TBT Tunnel and Bridge Technologies

Tunnel and Bridge Technologies
Spain & Canada

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Company Introduction

Tunnel and Bridge Technologies S.L. is a civil engineering consulting firm that focuses on the design of bridges, outstanding structures and underground construction. Founded in 2001 by Civil Engineers with extensive national and international experience, has been developing its work with the confidence of administrations and construction companies.

Tunnel and Bridge Technologies Inc, the Canadian branch, is partner of EWE+ General Partnership which provides consultant services on structures and geotechnics.

Quality policy

Tunnel and Bridge Technologies Quality Management System is certified by SGS as a demonstration of compliance with the international standard ISO 9001: 2015.

Our mission is to be a benchmark for all our customers and actively contribute to social welfare and creating value, maximizing the profitability of the resources used and minimizing the environmental impact of our activities.

Technical Services

TBT provides technical services in all structural specialities.

- Detailed design of Bridges and Viaducts
- Underground Construction
- Residential and Industrial Buildings
- Construction Engineering
- Specialized Services
- Structural monitoring and inspection
- BIM models

References Bridges and Viaducts

Alamillo Bridge, Spain
Design Supervision, wind tunnel studies, construction procedure and monitoring

Long Span Bridge

Characteristics: Span length: 200m
Cable stay bridges

References Bridges and Viaducts

Port Forum Footbridge, Spain
Detailed Design & Construction Supervision

Long Span Bridge

Characteristics: Overall length : 210 m
Span length: 140+50 m
Steel truss

References Bridges and Viaducts

Ponte Europa over Mondego River, Portugal **Long Span Bridge**
Verification of erection procedure by FEM

Characteristics: Overall length : 326.55 m
Span length: 45 + 50.625 + 185.625 + 45.3m
Cable stay bridge with spatial composite truss deck

References Bridges and Viaducts

Bridge over Odiel River, Spain
Cable stressing program

Long Span Bridge

Characteristics: Overall length: 170 m
Span length: 85+85 m
2 arches with lower deck

References Bridges and Viaducts

Manzanal Bridges, Spain
Tender Design

Long Span Bridge

Characteristics: Overall length : 425 m
Span length: 65+295+65 m

References Bridges and Viaducts

Soto de Ribera Bridge, Spain
Detailed Design

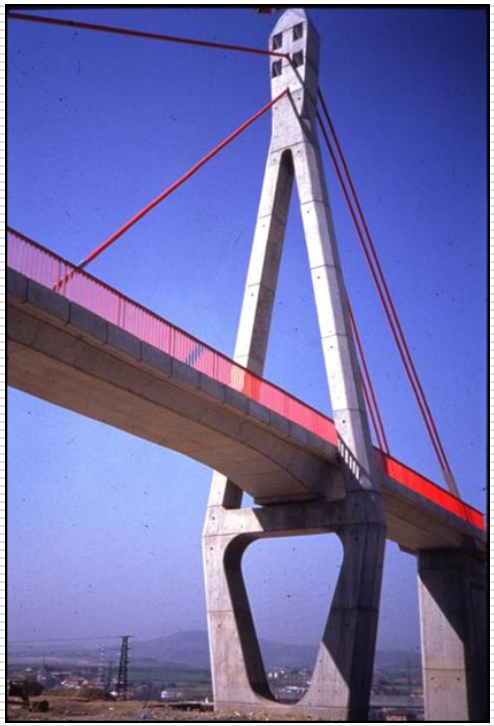
Long Span Bridge

Characteristics: Overall length: 200 m
Span lengt: 10+90+90+10
Cable stay bridge

References Bridges and Viaducts

Txori-Herri Footbridge, Spain
Detailed Design

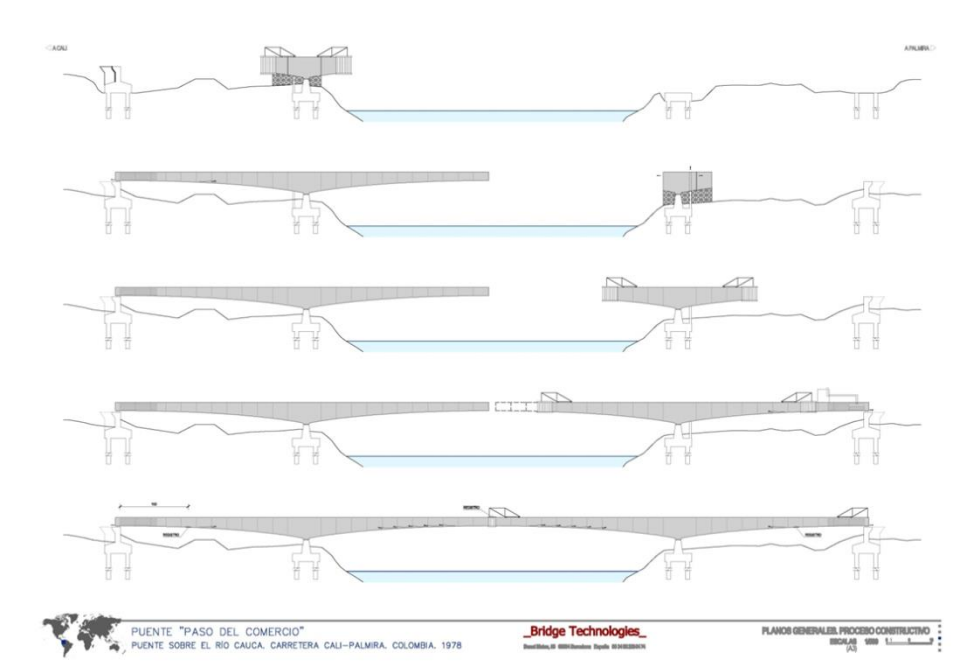
Long Span Bridge



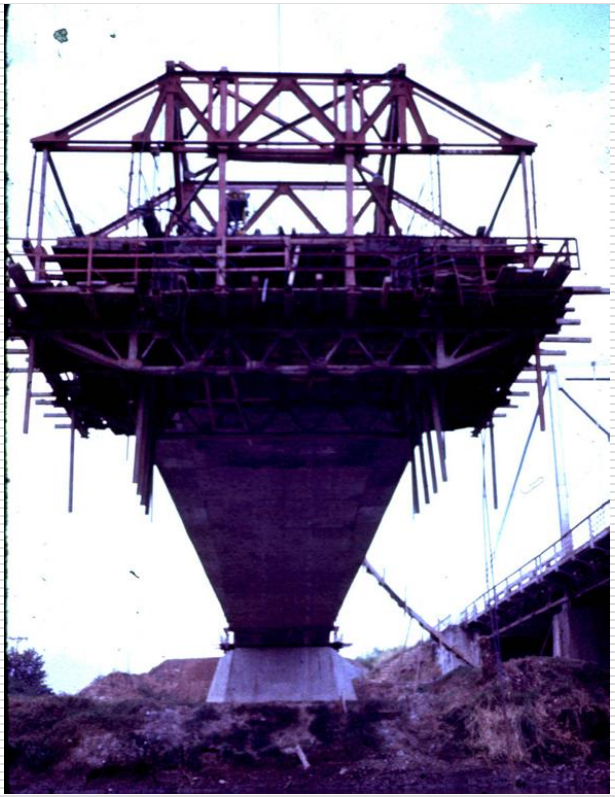
Characteristics: Overall length: 60 m
Span length: 15 + 45 m

