

Some sophisticated issues

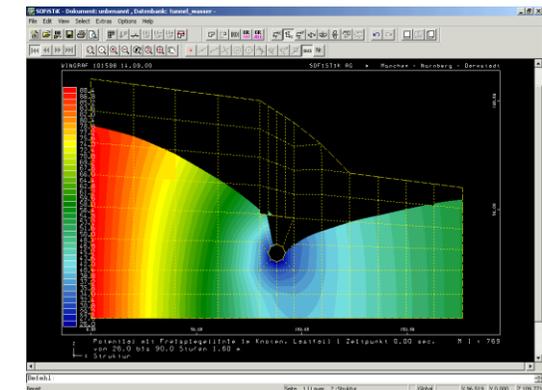
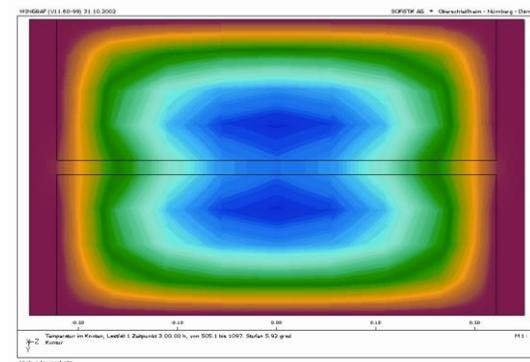
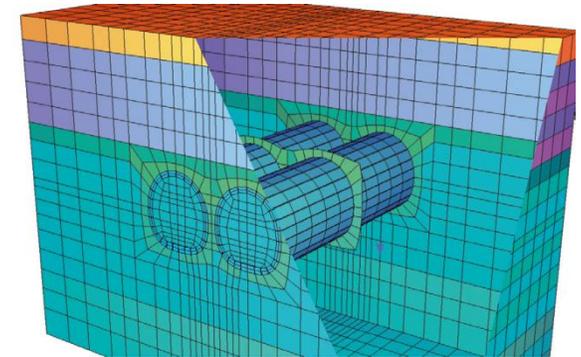
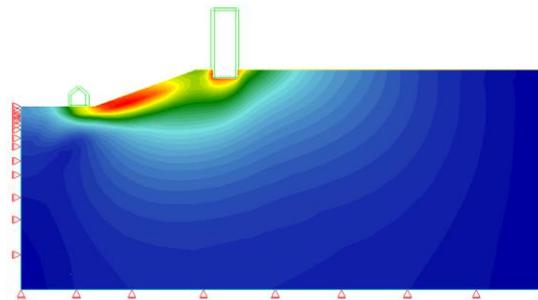
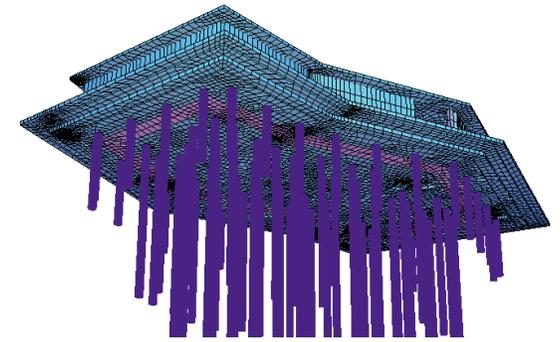
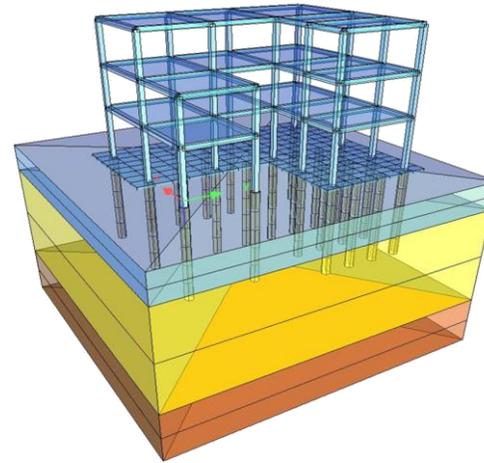
Dipl.-Ing. Robert Herceg

SOFiSTiK Geotechnics and more

- + 2D / 3D Geotechnics:
 - + Piles / dams / retaining walls / slopes / etc...
 - + Tunnel Engineering
 - + 2D Config: TALPA + WINTUBE
 - + 3D Config: 3D-FEM-PREMIUM + ASE4 + WINTUBE (+ Dynamics)

- + Half-Space Analysis (HASE)
 - + (DYNAMIC) Soil-Structure-Interaction

- + Seewater and Fire Analysis (HYDRA)



FIDES-WinTUBE 3D

+ Application Range - Tunneling

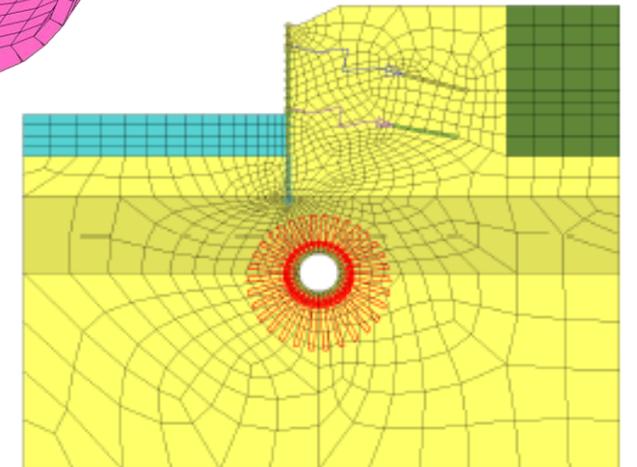
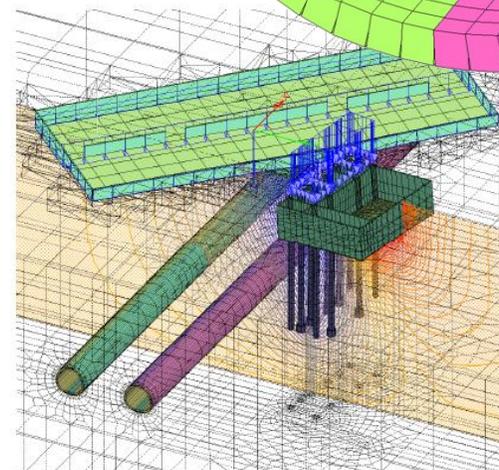
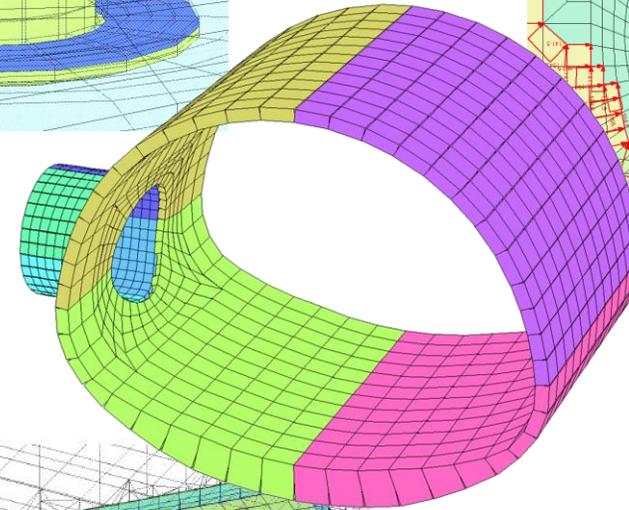
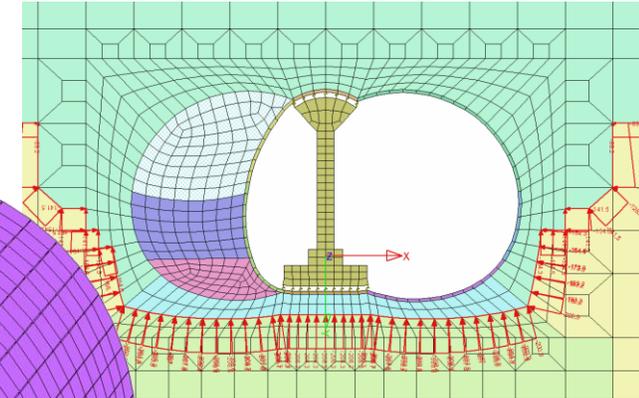
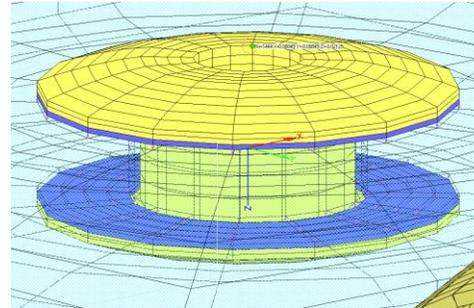
- + Cut & cover
- + Shotcreting method
- + Tunnelling machines (TBM)
- + Tubbing-lining
- + 3D detail analyses eg. tubbing hinges, ...
- + Special blocks like tunnel-junctions, branch of emergency exits, portals etc.

+ Application Range - Geotechnics

- + Shafts, Slopes, Dams, bulkheads, ...
- + Foundations of overall-structures on volume elements, pile- or combined pile-raft-foundations, ...

+ Various

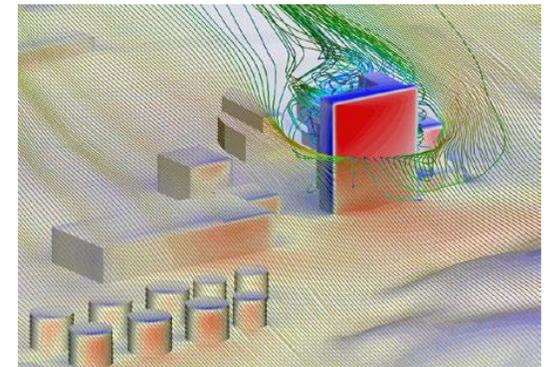
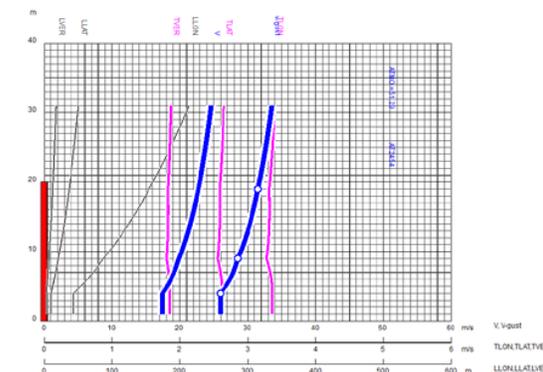
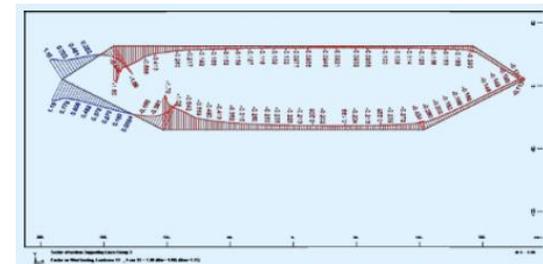
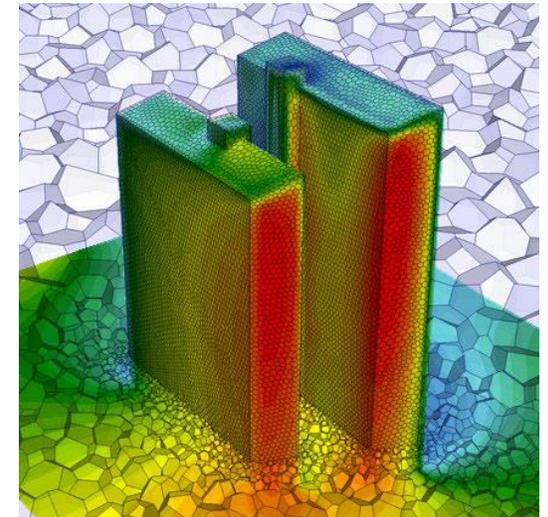
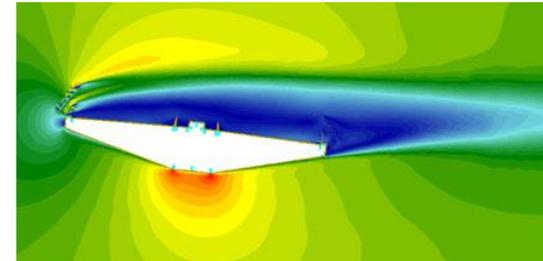
- + All kinds of volume-structures eg. laminated glass, elastomer bearing, ...
- + Dynamic analysis eg. falling rocks, ...





CFD (Computational Fluid Dynamics) DOLFYN | SOFiSTiK

- + Standard k- ϵ and RNG turbulence models
- + Stable numerical procedure
- + Temperature / scalars / particles included
- + Polyhedral volume cells for calculation
- + Postprocessing with ParaView / VisIt (VTK-files)
- + Full integration in SOFiSTiK environment
 - + SOFiMESH, WINGRAF, SOFILOAD, etc...

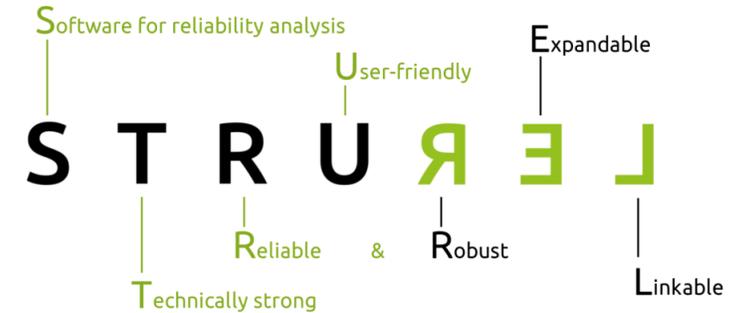


SOFiSTiK | Reliability Analysis (RELY)

- + Implemented reliability analysis tools in RELY with Annex C of Eurocode 0
- + State-of-the-art reliability methods based on STRUREL
- + The engineering system employed in RELY can be expressed using the full capabilities of the SOFiSTiK finite element solvers
- + You can use the flexibility of SOFiSTiK and its parametrized input options to arbitrarily tailor limit-state functions to match your needs
- + Reliability sensitivity analysis
- + Computation of equivalent partial safety factors

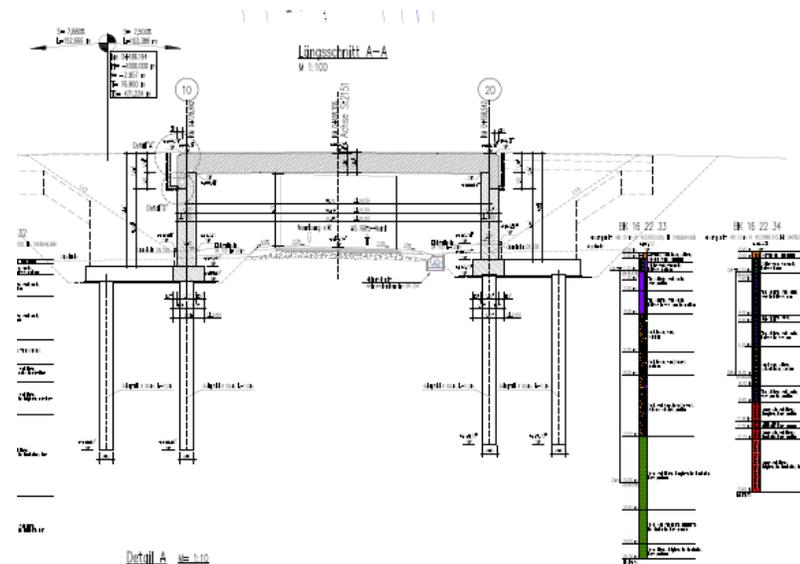
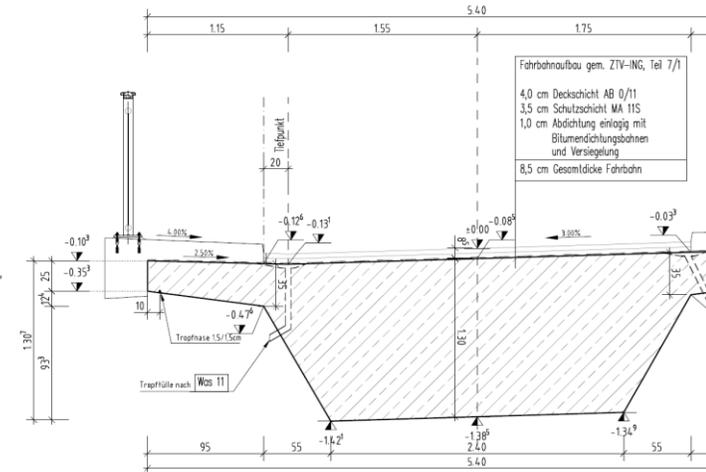
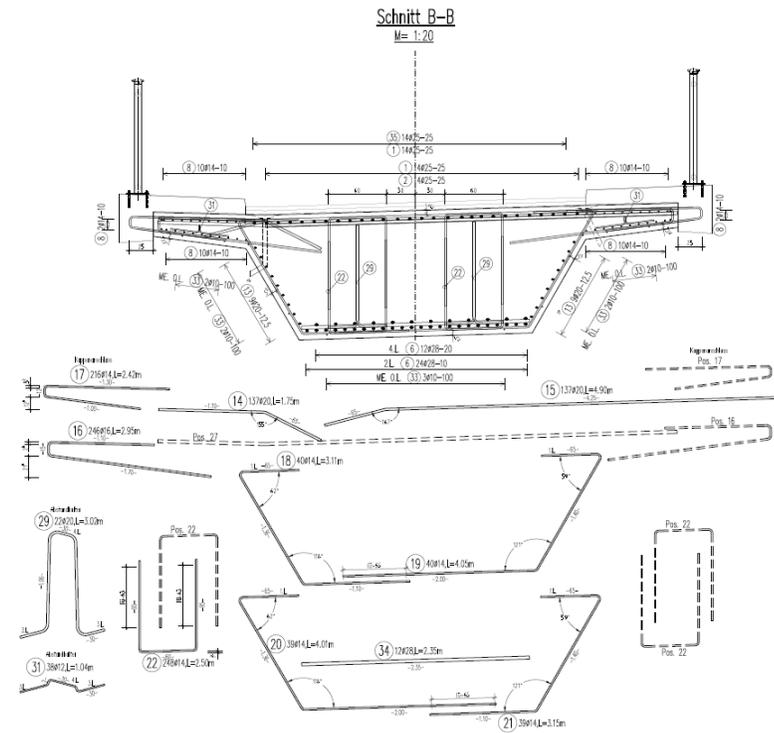
+ Use for:

- + existing structures
- + structures not covered by the codes
- + precast concrete elements
- + cost-efficient design



SOFiCAD since 1985

- + AutoCAD 2019 / 2020
- + SOFiCAD (Detailing)
- + SOFiCAD (Reinforcement)
- + SOFiCAD-BAMTEC



XY & Partners



Project

Name:

Address:

Client:

Shape Codes According to:

Rebar Weight Schedule

Material: B500B	Size used [mm]	Number of Bars	Total Length [m]	Total Weight [kg]
	10	45	187.47	115.47
	12	10	33.70	29.94
	14	10	31.20	37.73
	16	15	65.35	134.81
	TOTALS			218.95

