

Venizelos Metro Station – Main Part Temporary Retaining Works, Main Box & Construction Sequence

Thessaloniki, Greece

Project

BIM Model elaboration of Venizelos Station complex (main box and two entrances) in Thessaloniki including Temporary Retaining Works and Permanent Structure.

BIM implementation at construction stages simulation.

Construction Cost

Total project's cost: approx. € 60 m.

Project Schedule

Final & Detailed Design (estimated): 2019 – in progress

Construction (estimated): 2020 – in progress

Project Description

Top Down Construction Method.

Diaphragm Walls: 1.00m width x ~35,60m depth.

Diaphragm Wall System with variable top level.

Struts' installation in variable levels.

Slab members enabled at the retaining system.

Permanent Structure: 19,75m x 76,60m.

Six (6) levels of station construction.

Geology

Artificial Deposits of large thickness, very soft to soft Clays, silty sands with gravels and loose silty gravels with sand.

Soft to fine grain clays and clayey sands with gravel.

Stiff to very stiff sandy clays, locally very weak claystones / siltstones.

Materials

Reinforced concrete C30/37

Unreinforced concrete C12/15

Steel B500c

Struts 2HE-800B, 2HE-1000B, CHS610/20, S275

Software

Revit

Allplan

Special Challenges

Proximity of commercial buildings.

Special care for adjacent monuments and archeological areas.

Restriction of additional surface settlements and displacements.

Archaeological findings at the excavation area.

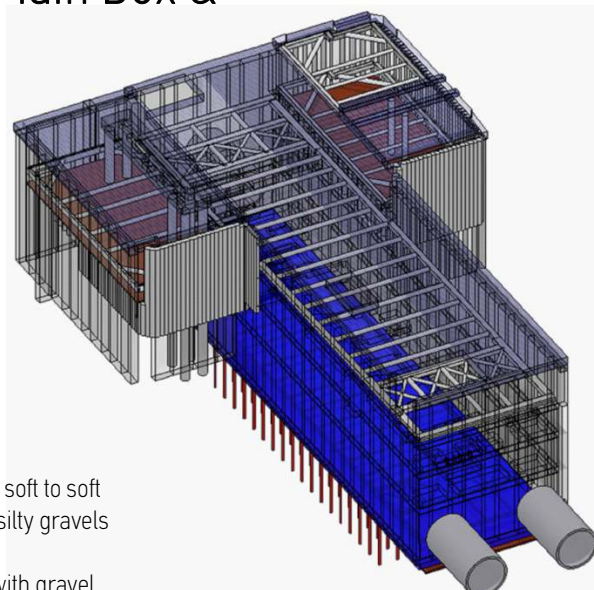
Complicated structure, combining both temporary & permanent system for overall complex of main box & entrances.

Particular complex of construction sequence works interacting also with the two entrances.

Tight time schedule.

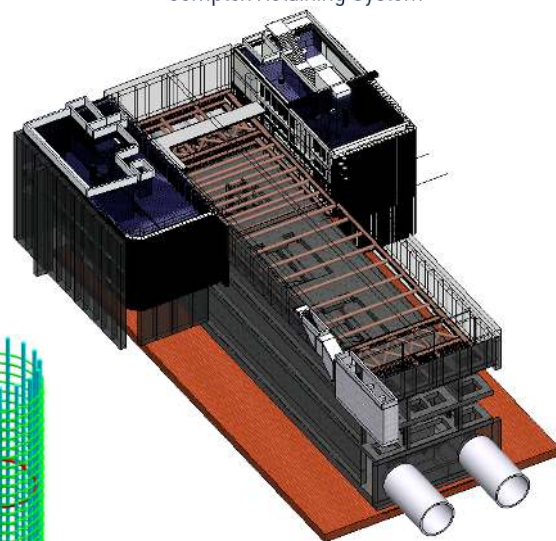
Our Services

- Elaboration of complete BIM Model regarding:
 - Temporary Retaining System.
 - Permanent Structure.
- Elaboration of BIM Construction Stages showing the exact sequence implemented on site.
- Elaboration of Geotechnical and Structural Calculation Models integrated with BIM Models.
- Elaboration of drawings for all the above cases directly derived from BIM Models, including construction details.
- Billing of Quantities directly derived from BIM Models.
- Derivables of Final and Detailed Design.