References Bridges and Viaducts

Bridge over Cauca River, Colombia
Detailed Design



Balanced Cantilever Bridge

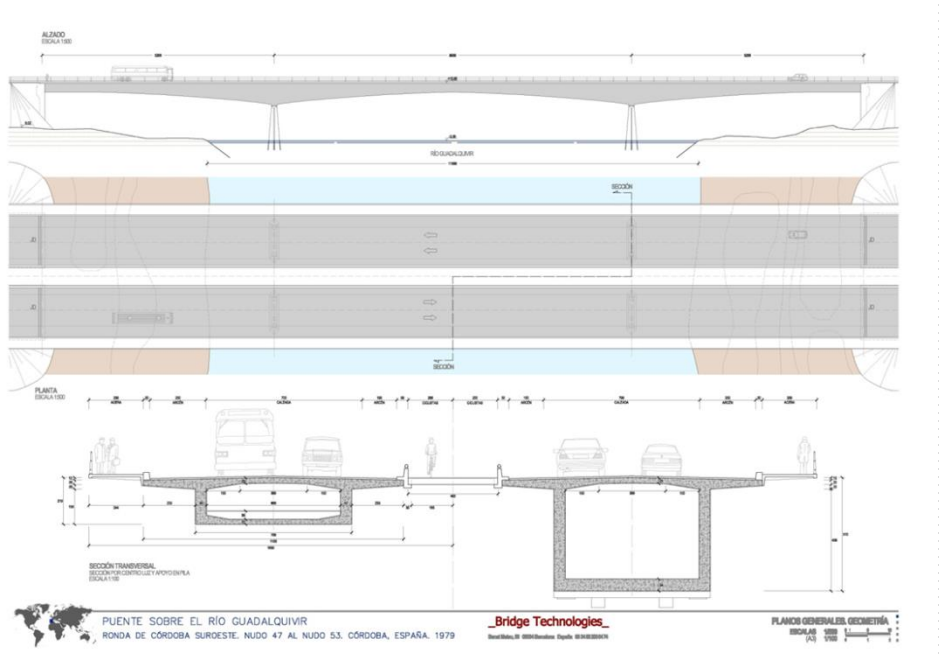


Characteristics: Overall length: 164 m
Main Span length: 82 m

References Bridges and Viaducts

Bridge over Guadalquivir River, Spain
Detailed Design

Balanced Cantilever Bridge

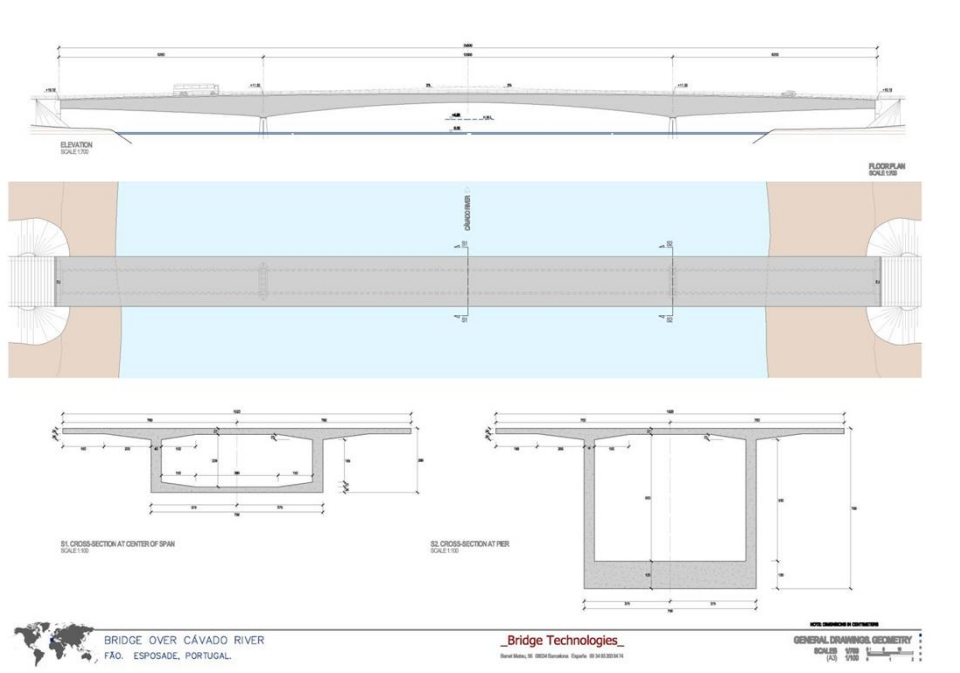


Characteristics: Overall length: 184 m
Span lengths: 52+80+52 m

References Bridges and Viaducts

Bridge over Cavado River, Portugal
Preliminary Design

Balanced Cantilever Bridge

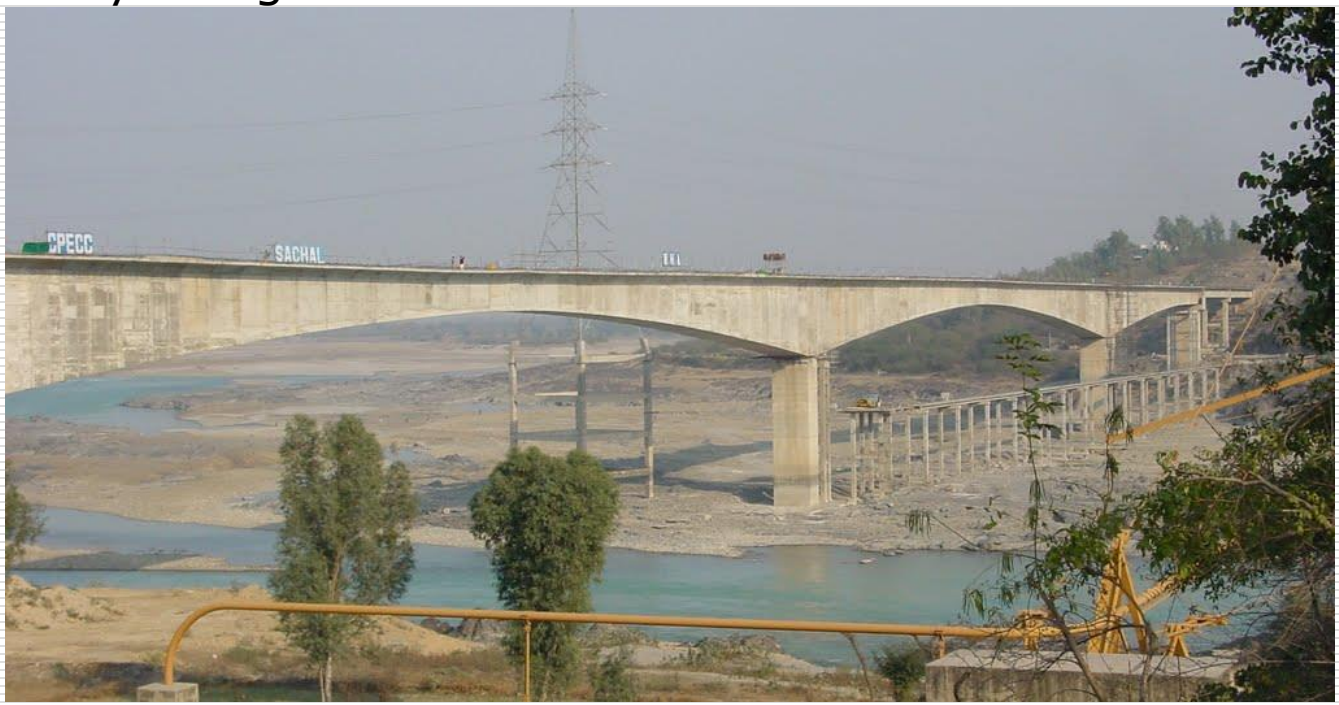


Characteristics: Overall length: 250 m
Span length: 62.5+125+62.5 m

References Bridges and Viaducts

Bridge over Indus River, Pakistan
Preliminary Design

Balanced Cantilever Bridge

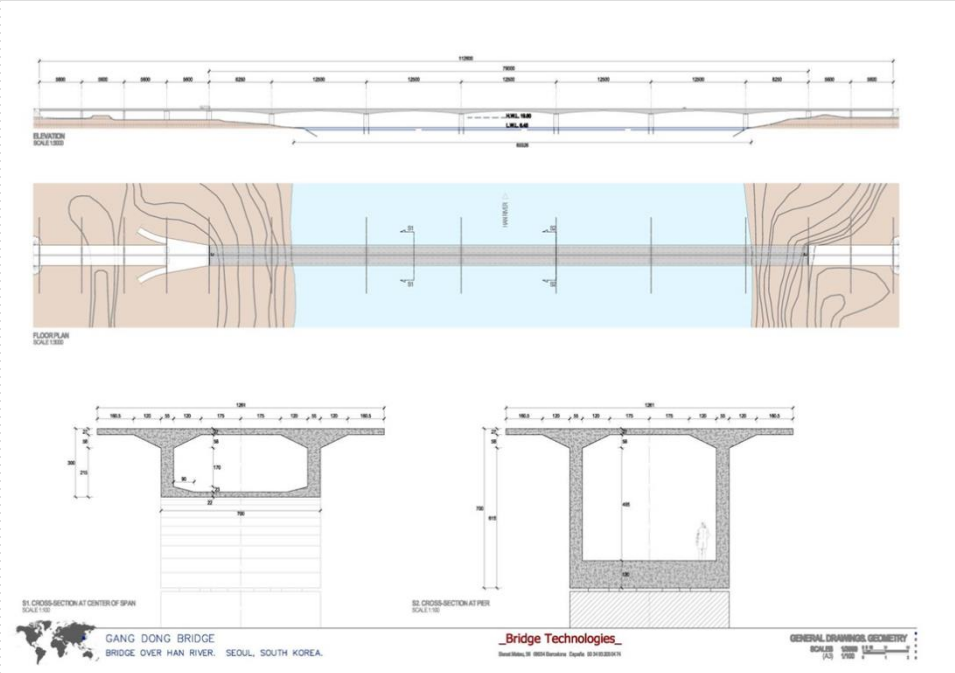


Characteristics: Overall length: 622 m
Span length: 111+200+200+111 m

References Bridges and Viaducts

Bridge over Han River, Korea
Preliminary Design

Balanced Cantilever Bridge



Characteristics: Overall length: 1,126 m
Span length: 4x56+82.50+5x125+82.50+2x56 m

References Bridges and Viaducts

Caboters Viaduct, Spain
Detailed Design

Railway Bridge

Characteristics: Overall length: 422 m
Main Span length: 47 m

References Bridges and Viaducts

Can Fares Viaduct, Spain
Detailed Design

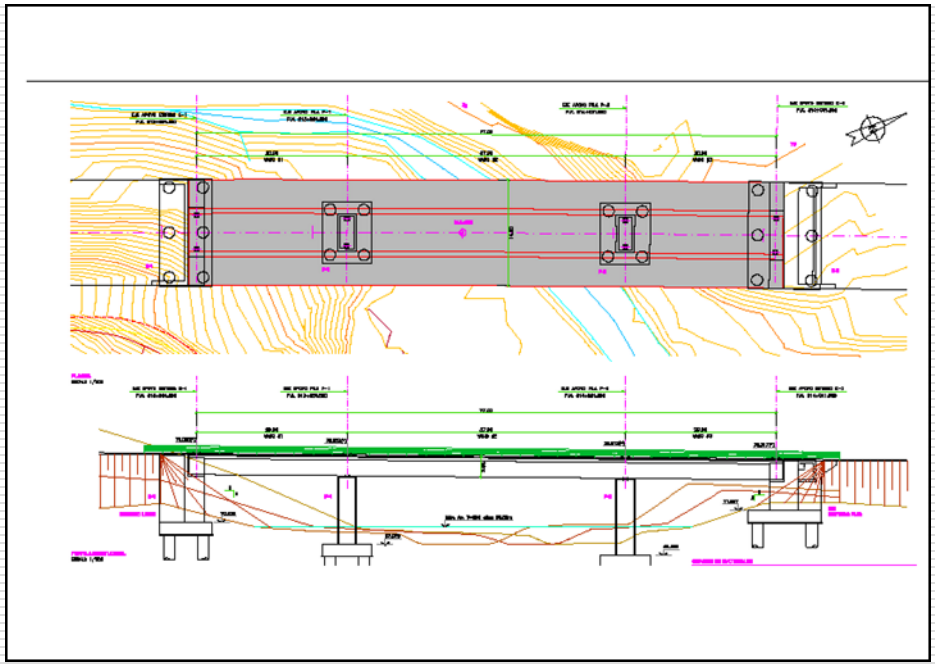
Railway Bridge

Characteristics: Overall length: 100 m
Span lengths: 27.5 + 45 + 27.5 m

References Bridges and Viaducts

Casinyola 1 Viaduct, Spain
Detailed Design

Railway Bridge



Characteristics: Overall length: 77 m
Span lengths: 20 + 37 + 20 m
Cross - section: Prestressed Concrete Box Girder

References Bridges and Viaducts

Casinyola 2 Viaduct, Spain
Detailed Design

Railway Bridge

Characteristics: Overall length: 127 m
Span lengths: 26.5 + 37 + 37 + 26.5 m
Cross – section: Prestressed Concrete Box Girder

References Bridges and Viaducts

Cinyana Viaduct, Spain
Detailed Design

Railway Bridge

Characteristics: Overall length: 96 m
Span lengths: 15+22+22+22+15 m
Cross – section: Hollow core slab

References Bridges and Viaducts

Fluvià Viaduct, Spain
Detailed Design

Railway Bridge

Characteristics: Overall length: 835 m
Typical span length: 60 m (Max. span: 70 m)
Cross – section: Prestressed Concrete Box Girder

References Bridges and Viaducts

Santa Ana Viaduct, Spain
Detailed Design

Railway Bridge

Characteristics: Overall length: 220 m
Span length: 35+45+60+45+35 m
Cross – Section: Prestressed Concrete Box Girder

References Bridges and Viaducts

Espinazo Viaduct, Spain
Pier Design

Railway Bridge

Characteristics: Overall length: 870 m
Typical Span length: 50 m
High earthquake risk area

References Bridges and Viaducts

Salto del Carnero Viaduct, Spain
Pier Design

Railway Bridge

Characteristics: Overall length: 830 + 730 m
Span length: 30 m

References Bridges and Viaducts

Riyadh Metro Line 3 Viaduct, Saudi Arabia
Piers Foundations Design

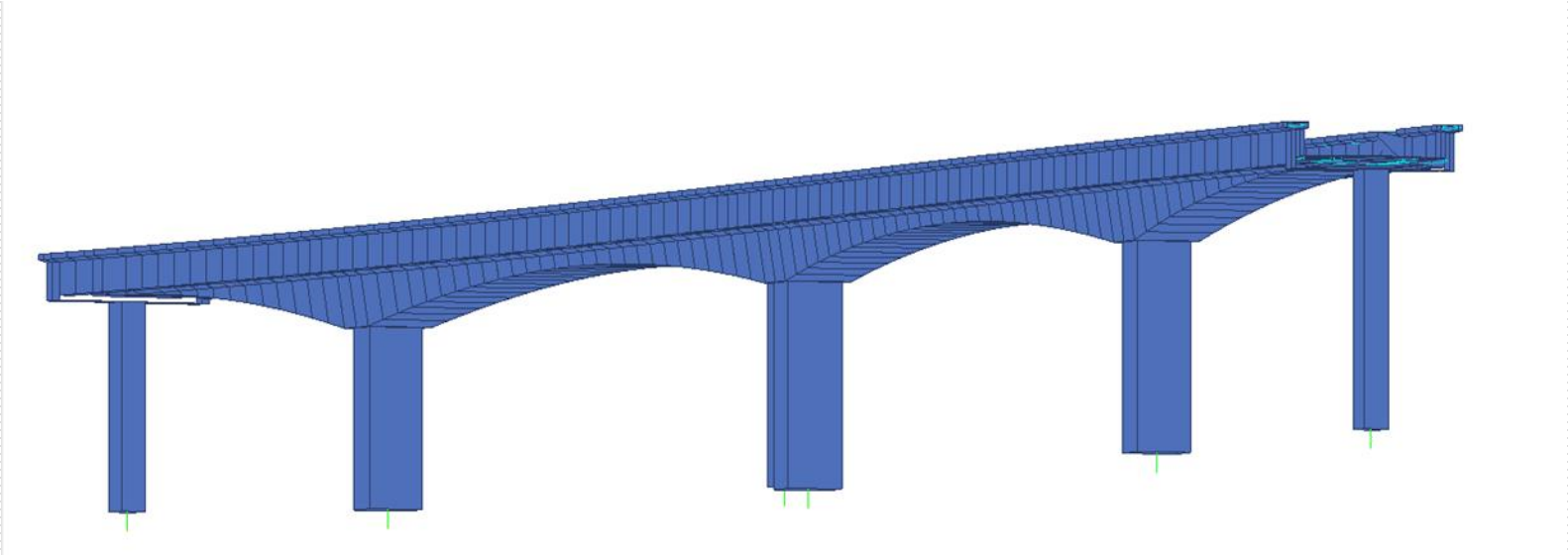
Railway Bridge

Detailed Structural and Geotechnical Design of 600 piers foundations. Footings, piles, micropiles,…

References Bridges and Viaducts

Doha Red Line Metro Viaduct, Qatar
Detailed Design

Railway Bridge



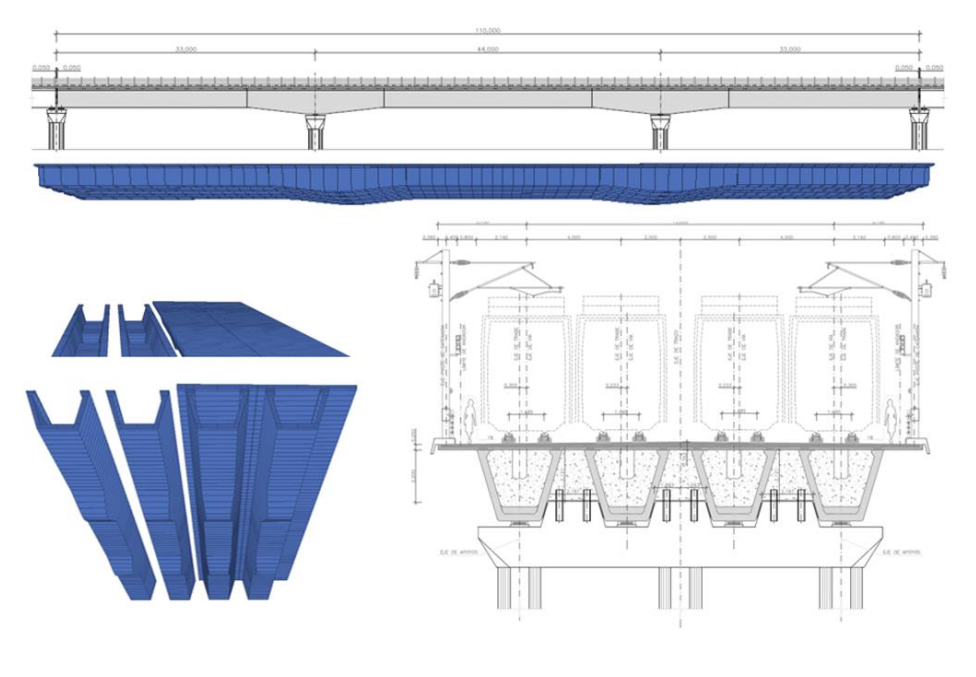
Detailed Structural and Geotechnical Design of 3 viaducts:

- 20 + 32 + 32 m span length
- 28 + 24 + 24 m span length
- 33 + 62.5 + 55.4 + 33 m span length with a variable depth deck

References Bridges and Viaducts

Mexico City-Toluca Interurban Rail Project, Mexico
Detailed Design

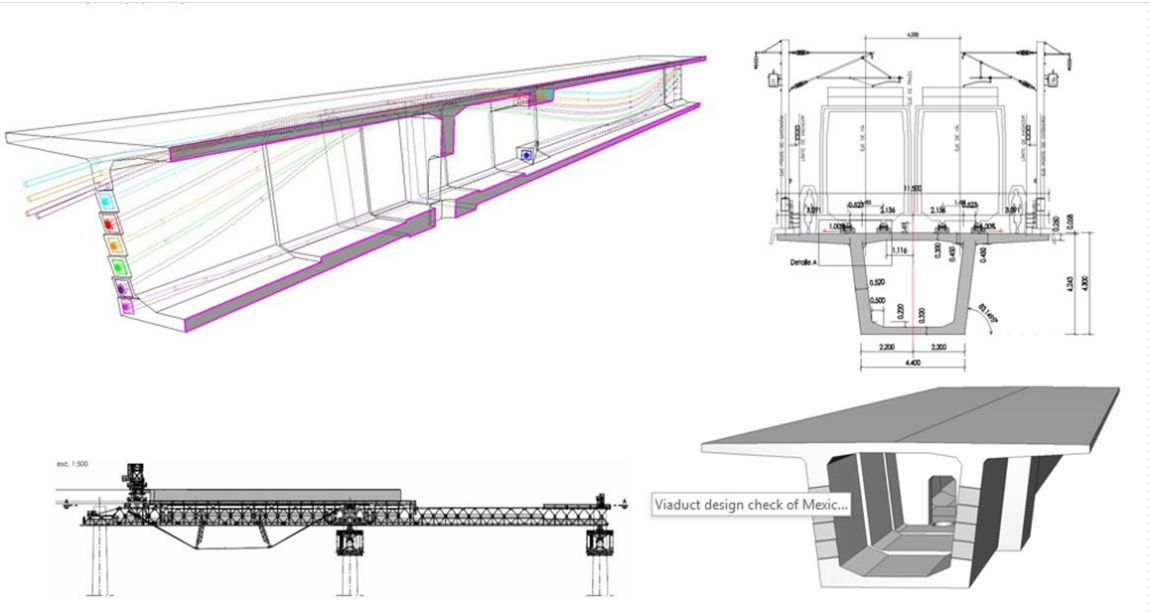
Railway Bridge



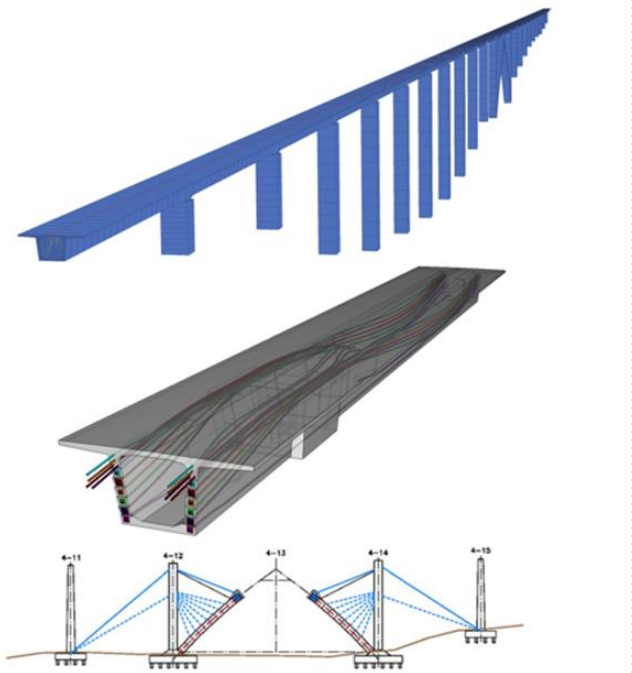
Detailed Structural and Geotechnical Design of a continuos viaduct, being 46 m the longest span. Decks formed by 2 to up to 4 U precast prestressed concrete beams.

References Bridges and Viaducts

Viaduct for Section 4 of the Mexico City-Toluca Interurban Rail Project, Mexico
Design Checking



Railway Bridge

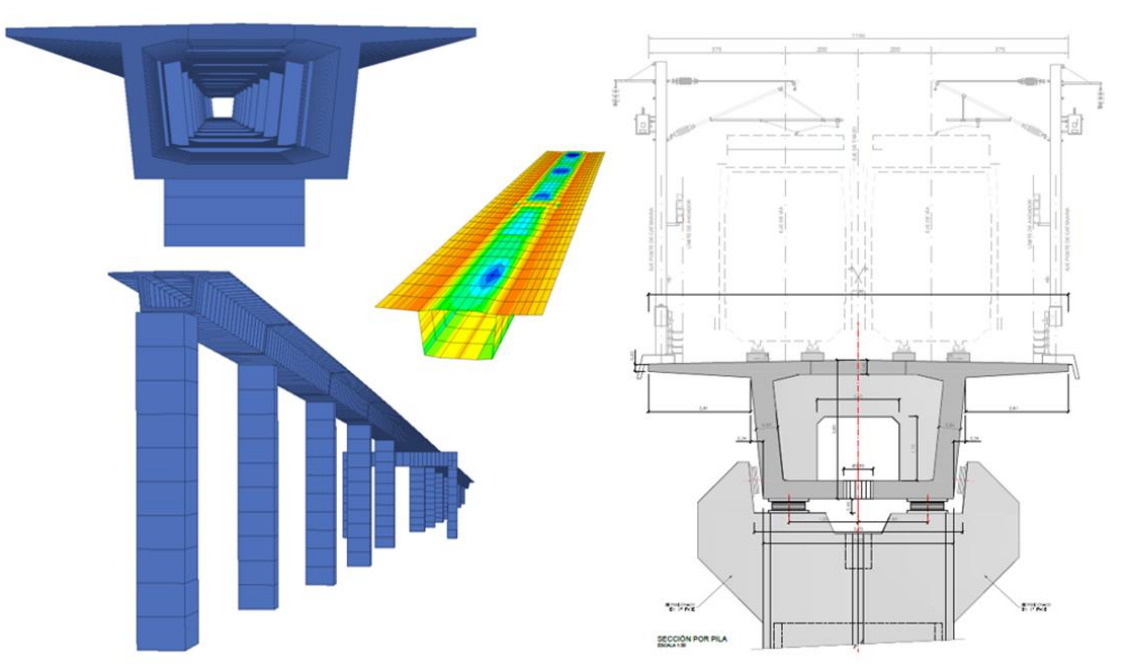


Continuos prestressed concrete viaduct (1,448 m long) with a cantiléver erected central arch (60 m high; 128 m span). Bridge deck is 11.5 m wide, bearing 2 tracks.

References Bridges and Viaducts

Viaduct for Section 2 of the Mexico City-Toluca Interurban Rail Project, Mexico
Design Checking

Railway Bridge

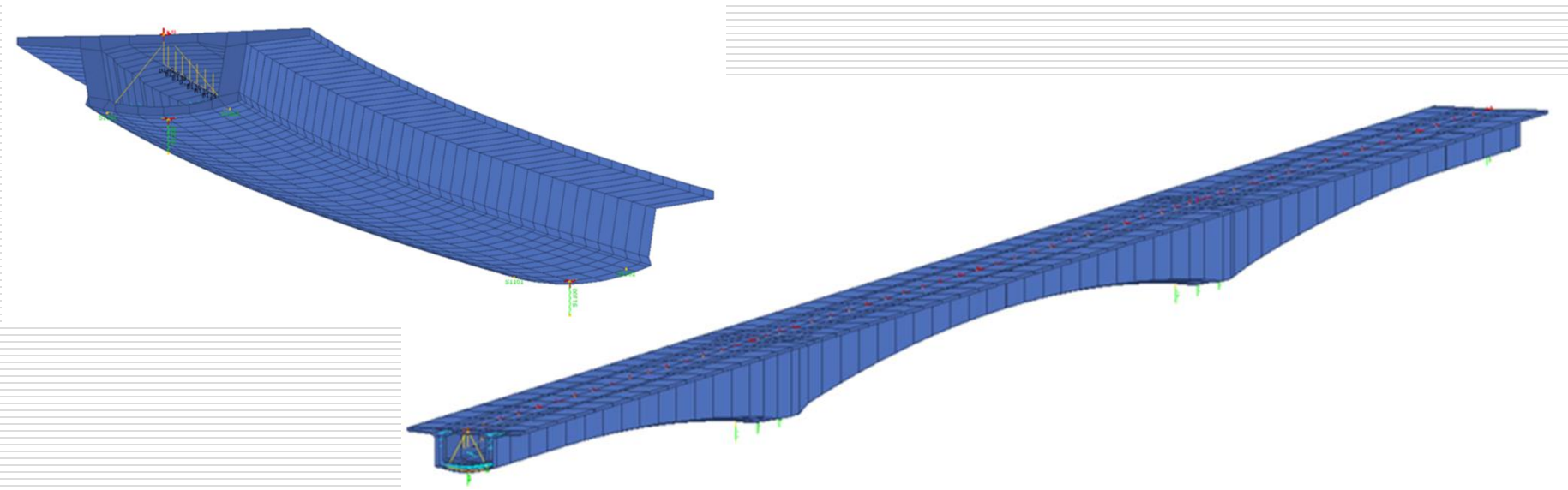


Continuos prestressed concrete viaduct (3,865 m long) with extreme spans of 44 m + intermidiate spans of 55 m. Span by span by mobile falsework construction method.

References Bridges and Viaducts

Viaducts for Riyadh Metro, Lines 4 & 6, Arabia Saudi
Design Checking

Railway Bridge

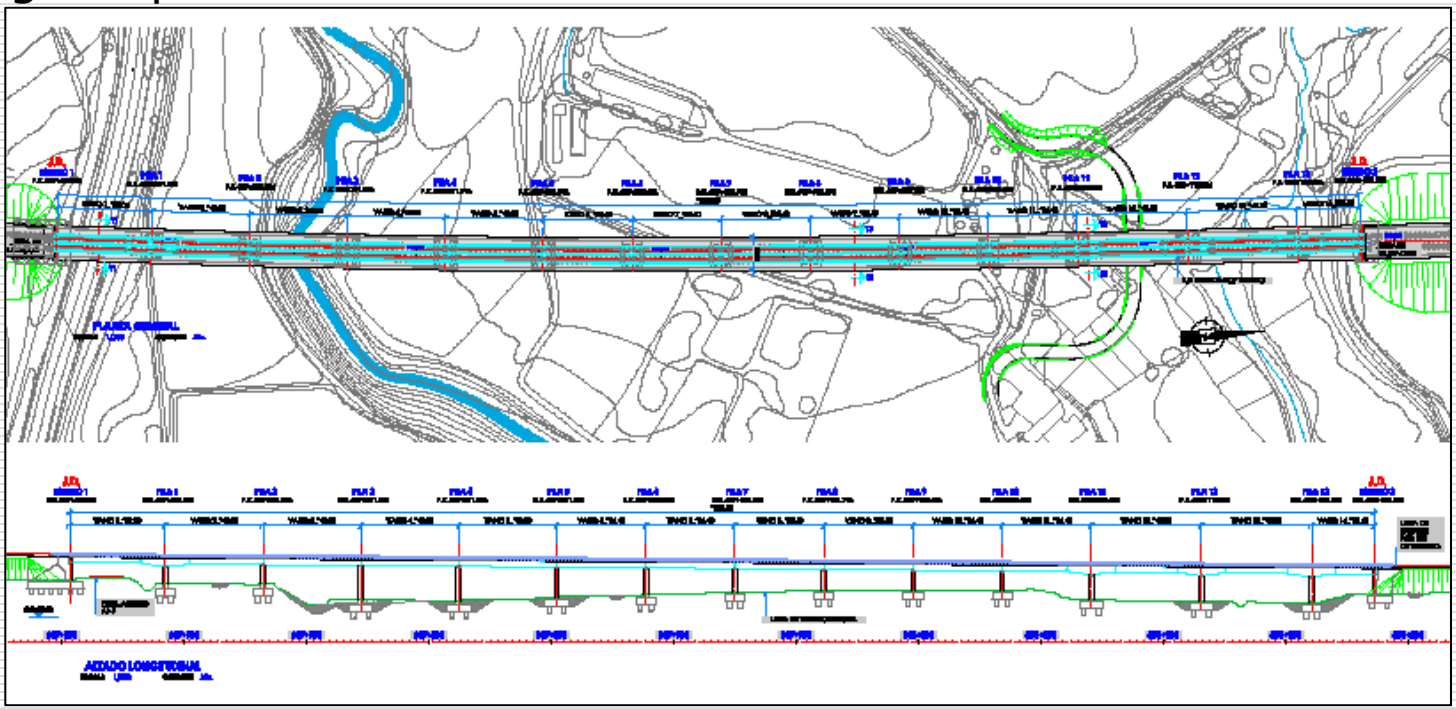


Prestressed concrete deck. Variable spans fromo 40 m to 96 m, curved and straight. Various construction methods: precast segments, precast beams+upper slab, launching girder and balanced cantiléver method.