Schedule

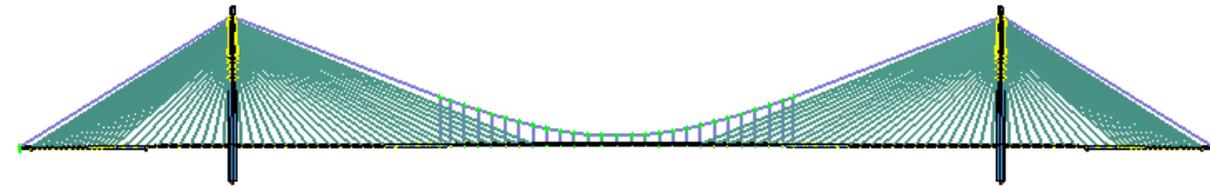
Member	Bar Mark.	Total No.	Ø [mm]	Length of each Bar [m]	Total Length [m]	Weight of each Bar [kg]	Total Weight [kg]
2	3	10	3.28	9.84	2.02	6.07	
2	3	10	3.40	10.2	2.10	6.29	
2	3	10	3.53	10.59	2.18	6.53	
2	3	10	3.66	10.98	2.26	6.77	
2	3	10	3.78	11.34	2.33	7.00	
2	3	10	3.92	11.76	2.42	7.26	
2	3	10	4.06	12.12	2.49	7.48	
2	3	10	4.16	12.48	2.57	7.70	
2	3	10	4.30	12.9	2.65	7.96	
2	3	10	4.42	13.16	2.73	8.18	
2	3	10	4.54	13.62	2.80	8.40	
2	3	10	4.68	14.04	2.89	8.66	
2	3	10	4.80	14.4	2.96	8.88	
2	3	10	4.92	14.76	3.04	9.11	
2	3	10	5.06	15.18	3.12	9.37	
3	10	12	3.37	33.7	2.99	29.94	
4	10	14	3.12	31.2	3.77	37.73	
5	5	16	3.45	17.25	5.45	27.25	
6	10	1	6.81	68.1	10.76	107.57	

Rebar Bending Schedule

Member	Bar Mark.	Ø [mm]	Length of each Bar [m]	Total Length [m]	Dbr ds	Shape Code	Hooks Start/End	A [mm]	B [mm]	C [mm]	D [mm]	E/R [mm]	Max / Min	Rev
2	3	3.28	3	9.84	20	A2		1.63	1.67					
2	3	3.40	3	10.2	20	A2		1.67	1.73					

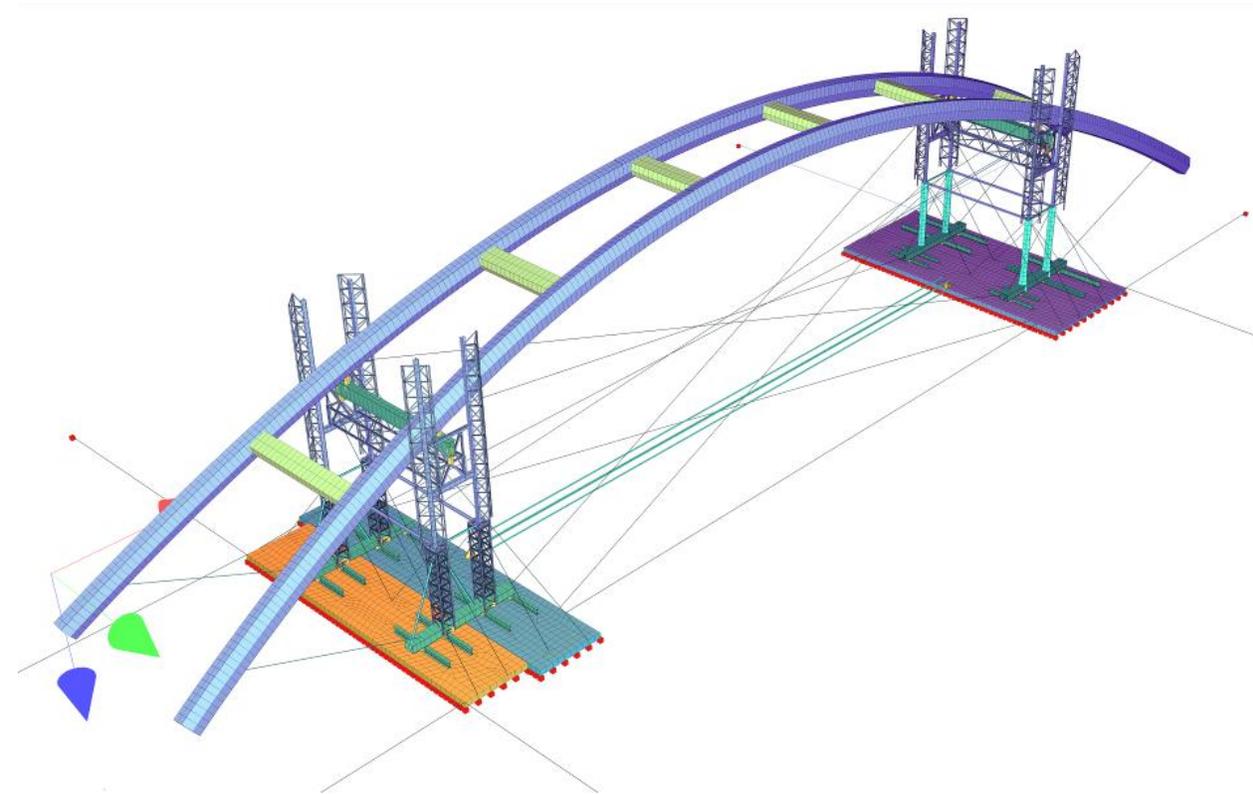
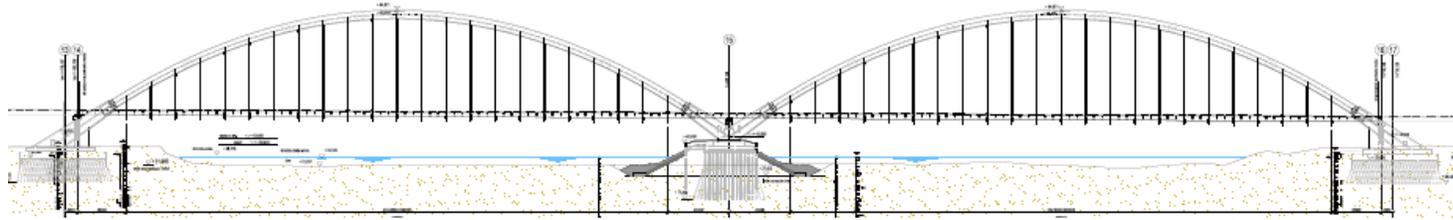
Some references

from big to small, from thin to large, you can find everything



Third Bosphorus Bridge, Istanbul, Turkey | Connecting Continents

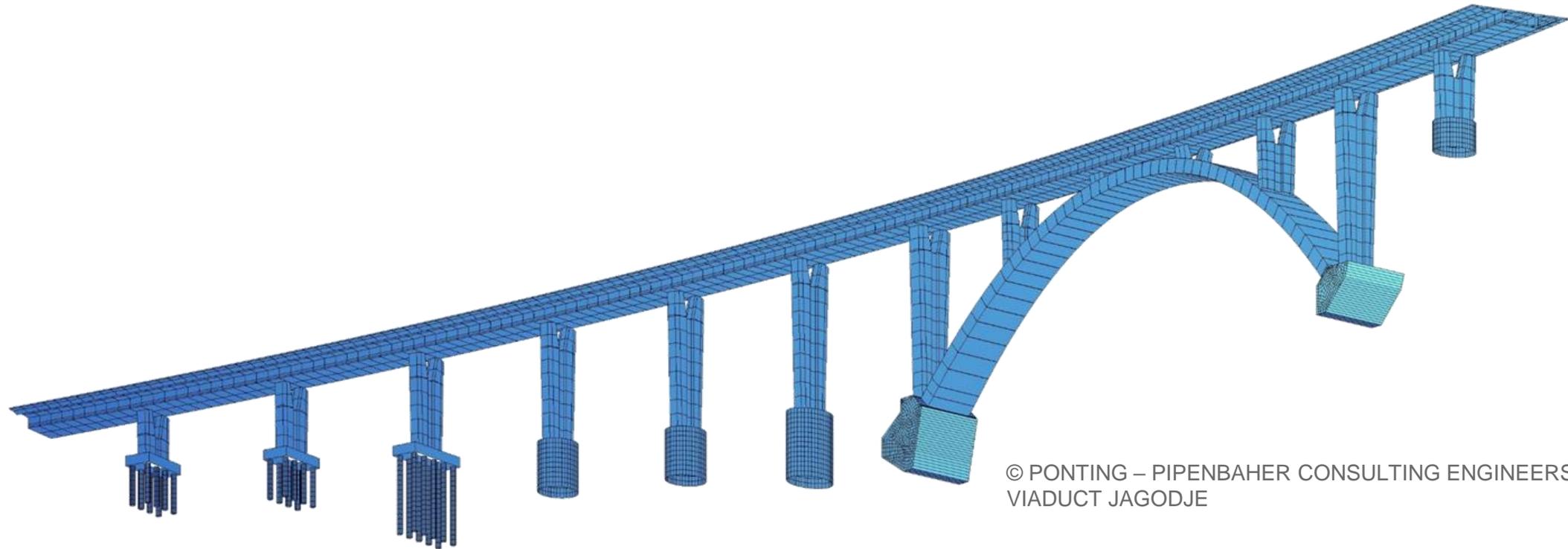
Client: T-Inginiérie, Geneva: conceptual design, detailed design, site supervision.
L = 1408m; Section width: 60m, Pylon height 300m. Longest railway bridge



Water Transport | Archbridge Torun, Poland

2x steel arches of 270m | 1.200 tons

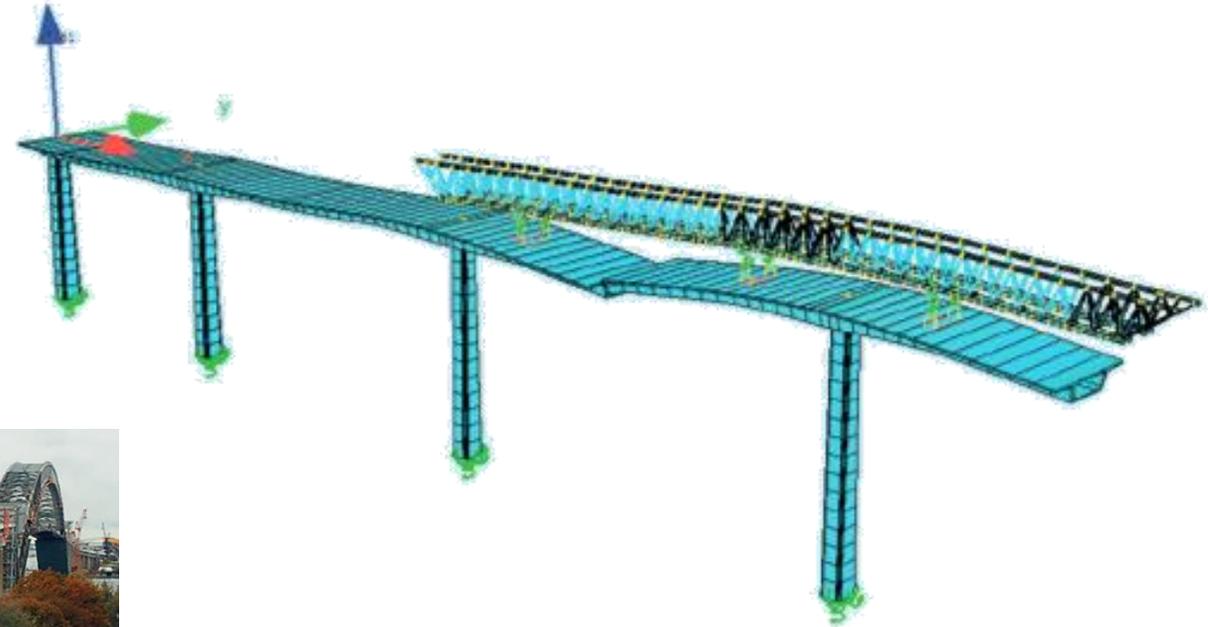
GTI – Tymon Galewski | Tomasz Deptula | Krzysztof Zoltowski | Pont-Projekt Marek Sudak & Krzysztof Wachalski



© PONTING – PIPENBAHER CONSULTING ENGINEERS
VIADUCT JAGODJE

Viaduct JAGODJE, Highway H6 Koper, Slovenia

Lenght 450 m | Arch span 140 m | Superstructure width 25.60 m (prestressed concrete)
Structural Design: PONTING - PIPENBAHER Consulting Engineers, Maribor, Slovenia

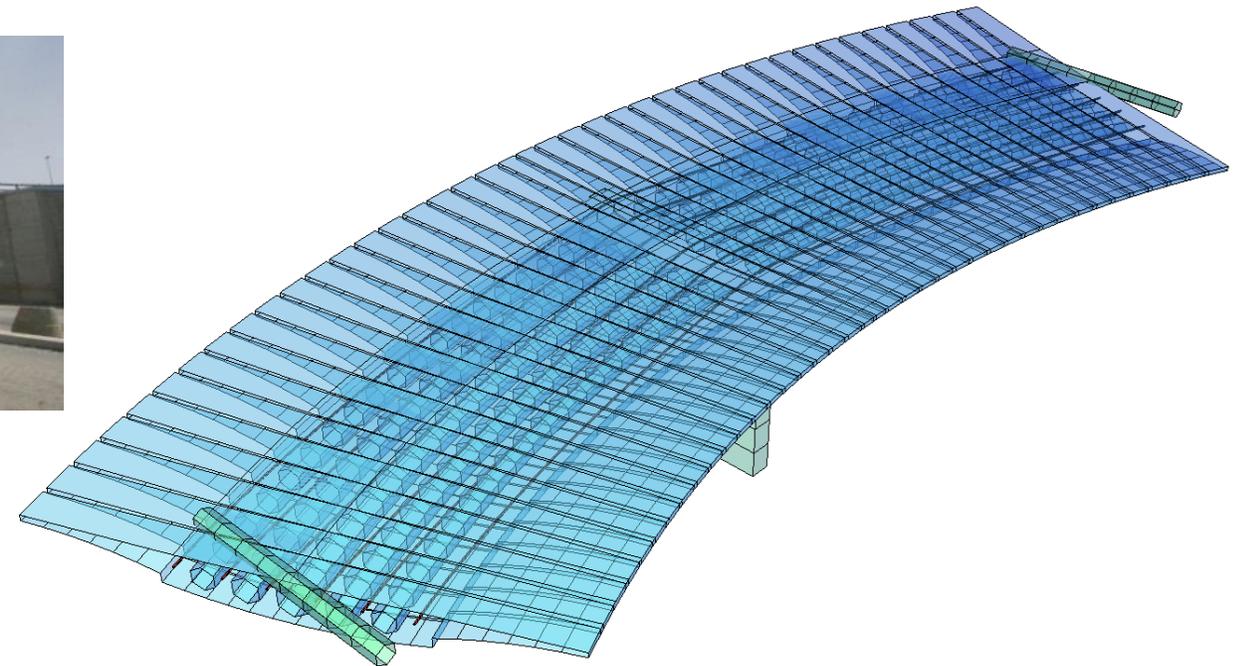
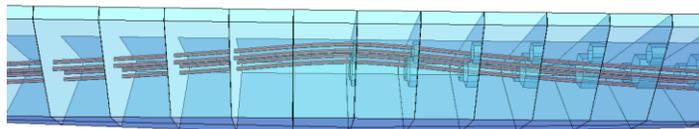
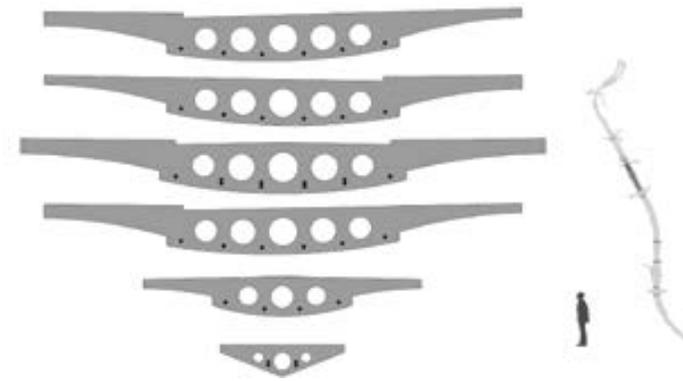


Bayonne Bridge extension, New York

Client: Kiewit, Denver.

Comment: rehabilitation, gantry as traveller and structural part, stages





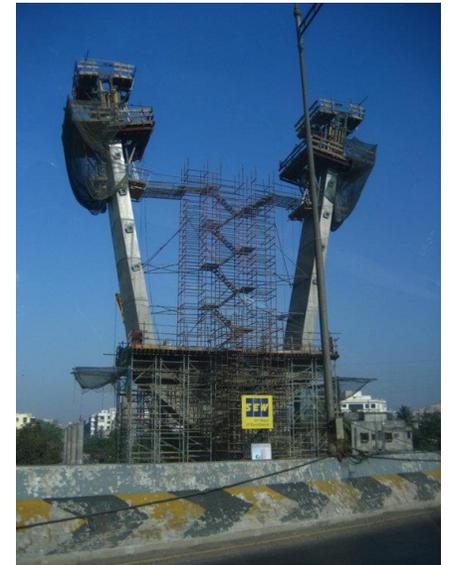
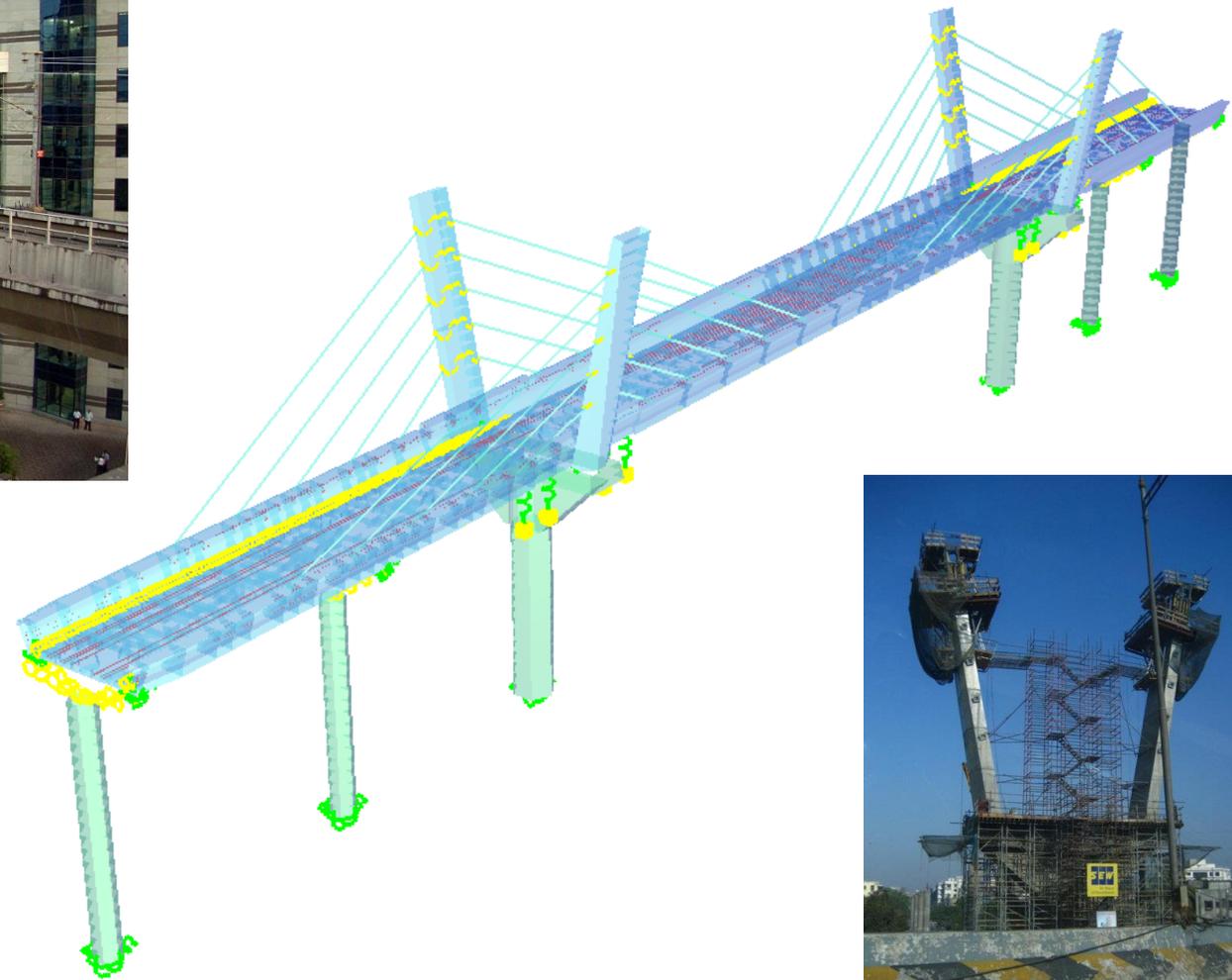
West Ring Sabadell Barcelona 2011

