units (almost the complete steel structure of a power plant) with a weight of 420 tons to a ship. The engineering contains the analysis of general stability and design of connection details.

SCIA Engineer was used, namely the steel check according to American standards.

The difficulty was to know the possible scenarios that may occur during lifting. The loads per lifting point are provided by the client, however, they are not directly applicable since they are determined with the assumption that the lifting frame does not deform. In reality, however, the loads are distributed differently because the end sections of the structure deform more than the middle part. To take this effect into account, different load distributions were evaluated. The type of cables used, the existence of one or two lifting cranes etc. All of these factors play an important role in the design of a lifting frame.



I.d.d. Engineering

Contact Dries Decloedt
Address Hoogkouterbaan 1
9450 Haaltert, Belgium
Website www.facebook.com/pg/iddEngineeringbvba



I.d.d. Engineering bvba is an engineering office near Brussels specialising in steel and concrete structures and foundations. The study presented contains a detailed engineering of connections and general stability. I.d.d. Engineering is specialising in industrial plants and civil structures such as bridges. The company was established in 2010 and has designed many structures all over the world, such as in Africa, Asia, Australia and the Middle East.

Waste Water Tower - Esslingen, Germany

Owner Hochschule Esslingen
Architect item Industrietechnik GmbH
General Contractor item Industrietechnik GmbH
Engineering Office Ingenieurbüro für Stahlbau Dipl.-Ing. Jürgen Mark
Construction Period 09/2016 - 10/2016

Item is the pioneer and worldwide market leader for building kit systems for industrial use. The principle of fastened aluminium profiles, as opposed to the welded steel bearers, was originally used for mechanical engineering. Nevertheless, this system quickly found other uses in many other areas. Just 20 km away from the German city of Stuttgart, this modern construction method is also being used in the new laboratory building of the Building Energy Environment facility at the College of Esslingen for special technical equipment.

In a so-called sewage tower, varied installation situations are shown in the sewage technology during sewage drainage. Through the help of transparent pipe ducts and dyed water, the sewage drainage can be seen clearly. The basic frame of the 3-storey sewage tower with a base of 6.10 x 2.50 m and a height of approximately 7 m is built from components of the Item production series 8.

The aluminium cable profile consists of EN-AW 6063 T66 (Al Mg Si 0.5 F25). The stairs and landings made from the same material are also a part of the building kit system and are approved for this use by the manufacturer.

Since the whole construction has already been constructed as a 3D-model, the entire framework and the components can be read and understood very easily with the help of the varied import functions in SCIA Engineer. For the calculation of the aluminium cable profile, the program modules general cross sections and aluminium code-based design turned out to be essential.

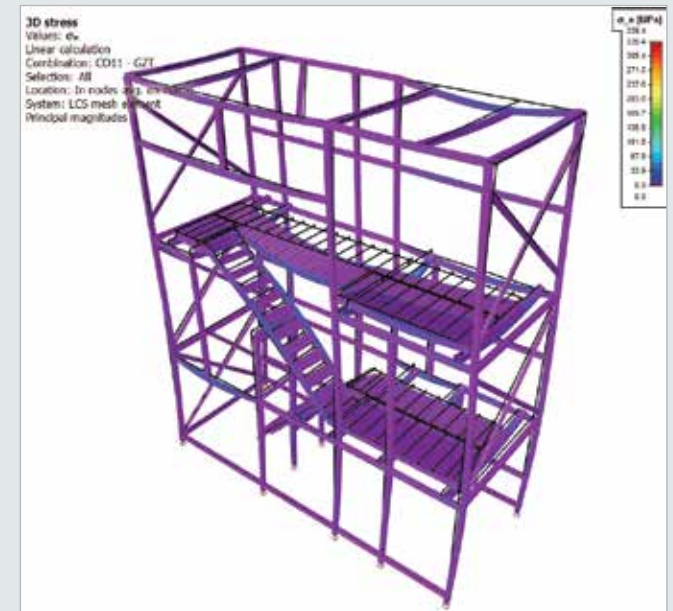
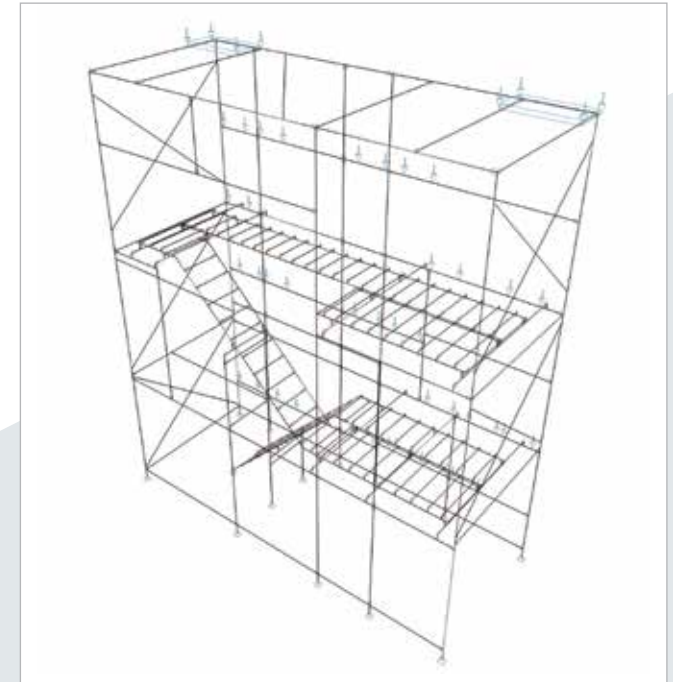
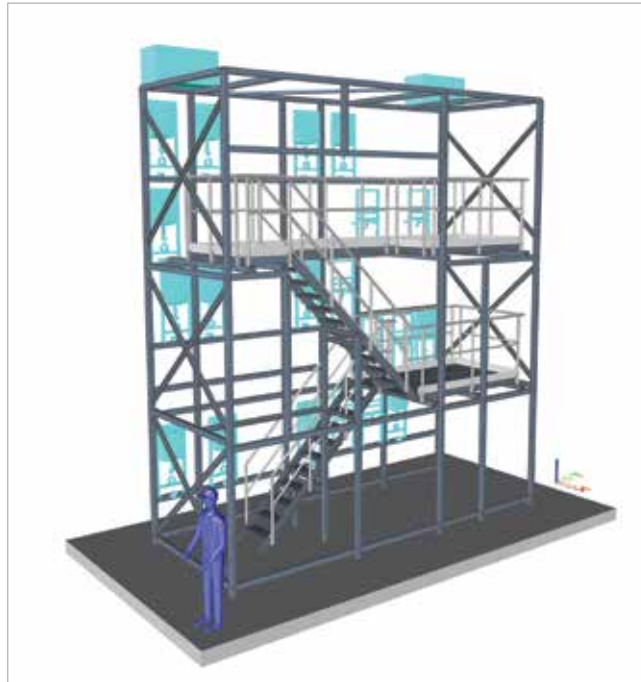
Ingenieurbüro für Stahlbau Dipl.-Ing. Jürgen Mark

Contact Jürgen Mark
Address Hauptstraße 1
 89264 Weißenhorn, Germany
Website www.ib-mark@email.de

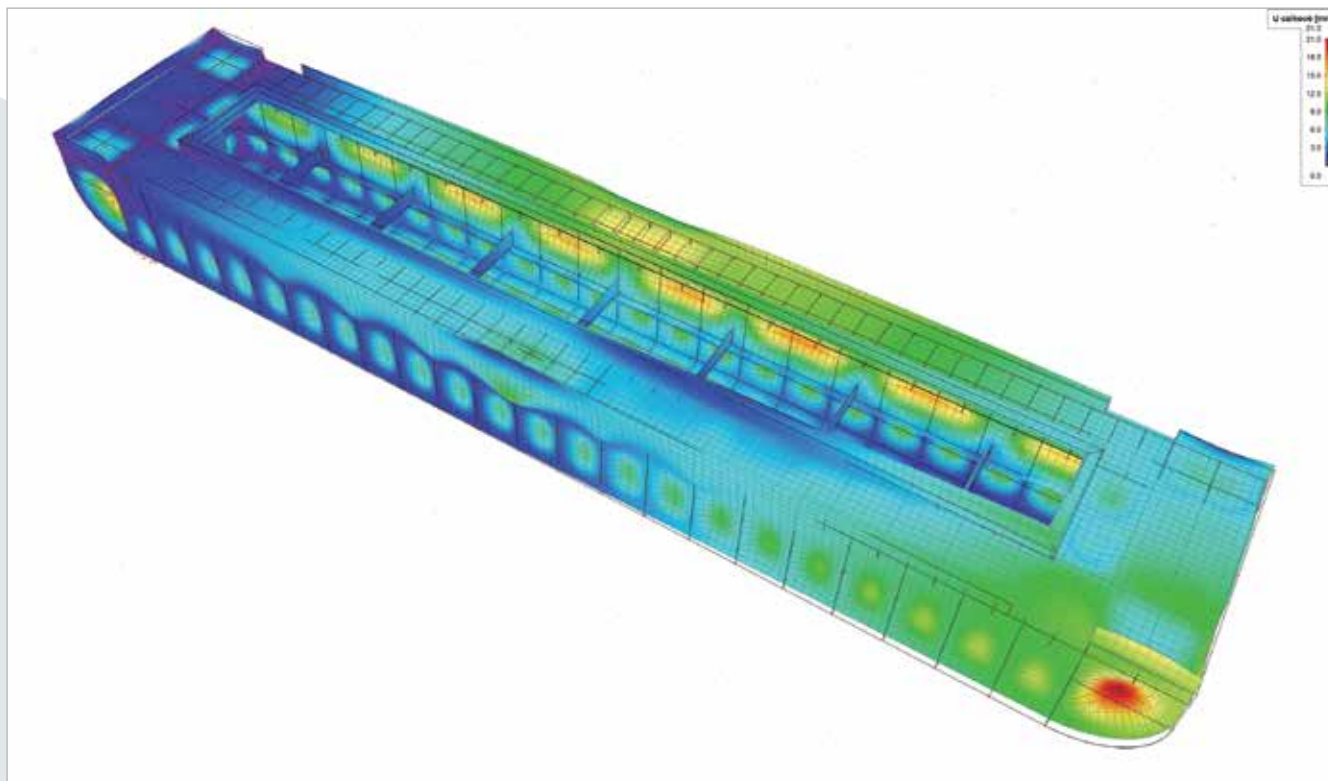


Since 2003 we have been capturing and designing various constructions from the areas of steel construction, steel lightweight construction, facades, aluminium and glass construction in 3D-CAD.

Through innovative and problem solving oriented project handling, effective use of the newest technologies and participation in constant advanced training, our company has developed a competitive advantage and is able to provide the client with economic benefits.



Plastic Technological Boat - Czech Republic



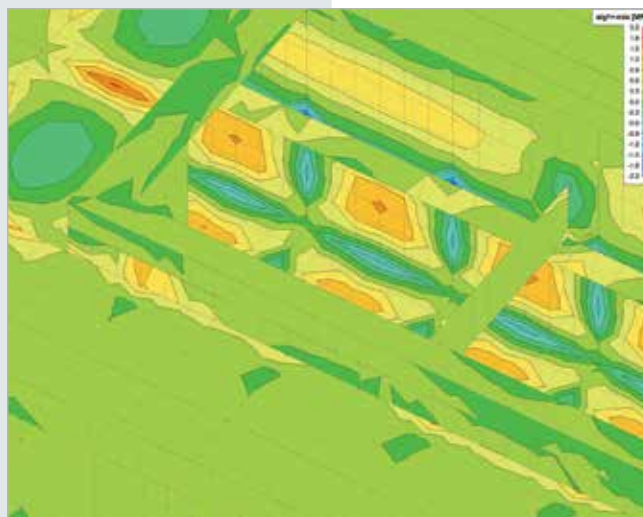
Owner ASIO, spol. s r.o., Czech Republic
Architect ing. Jiří Sládek
General Contractor ASIO, spol. s r.o., Czech Republic
Engineering Office Jaroslav Pražan, Plastic Structures Design
Construction Period 08/2009 - 09/2009

The purifying technology is based on the collection of biomass from the water surface and separation of biomass particles on a mechanical filter. The biomass contains a large quantity of nutrients that would otherwise settle in the form of organic compounds in the bottom sediment. This technology does not add any foreign substances to the water and the entire principle is very environmentally friendly.

Dimensions: length 12 m, width 2.4 m, height 2.38 m.
 Material Polyethylene PE100.

The boat geometry was modelled using plate and shell elements. The iterative process was used to determine the loading equilibrium state, with zero reactions, corresponding to a floating boat. The iterative nonlinear incremental indirect stability analysis followed and it proved the dimensions of the boat construction.

The main challenge was the iterative calculation of the equilibrium state and the indirect incremental nonlinear stability analysis. The preparation of the documentation was easy and productive thanks to the integrated Engineering Report.



Jaroslav Pražan

Contact Jaroslav Pražan
Address Podlomní 4
 636 00 Brno, Czech Republic



An engineering office specialized in the field of the plastic and fibreglass materials applications in the different types of structures. Almost 30 years of experience, hundreds of realized projects and expert analysis – under and above ground bins and tanks, septic tanks, reservoirs, basins and containers, pipelines for chemicals, liquids, gases, water and sewage water treatment and special plastic structures used in different industrial sectors.

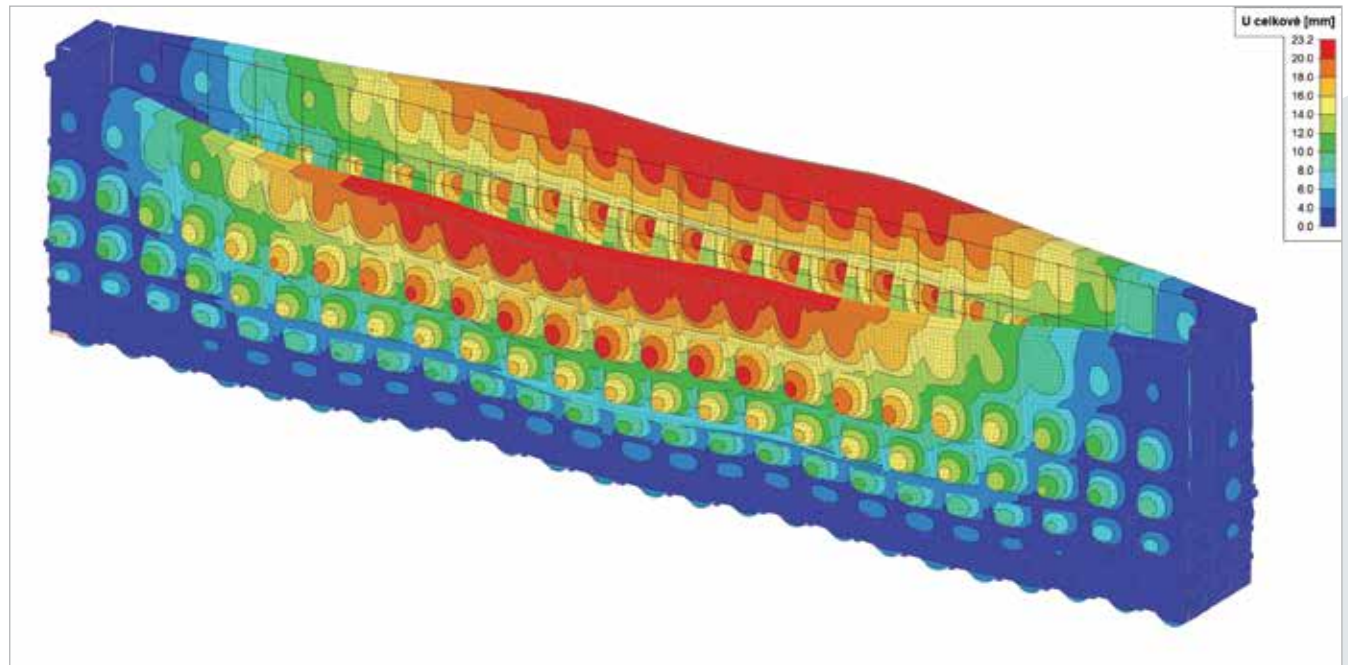
Polyethylene Plastic Tank with Steel Cage - St. Petersburg, Russia

Owner Techpribor, Russia
Architect Jaroslav Pražan
General Contractor Aquacomp Hard s.r.o., Czech Republic
Engineering Office Jaroslav Pražan, Plastic Structures Design
Construction Period 11/2013 - 12/2013

The structure is a part of the galvanic line. Tents of the tanks are grouped in the line together, used in the aeroplane parts production. The tank dimensions are: length 14.97 m, width 1.75 m, height 3.65 m.