References Bridges and Viaducts

Aragal Viaduct, Spain
Design Supervision

Railway Bridge

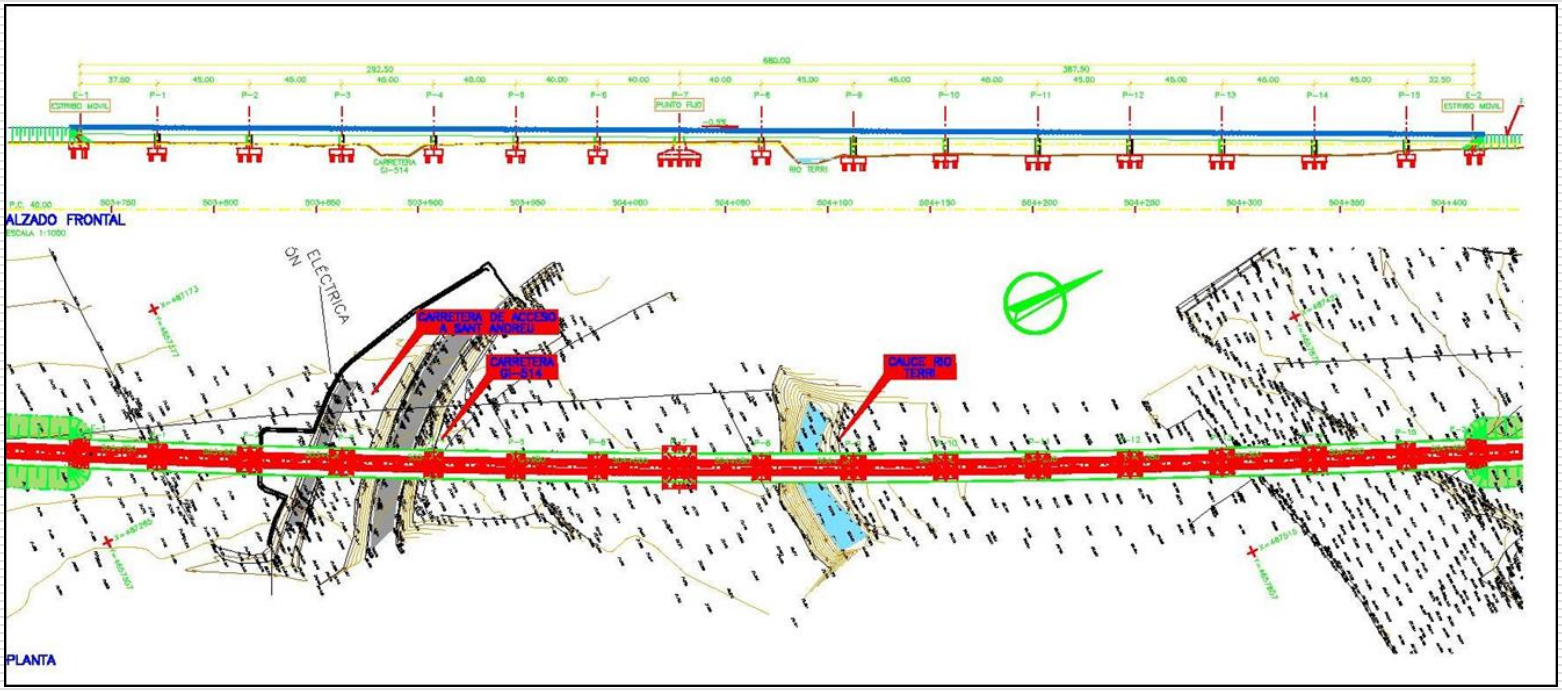


Characteristics: Overall length: 533 m
Span length: 39+4x40+6x36.4+2x45+25.6 m

References Bridges and Viaducts

Terri Viaduct, Spain
Design Supervision

Railway Bridge

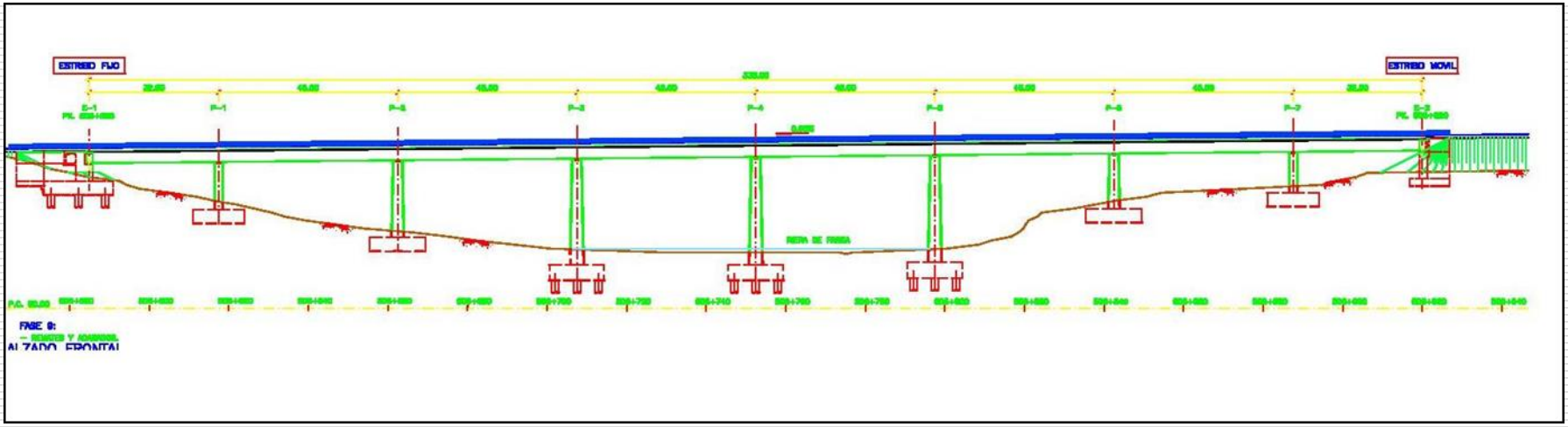


Characteristics: Overall length: 680 m
Span length: 37.5+3x45+4x40+7x45+32.5

References Bridges and Viaducts

Farga Viaduct, Spain
Design Supervision

Railway Bridge

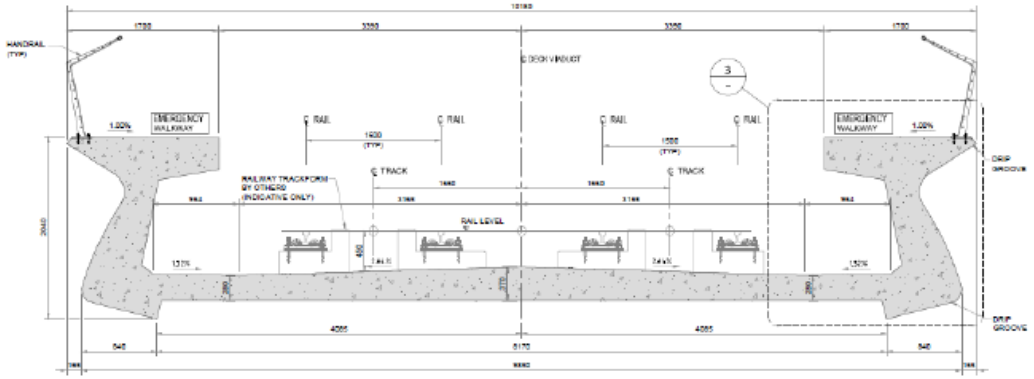


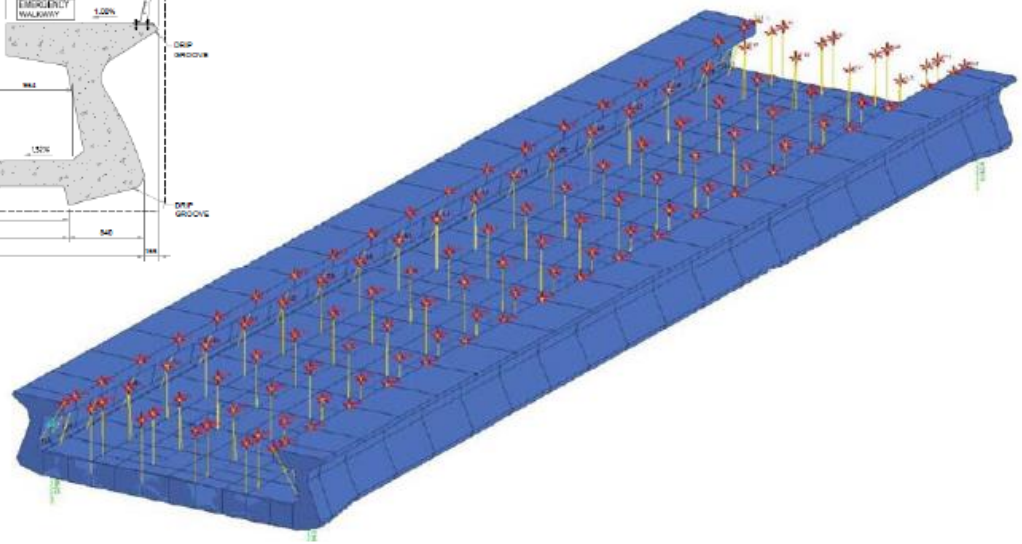
Characteristics: Overall length: 335 m
Span length: 32.5+6x45+32.5 m
Cross – Section: Prestressed Concrete Box Girder

References Bridges and Viaducts

Route 2020 Metro Project, Dubai
Preliminary design with fiber reinforced concrete

Railway Bridge





Precast prestressed concrete deck. Analysis of the 36 m straight span to assess the feasibility of a fiber reinforced concrete solution.

References Bridges and Viaducts

Rosario Victoria Viaduct (over La Plata River), Argentina/Uruguay
Design Supervision

Highway Bridge

Characteristics: Overall length: 4098 m

References Bridges and Viaducts

Extradosed Bridge over Pereira Risaralda's Calle 13, Colombia
Design Checking

Highway Bridge

Extradosed reinforced concrete bridge (70 m lenght):

- 35 + 35 span length
- 15.3 m width, allowing for 3 traffic lanes and pedestrian access

References Bridges and Viaducts

Hostalrich Bridge, Spain
Detailed Design

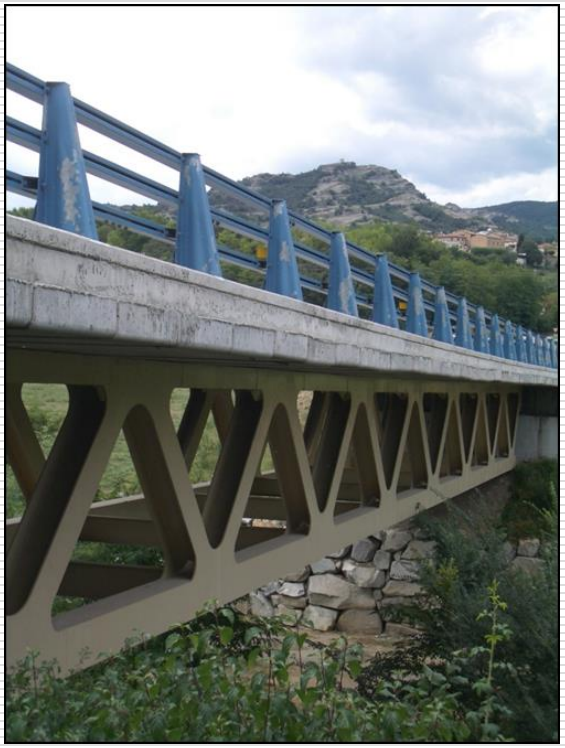
Highway Bridge

Characteristics: Overall length: 54 m

References Bridges and Viaducts

Torelló Bridge, Spain
Detailed Design

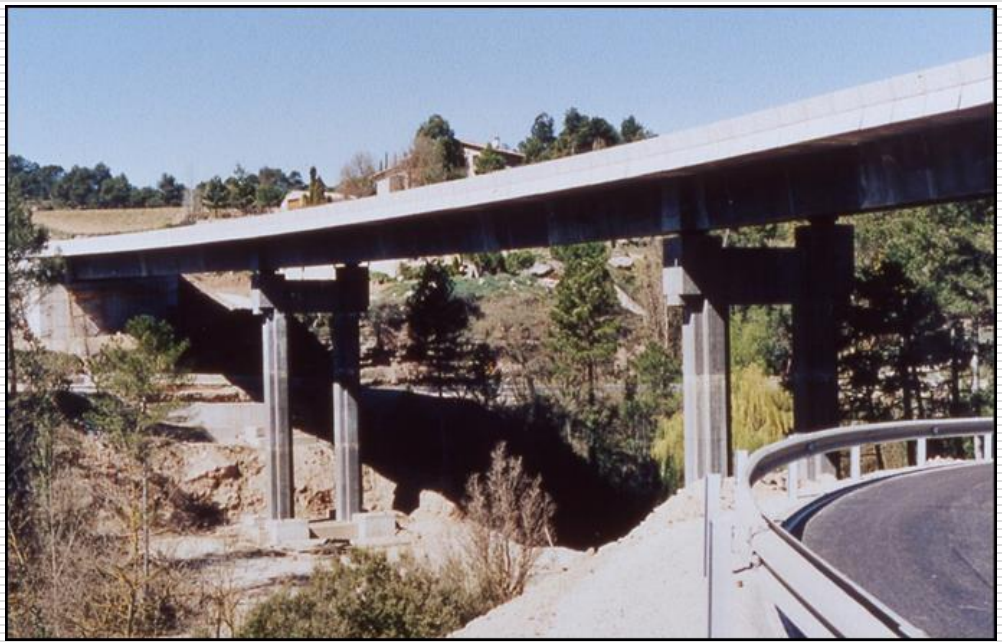
Highway Bridge



Characteristics: Overall length : 54 m

References Bridges and Viaducts

Riera de Rajadell Bridge, Spain
Detailed Design



Highway Bridge

Characteristics: Overall length : 131 m
Span length: 40+51+40 m
High strength concrete, External prestressing