Client: Infraestructures de la Generalitat de Catalunya

Total length = 3.5 km, 3+3 road lanes, 275 m tunnel, 7 road bridges, 1 rail bridge, 1 footbridge, Prestressed concrete



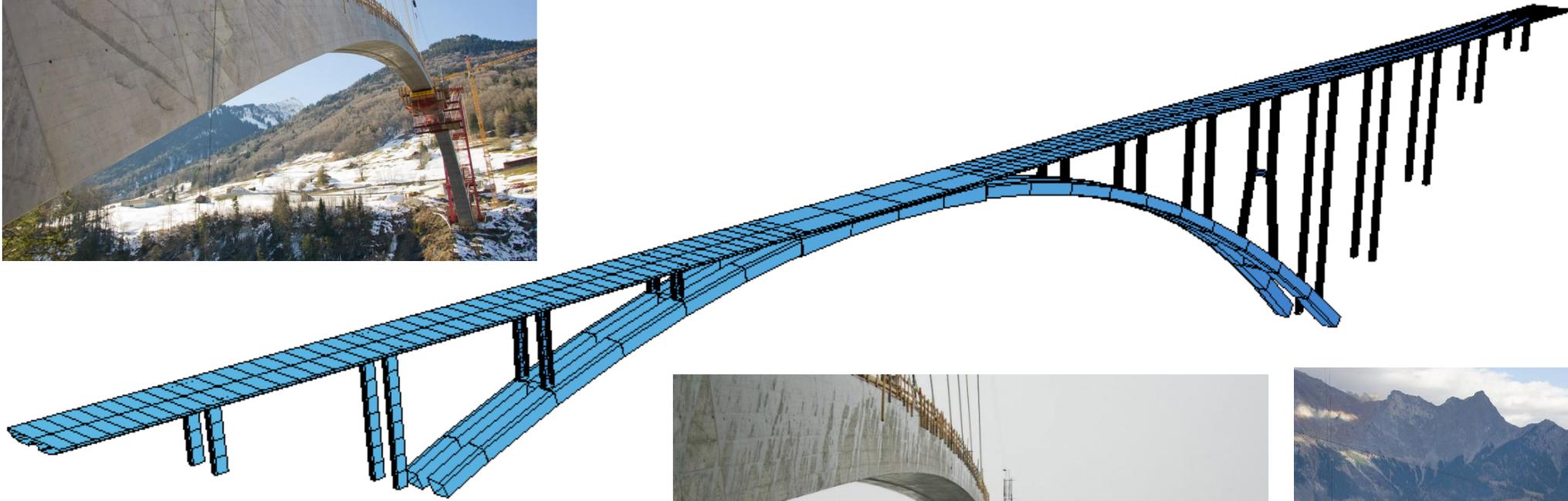
ENGINYERIA **REVENTOS**



Web Bridge, Mumbai

Consultant: Systra France

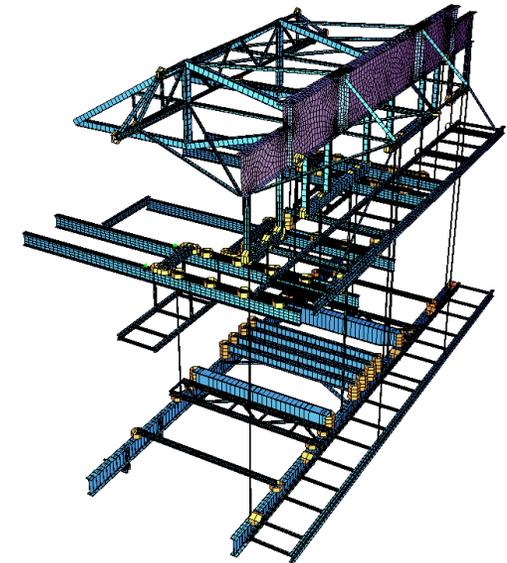
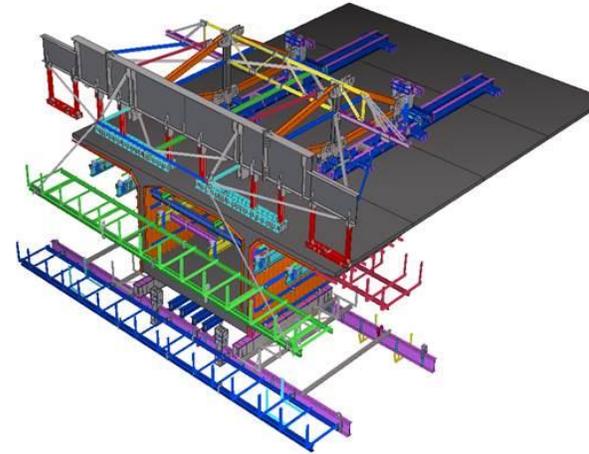
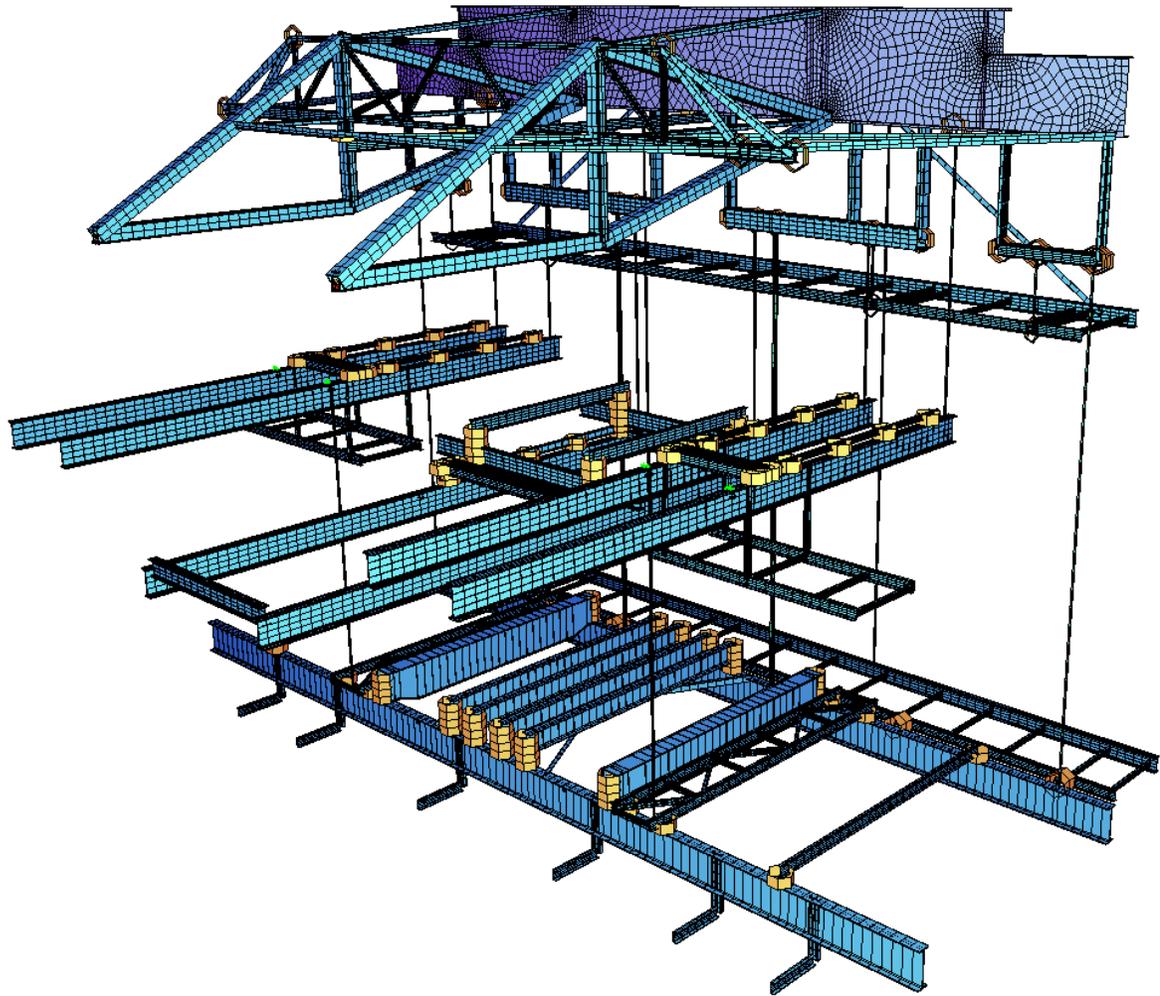
Comment: longitudinal and transversal prestressing in beams and shells, Construction stages, Cable force adjustment, EC design code checks



Tamina Crossing, Switzerland.

Clients: Detailed design: LAP; construction engineering: LGB
180m long arch, 300m above ground, very complex staging and cantilevering.

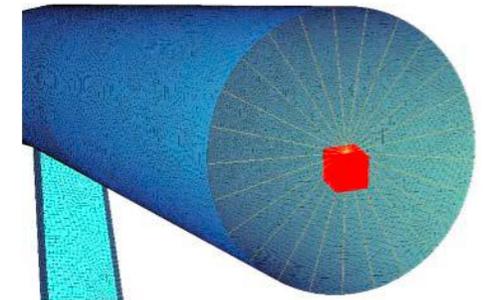
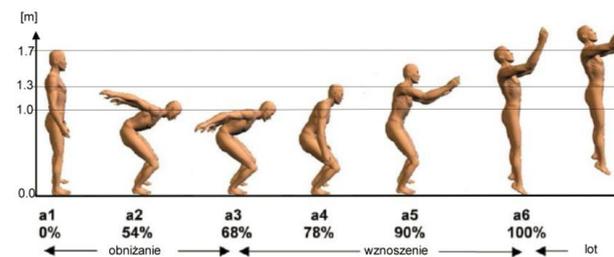
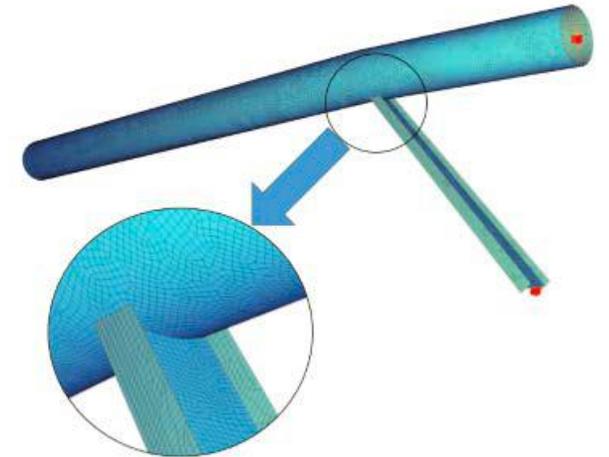
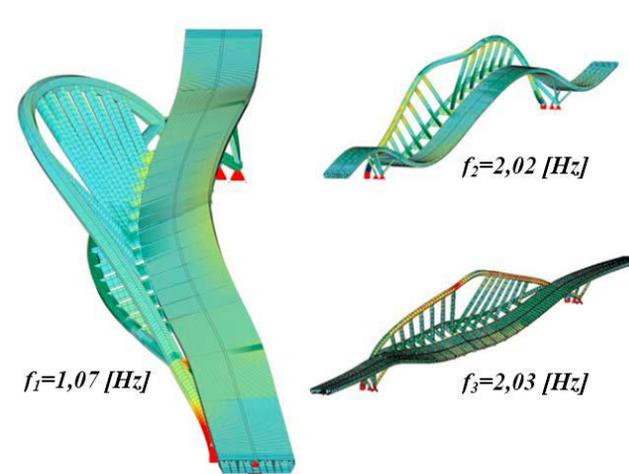
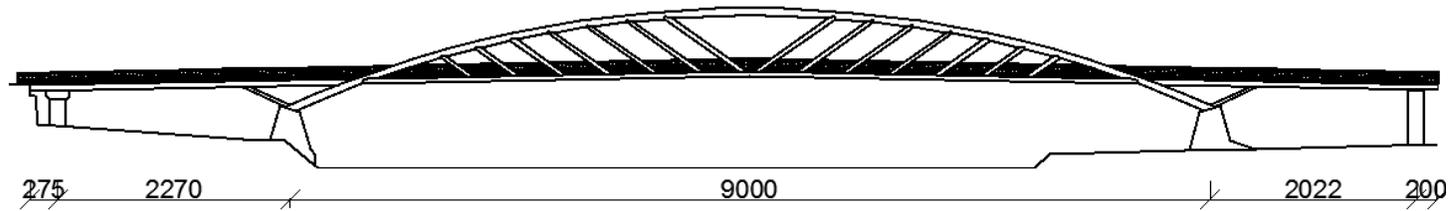




Form traveller Aghnaguig Bridge, Motorway N5, Ireland

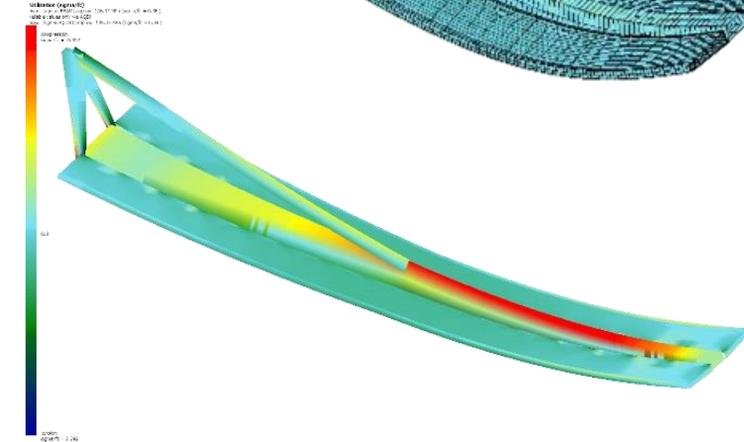
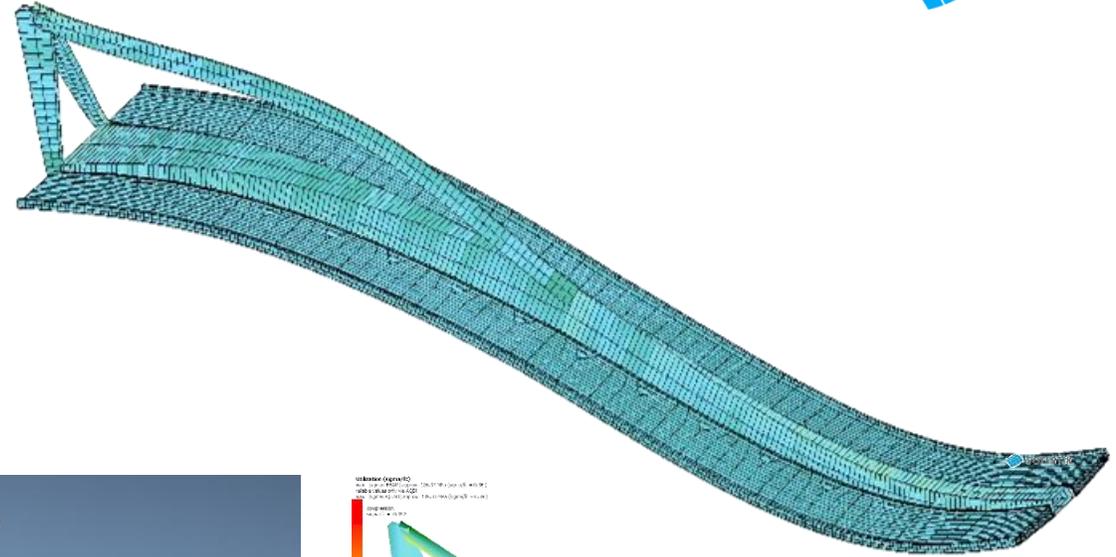
Client: Ferrovial – Agroman,
Supervision and independent check by SILGA, S.L., Madrid





Footbridge Wronki, Poznan, Poland | Pedestrian Influence Analysis & Steel Detail Checks

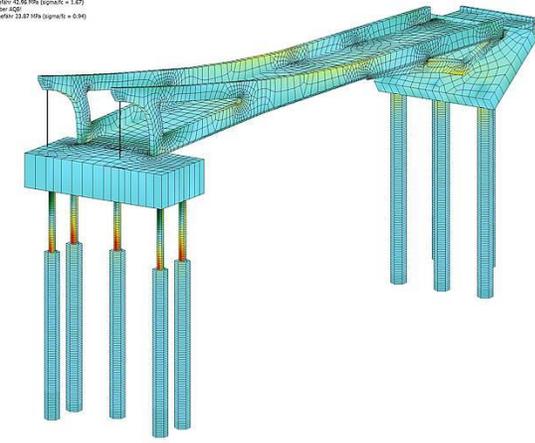
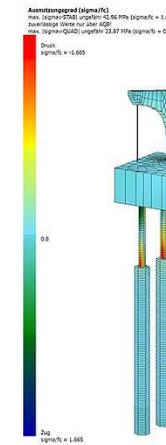
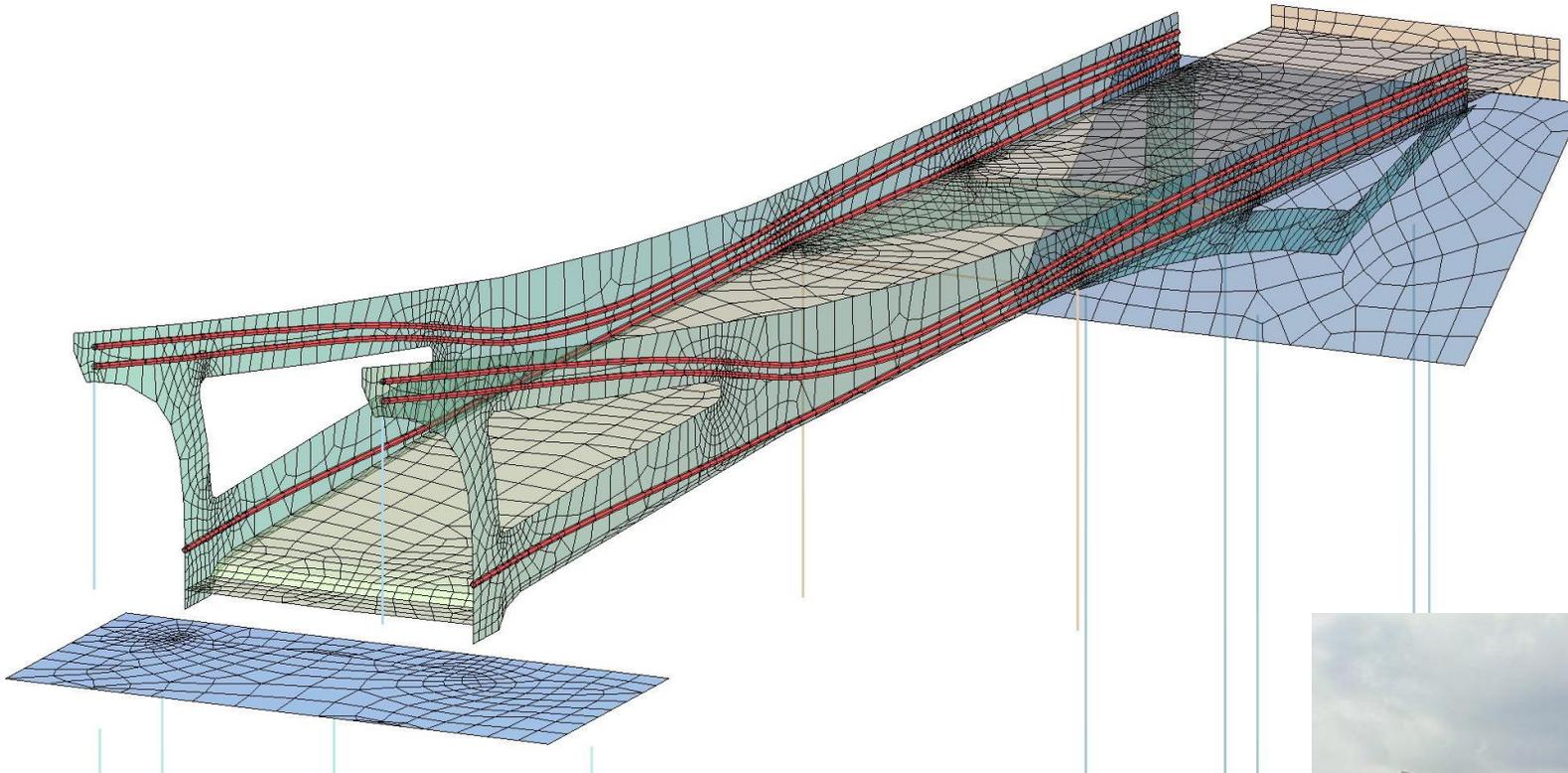
Spans: 22,70 + 90,00 + 20,22 [m]
 Politechnika Gdanska Krzysztof Zoltowski & Mikolaj Binczyk
 GTI – Tymon Galewski