The relatively complicated model was easily created using the modelling capabilities of SCIA Engineer. Free loads enabled us to apply the tank loading and the analysis of hundreds of thousands of equations was solved in hours.

The main challenge of this type of structures is repeated geometrical nonlinear analysis which must be used as an indirect method for finding the critical stability load factor because the polyethylene material requires us to take into account the 2nd order effects and the linear stability is not sufficient. Here the very fast problem solver included in SCIA Engineer is the key to the successful analysis and is very appreciated.

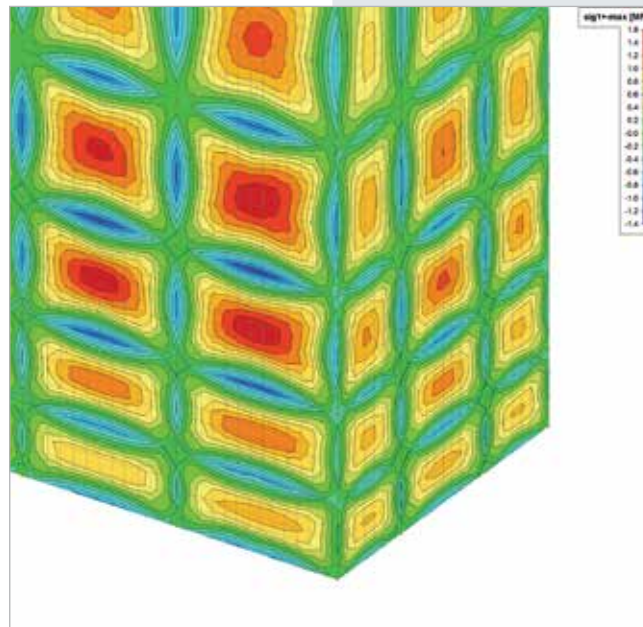


Jaroslav Pražan

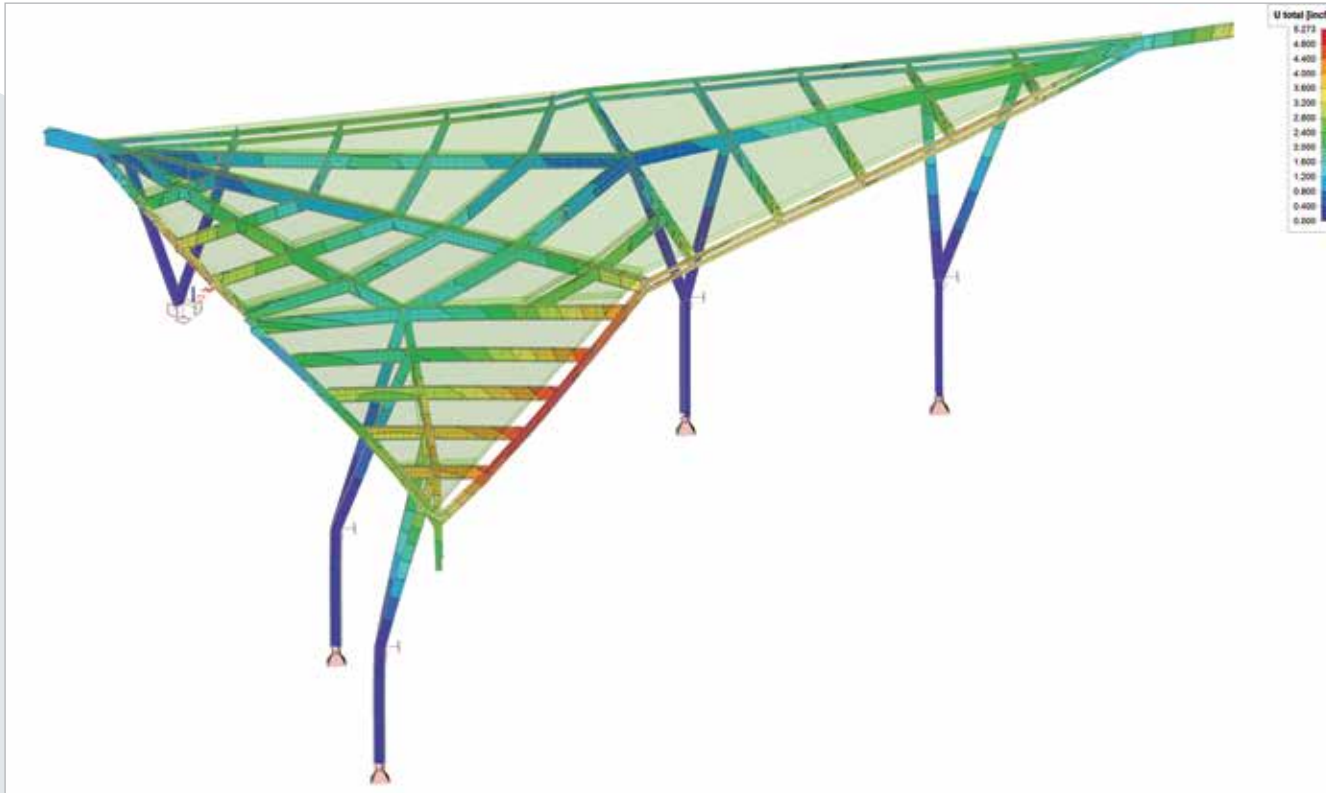
Contact Jaroslav Pražan
Address Podlomní 4
 636 00 Brno, Czech Republic



An engineering office specialized in the field of the plastic and fibreglass materials applications in the different types of structures. Almost 30 years of experience, hundreds of realized projects and expert analysis – under and above ground bins and tanks, septic tanks, reservoirs, basins and containers, pipelines for chemicals, liquids, gases, water and sewage water treatment and special plastic structures used in different industrial sectors.



Jane Sanders Softball Complex - Eugene, Oregon, United States

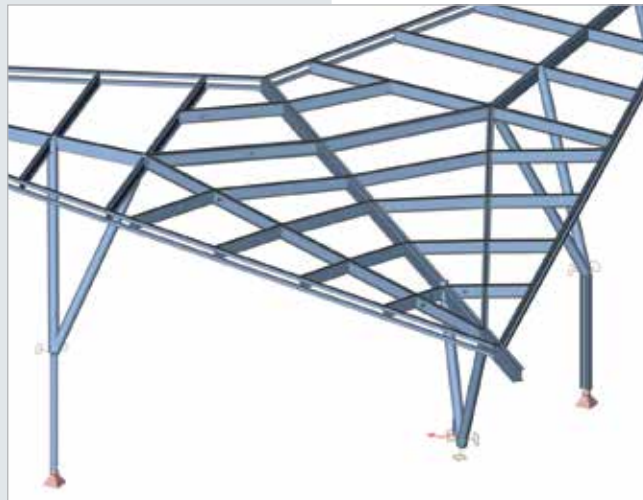


Owner University of Oregon
Architect SRG Partnership
General Contractor Howard S Wright
Engineering Office KPFF Consulting Engineers
Construction Period 06/2015 - 03/2016

The University of Oregon received a donation for new facilities for the women's softball team. The campus is well known for athletics and many of the men's teams have recently constructed world-class facilities. The new softball facilities for the top-10 Division 1 ranked Oregon Ducks needed to rival the other stadia and buildings on the campus.

The team of engineers and architects set out to determine the shape and extent of the roof structure. Once this was determined, the engineering team was given a series of five points at the concourse level from which the roof could be supported. From there KPFF determined an optimal column layout and configuration of roof beams. The structure is in a high seismic zone and a number of lateral analyses were carried out to determine whether the large structure - measuring more than 100 feet from "tip to tip" of the wing - would be stable in the event of an earthquake. Wind loads were also carefully considered, as the structure is shaped like an aeroplane, leading to concerns that it might want to "lift" off its supports.

Construction of the canopy roof was also a major consideration. To meet the tight schedule requirements, the canopy would be fabricated in the field and lifted into place. The engineers and contractors considered lifting in two pieces and designed the roof structure for this, but in the end, it was determined that lifting in one piece - including the roof decking - was more efficient.



KPFF Consulting Engineers - NYC

Contact Andrea Hektor
Address 299 Broadway
 Suite 820
 10007 New York, United States
Website www.kpff.com



KPFF Consulting Engineers is a multi-office, multi-disciplinary engineering firm that provides a wide variety of engineering services to the design and construction industry in both the United States and abroad. Services include structural engineering, civil engineering, construction management, project management, surveying and a variety of speciality engineering services. Significant broad-based experience provides us with the ability to solve the most difficult and challenging problems. We have built a reputation as creative and innovative engineers who are focused on a high level of client service and excellence in everything we undertake.

US Embassy Compound - Maputo, Mozambique

Owner US Government - Department of State
 Architect Allied Works Architecture & Yost Grube Hall Architecture
 General Contractor Pernix Construction
 Engineering Office KPFF Consulting Engineers
 Construction Period 07/2016 - 01/2019

This project contains numerous speciality elements, including roof trellises with unusual shapes and supports and a series of three-dimensional façade elements appended to the main office building that are configured to act as screening elements and, which vary in size and shape. Both the trellises and the façade elements will be fabricated from ultra-high performance concrete (UHPC), which does not require traditional steel reinforcing bar. This material is used to minimize the thicknesses of these elements and to enhance element durability to meet the US government 100 year design life for buildings internationally.

Early in the project the façade was an integral part of the exterior structure of the building and supported gravity loads. SCIA Engineer was used to analyse this structure for typical gravity and wind loads and for analysis under progressive collapse situations in which a portion of the exterior wall is removed, as would occur under a severe blast event. During the construction documentation phase, this wall was pulled off the building due to constructability concerns in southern Africa. The façade elements were then analysed for hurricane-force wind loads and gravity loads.

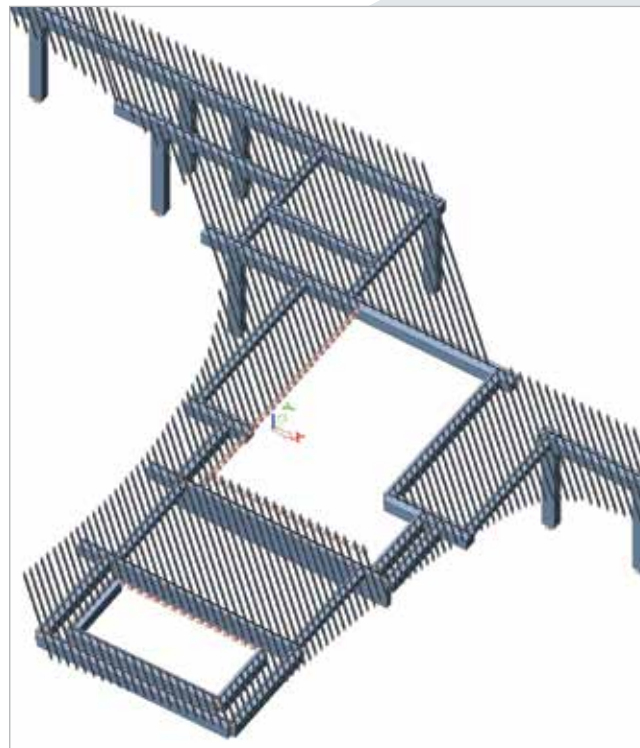
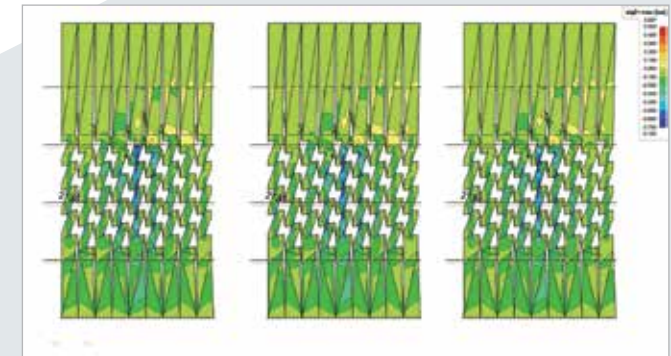
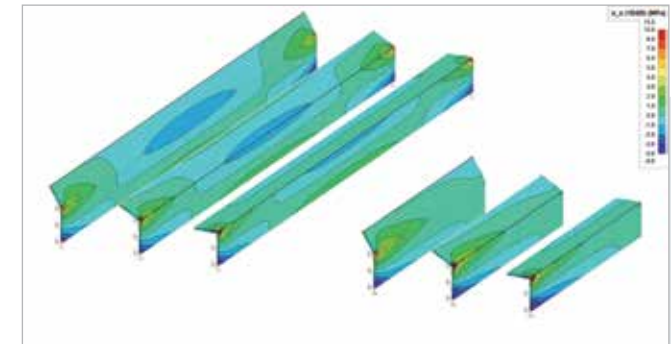
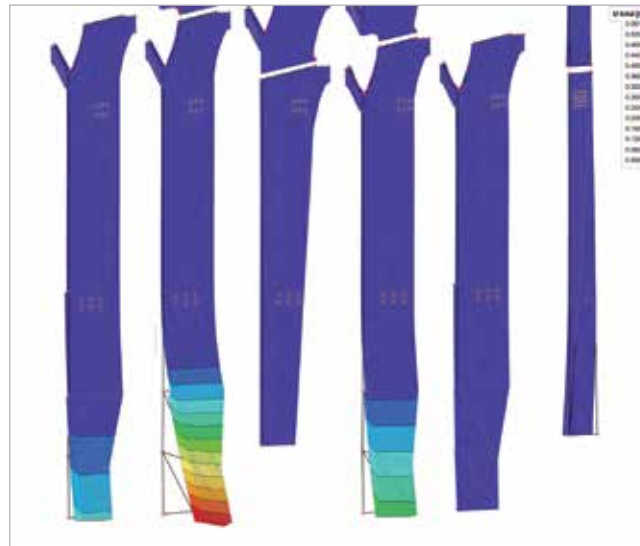
The trellis elements will also be made of UHPC. SCIA Engineer was utilised to verify the stresses due to their unique and changing shape and was used for analysis of each unique roof. A multitude of various cantilever conditions and backspans made SCIA's load panels and CAD import invaluable.