References Bridges and Viaducts

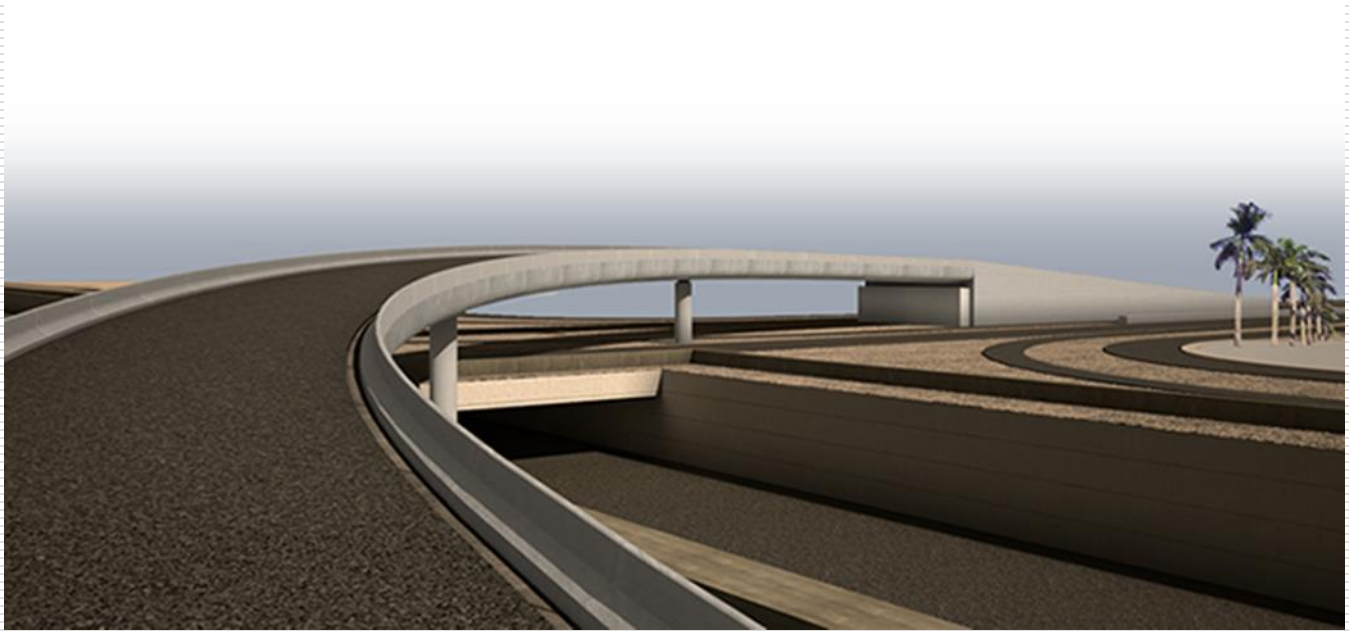
Lleida Bridge, Spain
Detailed Design

Highway Bridge

Characteristics: Overall length : 161.6 m
Span length: 24.8+56+56+24.8 m
High Strength Concrete

References Bridges and Viaducts

Abi Bakr Bridge, Riyadh, Arabia Saudi **Highway Bridge**
Detailed Design

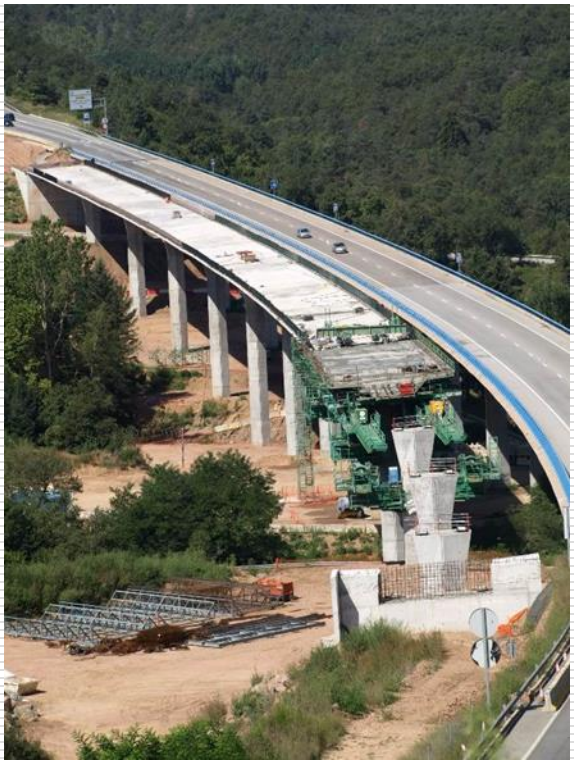


Characteristics: Overall length : 188.11 m
Span length: 54.21 + 48.68 + 49.85 + 35.37 m
Curvature radius: 125 m
Post-tensioned concrete box girder

References Bridges and Viaducts

Osormort Bridge, Spain
Detailed Design

Highway Bridge



Characteristics: Overall length : 500.1 m
Span length: 31.7 + 11x39.7 + 31.7 m
Post-tensioned concrete slab girder

References Bridges and Viaducts

Cuzco Barajas Bridge, Spain
Detailed Design

Highway Bridge

Characteristics: Overall length: 110.3 m
Main Span length: 51 m

References Bridges and Viaducts

M30 Bridge Bridge, Spain
Detailed Design

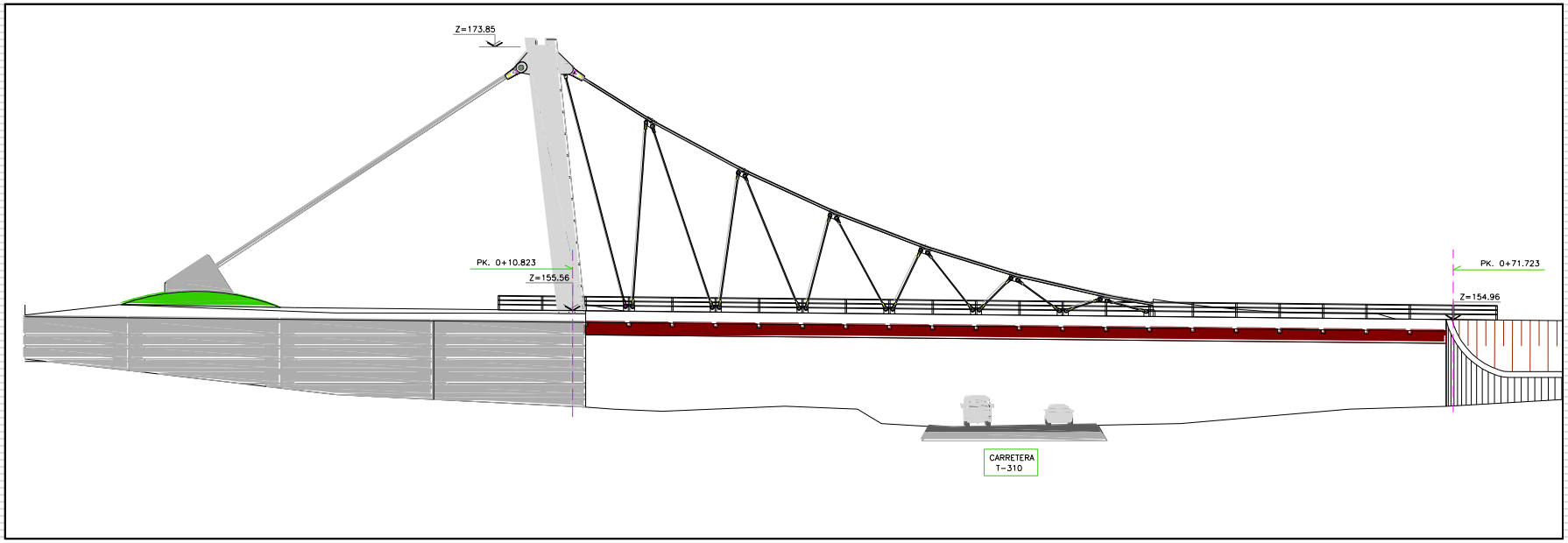
Highway Bridge

Characteristics: Overall length : 155.6 m
Span lengths: 27.6+32.4+35.6+32.4+27.6 m

References Bridges and Viaducts

Bonmont 1 Bridge, Spain
Detailed Design

Highway Bridge

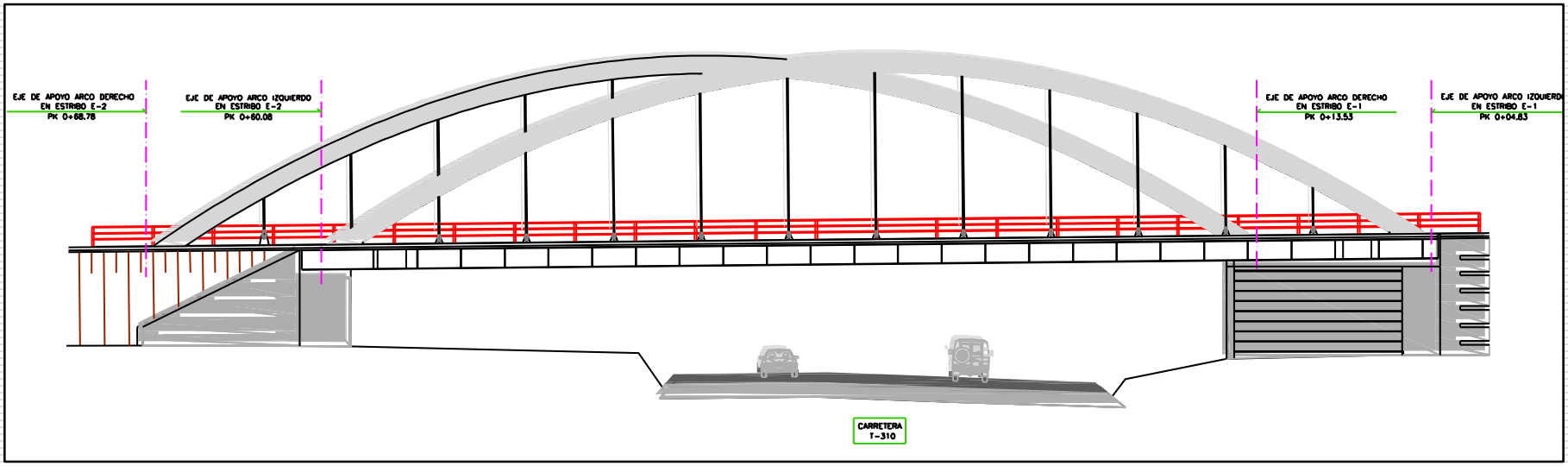


Characteristics: Overall length : 60 m

References Bridges and Viaducts

Bonmont 2 Bridge, Spain
Detailed Design

Highway Bridge



Characteristics: Overall length : 55.25 m

References Bridges and Viaducts

Steel footbridge in Tarragona, Spain
Detailed Design

Footbridge

Characteristics: Overall length: 376 m
Typical Span length: 16 m
Maximum Span length: 27 m

References Bridges and Viaducts

La Torrassa Footbridge, Spain
Detailed Design

Footbridge

Characteristics: Overall length: 262 m
Span length: 20+3x30+30+26+3x32 m
Supported on the diaphragm walls of the tunnel

References Underground Structures

Barcelona High Speed Train Tunnel, Spain
Supervision, Inspection and Risk Assessment

TBM Tunnel

Prof. Aparicio and Prof. Ramos have been members of the International Board for the supervision of the effects of the tunnel on the World Heritage by UNESCO (Sagrada Familia and Casa Mila by Gaudi):

- Supervision of settlement control during tunneling
- Structural Inspection of previously damaged buildings
- Structural Risk Assessment of buildings

References Underground Structures

High Speed Railway Tunnel Girona, Spain **TBM Tunnel**
Structural Advisors

Characteristics: 3.0 km long (tunnel 1=1.4 km + tunnel 2=1.6 km)
11.475 m excavated diameter.
Tunnel Lining Structural Advisors, Building Assessment, Monitoring Design and Compensation shafts design and monitoring.