The Draw Footbridge over the Motława River, Gdansk

Movable concrete / steel cantilevered footbridge | Maintenance free
 length: 62,20m | width: 6,00 – 8,00m
 Architecture and Concept Engineering: PONTING d.o.o., Slovenia
 Execution Engineering: MOSTY Gdansk

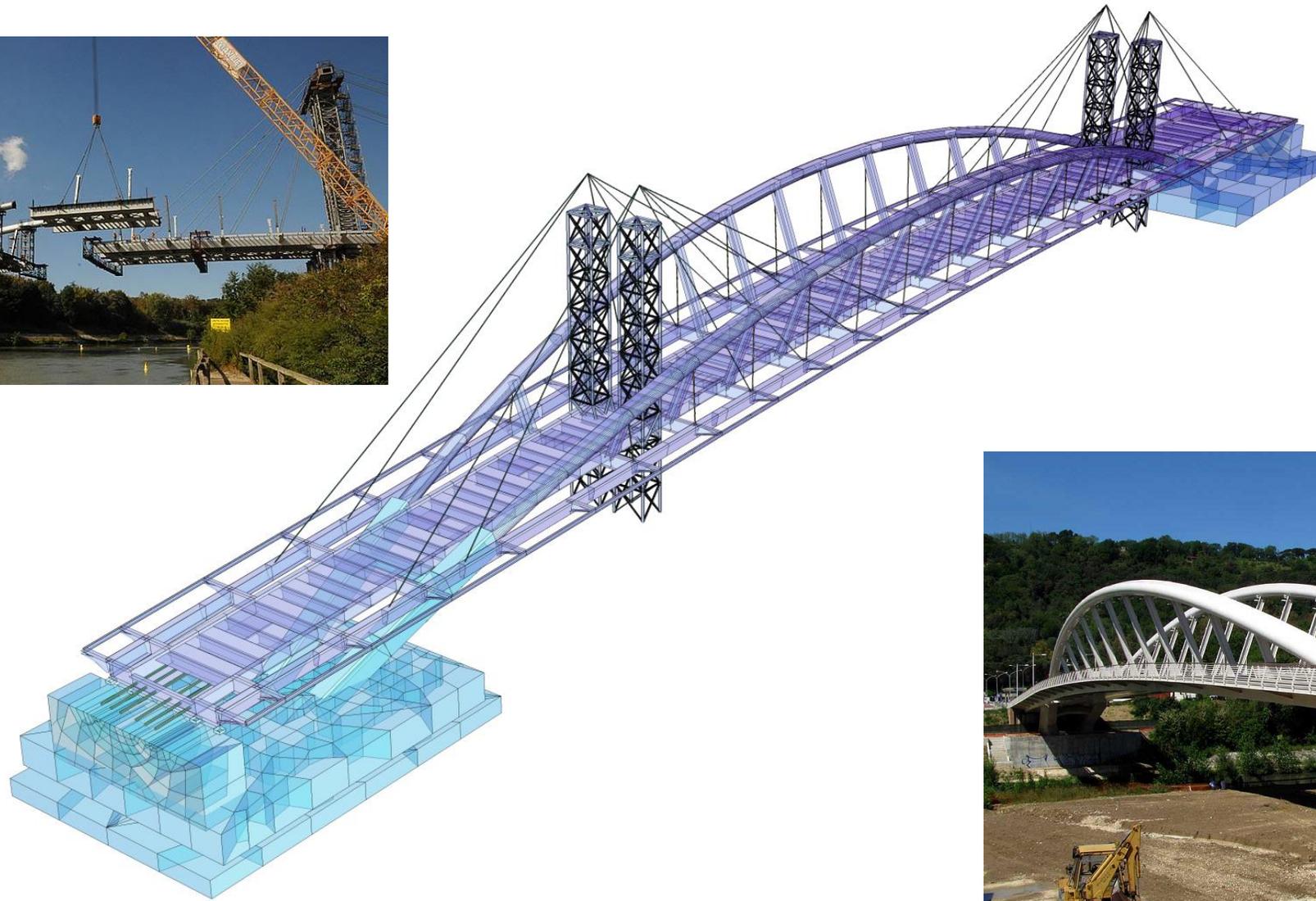




Paul Amann Footbridge, Vienna

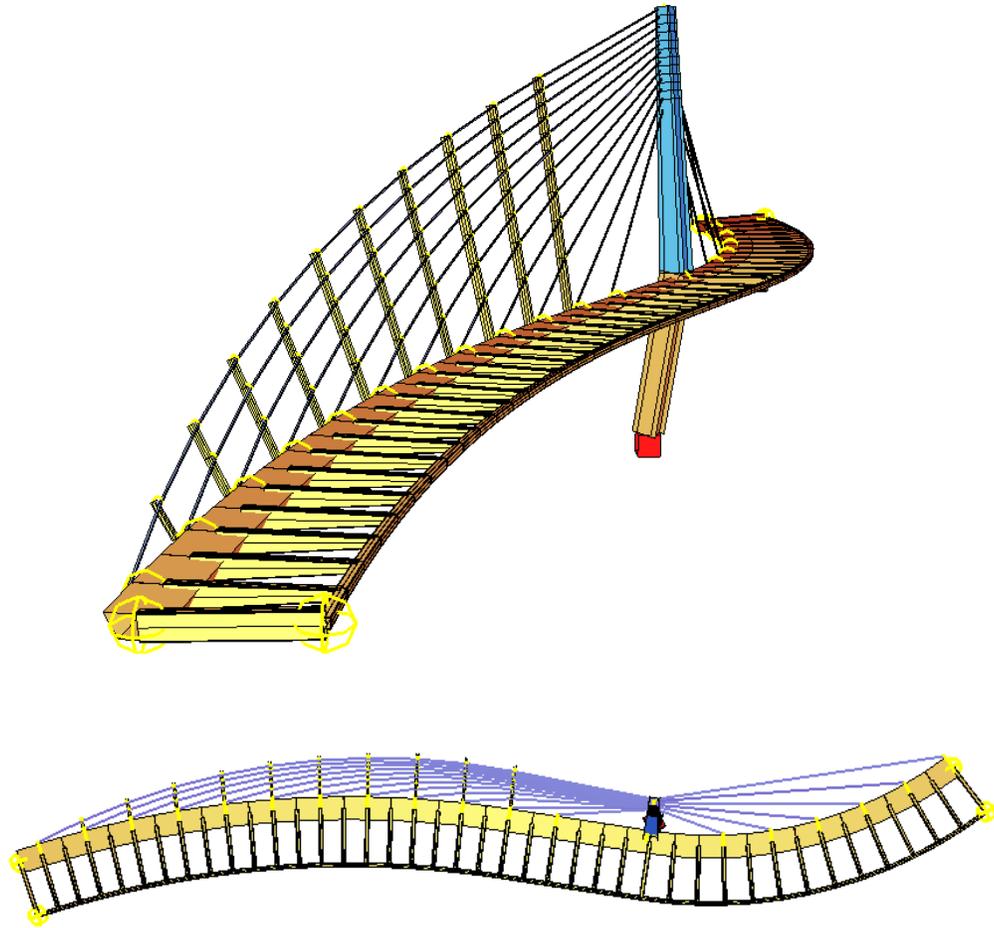
Engineering: ZT Mayer GmbH, DI Rudolf Hinterleitner + ZTHP , DI Matthias Parzer
 Design: DDI Rudolf Brandstötter





Ponte della Musica, Rome

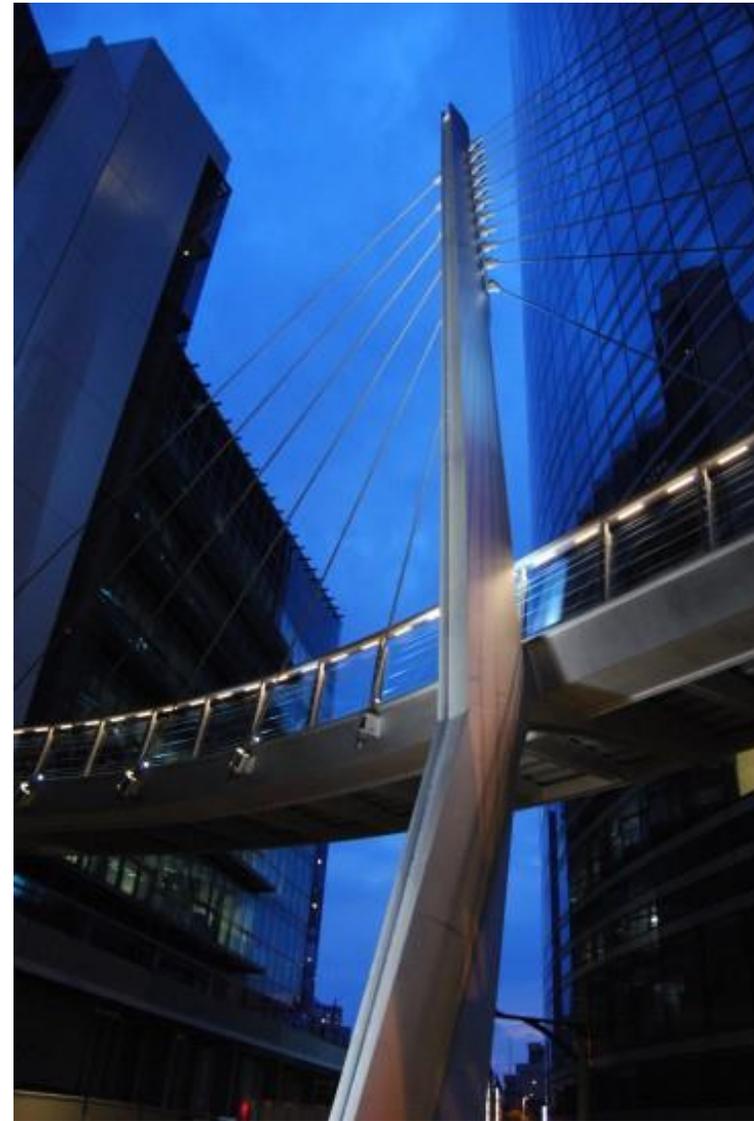
Client: Comune di Roma
Architecture: Kit Powell-Williams, C. Lotti e Associati
Engineering / Design: Buro Happold, MPA ingegneria
Construction Engineering : Dott. Ing. Giorgio Rizzo

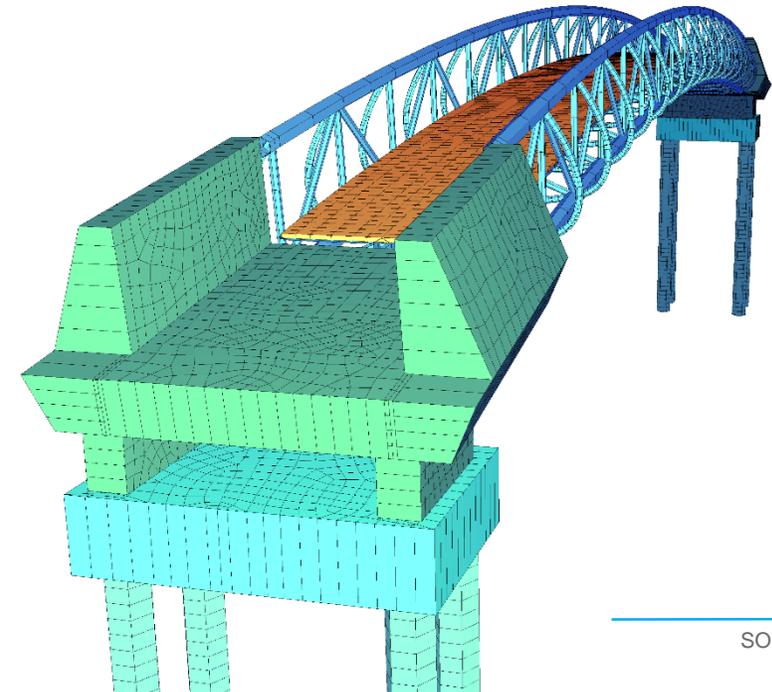


Passerelle a La Defense, France

Consultant: Marc Mimram Ingenierie, Schlaich Bergermann

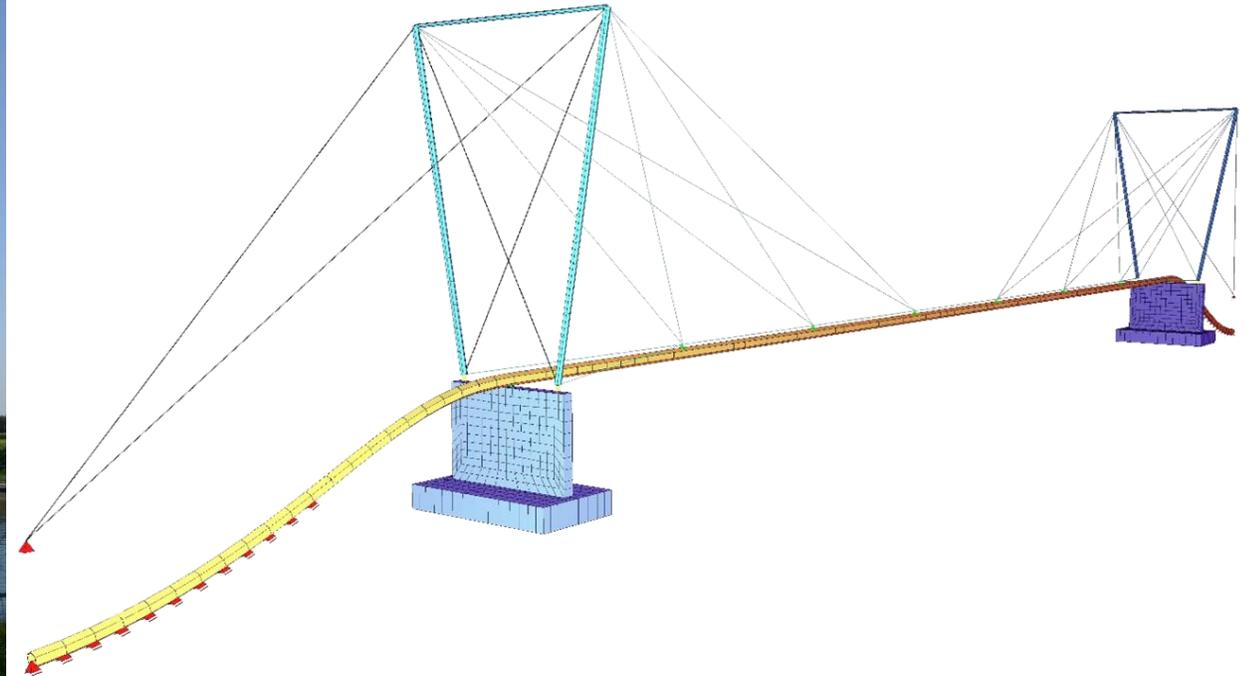
Comment: Formfinding, Cable force optimization, Dynamics (forced vibrations, dampers)





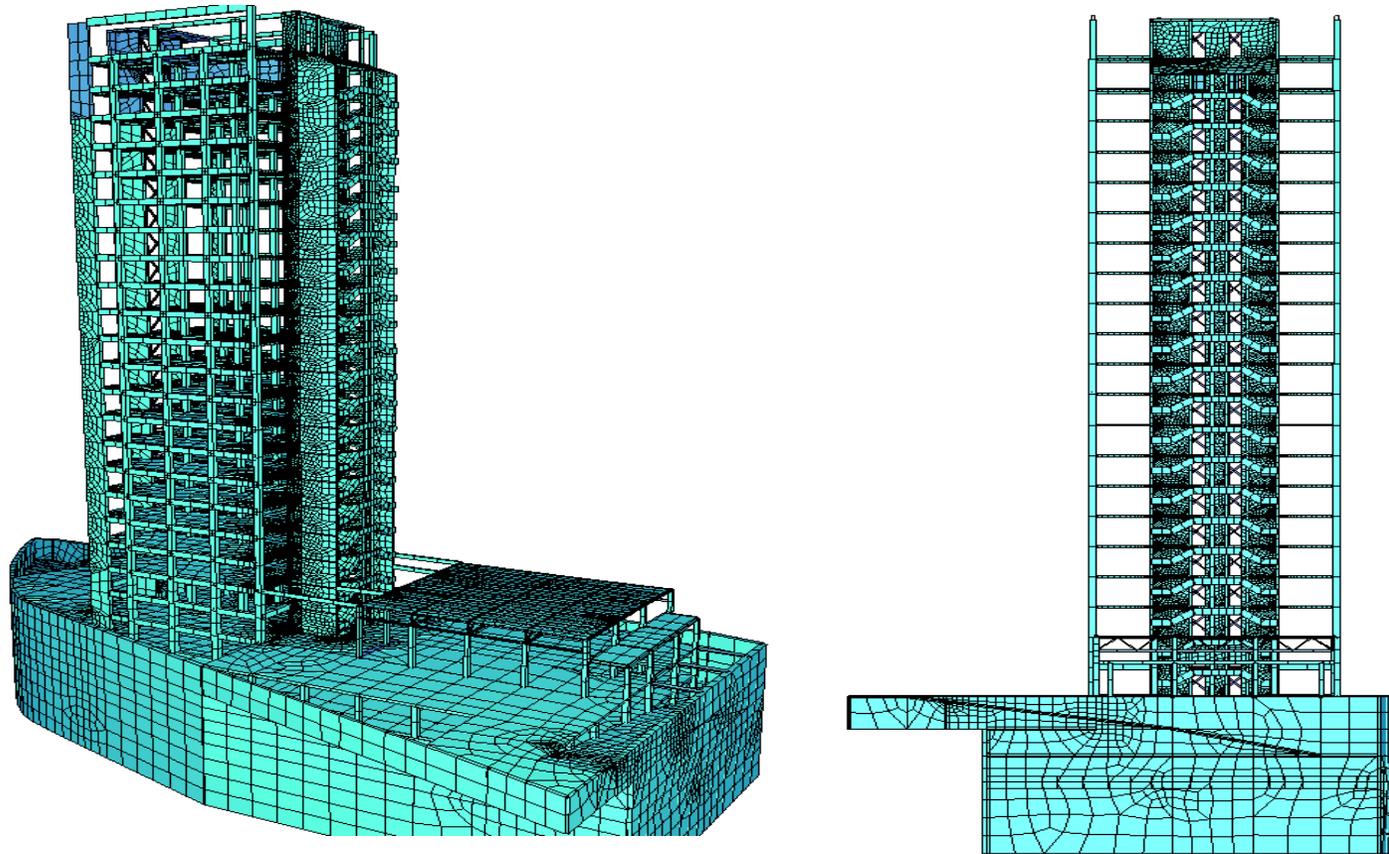
Footbridge over Vipava in Miren, Slovenia

Length 50m | Span 41m | Width: 4,82 m | Foundation depth 8m (piles)
Structural Design: Elea iC, a member of iC group, Ljubljana, Slovenia



Gas-Pipeline Bridge over River Channel SD-1, Miklavž na Dravskem polju, Slovenia

Span length 80,5 m | Width 4,82 m | Year 2013 | Investor Plinovodi d.o.o.
Structural design for bridge reconstruction: Elea iC, a member of iC group, Ljubljana, Slovenia