KPFF Consulting Engineers - NYC

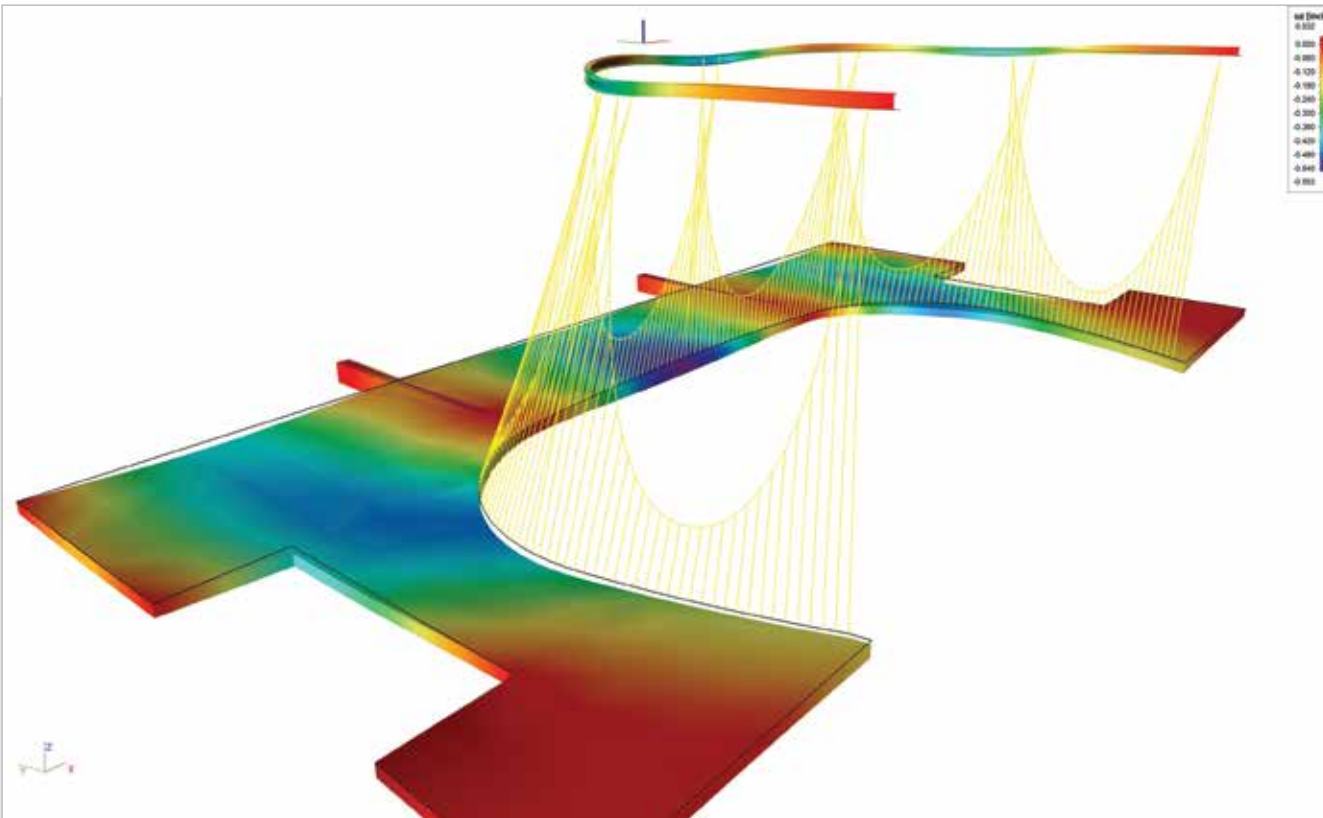
Contact Andrea Hektor
 Address 299 Broadway
 Suite 820
 10007 New York, United States
 Website www.kpff.com



KPFF Consulting Engineers is a multi-office, multi-disciplinary engineering firm that provides a wide variety of engineering services to the design and construction industry in both the United States and abroad. Services include structural engineering, civil engineering, construction management, project management, surveying and a variety of speciality engineering services. Significant broad-based experience provides us with the ability to solve the most difficult and challenging problems. We have built a reputation as creative and innovative engineers who are focused on a high level of client service and excellence in everything we undertake.



Pacific Northwest College of Arts - Portland, Oregon, United States

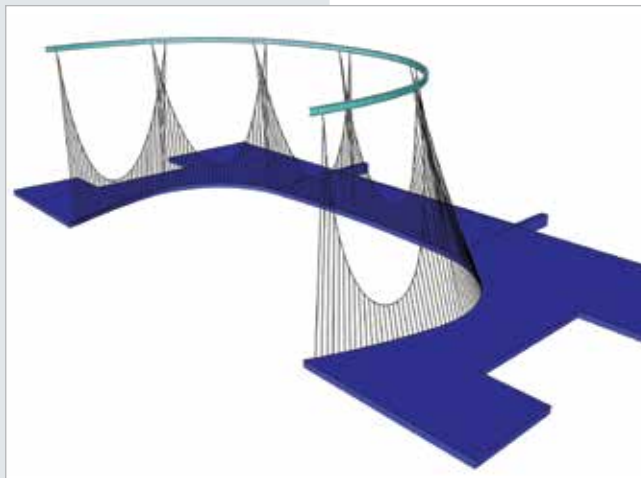


Owner Pacific Northwest College of the Arts
Architect Allied Works Architecture
General Contractor Howard S Wright
Engineering Office KPFF Consulting Engineers - Portland, OR
Construction Period 01/2014 - 01/2015

In 2015 The Pacific Northwest College of the Arts relocated from an industrial area of Portland, OR to a historic building downtown. The move required a major tenant improvement to make the building fitting for a well-renowned arts school. Part of the tenant improvement involved the addition of a new cable-supported concrete mezzanine.

The architect wanted to invoke the image of a suspension bridge with the mezzanine supports. To stay "true" to the structure the cables could not be solely an architectural element, but needed to support the curved mezzanine edge. Determining the structural loading of the cables and the subsequent optimal cable locations was challenging, as the cables follow a curved form at their top and bottom points and because of the tributary area of loading to each cable varied.

To determine the cable locations, the architect first passed a three-dimensional model with their "vision" to the engineer, this was imported into SCIA Engineer and all appropriate loads were applied. The deflected form of the model was determined and nodes were moved to their proper locations based on the loading. This revised model was passed back to the architect. When the final shape was agreed upon, the cables and supporting steel structure above were designed for their final loading.



KPFF Consulting Engineers - NYC



Contact Andrea Hektor
Address 299 Broadway
 Suite 820
 10007 New York, United States
Website www.kpff.com

KPFF Consulting Engineers is a multi-office, multi-disciplinary engineering firm that provides a wide variety of engineering services to the design and construction industry in both the United States and abroad. Services include structural engineering, civil engineering, construction management, project management, surveying and a variety of speciality engineering services. Significant broad-based experience provides us with the ability to solve the most difficult and challenging problems. We have built a reputation as creative and innovative engineers who are focused on a high level of client service and excellence in everything we undertake.

Taxi Stop - Brasília, Brasil

Owner GDF
Architect GDF
General Contractor GDF
Engineering Office Li Chong Lee Bacelar de Castro -
Engenharia de Excelência
Construction Period 01/2009 - 01/2016

Brasília is known as a city of monuments and this project of a Taxi Stop, built to be installed in four different locations in Brasília, is an inspiration of architectural design combined with masonry and steel.

The structure is divided into three main parts: the side columns and roof in steel and the foundations in reinforced concrete. The columns have an unusual shape resembling a horn. The challenge of this structure was the maintenance of the b/t / l slenderness ratio.

Moreover, the roof has the same slenderness and the shape demonstrates the light and robust steel structure. The manufacturing process of the columns counted on millimetre precision standards and the same occurred with the roof beams.

Assembled locally, the whole construction process took just twenty days.

SCIA Engineer was used for the calculation of the structure. This software has a user-friendly interface and fulfils our main challenges for the unusual column form.

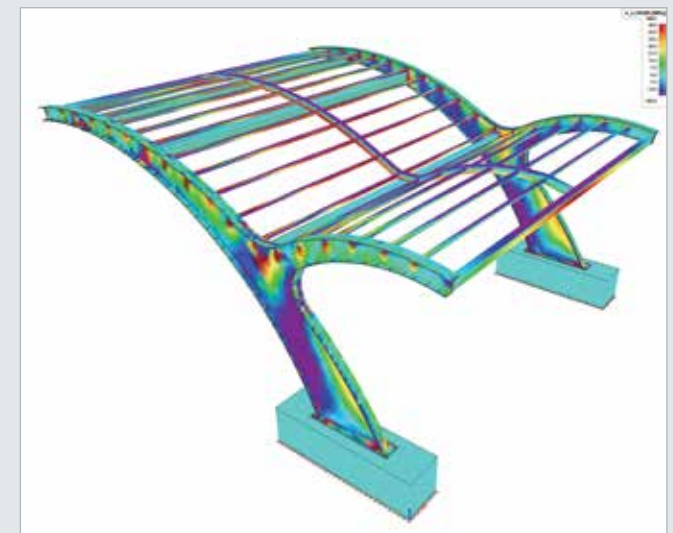
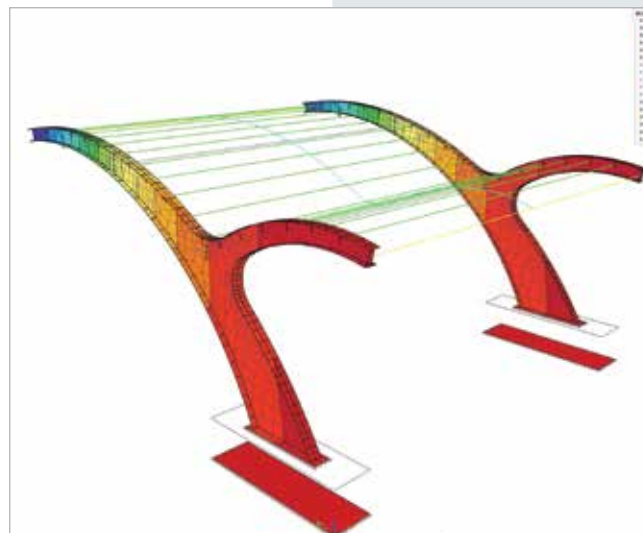
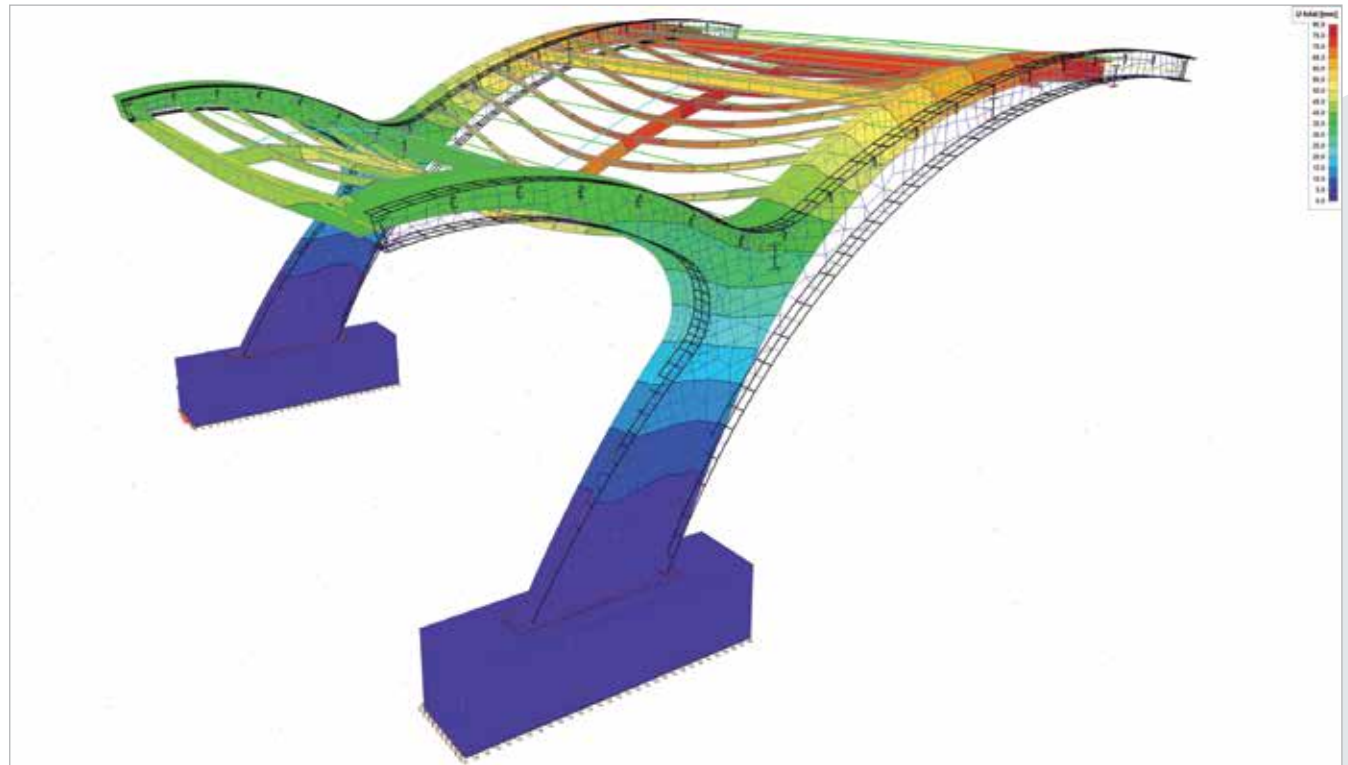
The project was finalised in time and by using Nemetschek Group software with which we had great productivity in detailing and calculation.

Li Chong Lee

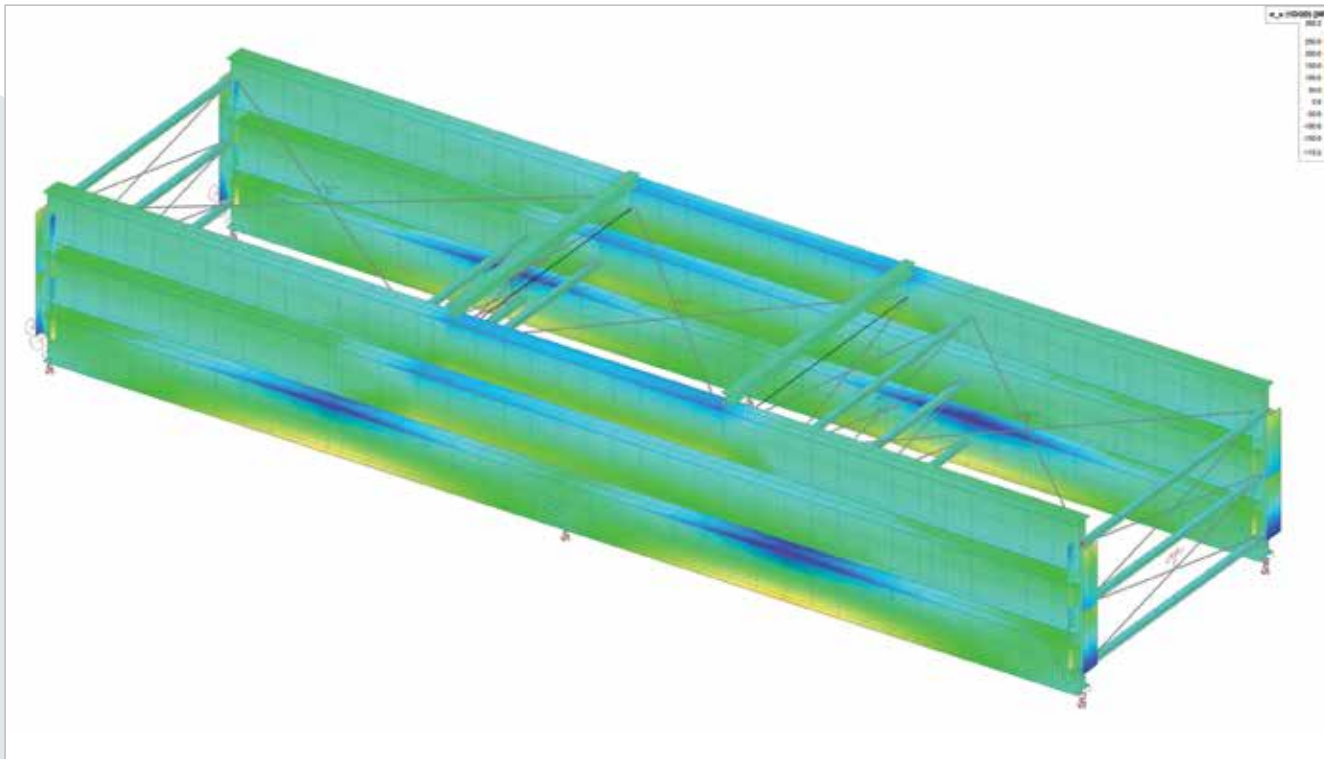
Contact Li Chong Castro
Address SQN 406 BL. MAP. 102
70847130 Brasília, Brazil
Website www.lichonglee.com.br



Since 2003, The Engineer Li Chong Lee Bacelar de Castro focuses on designing, detailing and project in addition to construction management for highly stressed, wide spanned bearing structures in steel, reinforced and prestressed concrete, wood and fibre composite materials. His activities even go underground with excavation, slope protection and specialist foundations. He knows and uses the newest methods and tools as well as national and foreign codes.