References

Underground Structures

Railway TBM Tunnel Galicia, Spain
Detailed Design

TBM Tunnel

Characteristics: Twin tunnels 6750 m long each, 8780 mm internal diameter

References

Underground Structures

Line 3 Riyadh Metro, Arabia Saudi
Structural Advisors and Checking

TBM Tunnel

Structural Advisors and Checking of TBM Tunnel
5.3 km long, 9.80 m external diameter

References Underground Structures

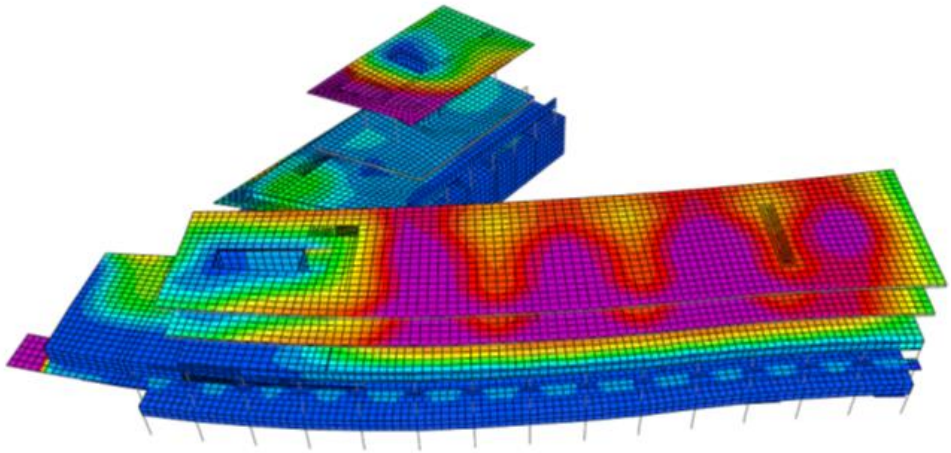
Line 5 Riyadh Metro, Arabia Saudi **TBM Tunnel**
Special studies on segmental lining

Detailed design and monitoring of joint strengthening in order to make stable the segmental tunnel lining and combine the tunnel and the stations construction

References

York Spadina Subway Extension-Schulich Building, Toronto, Canada
Structural Assessment

TBM Tunnel

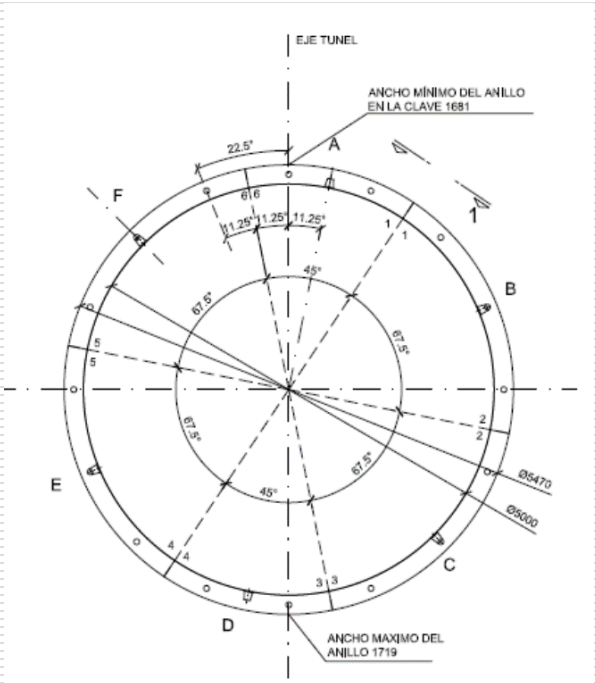


Characteristics: Reinforced concrete building only 1 diameter above tunnel crown. Complete structural assessment of possible damage during tunnelling. Building Risk Analysis.

References

Majes-Siguas Project, Peru
Detailed Lining Structural Design

TBM Tunnel

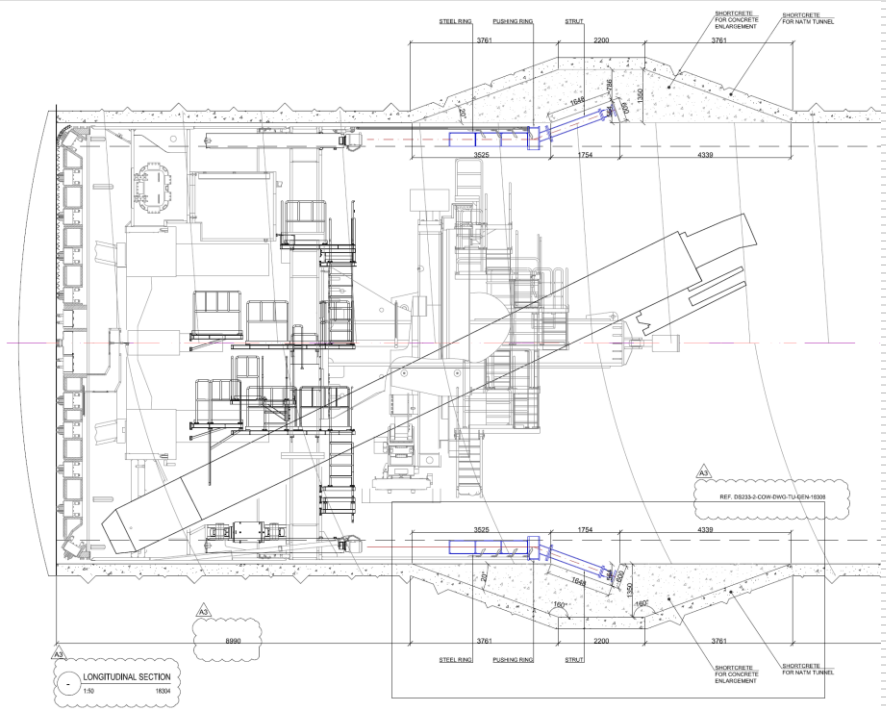


Characteristics: Lluclla – Siguas Tunnel : 12.820 km long, Pucará Tunnel : 6.330 km long,Transandino Tunnel: 9.674 km long. 5.47 m external diameter, 235 mm segments depth. Steel Fibre Reinforced Concrete without rebars

References

Underground Structures

Deep Tunnel Storm Water System Project, Dubai **TBM Tunnel**
Detailed Structural Design



Design of two different Steel Pushing Frames, one installed inside a NATM tunnel and the other installed inside a circular shaft

References Underground Structures

Les Cavorques Tunnel, Spain
Detailed Design

Cut&Cover Tunnel

Characteristics: Length: 120 m
Vault dimensions: height: 10 m, width: 14.5 m
Ground over key: 13 m

References

Underground Structures

Can Tunis Tunnel, Spain
Detailed Design

Cut&Cover Tunnel

Characteristics: 2100 m

References

Underground Structures

La Torrassa Tunnel, Spain
Detailed Design

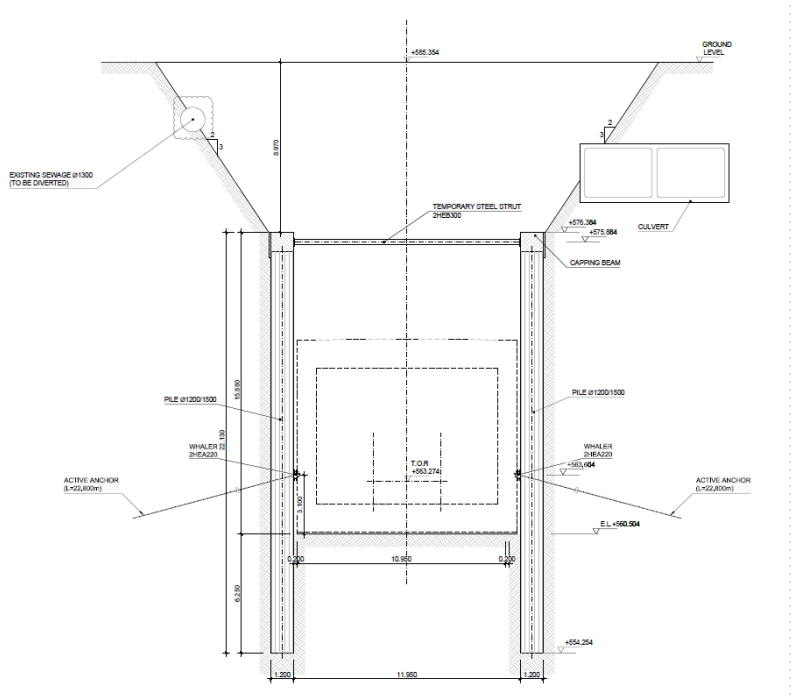
Cut&Cover Tunnel

Characteristics: Length 2800 m
The contract included the design of the Ventilation shafts

References

Line 3 Riyadh Metro, stretches 3J1, 3K1 & 3J2, Arabia Saudi
Detailed Design

Cut&Cover Tunnel

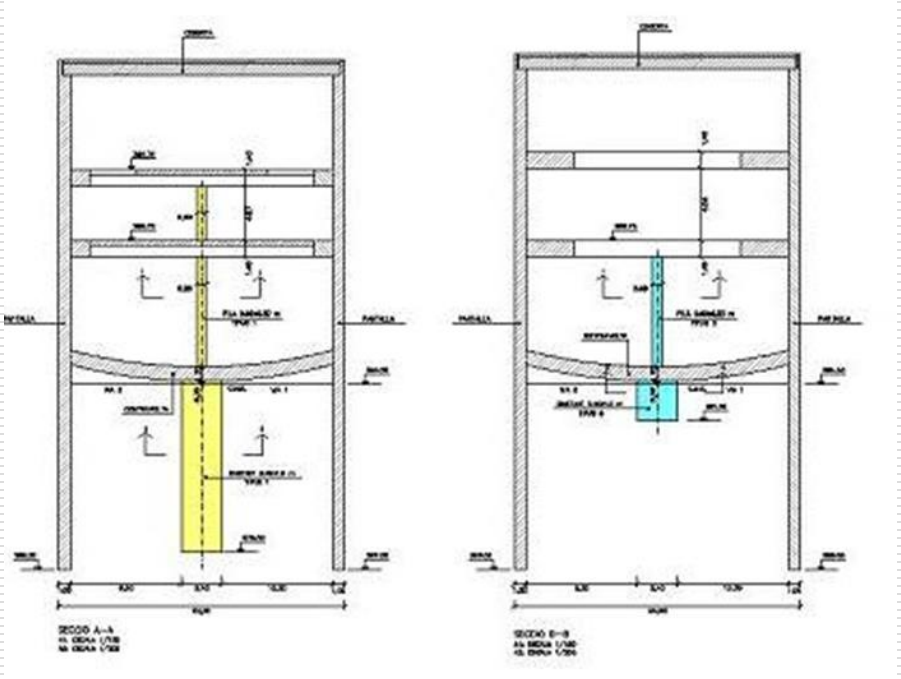


Characteristics: Length about 4 km

References

Terrassa Subway Station, Spain
Detailed Design

Cut&Cover Station

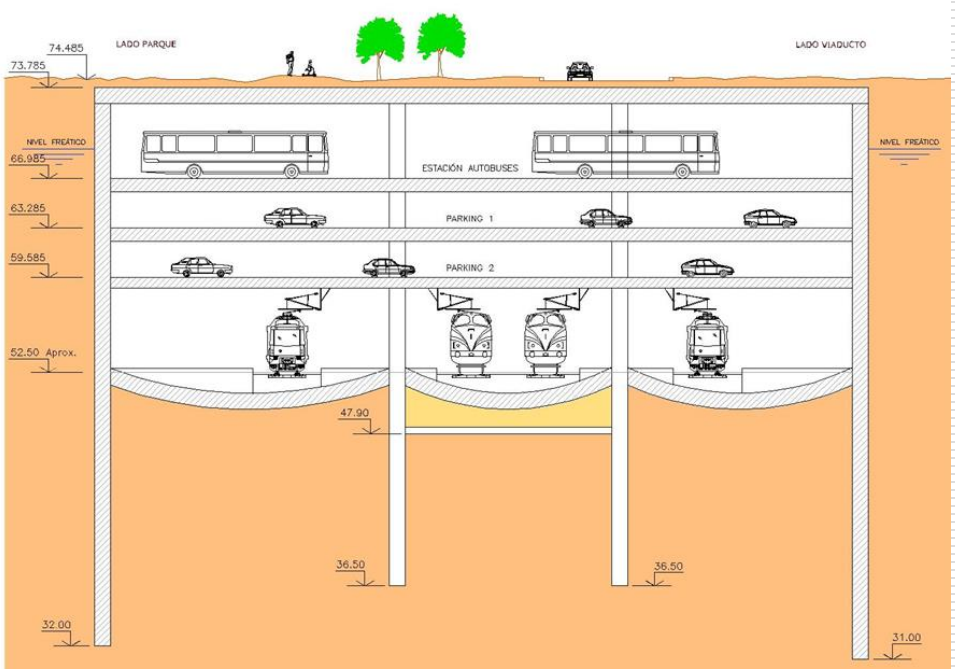


Characteristics: Subway Station, 144 m long, 22 m wide and 28 m deep, 1 m diaphragm walls, surrounded by buildings