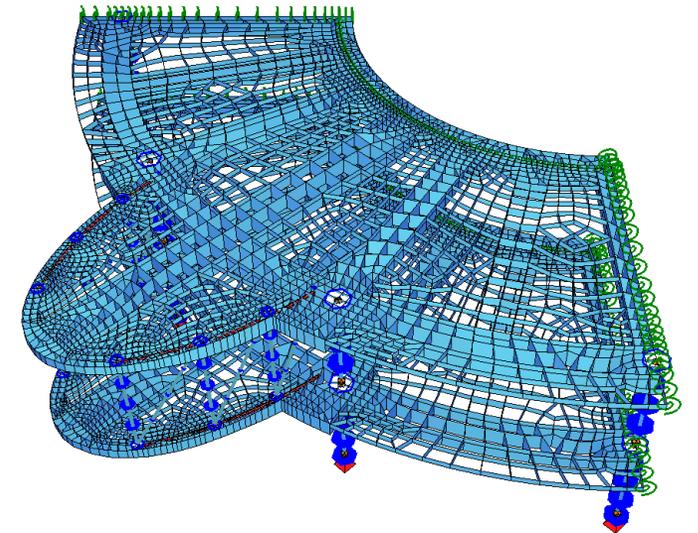
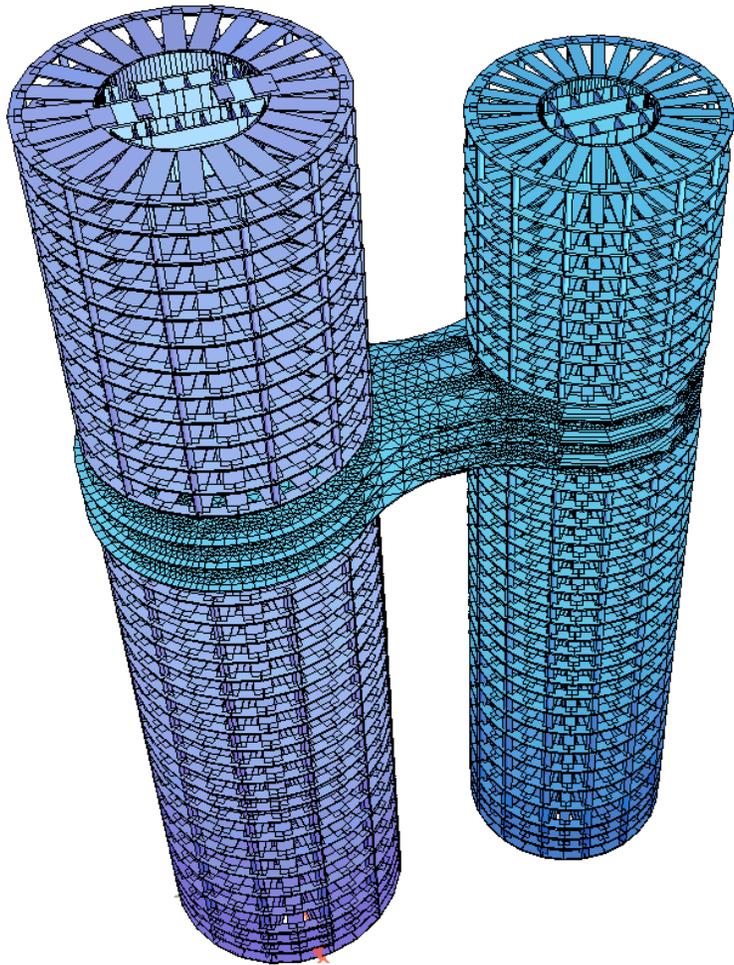


Hospes Huerto del Emir Hotel, Murcia

Client: FCC

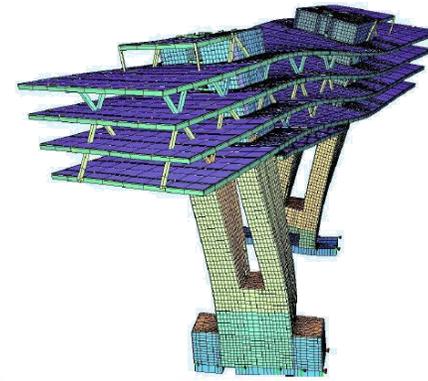
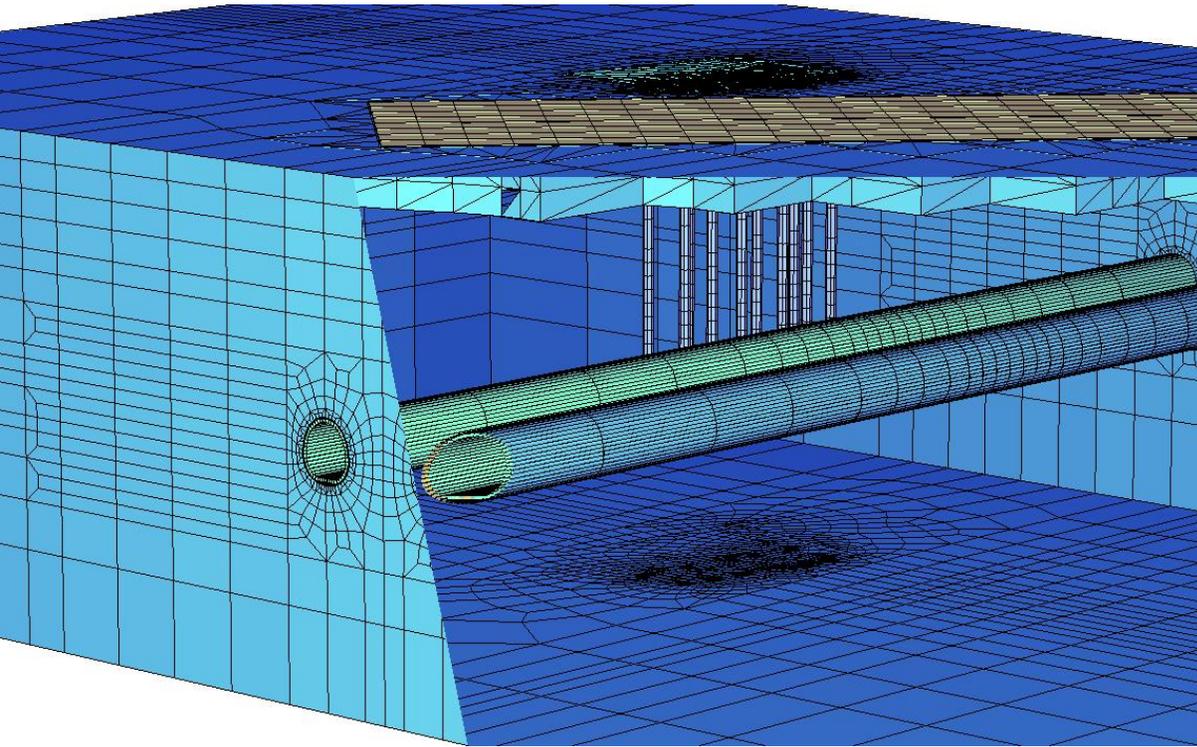
Architects: Francisco Lorente, Rafael Masaveu, Mariano Sánchez, José Luis Cano Clares

Structural Design: Calter Ingeniería, Madrid



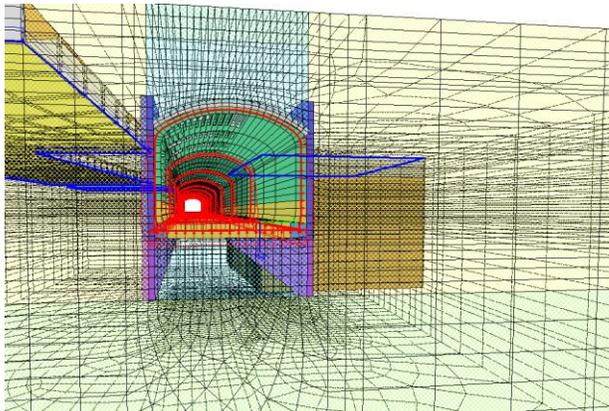
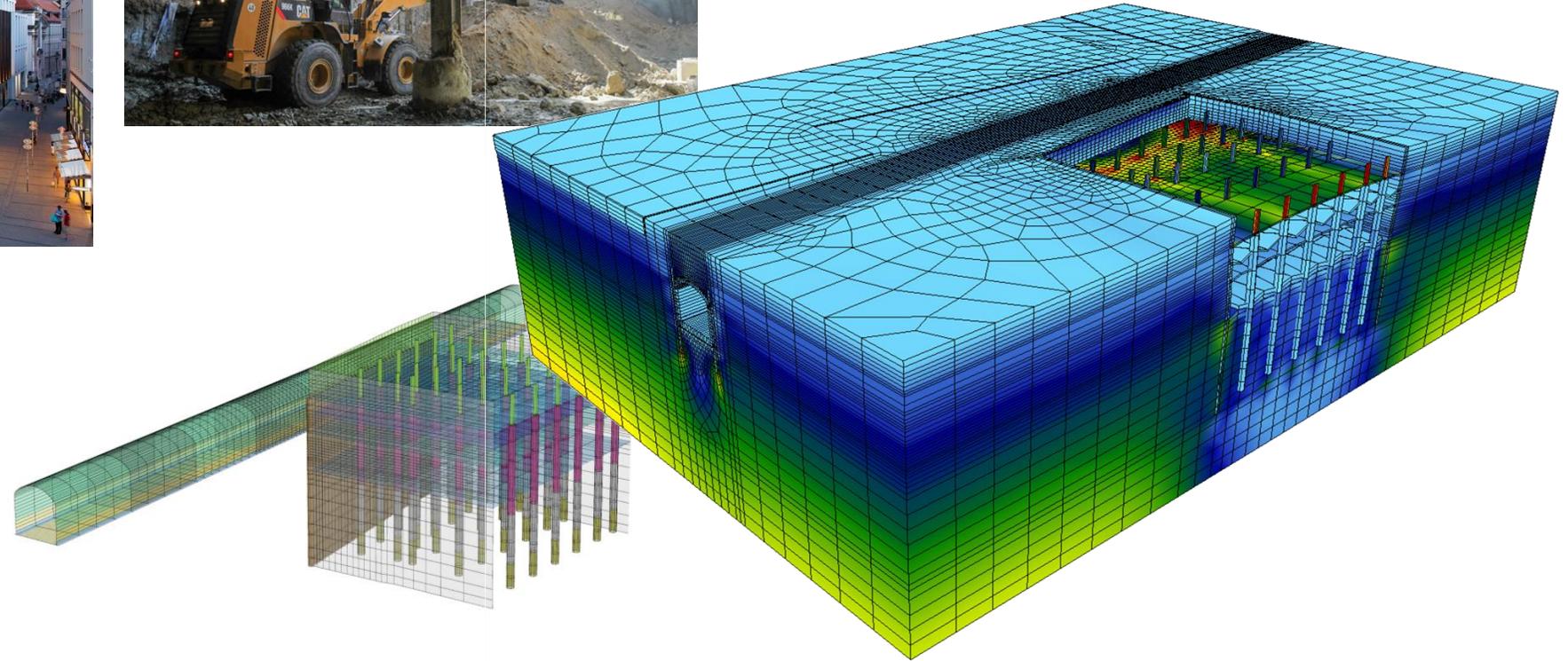
Z-Tower in Riga

Consultant: Pöyry
3D Building model, detailed and global model, construction stages incl creep&shrinkage



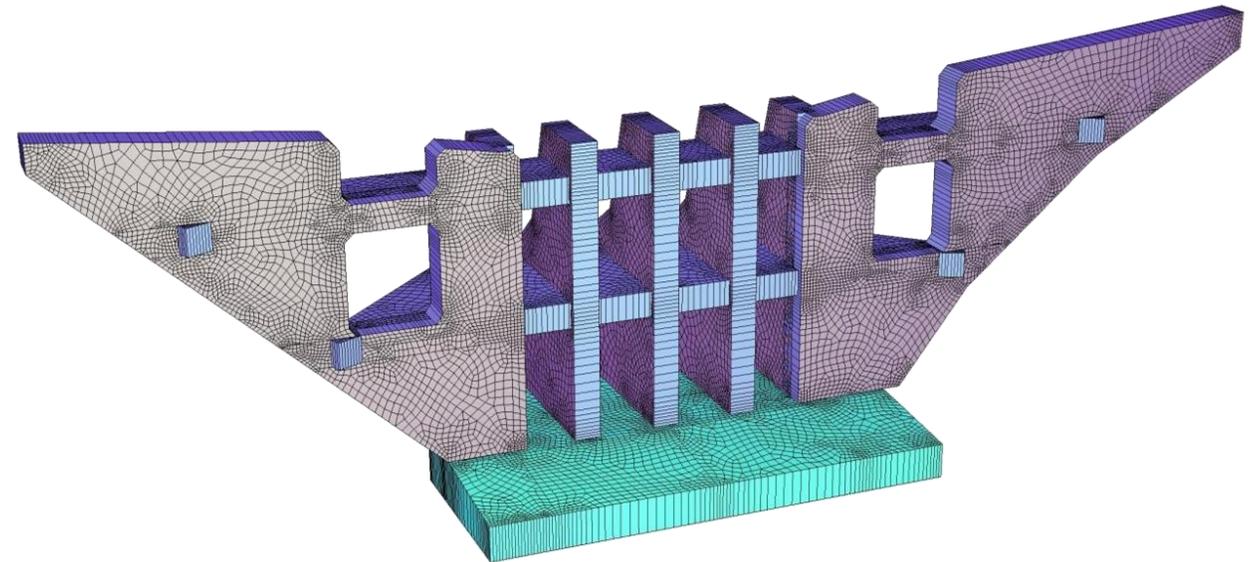
Media Bridge Munich | Soil-Structure Interaction between existing Metro

Tunnels and Media-Bridge Building, Munich
Client: IVG Development, München
Architect: Steidle Architekten
Engineering: bwp Burggraf + Reiminger



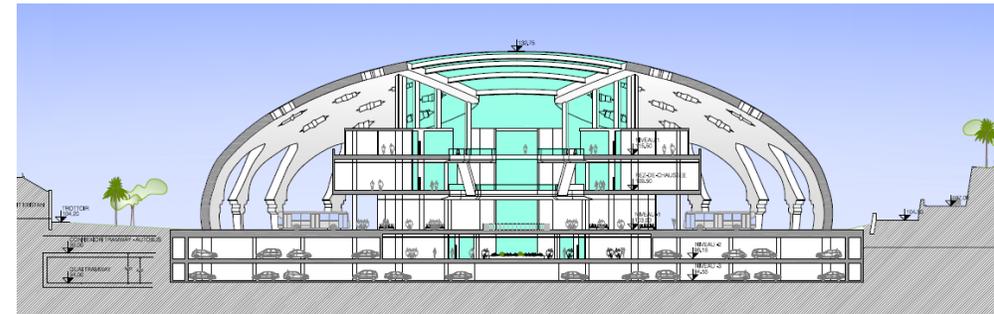
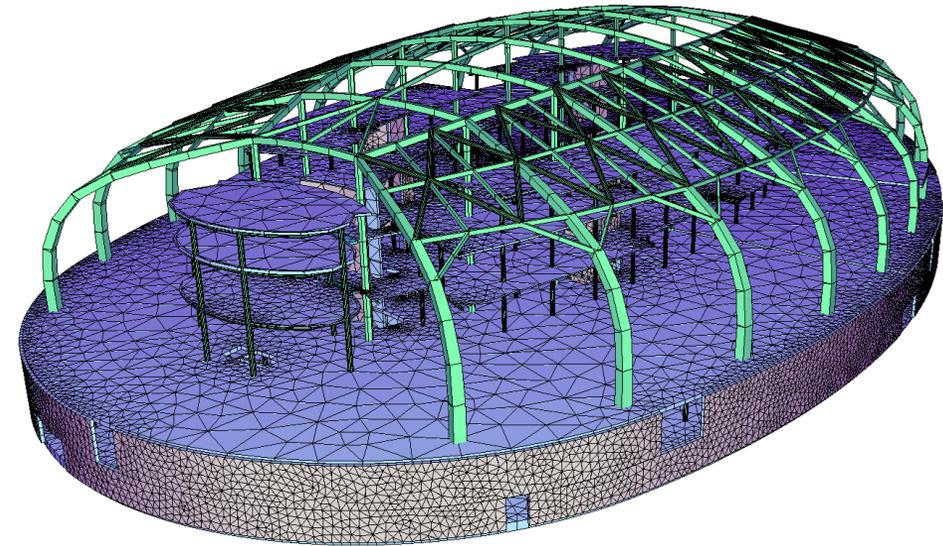
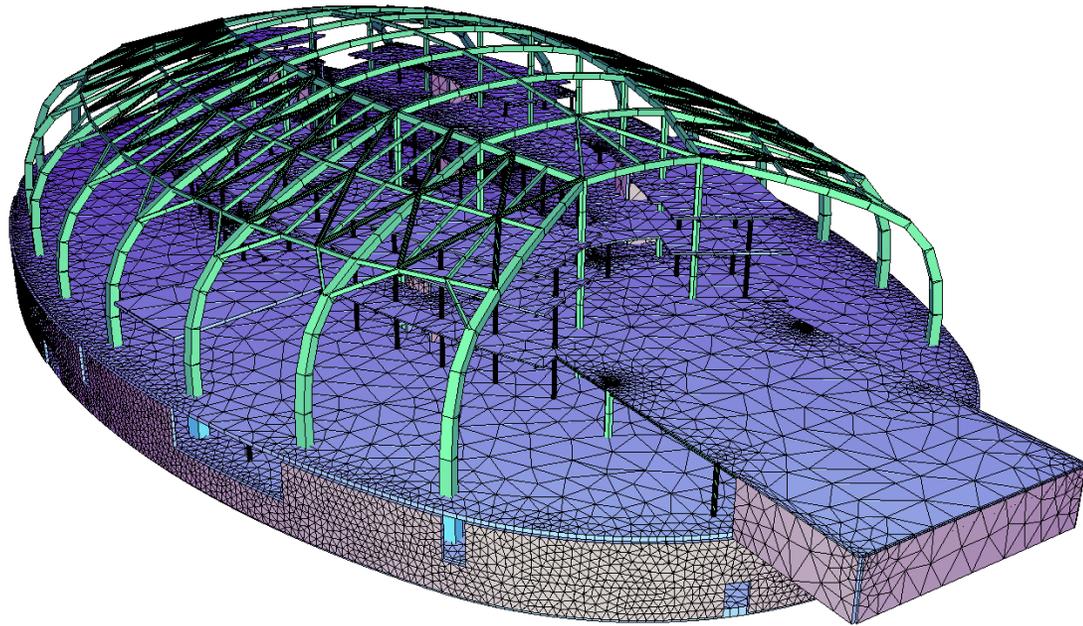
Joseph-Pschorr-Building | Munich Soil-Structure Interaction | Excavation and existing Metro Tunnel (S-BAHN Stammstrecke)

Client: Bayerische Hausbau GmbH & Co. KG, München
Architect: Kuehn Malvezzi GmbH, Berlin
Engineering: ZM-I, Zilch Müller Ingenieure München



Timmelbach avalanche breaker, Prägraten am Großvenediger, Austria

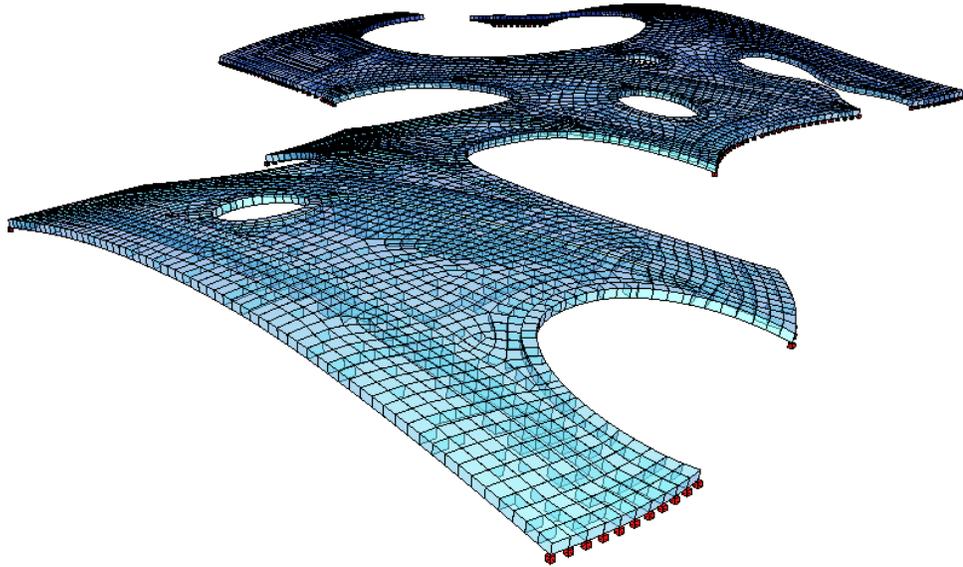
Width 69 m | Height 23 m | Anchored, pre-stressed reinforced concrete barrier | Protection from snow avalanches and debris flows through energy dissipation
 Client, project planning & execution: Torrent and Avalanche Control, Regional Construction Management East Tyrol, Tyrol Section
 Structural engineers: Elea iC, a member of iC group, Ljubljana, Slovenia



Argel's Intermodal station, Algeria.