Temporary Crane Base - Paris, France



Owner SCI Acep Invest 3
 Architect Architecte Ateliers 234
 General Contractor Eiffage Construction Tertiaire
 Engineering Office Builders & Partners
 Construction Period 07/2015 - 03/2017

The A9A1 building is an office building integrated in the Paris Austerlitz Highway covering project. The worksite is located on the Pierre Mendès-France Avenue, which itself is built above the railways in its main part. Two tower cranes were equipped by a Locapal repartition frame.

One of these cranes has been particularly hard to study because it was located over a beam. The forces generated at the base of the crane were between +115 and -57 tons depending on the orientation of the boom. The infrastructure was not supposed to receive this type of material, so it has been necessary to equally distribute the load on 3 supporting lines. The crane's centre of gravity was in an offset position, requiring very precise work on the load repartitioning.

Each beam line is separated by a distance of 15 metres from the other and the final frame is 30 m long and 8 m wide, with a height of 5 m.

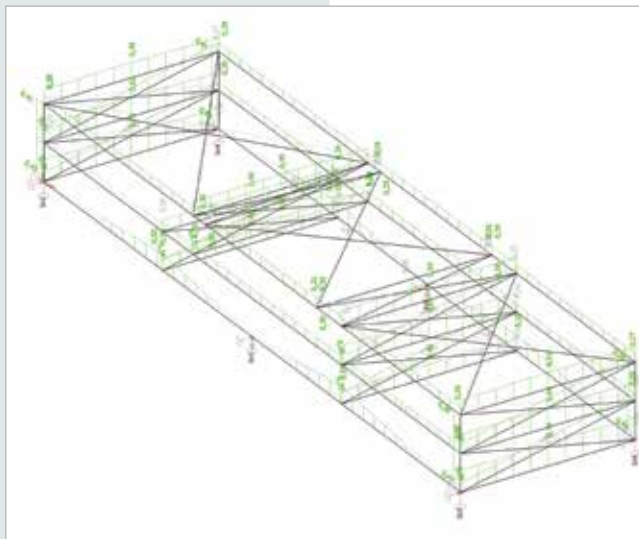
The analysis model has been realised in different steps (almost 20 stages) in order to respect the load repartitioning admissible by the structure. Three levels of PRS1300 (from Locapal) were disposed very precisely to ensure the correct load repartitioning. All these three levels have been embedded to comply with the very restrictive norms for installation of tower crane booms. SCIA Engineer allowed us to manage the different load cases (evolving with the crane orientation) by inserting nonlinear supports in very short delays.

Locapal SAS

Contact Mosnier Nicolas
 Address 344 rue Galilée
 60100 Creil, France
 Website www.locapal.fr



Locapal is specialized in non-permanent structures for civil engineering works and buildings. Locapal designs, manufactures and rents several specialized tools as formworks, provisory bridges and other metallic elements.



Gas Storage Extension - Libreville, Gabon

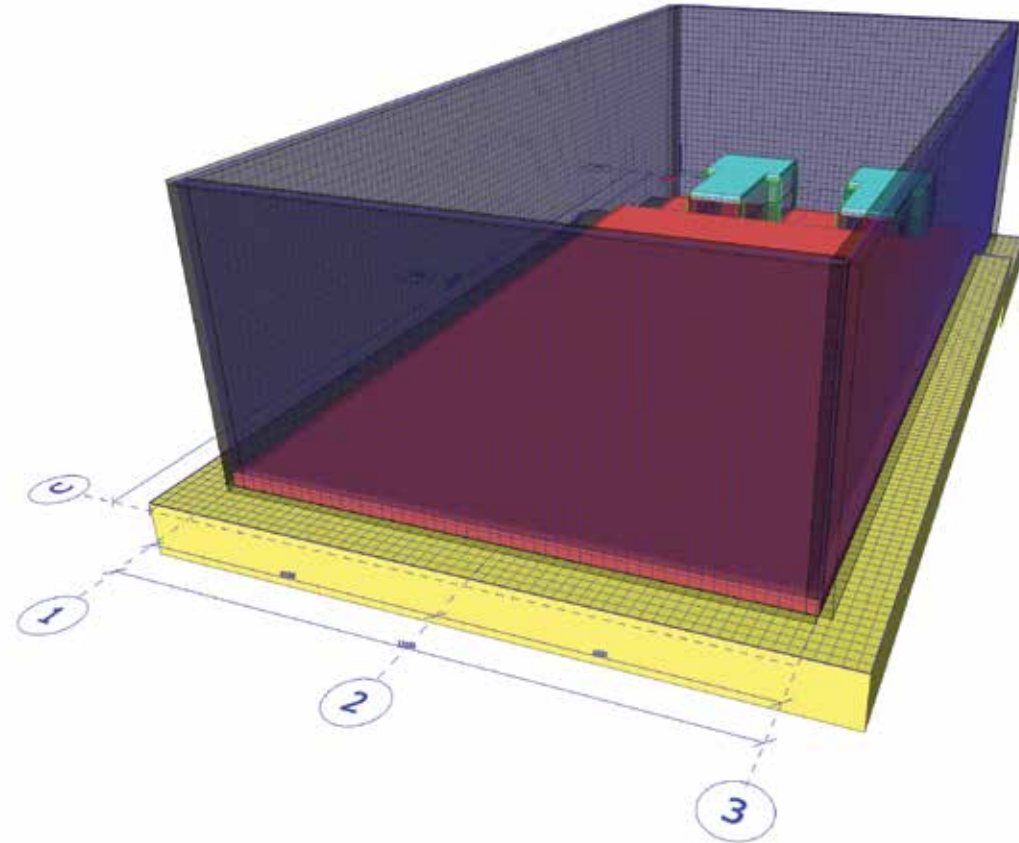
Owner SGEPP
Architect Secomat
General Contractor SOCOBA-EDTPL
Engineering Office OSI Gabon
Construction Period 12/2015 - 12/2017

In order to increase its storage capacity, the SGEPP decided to set up two additional cylinders of 400 m³ each. These cylinders are protected by a reinforced concrete sarcophagus 23.60 metres long, 13.60 metres wide and with a visible height of 6 metres. The volume of concrete used is about 500 m³.

One of the major constraints of the project was the limitation of the deflection of the cylinders, in accordance with the manufacturer's calculation design. The setting up of these cylinders was challenging as it required the use of rolling portals temporarily installed on rails.

SCIA Engineer was used to model the full FE model in plates and shells. The soil was defined using a boring hole. Then we used the Soil-in module to take into account the interaction between the soil and structure.

With the non-linear calculation, we could determine the long-term deformation of the floor slab. On the other hand, we were able to observe the zones exposed to cracks which were reinforced consequently.

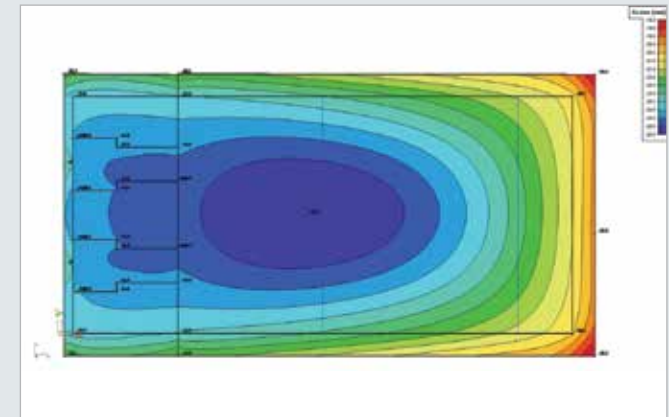


OSI Gabon

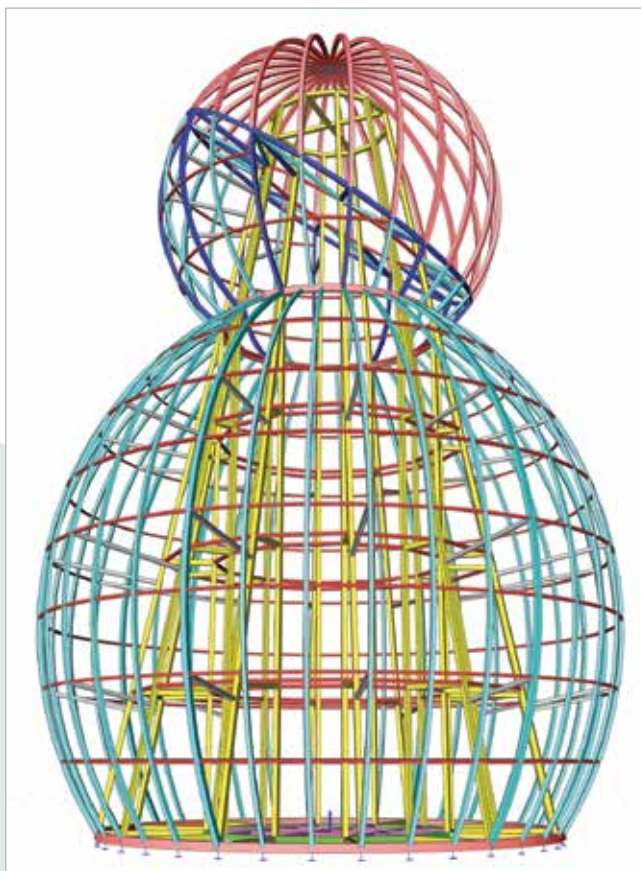
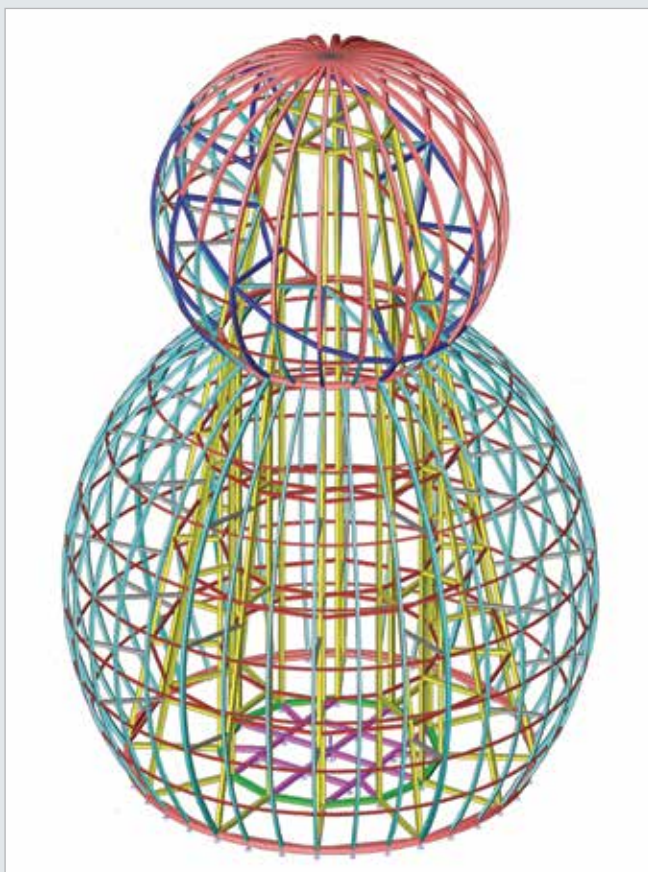
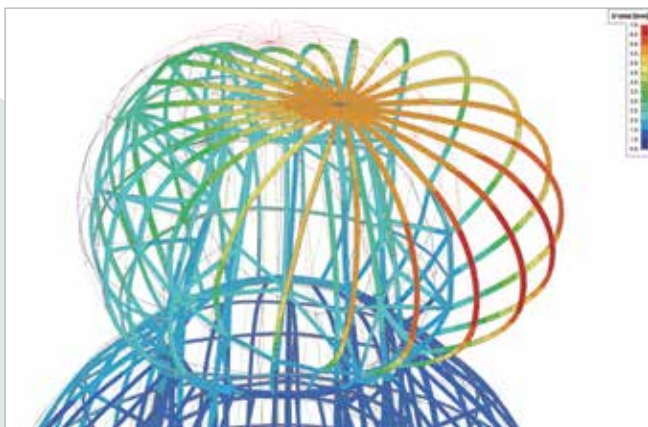
Contact Alain Madi
Address Ancien Sobraga
 11569 Libreville, Gabon



OSI is a design office established since 2005 in Cameroon. The agency of Gabon was born in March 2010. The office aims to offer an efficient service is specifically in the field of civil engineering, or in the computer field related to civil engineering. OSI skills are mainly based on the structural design (Building and Civil Works): reinforced concrete, prestressed concrete, steel construction, wood construction ... in execution and design, new construction or renovation. The advantages of OSI are based around a team of dynamic young engineers and proud to participate in the development of their country including the sub region.



Snowman - Novosibirsk, Russia



Owner S.O.S.-Dekorace, s.r.o.
 Architect Ing. Ida Kabrmová
 General Contractor S.O.S.-Dekorace, s.r.o.
 Engineering Office Atelier P.H.A. Ltd.
 Construction Period 11/2015 - 12/2015

Building geometry and structural system: The steel supporting construction for a snowman decoration is 5.0 m in diameter and a 6.6 m high.

The supporting structure was calculated in SCIA Engineer and exported to the Tekla program using the "SCIA 2 Tekla" module. The designer used the complete combination for design and fabrication of the steel constructions. For a fast feedback, the designer used the 3D export from Tekla to a browser.

The whole structure was calculated in a complete 3D-model. In this way, the total influence of all external loads can be considered and the global stability can be calculated, with the accompanying deformations, including the details of connections. The designer used the advantage of the programs for cooperation between contractor, designer and different software.

Using SCIA Engineer and Tekla programs together can help design not only civil or other commercial structures, but also unusual and funny structures like this one.

P-H-A Ateliér

Contact Michal Škoch
 Address Gabčíkova 15
 18200 Praha 8, Czech Republic
 Website www.p-h-a.cz



Atelier P.H.A. was founded in 1990. It deals with design tasks, preparation and implementation of investment projects, engineering activities and is an expert in the field of construction and real estate investments. Participation in opinions on the condition and measures taken on load-bearing structures in industrial, high-rise apartment buildings, apartment building regeneration, opinions on the impact of emergency situations - like fires and flooding - on load-bearing structures, building passports during reconstruction etc.