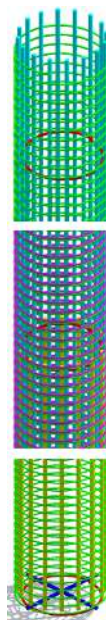


Complex Retaining System

Conceptual Design & Execution



Temporary & Permanent Structure



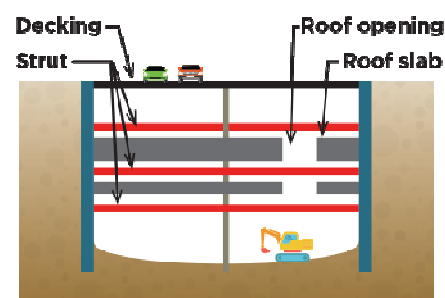
Details: Piles' Reinforcement



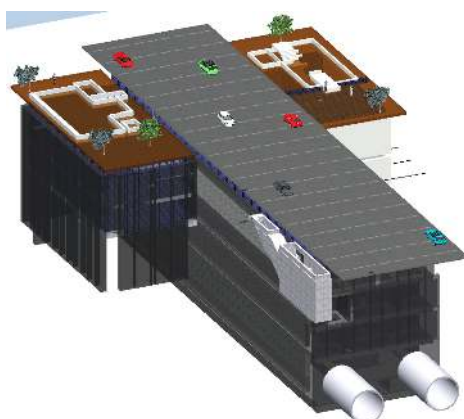
Details: Struts



Construction Simulation



Top Down Construction Method



Final State

Client

AKTOR S.A. & BIM Clients

Diaphragm Walls & Top-Down Construction Method Venizelos Metro Station - South Entrance Temporary Retaining Works, Permanent Structure & Reinforcement Design of Diaphragm Walls

Thessaloniki, Greece

Project

BIM Model elaboration of South Entrance of Venizelos Station in Thessaloniki including Temporary Retaining Works, Permanent Structure and Reinforcement Detailed Design of Diaphragm Walls.

BIM implementation at construction stages simulation.

Construction Cost

Total project's cost: approx. € 60 m.

Project Schedule

Final & Detailed Design (estimated): 2019 – in progress

Construction (estimated): 2020 – in progress

Software

Revit

Allplan

Project Description

Top Down Construction Method.

Diaphragm Walls: 1,00m width x 19,90m depth.

Cage Reinforcement & Connection Details.

Struts' installation in two (2) levels.

Six (6) temporary piles Ø1200mm, depth 26,30m.

with pilecap 1,50m x 4,10m.

Permanent Structure: 31,80m x 16,40m.

Materials

Reinforced concrete C30/37

Piles concrete C20/25

Unreinforced concrete C12/15

Steel B500c

Shotcrete C20/25

Struts CHS610/20, S275

Geology

Artificial Deposits of large thickness, very soft to soft

Soft Sandy Clays and fine grain Clayey Sands with gravel.

Very Stiff to locally hard Sandy Clays.

Special Challenges

Proximity of commercial buildings.

Special care for adjacent monuments and archeological areas.

Restriction of additional surface settlements and displacements.

Archaeological findings at the excavation area,

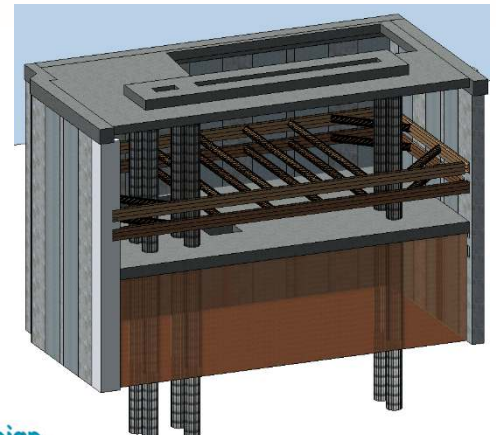
ensure the continuation of archeological works.

Limited area of construction site & excavation works.

Tight time schedule.