Client: Achitecture and Global Project: Tecnia Ingenieros, Structural Design: SILGA, S.L., Madrid
L = 170m; Transvers arches over 100m span.

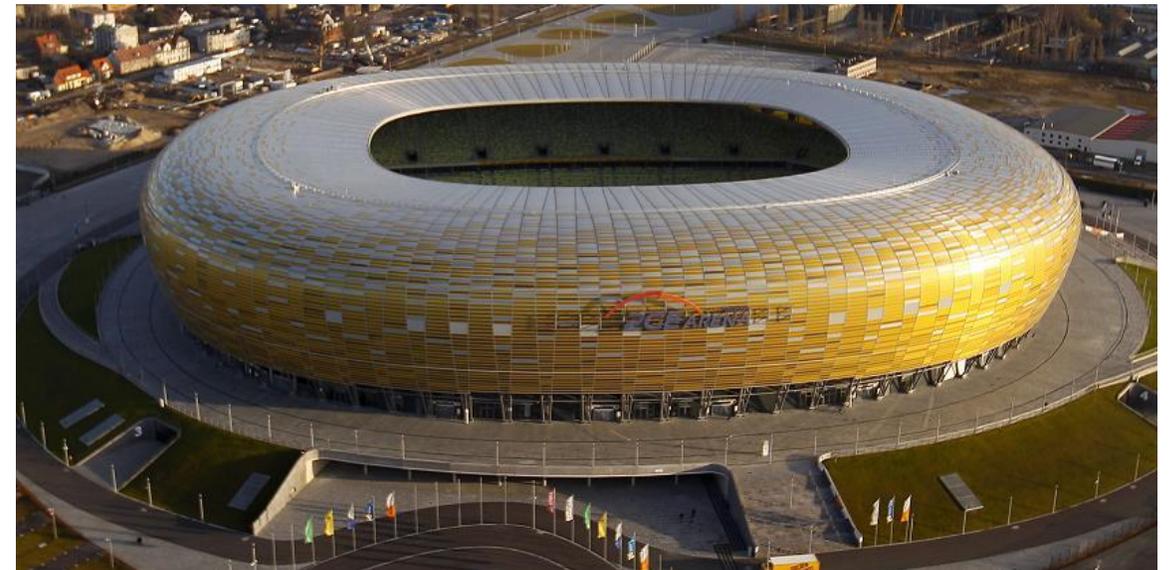
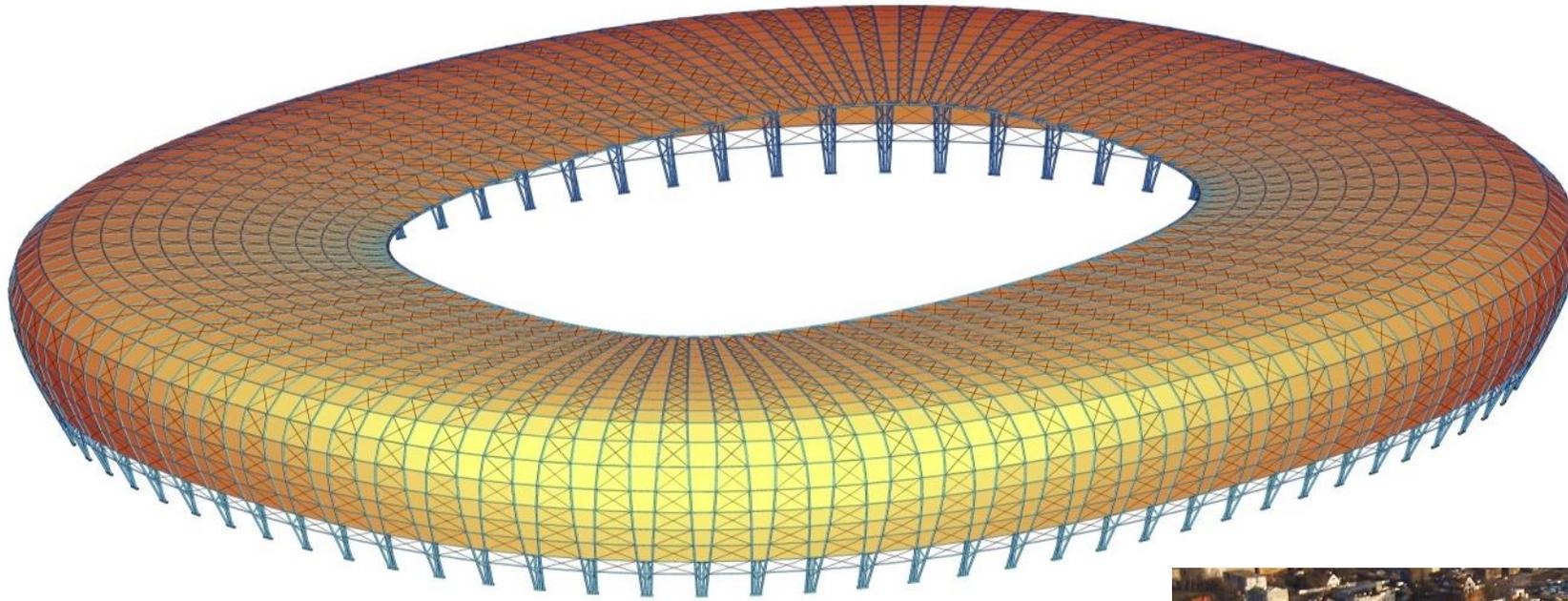




Rolex learning center, EPFL, Lausanne

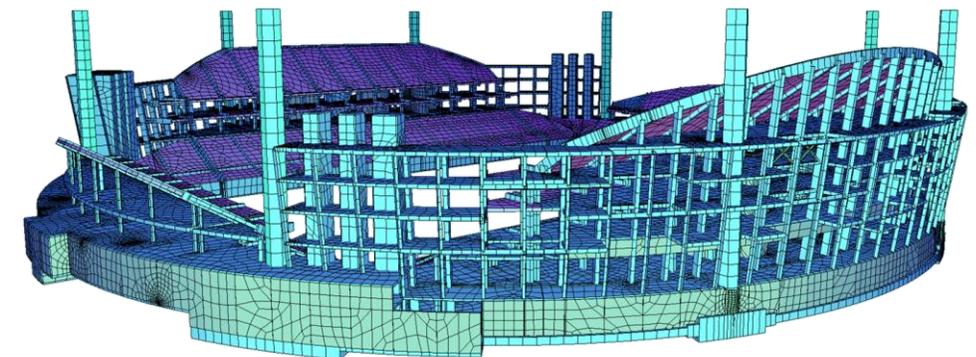
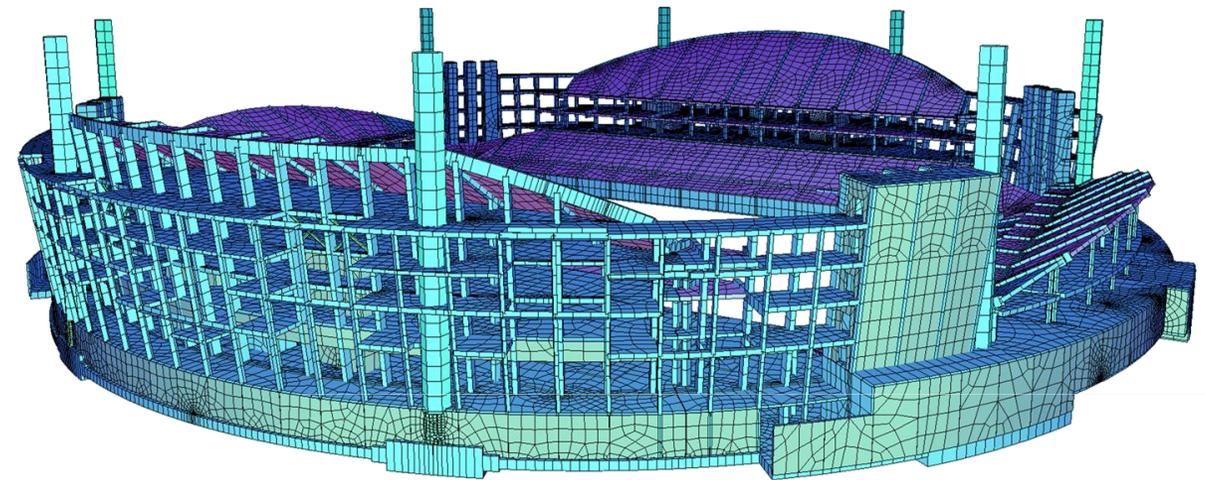
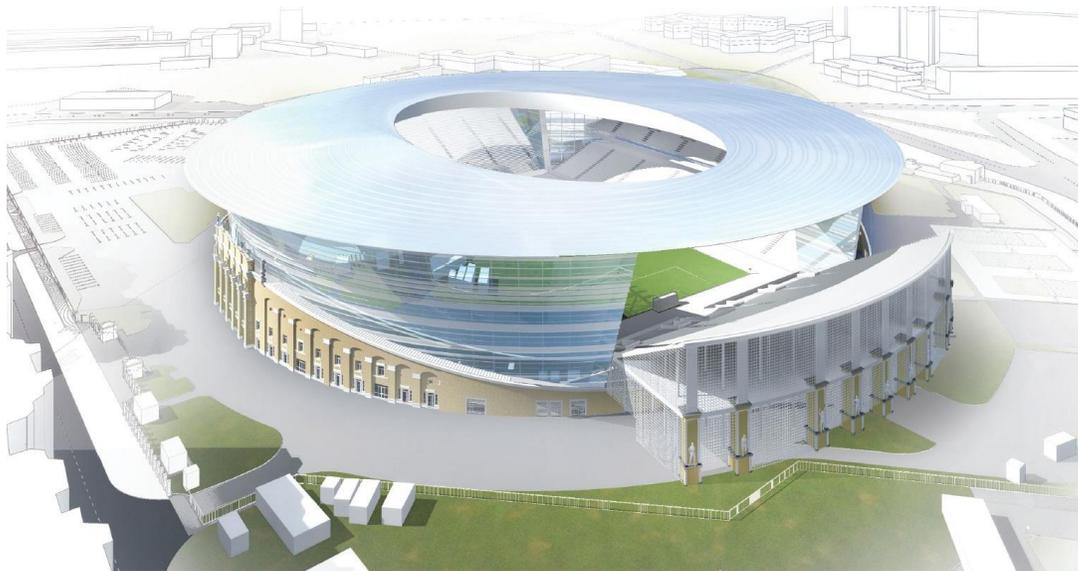
Consultant: Bollinger Grohmann

Comment: Formfinding, stability, local buckling, cracked concrete



PGE Arena Gdansk, Poland

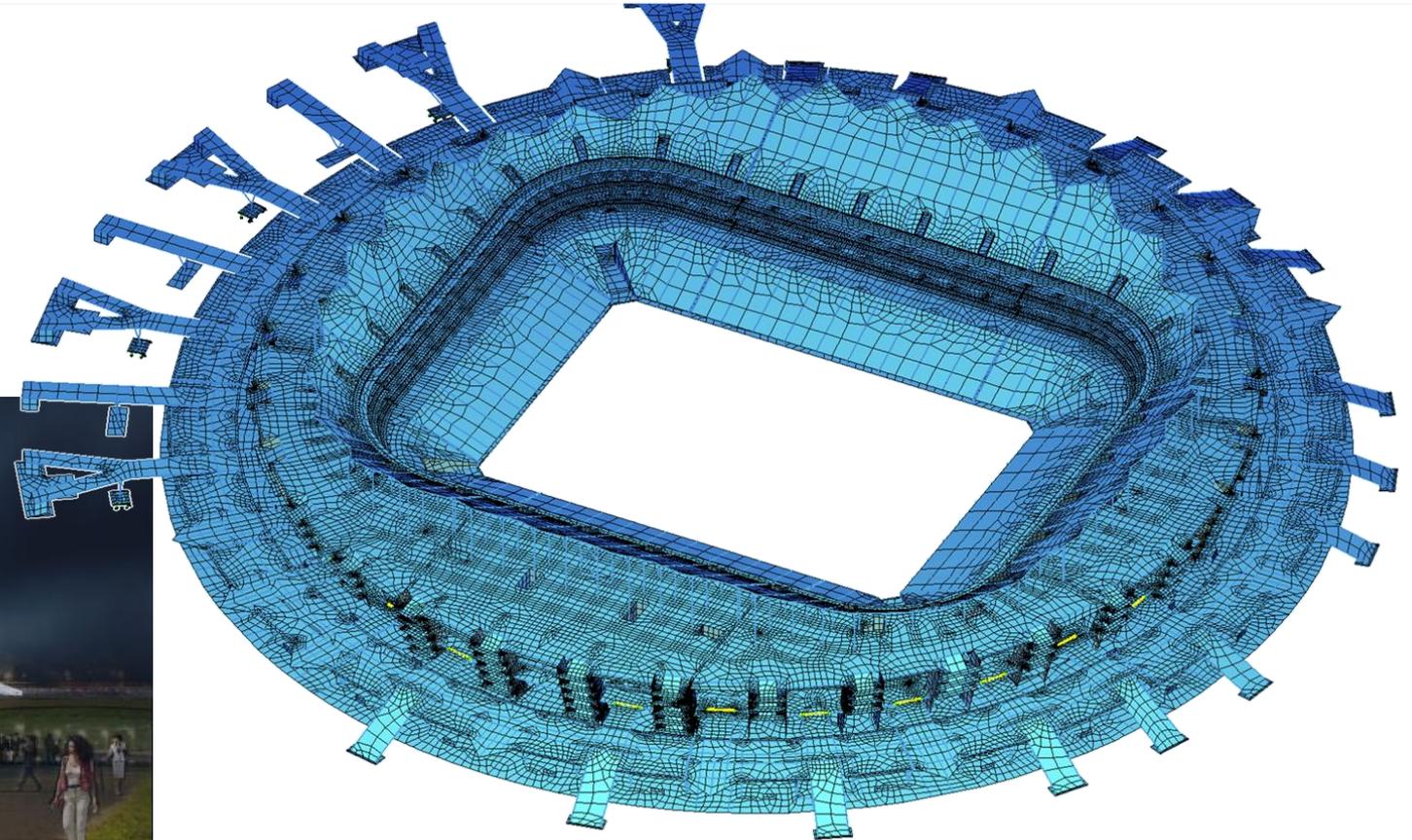
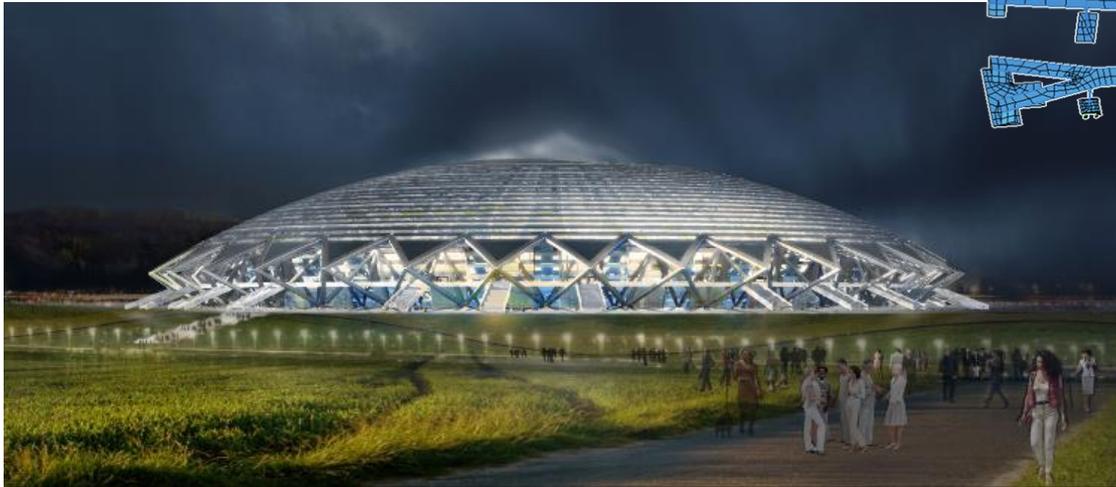
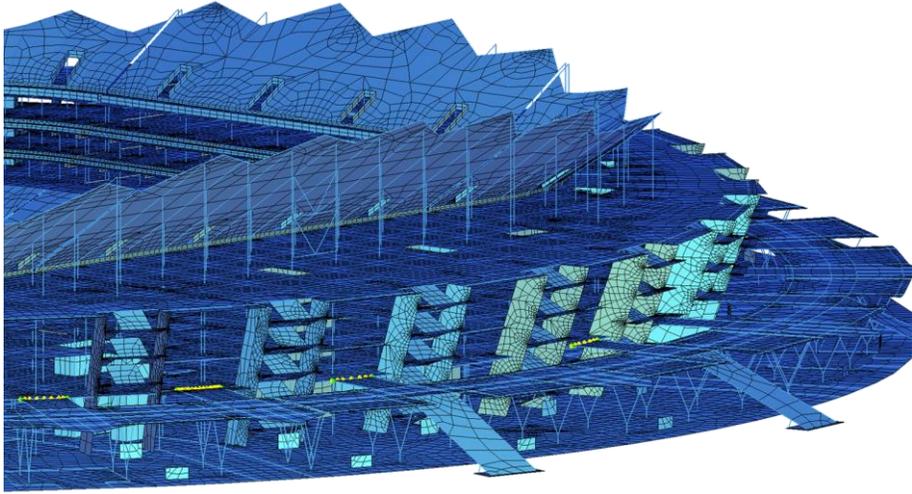
Architect: RKW Rhode Kellermann Wawrowsky,
HPP Hentrich Petschnigg & Partner
Engineering: B+G Ingenieure Bollinger und Grohmann
Engineering Steel-Roof and Membrane: KBP Zoltowski



„Yekaterinburg Arena“ | Football Stadium for 2018 Worldcup | Yekaterinburg, Russia