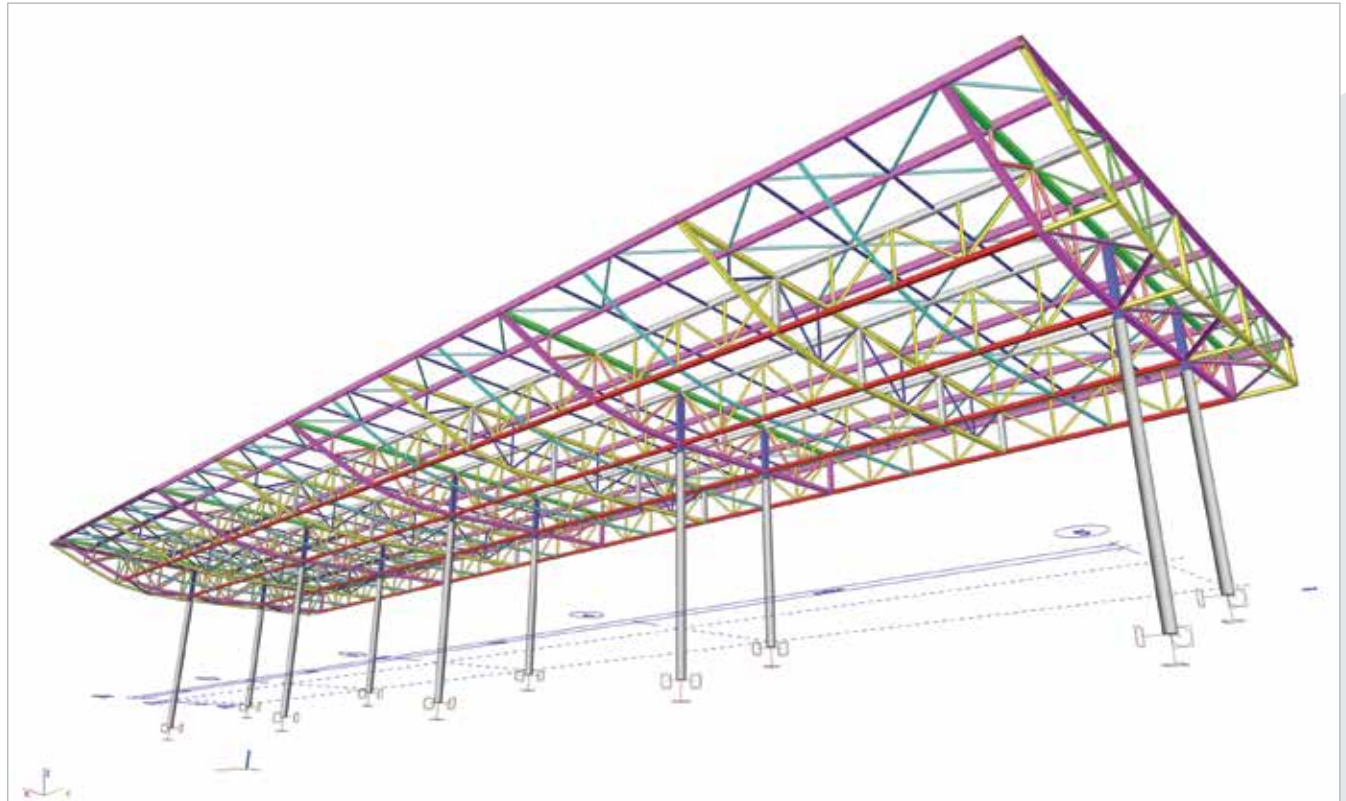
Stadium Steel Roof - Kladno, Czech Republic

Owner City Kladno
Architect Ing arch. Karel Albrecht
General Contractor City Kladno
Engineering Office P-H-A Atelier
Construction Period 09/2015 - 04/2016

Building geometry and structural system: The new roof covers the existing stage built in last century for Sokol movement athletic stadium. The new steel columns were founded on piles drilled into existing limestone gravity wall of grandstand. The new roof is made of steel spatial trusses with the span $4 \times 13.5 / 4.1$ m. The roof was cantilevered on both sides. The length of the cantilevers is 2×7.0 m.

The roof was calculated in SCIA Engineer and exported to Tekla using the SCIA 2 Tekla module. The designer used the perfect combination of design and fabrication of steel constructions. For a fast feedback, the designer used 3D export from Tekla to a browser.

The whole structure was calculated in a complete 3D-model. In this way, the total influence of all external loads can be considered and the global stability can be calculated, with the accompanying deformations, and details of connections. The total weight of the structure is 56.0 t. The bill of material calculated by SCIA Engineer was the first input for the preliminary offer to the contractor. The total price of the structure given by the developer was limited. SCIA Engineer and Tekla software helped to find the optimal structure.

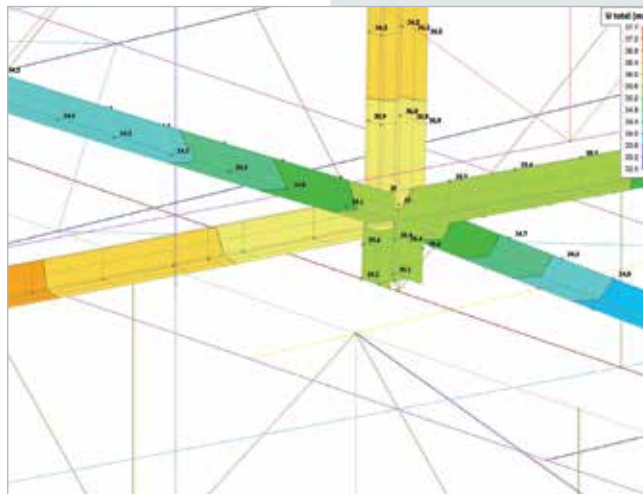


P-H-A Atelier

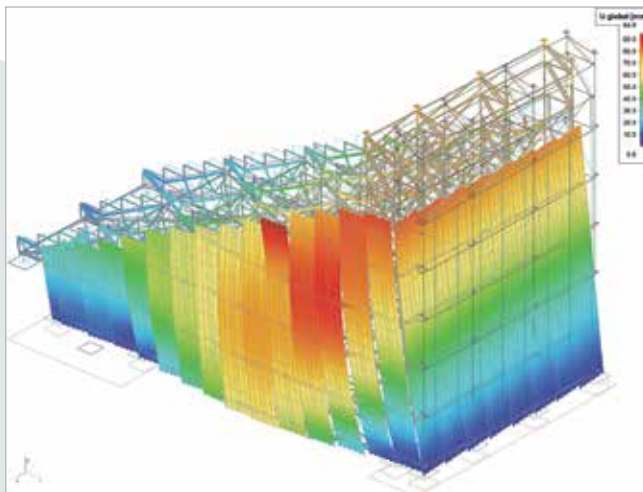
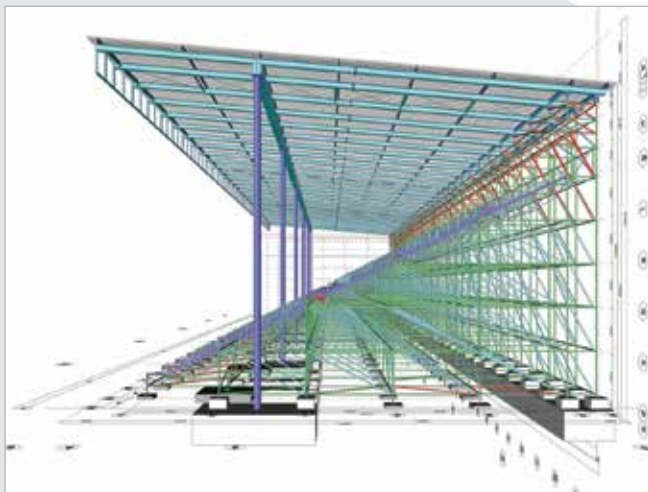
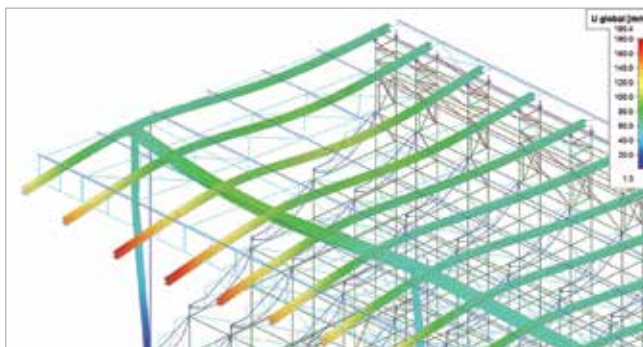
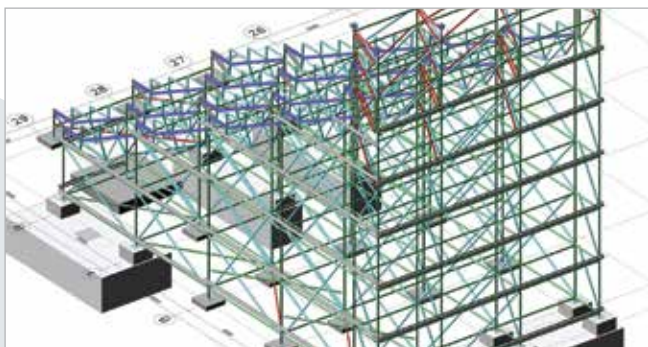
Contact Michal Škoch
Address Gabčíkova 15
18200 Praha 8, Czech Republic
Website www.p-h-a.cz



Atelier P.H.A. was founded in 1990. It deals with design tasks, preparation and implementation of investment projects, engineering activities and is an expert in the field of construction and real estate investments. Participation in opinions on the condition and measures taken on load-bearing structures in industrial, high-rise apartment buildings, apartment building regeneration, opinions on the impact of emergency situations - like fires and flooding - on load-bearing structures, building passports during reconstruction etc.



Scaffold Tribune Reinforcement - Sandhausen, Germany



Owner SV Sandhausen 1916 e.V.
 Architect INWO-Bau-GmbH
 General Contractor Dielmann Gerüstbau GmbH,
 Stahlbau Alfred Müller GmbH
 Engineering Office Ryklin STATIK
 Construction Period 05/2015 - 06/2016

The temporary Layher scaffold tribune by Soccer Club SV Sandhausen had to be disassembled, because after five years the permission to use it as a "Flying Structure" could not be extended. SV Sandhausen asked to find a solution to keep the tribune for further use. It is only possible, if the tribune complies with the obligations of the standard "Permanent Structure". That means the tribune has to withstand additional higher loads with higher safety factors and requires a new solid foundation (instead of soil anchors with ballast). Additionally, the new bigger roof and a new facade were required. After a detailed investigation of the existing scaffold and pre-calculations the order was confirmed. The tribune with new roofing and the required foundation was detailed in SCIA Engineer with Structure and 3D-Free-Modelling tools. All eccentricities and pliability's due to Layher admittance were proved in-situ and implemented in the model. The calculations and analysis were processed with the help of the SCIA Scaffold tool. To check the tribune according to the standard for permanent usage, different variants of strengthening of the scaffold structure were realised. All the overviews, elevation, execution and detail drawings were processed and created in SCIA Engineer using the appropriate Modelling and Drawing Tools. The biggest difficulty was to find the right position for the strengthening rods and plates, to adjust the new roofing to the existing scaffold and to find the fixing solution for the new facade. The required permission as a permanent structure was given and the tribune is in use.

Ryklin Statik

Contact Sergej Ryklin
 Address Liselottestrasse 17
 69123 Heidelberg, Germany
 Website www.ryklin.eu



Planning and optimization of Steel, Aluminium, Solid, Composite, Timber and Membrane Structures.

More than 1300 different projects processed, a. o. residential and industrial buildings, park decks, pedestrian bridges, swimming pools, silos, membrane coverings etc. for Daimler AG, John Deere AG, SAP AG, DB AG, Siemens AG, Henkel AG, BASF AG, Bridgestone AG, Roche AG, IKEA AG, ENBW and a lot of private clients.

The Philosophy of the Company is to offer the flexibility in planning due to integral 3D-Design with ability for finding feasible and low-cost solutions already on the draft stage.

MUSE Apartment and Office Building - Metz, France

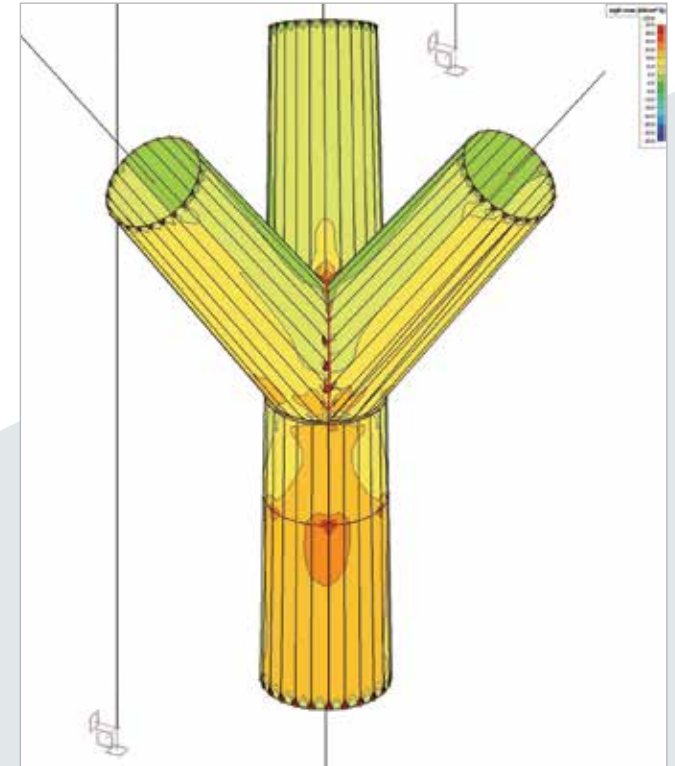
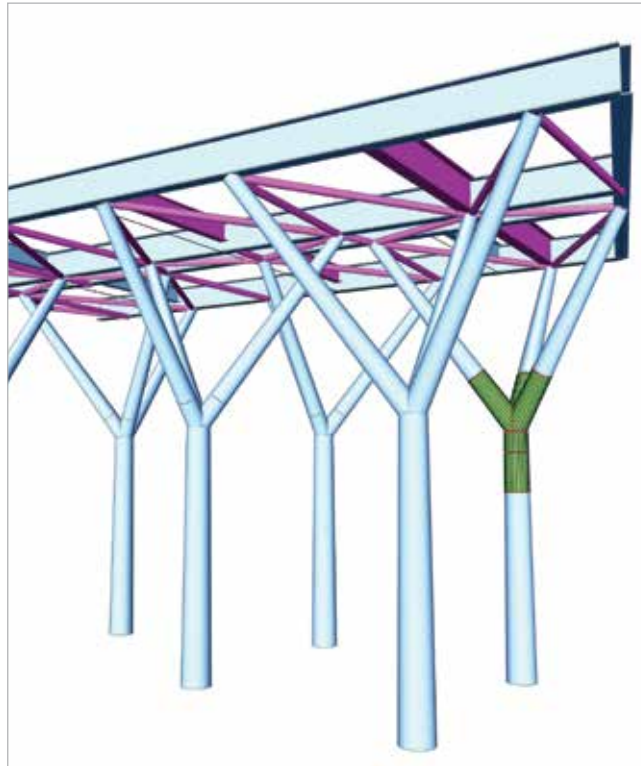
Owner Apsys
Architect Agence Jean-Paul Viguier et Associés
General Contractor GTM Hallé
Engineering Office EDEIS
Design Office Schroeder & Associés
Construction Period 12/2014 - 10/2017

The building FIRST is a part of the MUSE project in Metz. The FIRST will be used as an apartment and office building, in the new MUSE dynamic district located close to the main train station. It's a four floor concrete building supported by six tree steel columns. As the building faces the famous Museum "Centre Pompidou", the architect wanted a strong architectural concept for the FIRST to face the Museum. The building size is about 25 x 15 m and the steel trees are about 14 metres high.