Our Services

- Elaboration of complete BIM Model regarding:
 - Diaphragm walls, Struts and complete retaining system.
 - Permanent Structure.
 - Reinforcement of Diaphragm Walls System.
- Elaboration of BIM Construction Stages showing the exact sequence implemented on site.
- Elaboration of Geotechnical and Structural Calculation Models integrated with BIM Models.
- Elaboration of drawings for all the above cases directly derived from BIM Models including construction details.
- Bill of Quantities directly derived from BIM Models.
- Derivables of Final and Detailed Design.



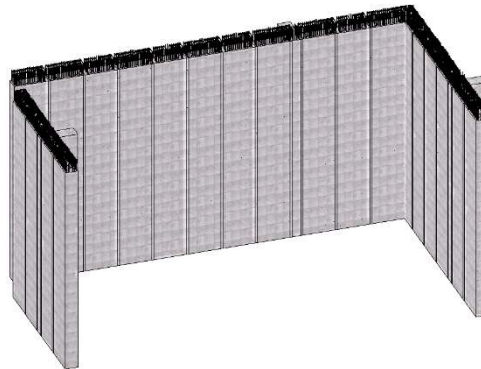
Diaphragm Walls Arrangement

Conceptual Design
&
Execution

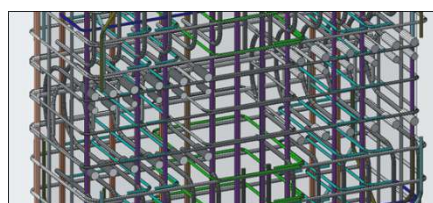
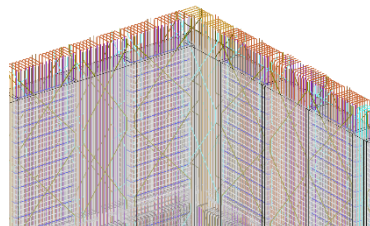


Construction Realization

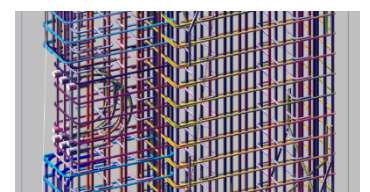
Range of Scale in
Design & Execution
Fully integrated chain:
Design-calculations-deliverables-
site implementation-quantities-construction



Reinforcement of Diaphragm Walls



Reinforcement Details directly
from the 3D Model



Final State

Client

AKTOR S.A. & BIM Clients

Venizelos Metro Station

Permanent Structure & 3d Mapping of Archaeological Findings

Thessaloniki, Greece

Project

BIM Model elaboration of Venizelos Station complex: main box and two entrances.
BIM Model of archaeological findings at the underground area integrated with the final project.

BIM implementation at construction stages simulation.

Construction Cost

Total project's cost: approx. € 60 m.

Project Schedule

Final & Detailed Design (estimated): 2019 – in progress
Construction (estimated): 2020 – in progress

Project Description

Top Down Construction Method.
Permanent Structure: 19,75m x 76,60m.
Six (6) levels: foundation, platform, E/M operation, concourse, archaeological, roof. Intermediate mezzanine level.

Software

Revit
Allplan
SCIA Engineer

Materials

Reinforced concrete C30/37
Unreinforced concrete C12/15
Shotcrete C20/25
Steel B500c, Structural Steel S275

Geology

Artificial Deposits of large thickness very soft to soft Clays, silty sands with gravels and loose silty gravels with sand.
Soft to fine grain clays and clayey sands with gravel.
Stiff to very stiff sandy clays, locally very weak claystones / siltstones.

Special Challenges

Archaeological findings at the excavation area, ensure the continuation of archeological works.
Complex and challenging construction sequence.
Construction works to ensure safe detachment and relocation of findings with intermediate stages of underground construction to build the archaeological area complex.
Additional loads of final archaeological complex.
Proximity of commercial buildings.
Restriction of additional surface settlements and displacements.
Complicated structure and particular complex of construction sequence works
Interacting with the two entrances.
Special parts at the design regarding existing structures treatment and deposition parts.
Tight time schedule.