References Underground Structures

Girona High Speed Train Station, Spain
Detailed Design

Cut&Cover Station

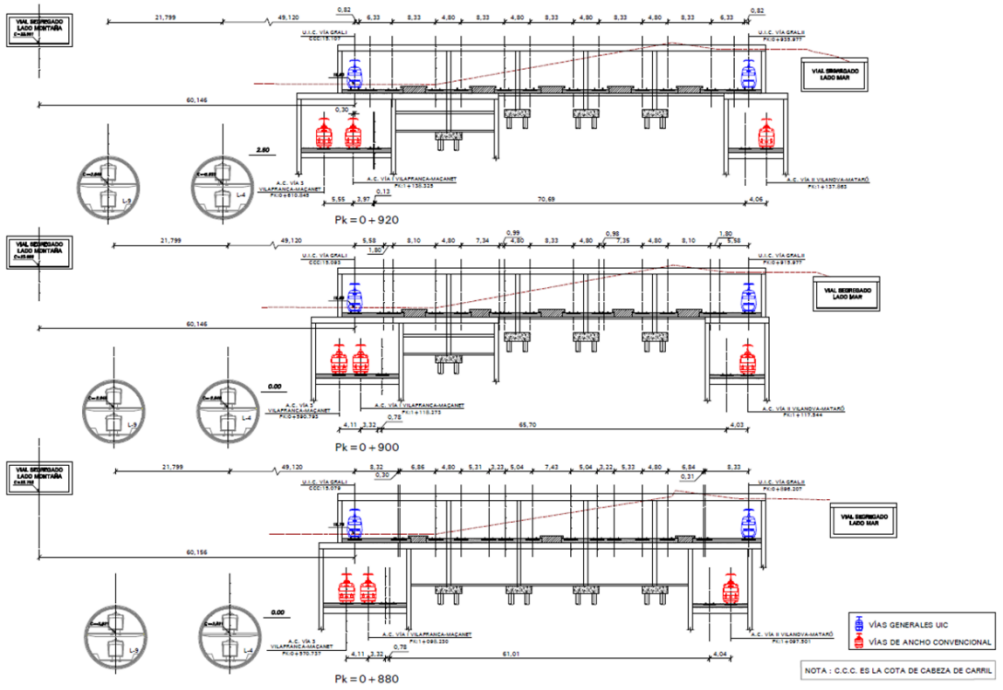


Characteristics: 650 m long, 50 m wide, 25 m deep, 20 m of water pressure, diaphragm walls 1.2 m deep, postensioned concrete slabs

References

Underground Structures

Barcelona High Speed Train Station, Spain
Detailed Design



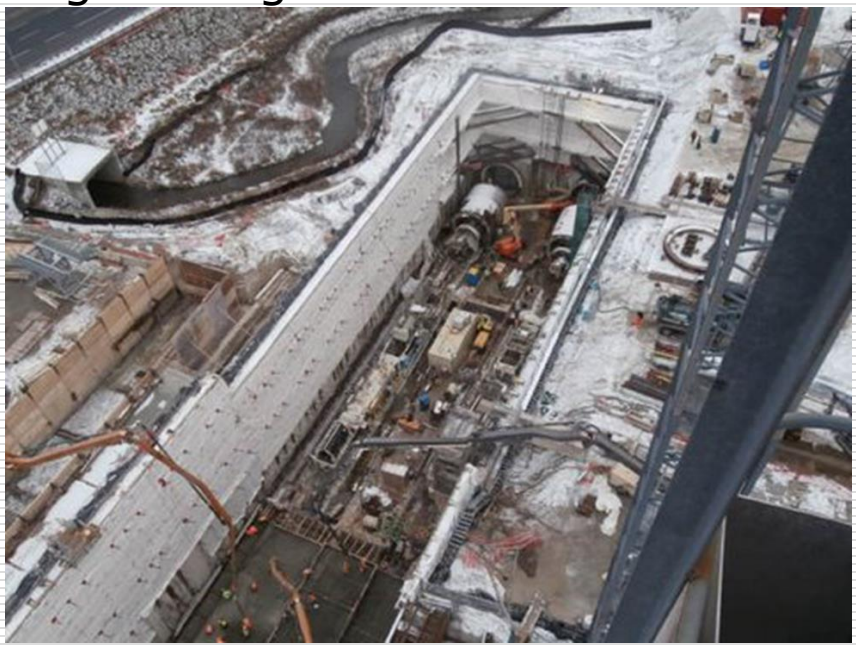
Cut&Cover Station

Characteristics: Length: 624 m
Width: 80 m
Depth: 25 m

References

York Spadina Subway Extension - Highway 407 Station, Toronto, Canada
Construction Engineering

Cut&Cover Station



Characteristics: 165 m long, 19 m wide, 20 m deep. Complete definition of the construction process, structural verification

References

Line 9 Barcelona Subway, Spain
Structural Advisors

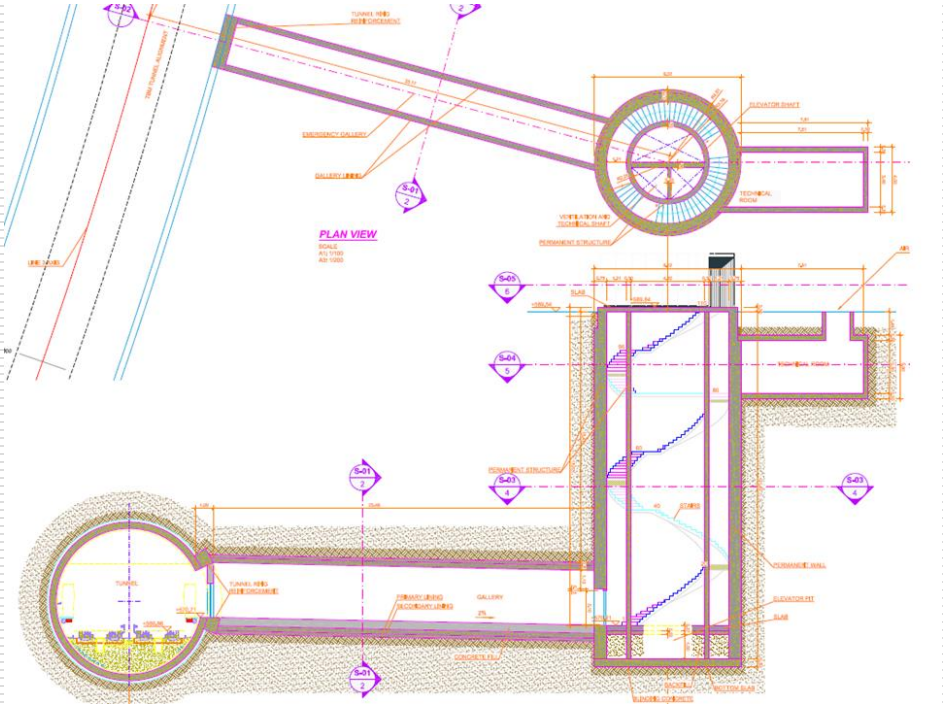
Shaft

Several deep shafts, specially Zona Universitaria Shaft. 61.6 m deep, 32.8 m internal diameter. Crossed by TBM tunnel eccentrically.

References

Line 3 Riyadh Metro, shafts 3E5-3E6 & 3F1-3F2, Arabia Saudi
Detailed Design

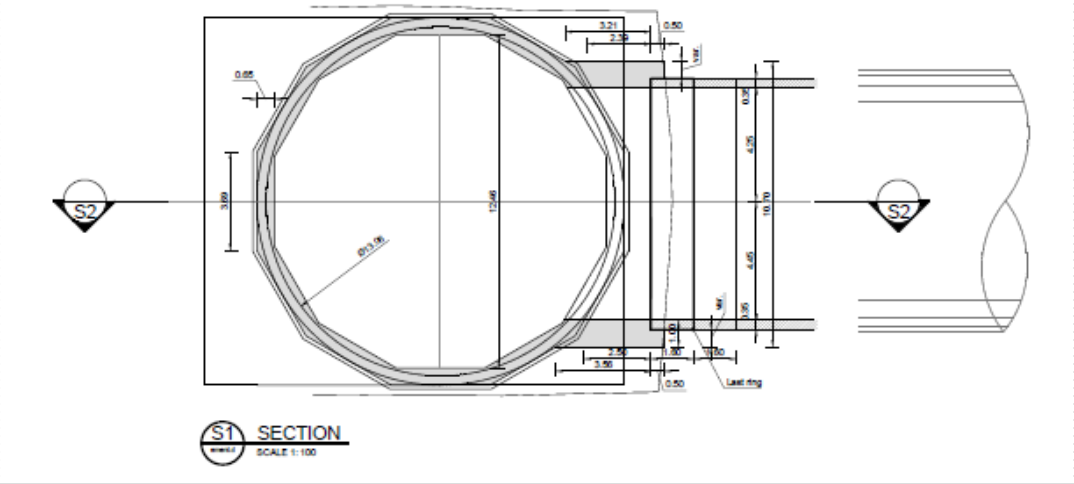
Shaft

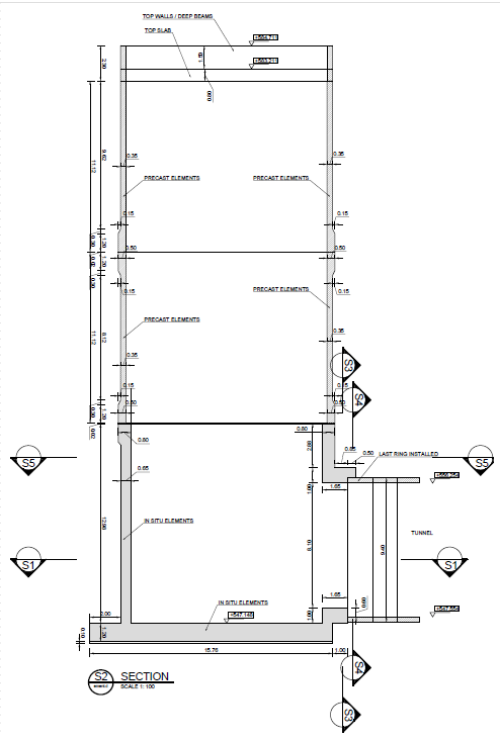


Characteristics: Design of 2 ventilation and emergency shafts, and their connection galleries to the TBM tunnel. The depth of the shafts was 22 m and 29 m.

References Underground Structures

Line 5 Riyadh Metro, precast shafts, Arabia Saudi **Shaft**
Detailed Design

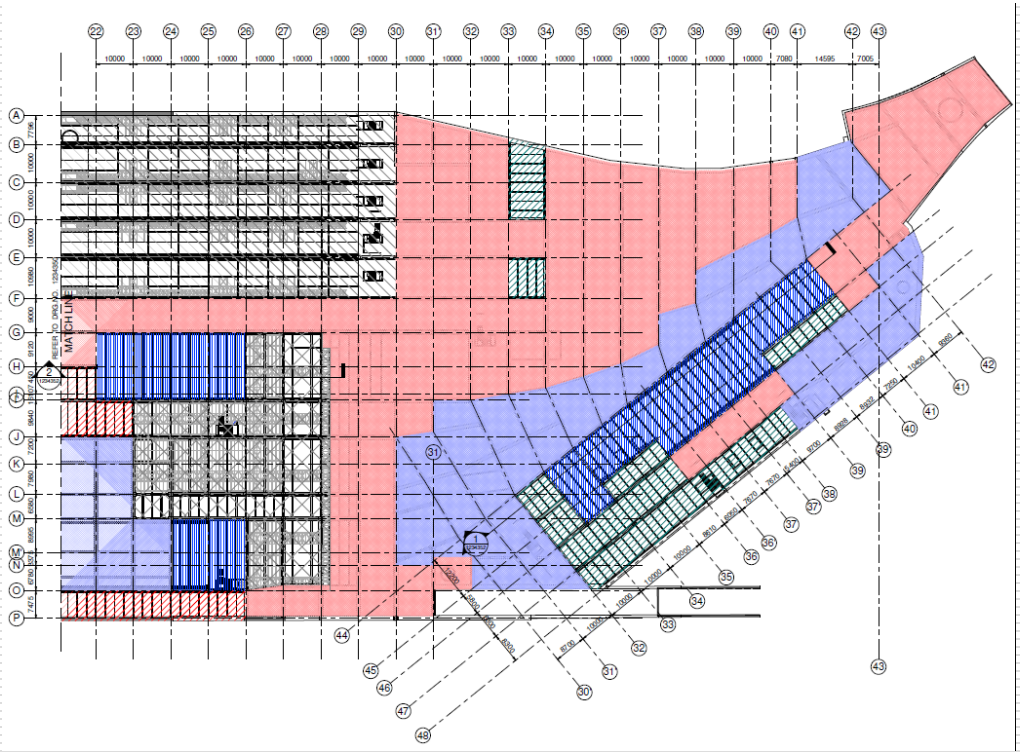




Characteristics: Design of 12 evacuation and ventilation precast shafts. The depth of the shafts was between 23 m to 36 m.