The model geometry was imported from a DXF file provided by the client. Then the beams, hinges, support and loads were introduced. 3D export to DXF and PDF was used for transmit sketches of the results, such as column displacement and reactions. For the analysis of the behaviour of the structure we used the deformed structure results. In fact, by using a relatively big scale factor, this tool shows how the structure deflects and helps to target the critical points

The critical part of this project was the main node of the three branches. To solve this issue, 2D elements were used to analyse all the displacements and constraints. This was done with rigid cross links to connect the 1D column element to the 2D stiffeners and shell elements.

The very large document possibilities allowed us to produce the calculation sheet and the transmission of information between the project parties.



Schroeder & Associés

Contact Faiza Benyahia
Address 8, rue des Girondins
 1626 Luxembourg, Luxembourg
Website www.schroeder.lu

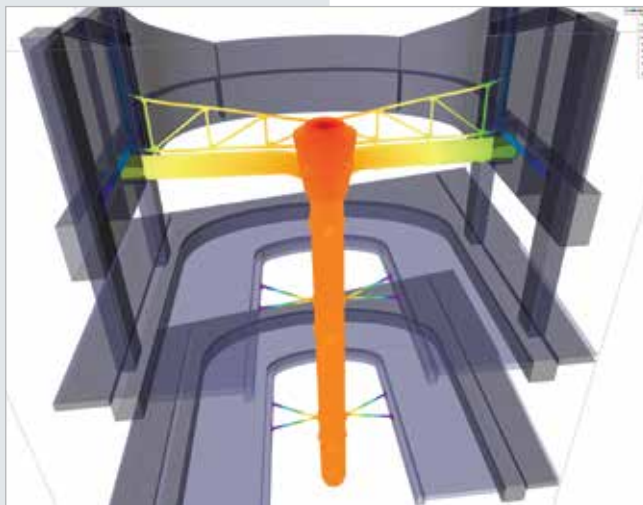
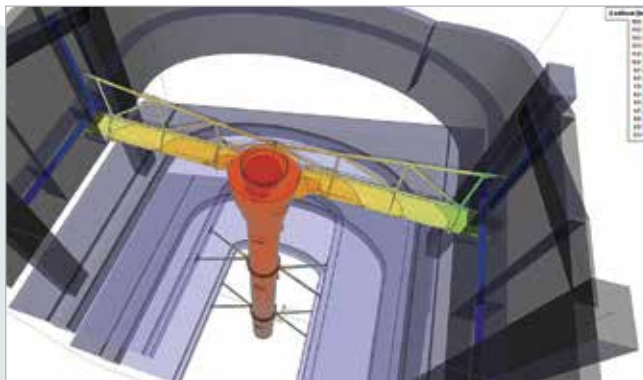
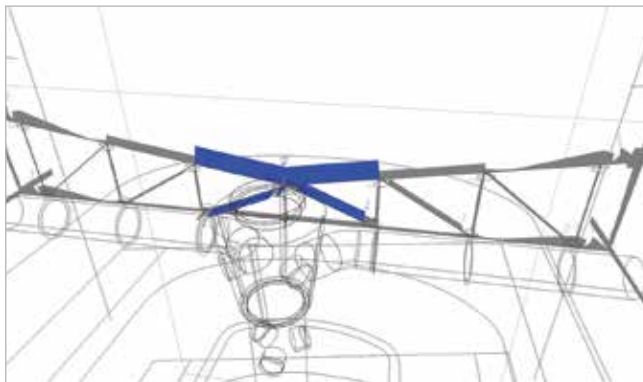
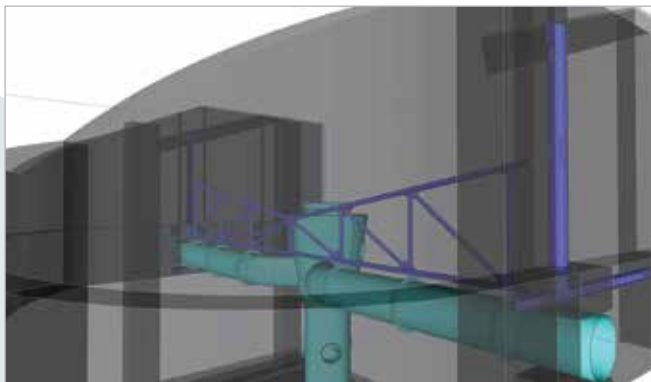


The engineering office Schroeder & Associés, founded in 1961, operates in four fundamental departments: building and structural engineering, road system, networks, urban and landscape design. Relying on its more than 50 years of experience and 288 employees, as well as on foreign specialised partners, the office offers its services, experience and know-how to its customers.

The challenge consists in providing activities answering the demands of the customers and increasing their satisfaction by completing the missions in an effective way.



Steel Structure as Base for Art - Hradec Králové, Czech Republic



Owner The Gallery Of Modern Art In Hradec Králové
Architect Ing. Arch. Pavel Tušíl
General Contractor S T A K O společnost s ručením omezeným
Engineering Office Skála & Vít s.r.o.
Construction Period 11/2014 - 12/2016

The steel structure is installed in the building of the Gallery of modern art in Hradec Králové. The structure is assembled from AHU piping with 1.5 mm thickness and the truss with span of 7.7 m and a height 1.1 m. The shell of piping is going through three levels and its length is 10.5 m. All is embedded in a concrete structure of the building from 1920s, which was completely reconstructed.

SCIA Engineer was used for linear static analysis of the static model assembled from members, plates and shells and for the construction model of the existing building. The members in the structure were completely designed by the SCIA Engineer steel module, the tension in steel shell was evaluated in the postprocessor. The general arrangement drawings with connection details were made in the Engineer Report.

The surface of the structure was used as a "canvas painting" for the painter Aleš Lamr. An exhibition of his paintings was part of the opening ceremony of the reconstructed gallery. This structure is an example of a connection between a steel construction and modern art.

Skála & Vít, s.r.o.

Contact Vladimír Ferkl
Address Opletalova 328
 50003 Hradec Králové, Czech Republic
Website www.skala-vit.cz



SKÁLA & VÍT, s.r.o. Design and Construction Office was incorporated in the Commercial Register on January 21, 1998. However, our activities date back to June 1997 when the company founders executed their first projects. The company specializes exclusively in steel construction and building sheeting.

We are the design and construction office which produces documentation with a strong focus on actual customer's needs, while taking future consequences into account and trying to minimize both their present and future capital expenditures - all this is thanks to the highest commitment of all members of our team.

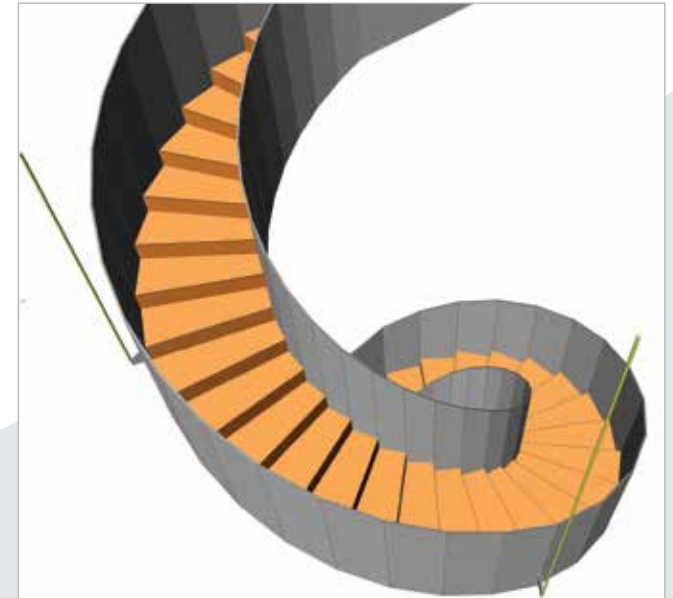
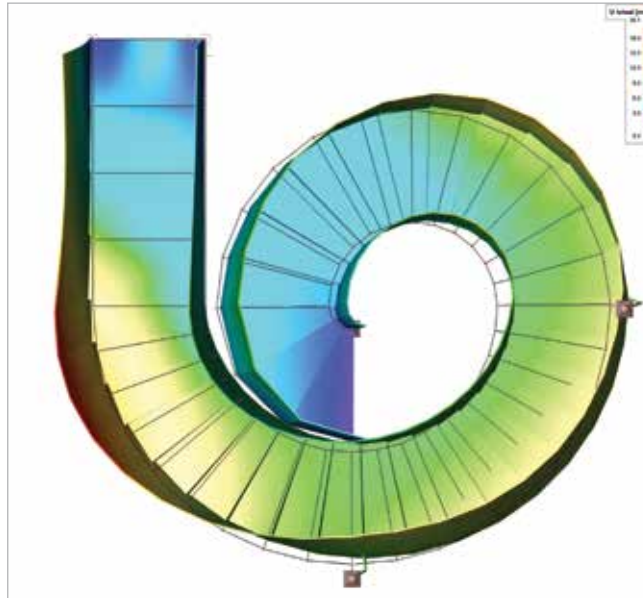
Mediahuis Staircase - Antwerp, Belgium

Owner *Mediahuis NV*
Architect *ELD Architects*
General Contractor *Eestairs BE nv / Building Group Jansen*
Engineering Office *Snetselaar Constructieve Ingenieurs*
Construction Period *2015 - 2016*

The project presents a staircase for a client that specialises in extraordinary staircases. The staircase looks from above like a helix with a variable width. The staircase is built from steel plates and finished with wood on the inside and EeSoffit underneath.

SCIA Engineer was used to design the steel plates that form the staircase. In this project, the standard SCIA functionalities were employed. The project started by importing an IFC file and DWG drawing from the architect. This imported shape was used to model the structure in SCIA Engineer. The difficulty of this project lays in its shape. With the import of an IFC model the shape became a lot easier to model.

The challenge in this case was obviously the shape of the stairs. When that was tackled, it was very clear to understand how the structure deforms. The first results showed that the deformations were too large. Therefore, 2 cables were added to hang the stair to the edge of the floor above. This results in a stiff structure that is capable of bearing the loads of daily use.



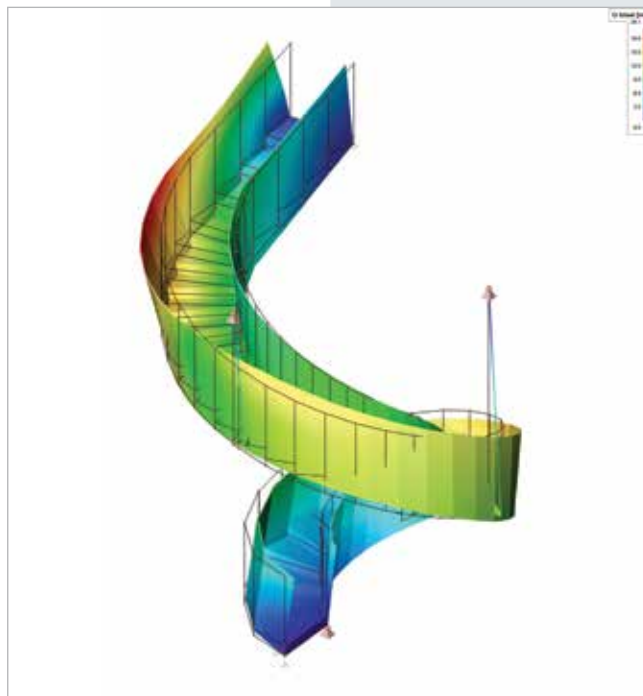
Snetselaar Constructieve Ingenieurs

Contact *Michel Garssen*
Address *Galileilaan 36
6716 BP Ede, Netherlands*
Website *www.snetselaar.nl*

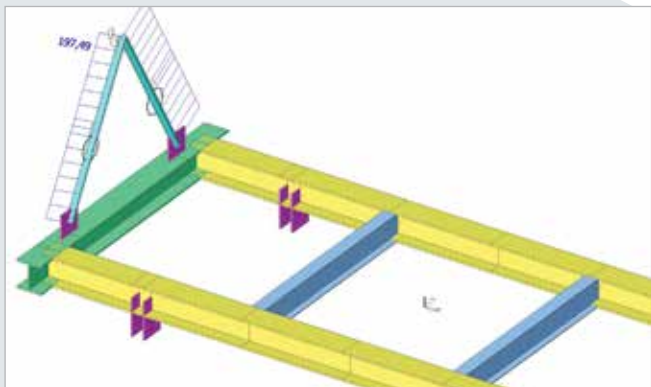
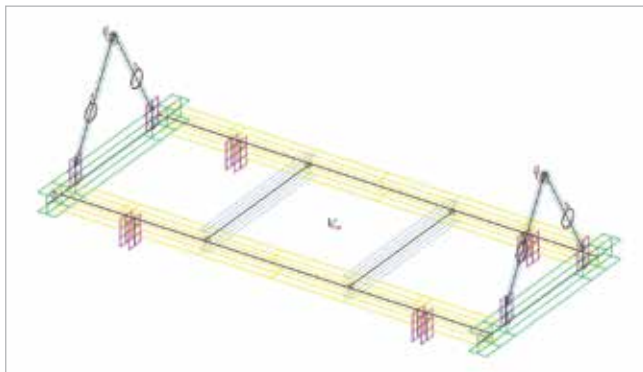
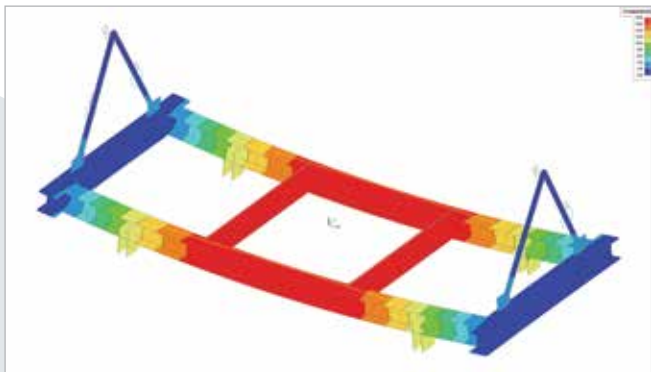


Snetselaar Constructieve Ingenieurs BV is an international independently operating engineering office with almost 20 years of engineering experience. Our agency is characterized by short communication lines between the client and the engineer. Our Engineering Team makes the difference by giving practical advice.

With our team of over 20 engineers and engineering draftsman, we offer the following service: the design, engineering and drawing of constructions (full 3D BIM). We are active in the following fields: buildings, industry infrastructure, civil structures and many more.



Hoisting and Displacement of 63-ton Machine - Kortrijk, Belgium



Owner *Ferromatrix NV*
 General Contractor *Snoeck Gebrs NV (Steel),
 Transport Vandendorpe (Hoisting)*
 Engineering Office *Snoeck Gebrs NV*
 Construction Period *04/2017*

The purpose of this project is to provide maintenance for a machine with a total weight of 63 tons. In order to realise this, the machine needs to be lifted from its sub-level position and transported all the way across a production hall. Two 40-ton hoisting cranes are present in this production hall, but are physically separated by a wall in order to avoid hoisting simultaneously together in the same zone. However, in order to complete the lifting operation, this wall had to be removed and the hoisting cranes were both needed.