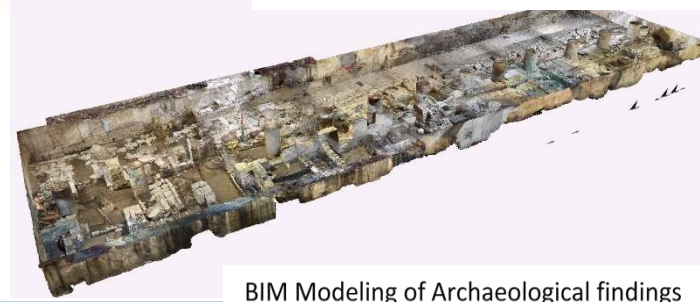
Our Services

- Elaboration of complete BIM Model regarding:
 - Permanent Structure of main box.
 - Permanent Structure of entrances.
- 3d mapping of archaeological findings and incorporation at the final BIM Model.
- Elaboration of BIM Construction Stages showing the exact sequence implemented on site.
- Elaboration of Geotechnical and Structural Calculation Models integrated with BIM Models.
- Elaboration of separate calculations about the construction of archaeological area in the station.
- Elaboration of drawings directly derived from BIM Models including construction sequence.
- Bill
- of Quantities directly derived from BIM Models.

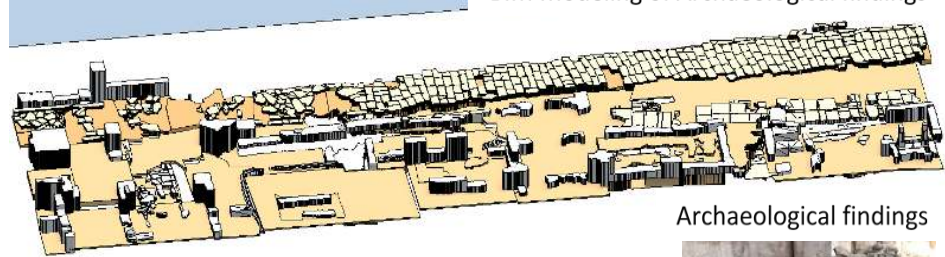


Complex Construction Sequence & Final State

3d Mapping of Archaeological findings



BIM Modeling of Archaeological findings

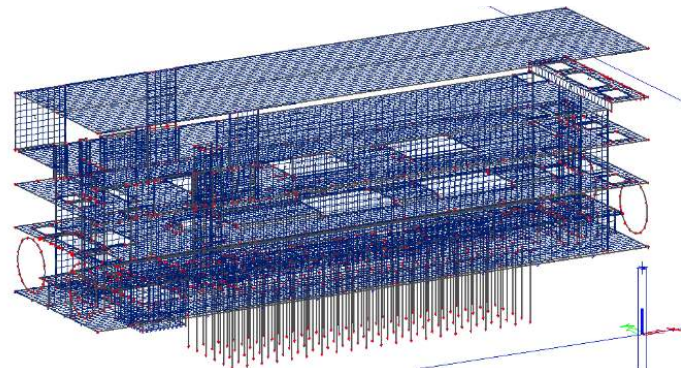


Archaeological findings

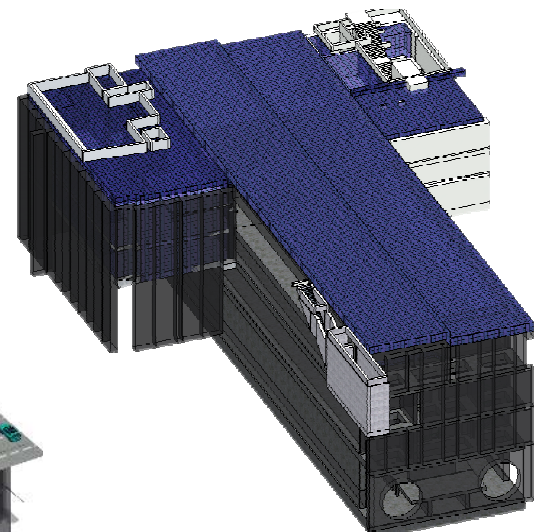


Conceptual Design
&
Execution

Analytical Structural integrated Model



BIM Structural Model



Client

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