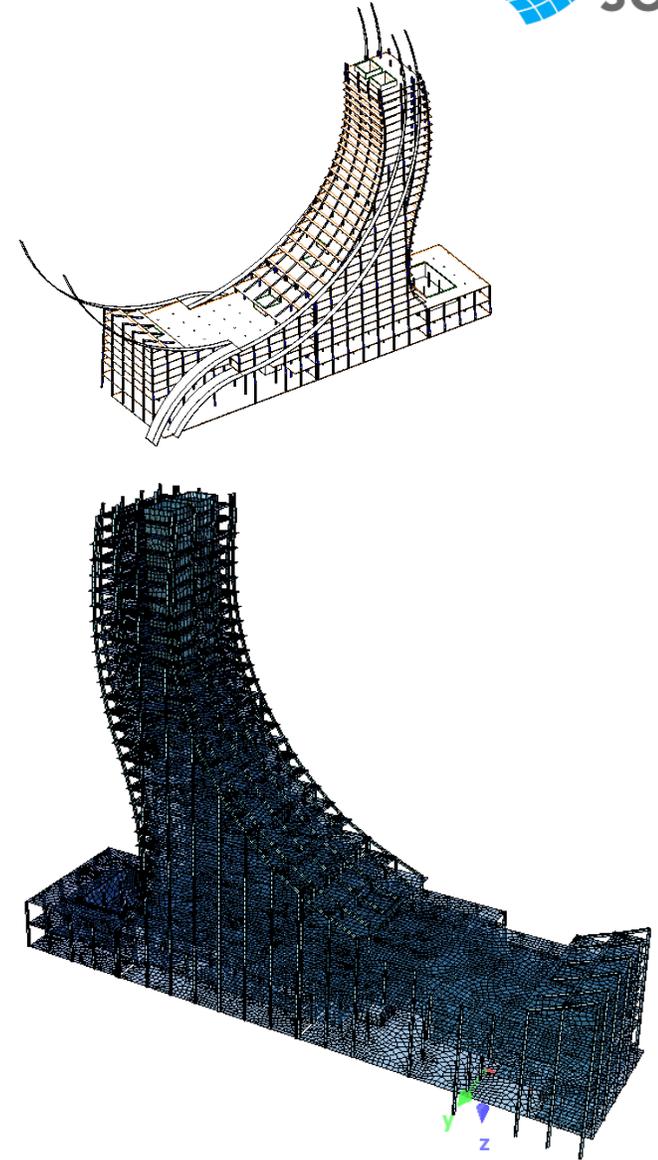
Total area: 60.000 sqm | Multi-story monolithic reinforced frames surrounding the football field | Contour diameter 178 m
 Structural Design INFORCEPROJECT, Moscow, Russia | Architect: Dmitry Bush, Oleg Gak - PI Arena
 Client: PI Arena, Ltd





„Samara Arena“ | Football Stadium for 2018 Worldcup | Samara, Russia

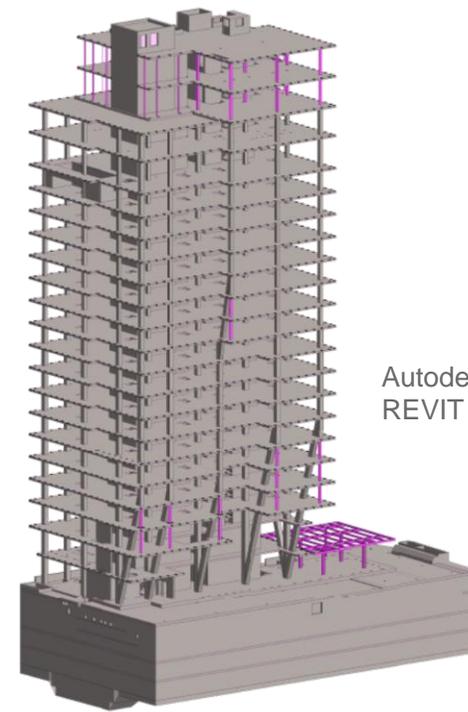
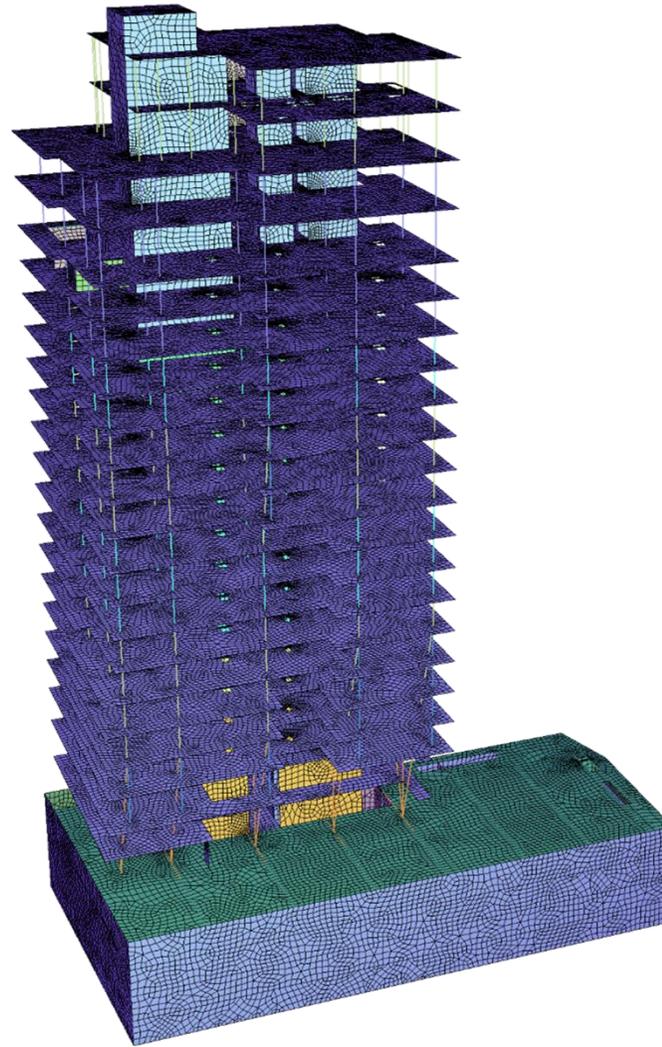
Total area: 153.000 sqm | Complex of monolithic reinforced frames perpendicular to the football field
 Structural Design INFORCEPROJECT, Moscow, Russia | Architect: Dmitry Bush, Oleg Gak - PI Arena
 Client: PI Arena, Ltd



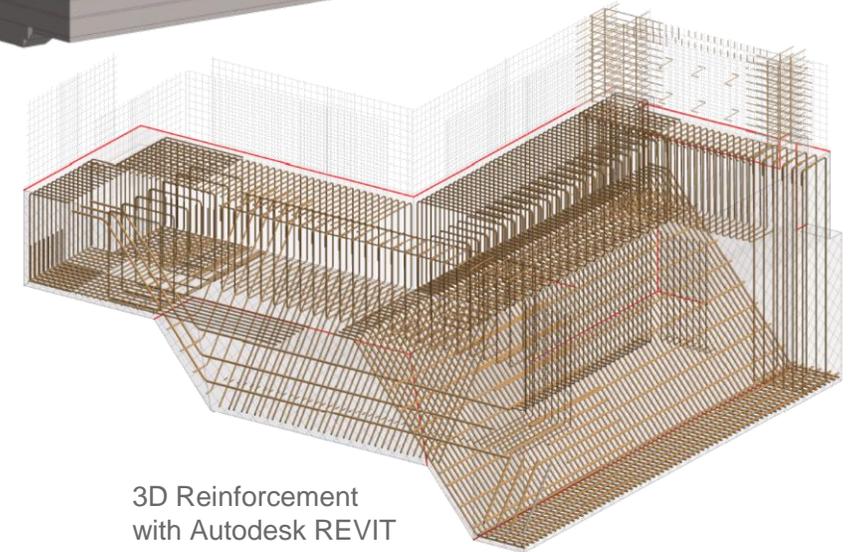
Lusail Katara Hotel, Qatar | BIM Workflow

Client: Katara Hospitality, Doha (Katar)
General Planning: Kling Consult Planungs- und Ingenieurgesellschaft für Bauwesen





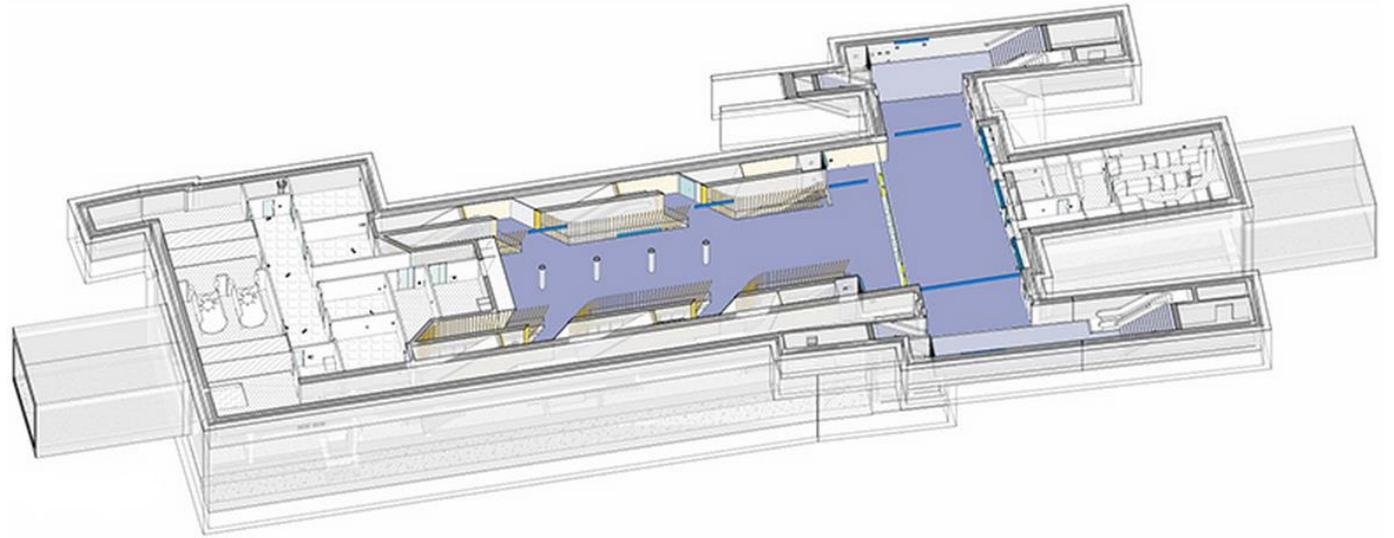
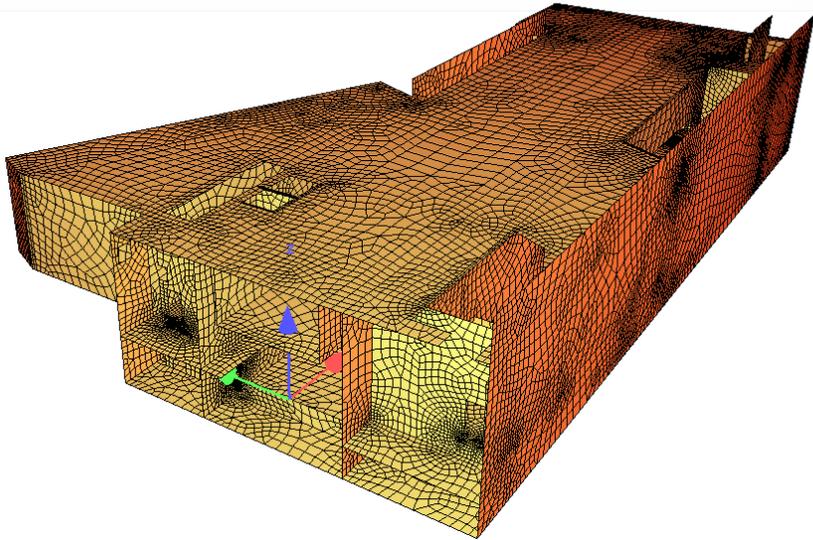
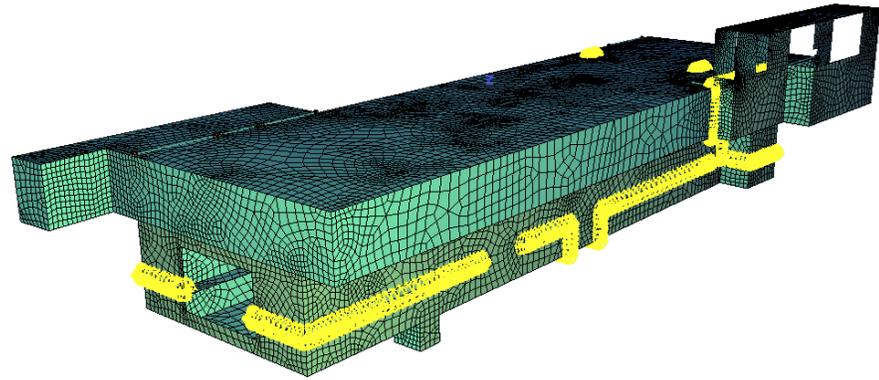
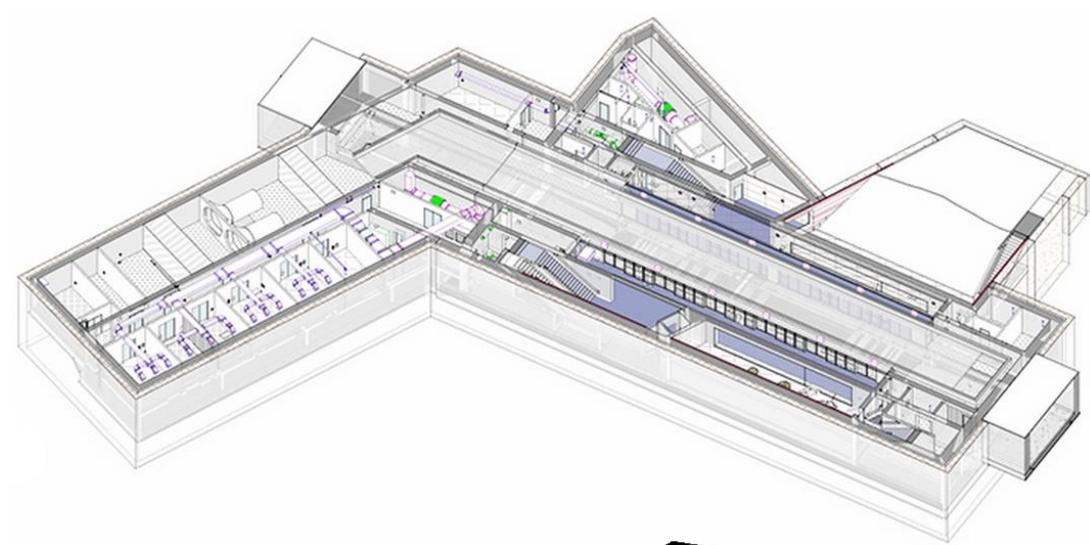
Autodesk
REVIT Modell



3D Reinforcement
with Autodesk REVIT
and Reinforcement
Detailing (RCD)

Hotel Intercontinental, Ljubljana, Slovenia | BIM Workflow

Height 81,25 m | Inclined composite columns | Post-tensioned reinforced hangers | Opening 2017
Structural Design: Elea iC, a member of iC group, Ljubljana, Slovenia | Architect: Ofis arhitekti, Ljubljana

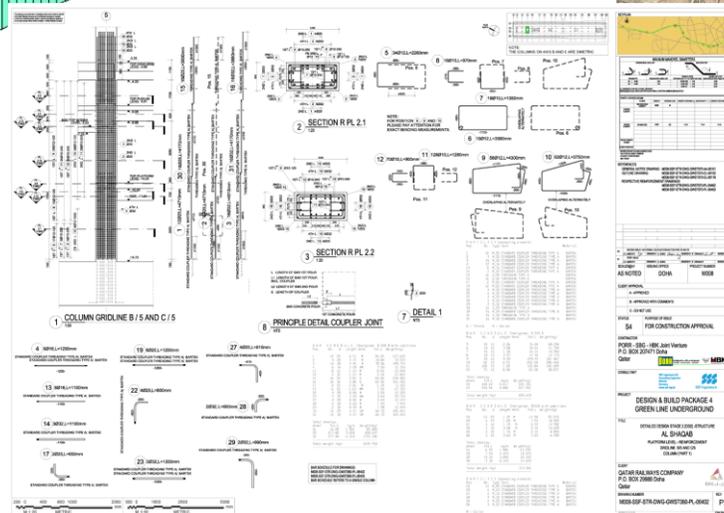
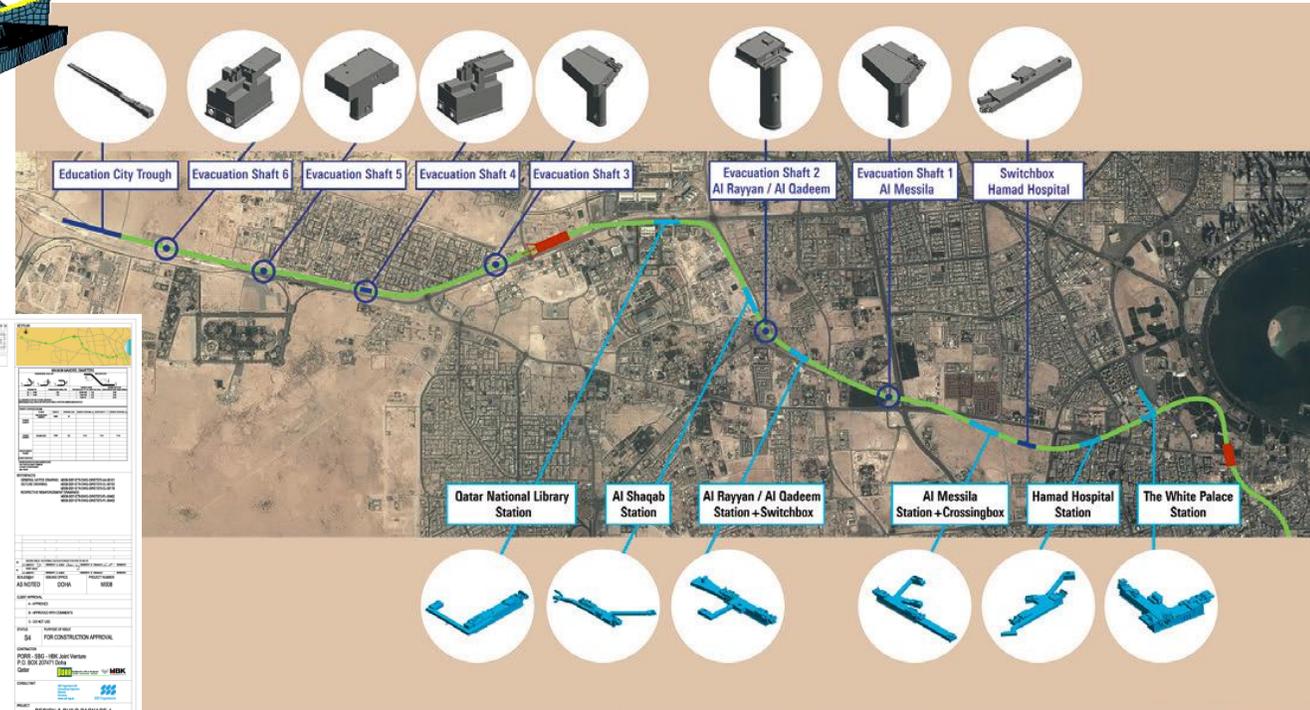
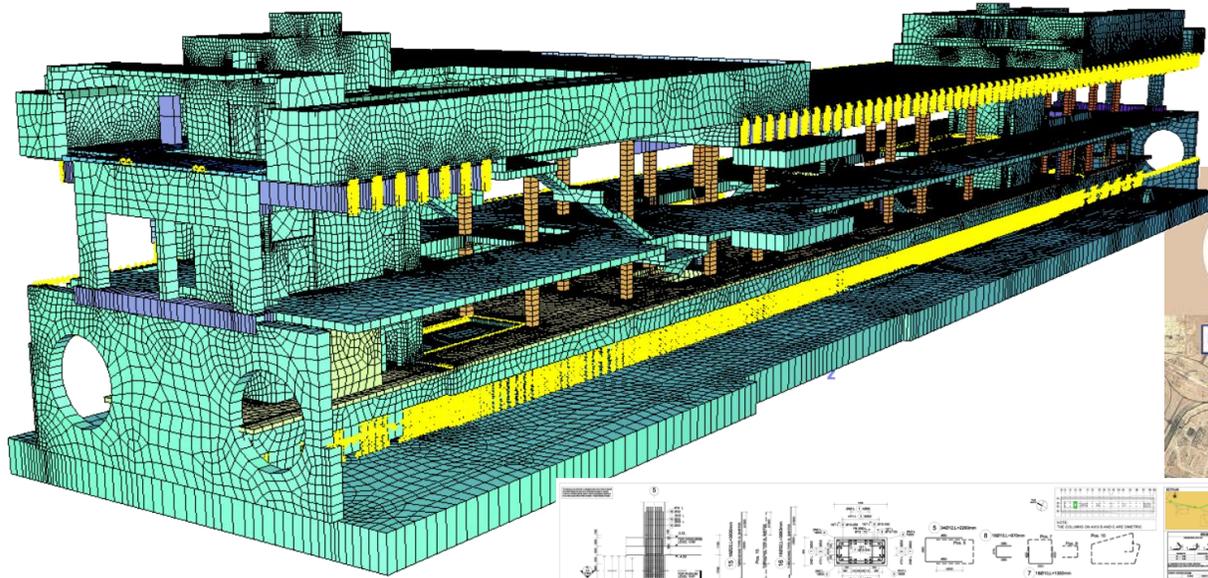