In the first SCIA Engineer model, the effect of the hoisting on the guiding beams of the hoisting cranes was checked with the help of the mobile loads feature. This quickly proved that a hoisting frame was necessary in order to increase the distance between the occurring loads and spread the effect of them along these guiding beams. Furthermore, the rest of the existing hall structure was checked, taking into account these resulting hoisting loads as well as global effects from permanent loads and wind. After this check, the hoisting frame itself was dimensioned in a separate model.

Because of the extensive checks in SCIA Engineer, the lifting process went perfectly and no problems were encountered during the whole lifting and transportation operation.

Snoeck Gebrs NV

Contact *Steven Nachtergaele*
 Address *Hooiemeeersstraat 10
 8710 Wielsbeke, Belgium*
 Website *www.snoeckgebrs.be*



Snoeck Gebrs NV is specialising in the production and assembly of steel constructions for industrial buildings and for the agricultural sector.

The state-of-the-art production workshop is certified in accordance with EN 1090-2 up to and including execution class III. The company also offers the expertise of its own engineering and drawing office.

By being an autonomous part of the larger Willy Naessens Group, Snoeck Gebrs NV can also anticipate on a wide range of prefabricated concrete elements, being able to provide a complete package for its customers.

Electrical Power Tower - Netherlands

Owner *Tennet*
 General Contractor *SPIE*
 Engineering Office *SPIE Controlec Engineering*
 Construction Period *01/2016 - 03/2016*

Upgrade of a power transmission tower for extra mobile devices.

The power transmission tower is a big supporting structure that transports energy from electrical power plants to distribution cabinets, or connects different power line networks.

There are different types of power transmission towers: start or termination tower, transposition tower and line deviation towers.

The power transmission towers are also used to install mobile antenna devices to create a mobile distribution network. To install these devices in a power transmission tower, the tower itself has to be upgraded to be able to house these extra items. The power transmission towers were mainly designed in the 1960s and 1970s. The power tower of our project has the height of 44.2 m and the base of 11.6 m x 11.6 m.

The SCIA Engineer model is a truss model. All members are hinged connected. The loadings (wind, icing, cable tension of the power lines) on the power transmission tower are designed according to the NEN-EN 50341-3-15, and also the loading combinations are according to this code.

The output of the calculation is used to verify the capacity of the foundation. Moreover, the verification of the old NEN1060 code was done to check the overcapacity of the structure.

SPIE Controlec Engineering

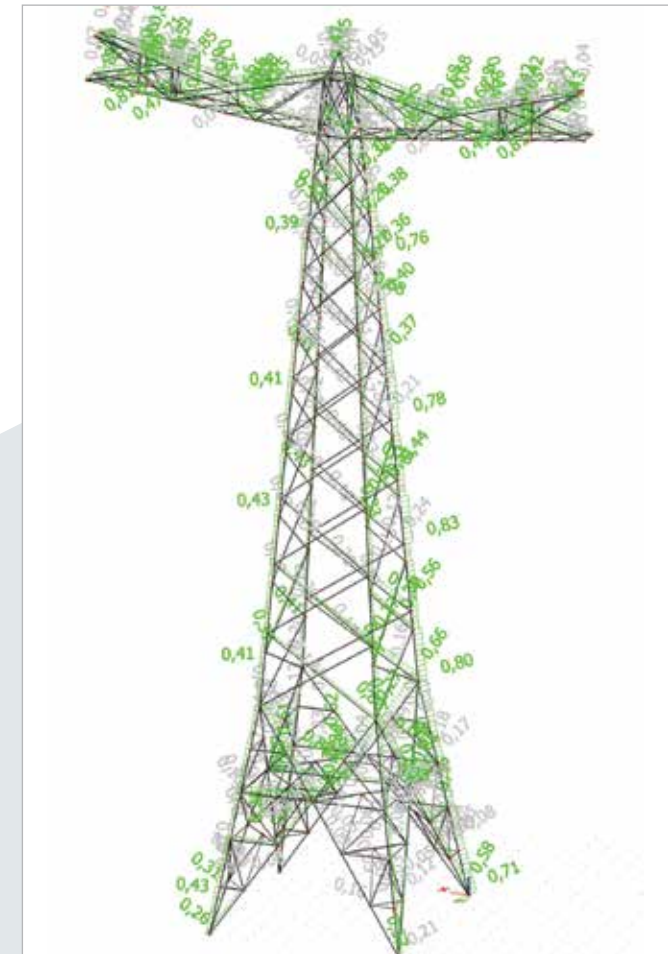
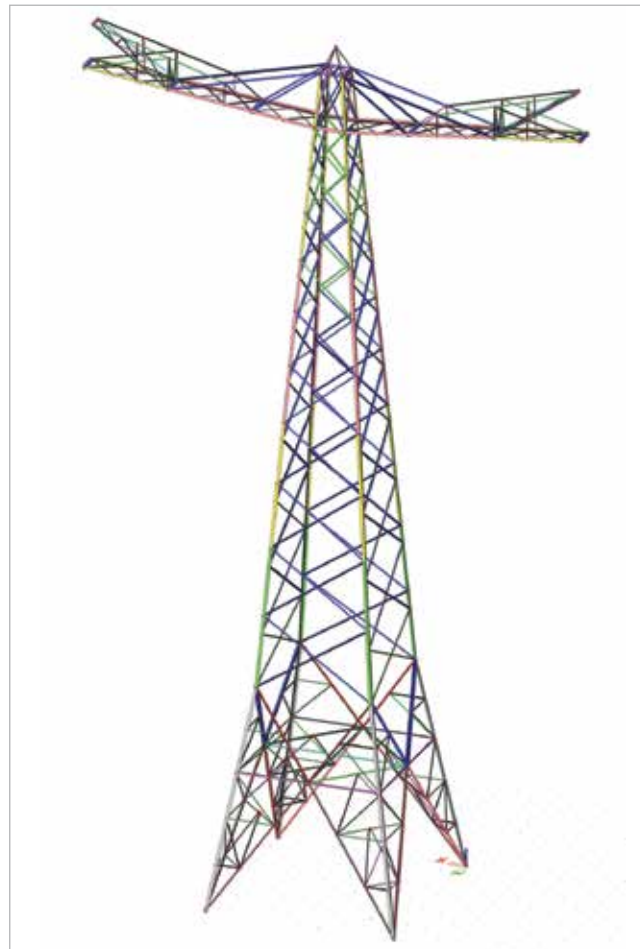
Contact *Geert D'Hollander*
 Address *Innovatieweg 12
 4542 NH Hoek, Netherlands*
 Website *www.spie-nl.com*



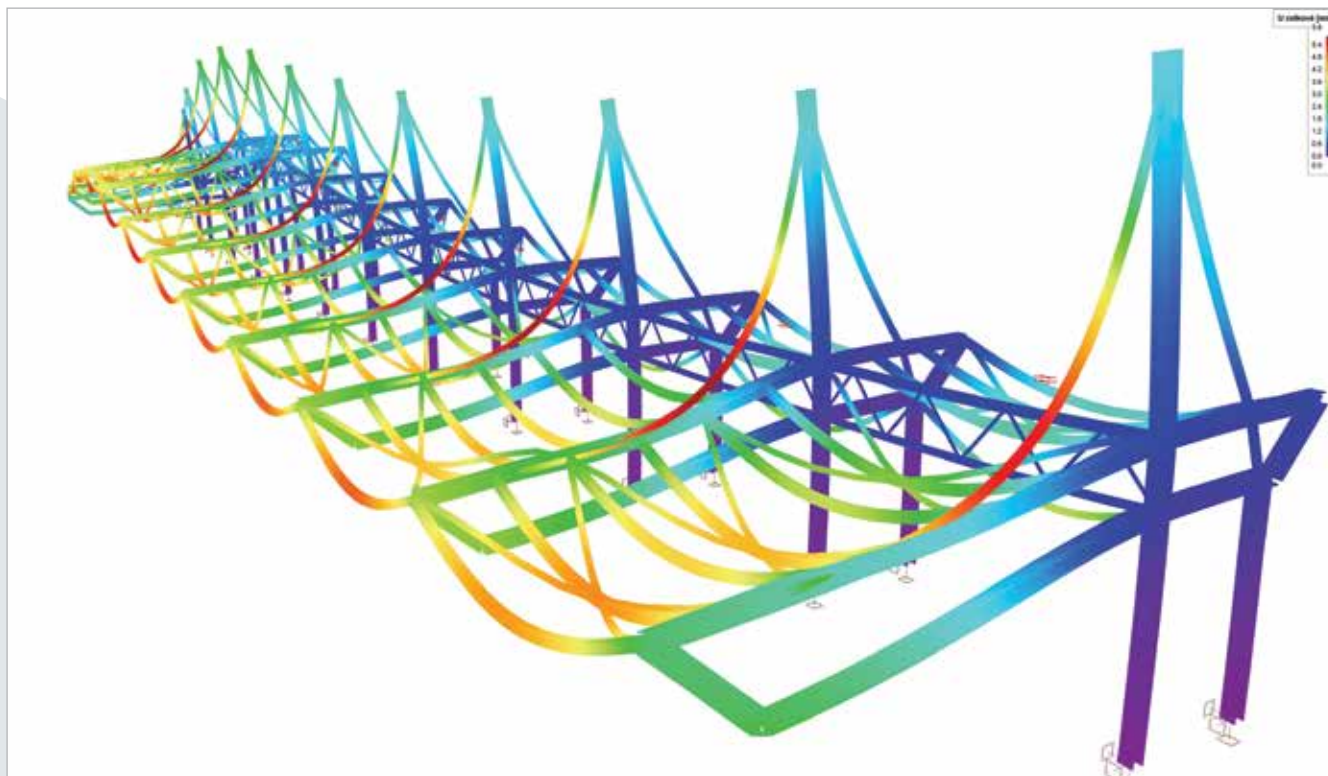
SPIE-Controlec Engineering is an independent, multidisciplinary engineering and consultancy company specialising in front-end, basic, and detail engineering, procurement, project and construction management and is a member of the SPIE group.

From start to finish, we support our clients' implementation of their projects by applying state-of-the-art know-how, years of experience and a flexible approach to projects.

We have specialized engineers in the following fields; process, piping, mechanical, civil/structural, electrical, instrumentation and process control.



Football Stadium Grandstand Canopy - Athens, Greece



Owner *ELPEN S.A.*
 Architect *Elastic Architects - Alexandros Ksenos, Ria Vogiatzi*

Engineering Office *T.E. Consulting Engineer*

Construction Period *02/2016 - 12/2017*

Commissioned by Elpen S.A., a pharmaceutical company, this huge project includes a sports centre, a conference centre and a research centre. A design team formed by Elastic Architects worked to shape this idea. This structure constitutes the canopy of the football stadium grandstands. The dimensions of this canopy are about 61 m x 10 m and the maximum height is around 14 m.

The structure has an intricate geometry composed of curved members. SCIA Engineer was used to create a 3D model of this complex structure. First, the stability analysis was performed to calculate the α_{cr} factors. The next step was the linear and non-linear analysis, including global imperfections, using the buckling shapes determined by the stability analysis. The seismic design followed, as well.

It was a challenge for us to model the geometry of the canopy exactly and maintain the architect's idea.

T.E. Consulting Engineer

Contact *Lefteris Tsolakis*
 Address *Soudas Av. 23, Crete, Chania*
73200 Chania, Greece

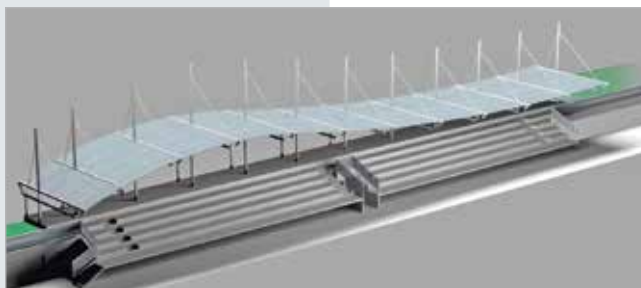
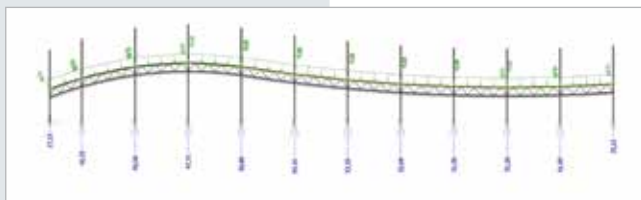
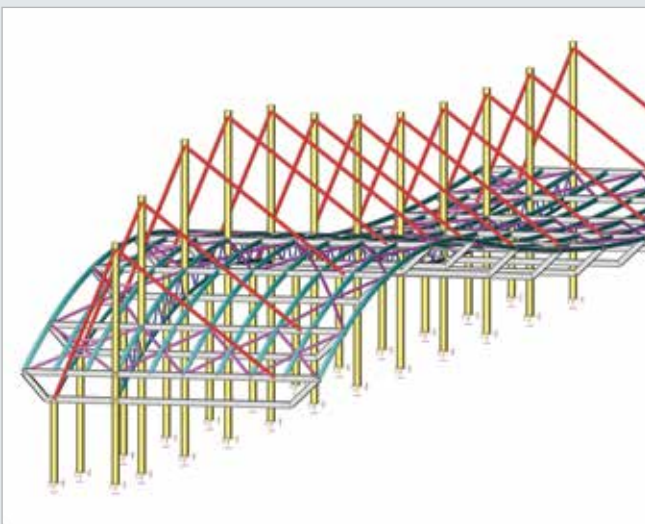


T.E., Consulting Engineer was founded in 2007 to provide the following civil engineering services:

- Technical advice for the development of new buildings.
- Technical advice for the restoration/upgrading of existing buildings.
- Structural design of new buildings (concrete, steel, composite, timber and masonry structures).
- Structural design and assessment of existing buildings.
- Supervision of civil engineering works.

Due to our experience and our knowledge, we can accomplish even the most exacting projects.

T.E., Consulting Engineer has managed over 100 projects in Greece.