References

Line 5 Riyadh Metro, Depot, Arabia Saudi
Detailed Design



Characteristics: Building built in an underground excavation. 56,000 m^2 plan surface. Verification of all precast elements, detailed design of the in situ slabs, detailed design of the internal steel structure.

References

Instituto de Microcirugía Ocular (IMO), Spain
Detailed Design

Characteristics: Medical center, 17,000 m^2 plan surface

References

Structures for Buildings

Capitanía Building at Marina "Forum", Barcelona, Spain
Detailed Design

Characteristics: Auxiliary Port Building, 2,250 m^2 plan surface

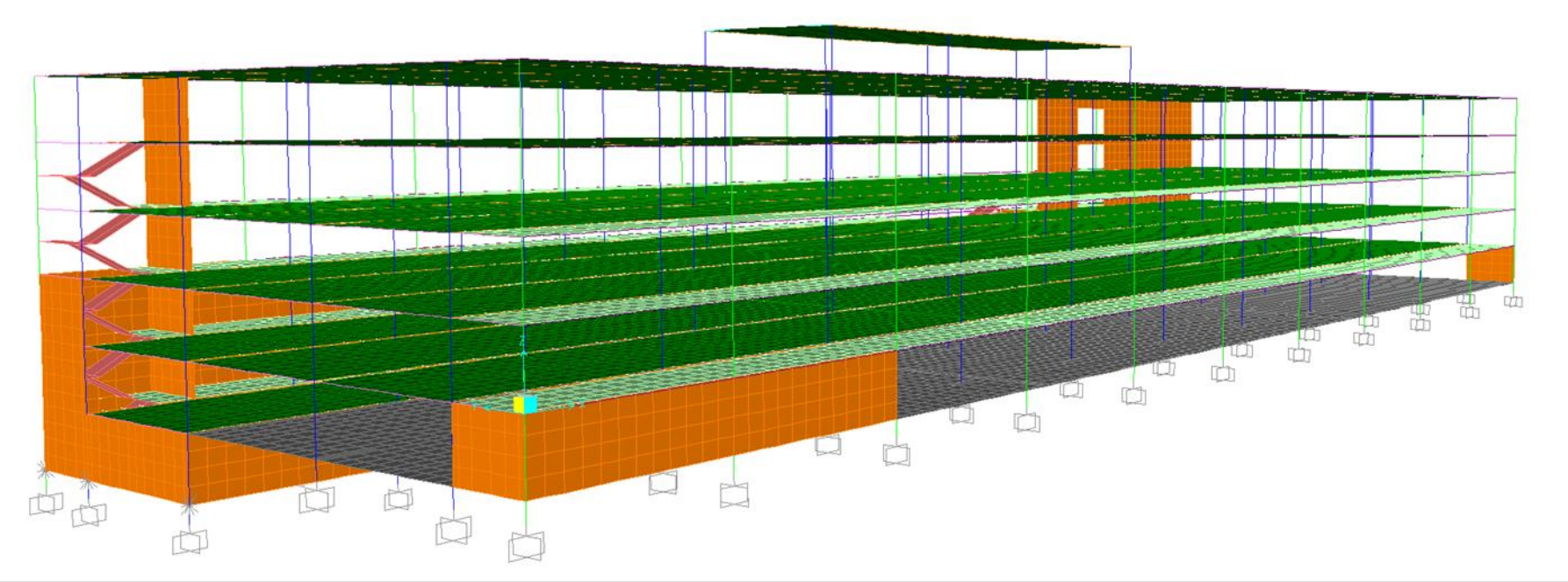
References Structures for Buildings

Barcelona Airport Terminal 1, Steel Structure for Automatic Luggage Transportation System, Spain
Detailed Design

Characteristics: Airport Equipment, 18000 m^2 plan surface

References Structures for Buildings

Line 3 Metro Riyadh Park&Ride, Arabia Saudi
Detailed Design



Characteristics: 4 Park&Ride Buildings, about 600 parking lots per building, between 5,000 m^2 to 7,000 m^2 plan surface per building.

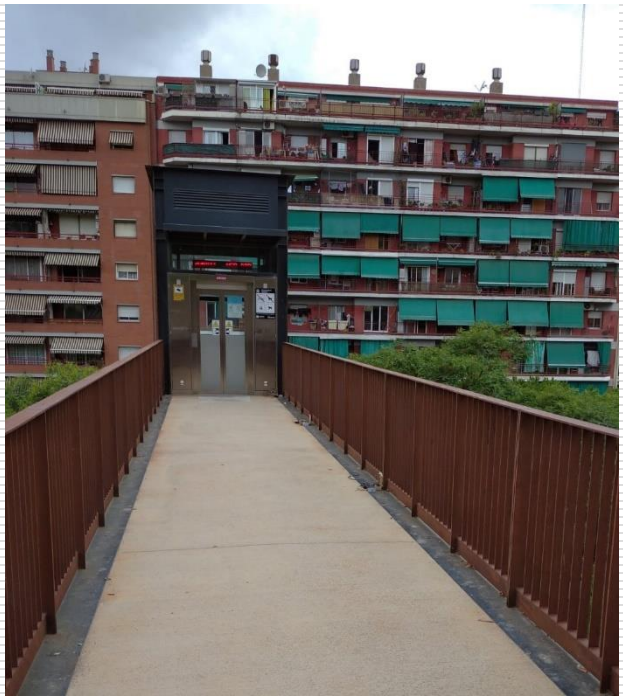
References

Guatemala Dock, Guatemala
Detailed Design

Structural and Geotechnical Design of a Dock supported on 350 x 35 piles on a soft soil in seismic area.

References
Structural monitoring and inspection

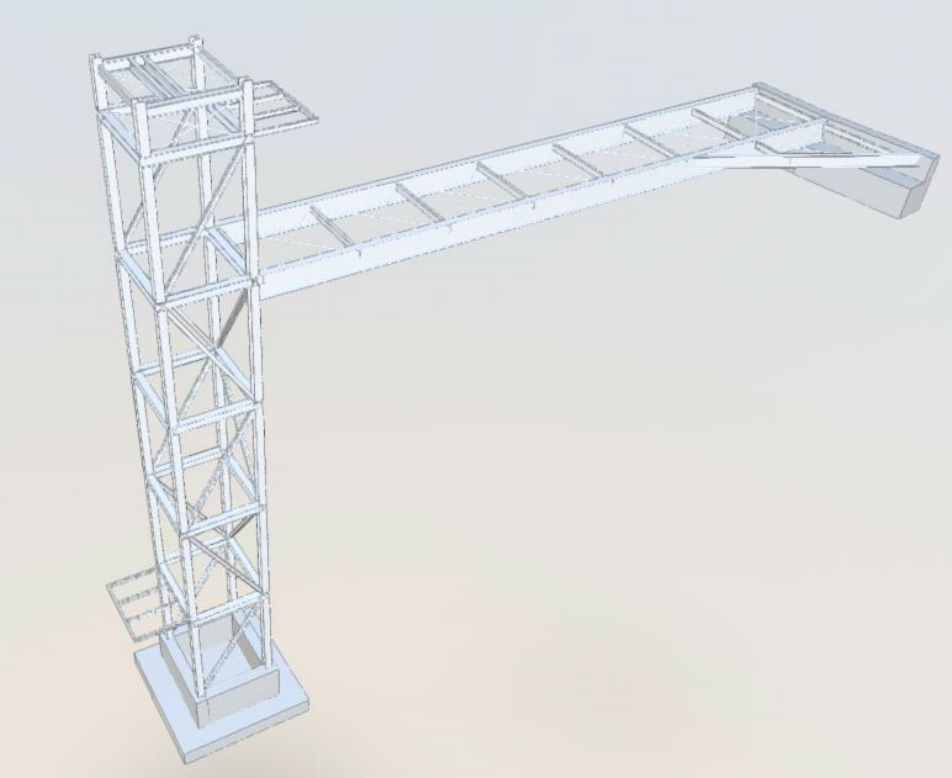
Pedestrian Bridge in “Carrer del Segura”, Barcelona, Spain. Instrumentation



Instrumentation of the Pedestrian Bridge in the neighbourhood “El Polvorí” in Barcelona.

References BIM models

TBT provides services in BIM modelling.



Pedestrian Bridge in "El Polvorí", Barcelona, Spain

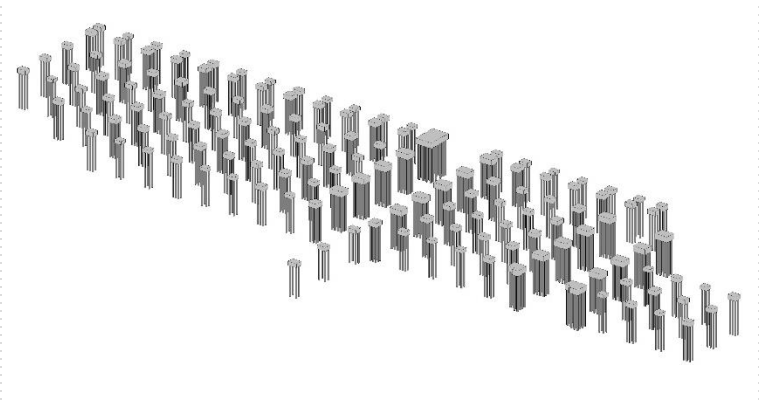
References

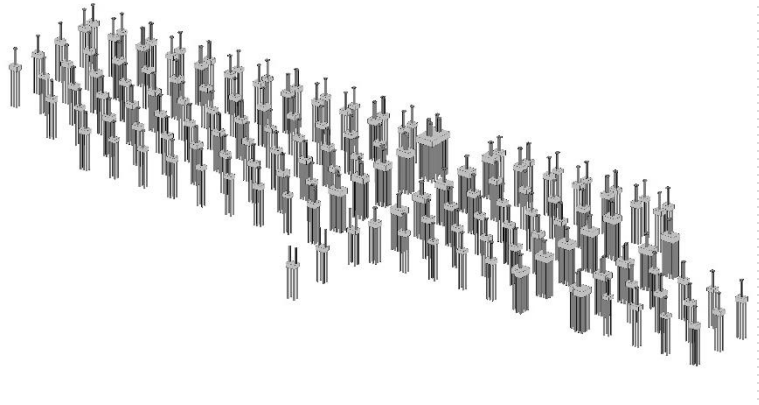
BIM models

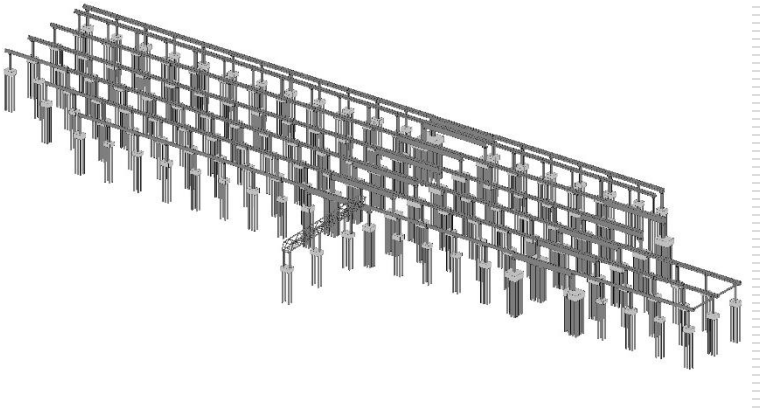
Bus Depot for TMB (Transports Metropolitans de Barcelona)
Zona Franca, Barcelona, Spain

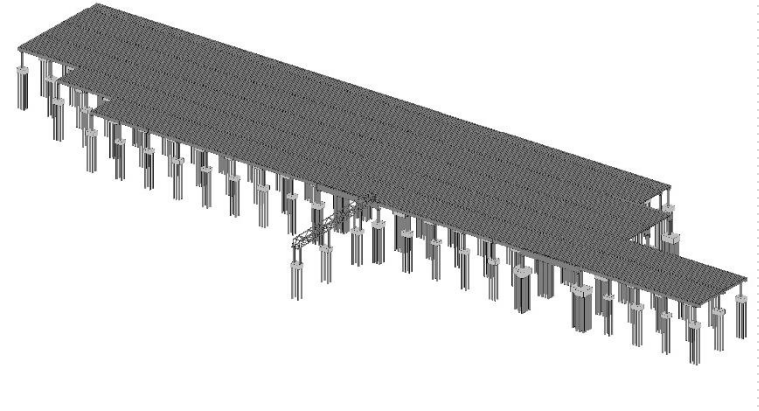
References

BIM models









Bus Depot for TMB (Transports Metropolitans de Barcelona)
Zona Franca, Barcelona, Spain

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