Underground stations Rennes, France

Engineering: Groupe Legendre-Ingénova

Software: Autodesk Revit Structure + SOFiSTiK FEM Software

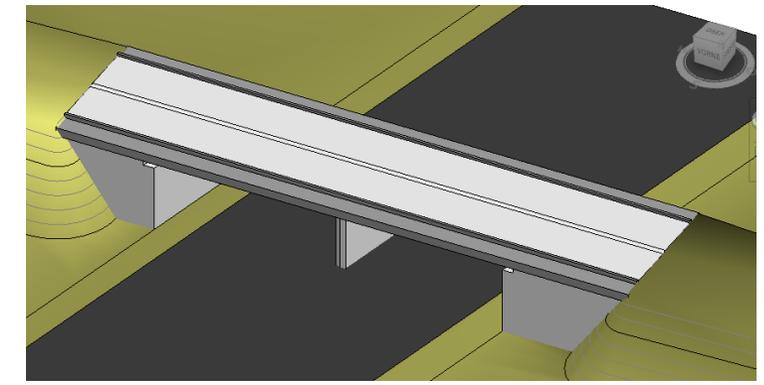
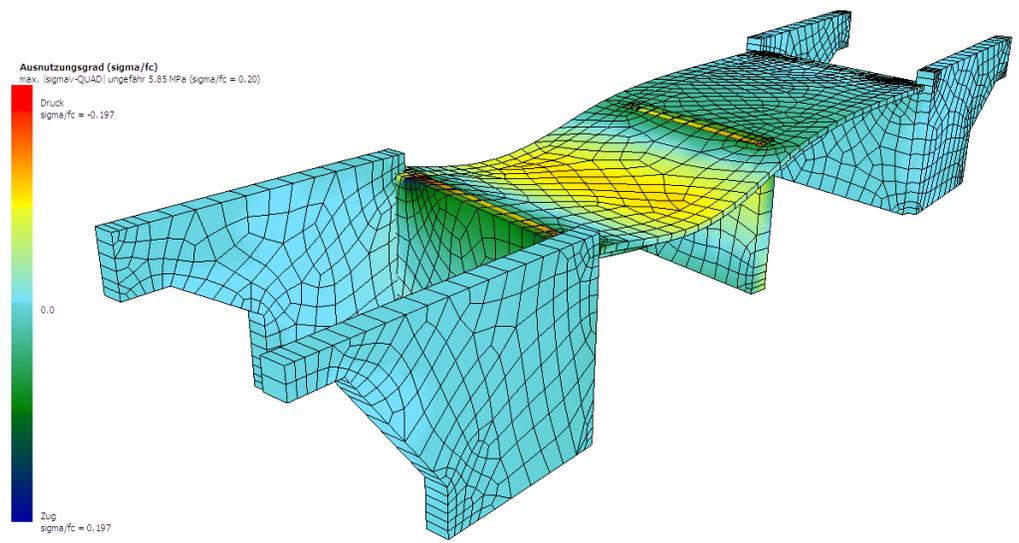
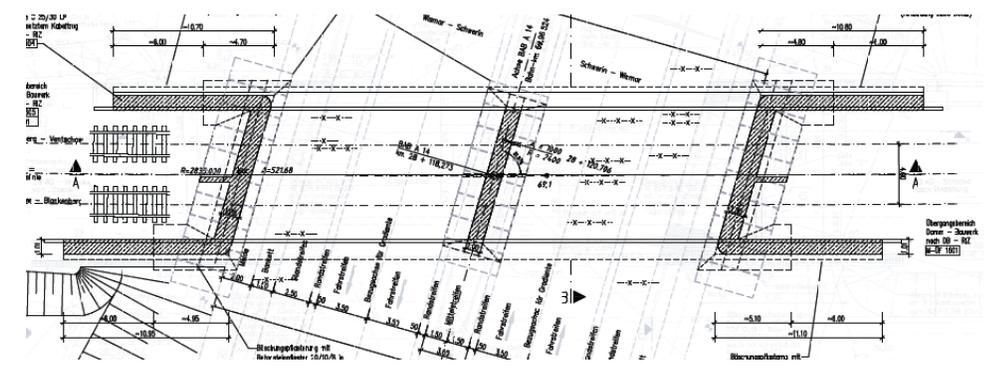
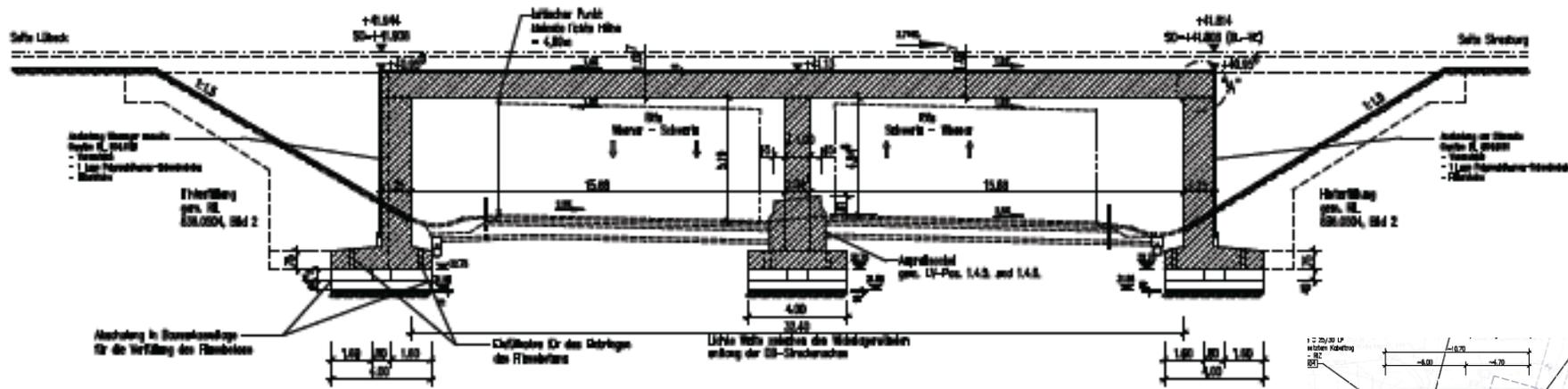




Metro Doha, Qatar | Green Line Underground | 6 Metro Stations & 8 additional Structures in BIM

Fully Integrated BIM | Architecture, Structure, Mep, etc | Full Revit SOFiSTiK RCD Workflow
 Consultant: SSF Ingenieure AG
 Client: Qatar Railways

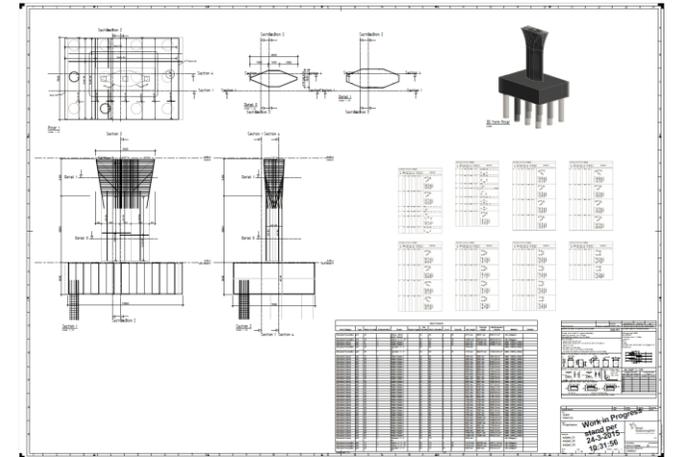
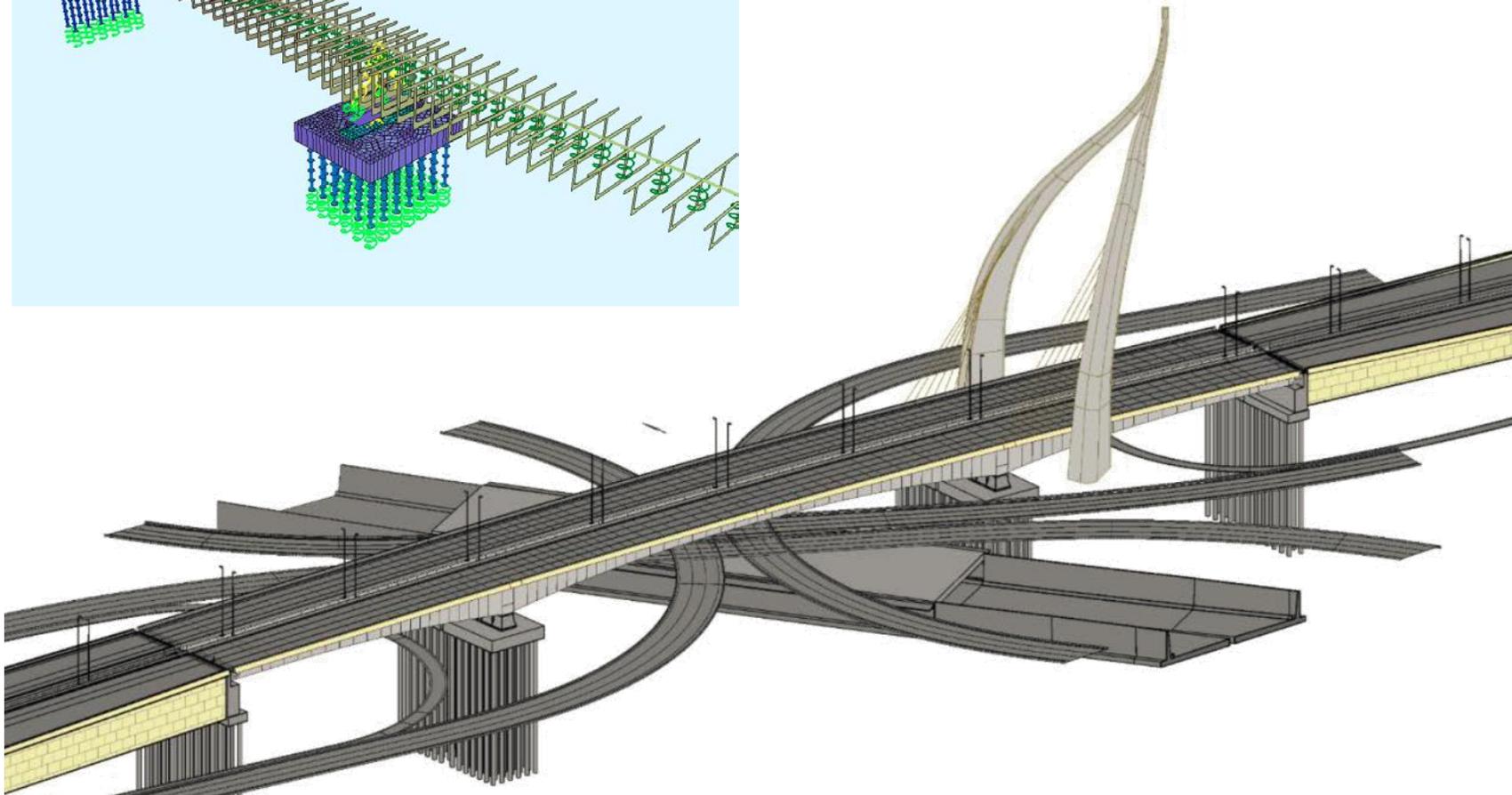
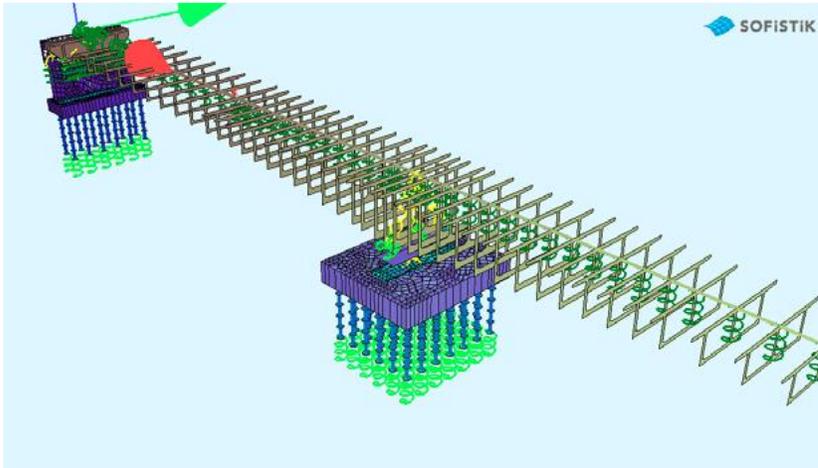




Highway Bridge | BIM Workflow (2012)

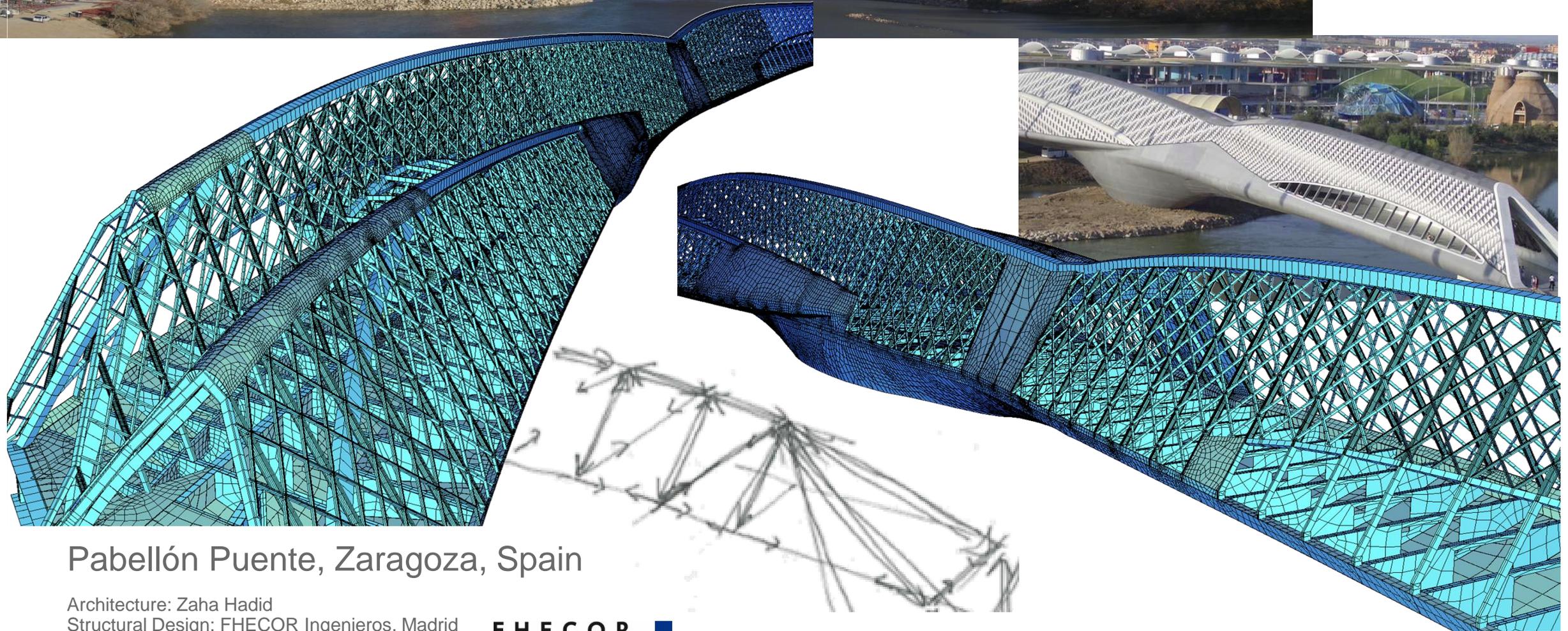
Engineering: Obermeyer Planen + Beraten GmbH
 Software: Autodesk Revit Structure + SOFiSTiK FEM Software





Bridge Engineering with BIM 2016 | Balanced Cantilever Bridge KAASKAR (Jeddah)

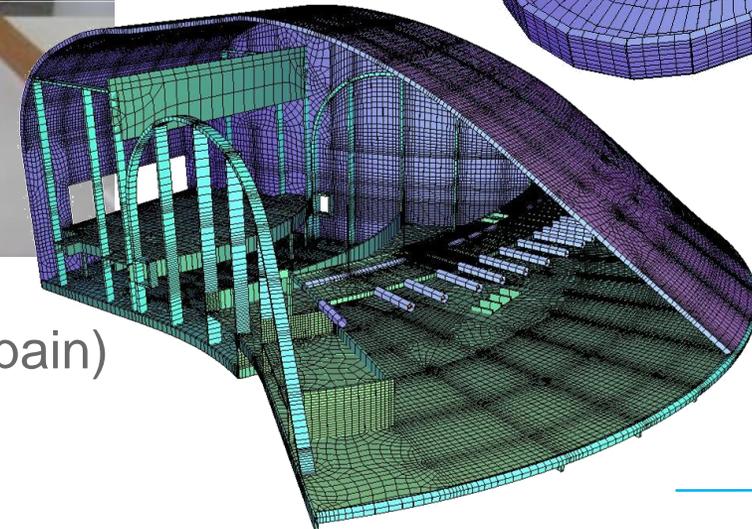
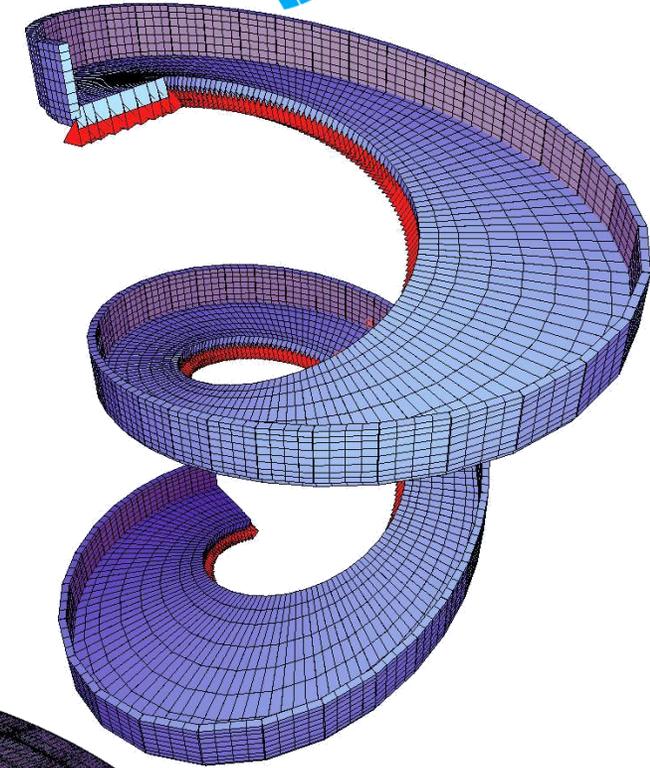
Length 374 m | Main Span 174 m | Side Span 100 m
 Engineering: Royal Haskoning DHV
 Software: Autodesk REVIT + SOFiSTiK FEA + Reinforcement Detailing



Pabellón Puente, Zaragoza, Spain

Architecture: Zaha Hadid
Structural Design: FHECOR Ingenieros, Madrid
Total length = 250m (100m & 150m)

FHECOR ■
Ingenieros Consultores



Oscar Niemeyer Cultural Centre Auditorium in Aviles (Spain)

F H E C O R ■
Ingenieros Consultores



My work is not about “form follows function” but “form follows beauty, or even better, “form follows feminine.” by Oscar Niemeyer