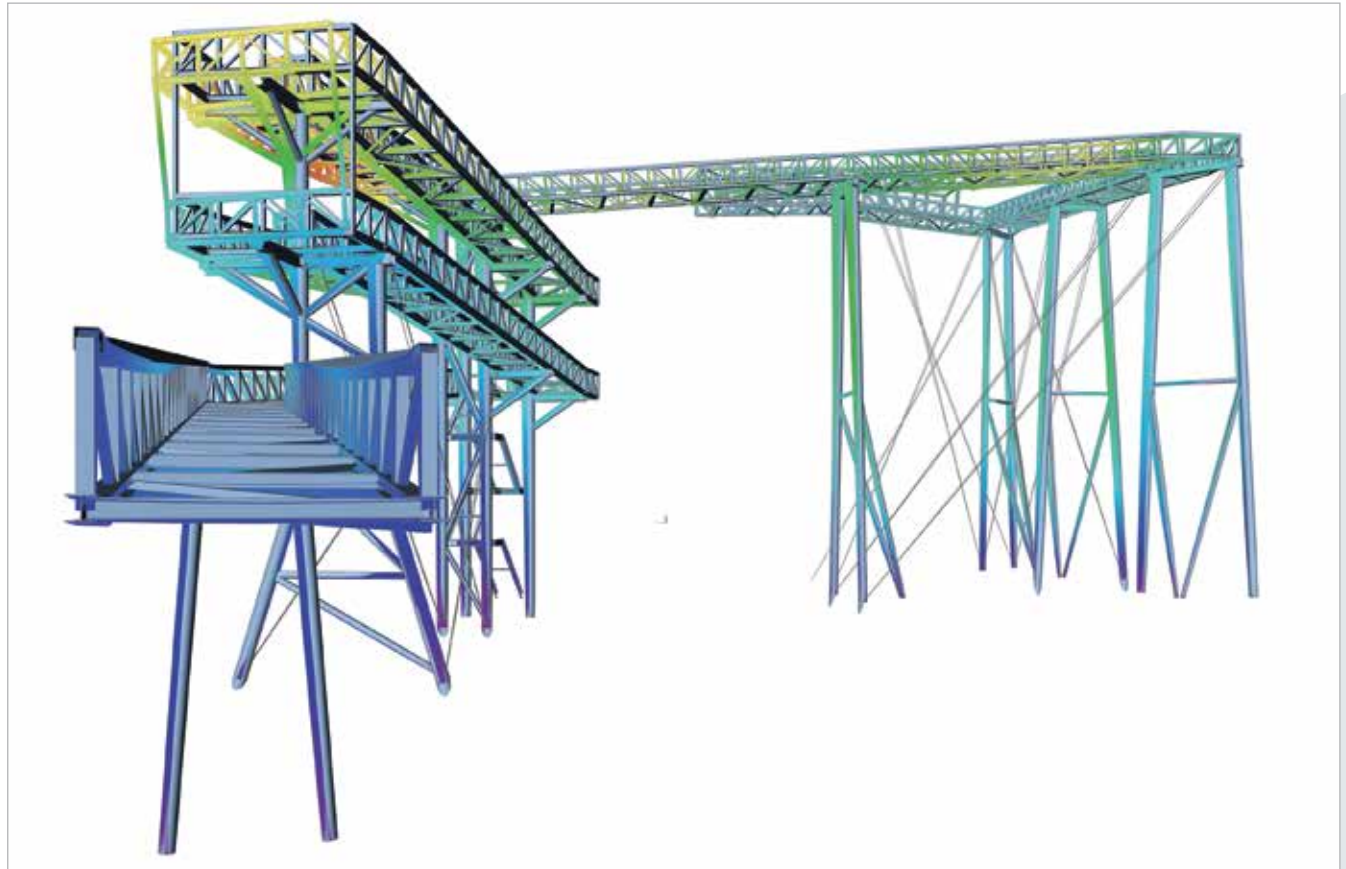
Duelling Alpine Coaster - Ieper, Belgium

Owner Belpark nv
Architect Tides Architecture bvba
General Contractor De Wandler Metaalbouw nv
Engineering Office Tides Engineering bvba
Construction Period 02/2017 - 04/2017

Unique in Europe, a Duelling Alpine Coaster is built on a non-natural slope. After a sky-walk up to 25 meters in the forest, visitors will be able to race against each other downhill. This approximately 280 m long sky-walk is designed using SCIA Engineer.

Tides used SCIA Engineer in order to understand all aspects of the structure. Design meets engineering and we also learned the behaviour resulting from different load cases.

The Eurocode and specifications from TUV were used. With SCIA Engineer, we were also able to determine the different frequencies inherent to the structure. It was possible to predict and increase the comfort of this sky-walk to another level.



Tides

Contact Maarten Tavernier
Address Pottelberg 171
8510 Kortrijk, Belgium
Website www.tides.be

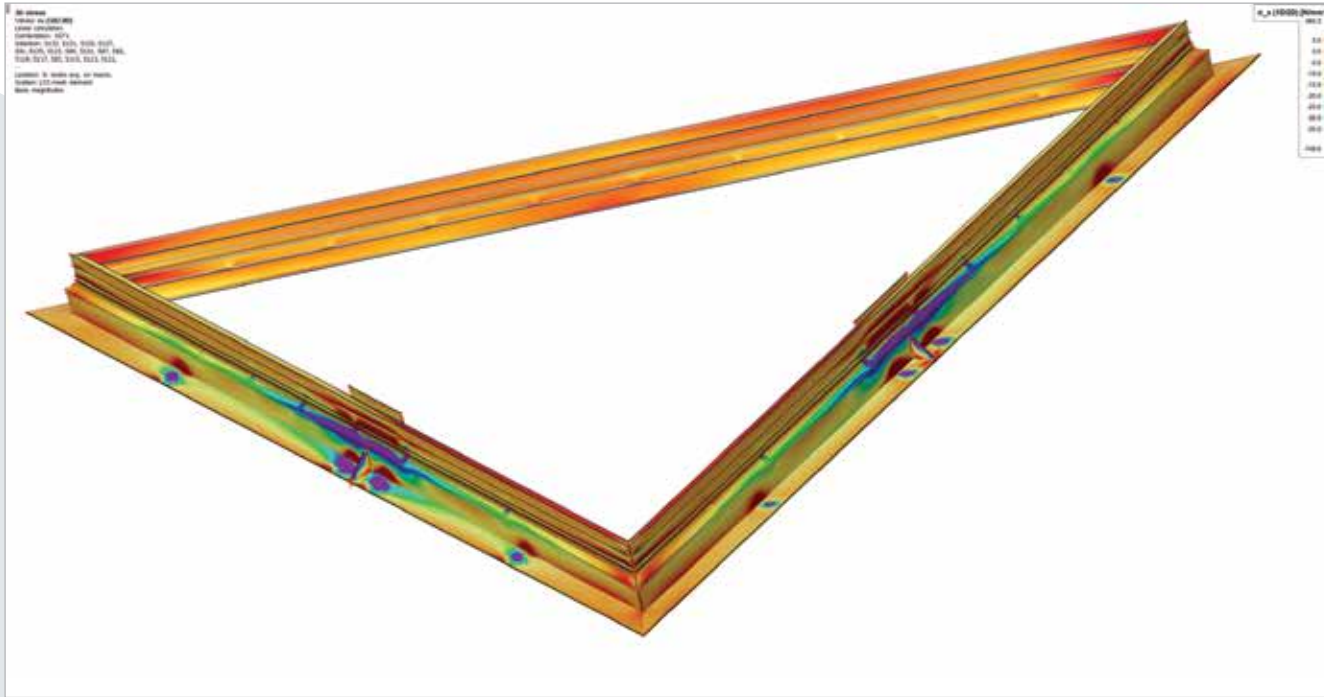


Tides is a multidisciplinary office that offers consultancy & advice in architecture & structural engineering. By integrated services – from consulting, design, engineering, coordination to long-term facility engineering – we accompany our clients at every stage of the process. We focus on what we do best: offices & industrial buildings for businesses & governments. From SMEs to multinationals, from town to region.

A modest and accessible team with considerable expertise. Tides is a dynamic team where the thirst for knowledge & innovation works contagious.



Province House - Antwerp, Belgium



Owner Province Antwerpen
 Architect Xaveer de Geyter Architecten bvba Brussel
 General Contractor Blitta gevelsystemen BV Venray
 Engineering Office vander Weide- van Bragt
 Construction Period 2014

Our company supports the leading façades provider Blitta gevelsystemen BV (Netherlands) with engineering for aluminium façades. Triangular windows used in the presented project consist of two separate aluminium frames.

First, a light-weight base-frame is mounted on the walls. Afterwards, the triangular window itself can slide into this base-frame. This approach minimises the assembly time. The aluminium profiles used are designed and manufactured especially for this project. The aluminium window frames are completely modelled in SCIA Engineer, which gives us the possibility to check all local stresses. It was also possible to check the local stresses in the connection between the insulator and inner and outer aluminium frames. These stresses must be kept low to avoid breaking of the insulator. Moreover, it was possible to determine the exact displacement of glass supports. This displacement is important due to the triangular shape of the glass. The glass support is placed in the middle of the opposite side. If the deflections are too large, the glass would move too much in the vertical direction, which could result in an insufficient airtightness. By placing the glass higher in the frame based on the deflections calculated in SCIA Engineer, this problem was eliminated. SCIA Engineer was also used to check the stresses and deformations in the curved glass panels. Due to the curved shape of the glass it was not possible to use standard 2D-software.

vanderWeide - van Bragt

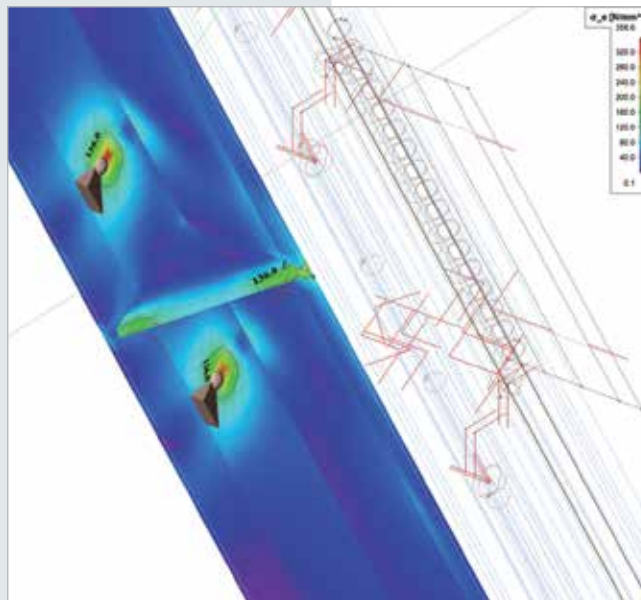


Contact John Jans-Beken
 Address Burgemeester van Rijsingel 17
 5913AN Venlo, Netherlands
 Website www.vanbragtbv.nl

The engineering company vander Weide - van Bragt is located in Venlo and Eindhoven. We are an independent engineering company, working in the fields of concrete, steel, aluminium and timber structures.

Our office designs, calculates, draws and details a wide range of structures for residential, commercial and industrial buildings, shops, monuments, renovations and building damage repairs.

We support the design partners from the start, to reach an optimal, economical and durable design.



GH Delta Learning and Innovation Centre - Roeselare, Belgium

Owner General Hospital Delta Roeselare - Menen
Architect VK Architects & Engineers
General Contractor Van Laere - De Nul
Engineering Office VK Architects & Engineers
Construction Period 2016 - 2018

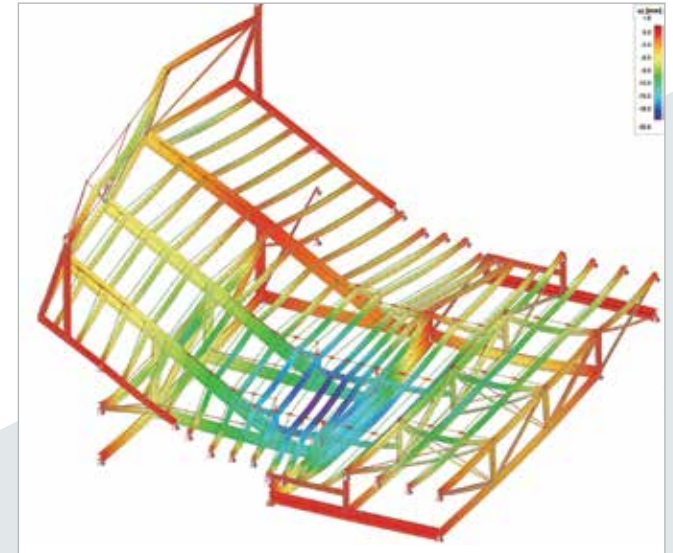
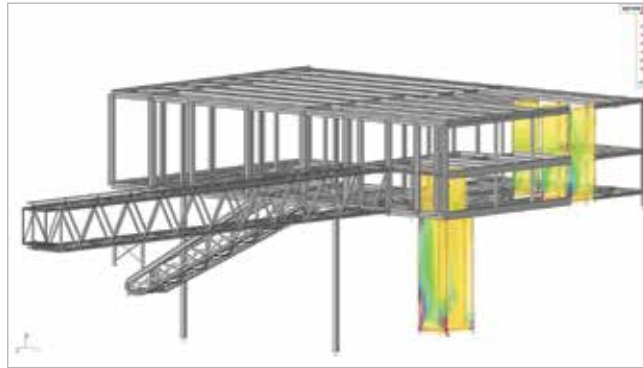
VK Architects & Engineers were responsible for the design of a new Innovation and Learning centre for the AZ Delta hospital in Oekene, Belgium. The I&L centre is an expansion that will be built on the top of the logistics building. A steel structure on the top of the concrete building with 2 cantilevers on each side of the building.

SCIA Engineer was used for every aspect of the design including the SCIA Revit Link for BIM design.

The Revit model of the existing concrete building was sent to SCIA Engineer to allow for the definition of loads. The extra reactions due to wind and vertical loads could be added to check the columns and the foundation.

The I&L centre is connected to the ground floor by an eye-catching stairway, and with the hospital by a footbridge. All these separate structures are designed in one complex three-dimensional structural model for the analysis of the global stability and deformations.

A dynamic study of the theatre room was made and the human induced vibrations of the steel structure were checked in a second model.



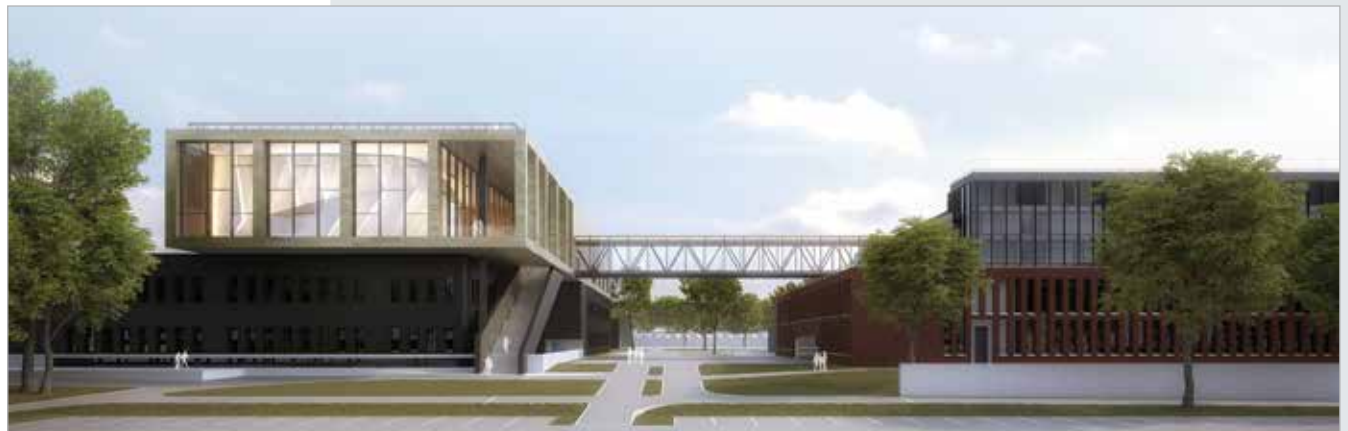
VK Architects & Engineers

Contact Serge Cappon
Address Brugsesteenweg 210
8800 Roeselare, Belgium
Website www.vkgroup.be



VK Architects & Engineers is an interdisciplinary company focusing on healthcare design and building engineering. We offer our healthcare and industry clients an integrated approach: master-planning, architecture, engineering, interior architecture and landscaping.

Real estate developers, architects and public authorities rely on VK for the technical and structural engineering of buildings and infrastructure projects and advanced engineering such as façade engineering, acoustical engineering, BREEAM and fire safety engineering.



We would like to thank and congratulate every participant for making this 10th edition of the User Contest the most impressive ever.

SCIA nv

Copyright © 2017 - All materials in this book are protected by copyright. You may not copy, reproduce, distribute, publish, display, perform, modify, create derivative works, transmit, or in any way exploit any content. For permission to reprint texts, photographs, illustrations, or graphics, please ask marketing@scia.net.



SCIA nv
 Industrieweg 1007, 3540 Herk-de-Stad, Belgium
 info@scia.net, www.scia.net

