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TITAN POLSKA



The 12th International
Workshop on Micropiles

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Organized by:



Modernization of historical constructions for the New Silesian Museum construction



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Presentation plan

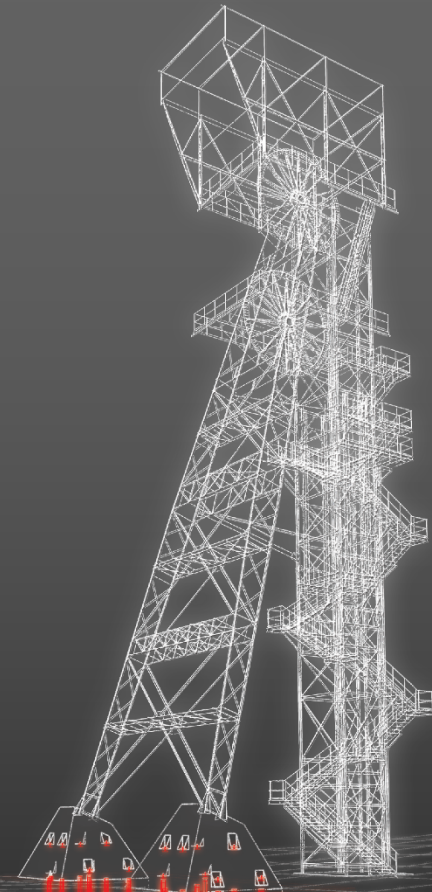
General information

Design problems

Geotechnical conditions

MS-8 building part of the
project

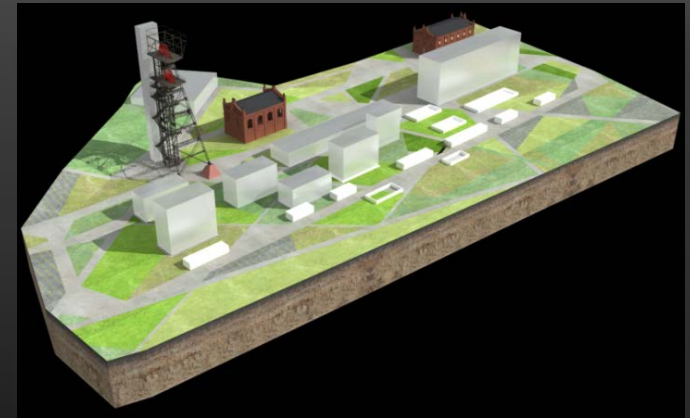
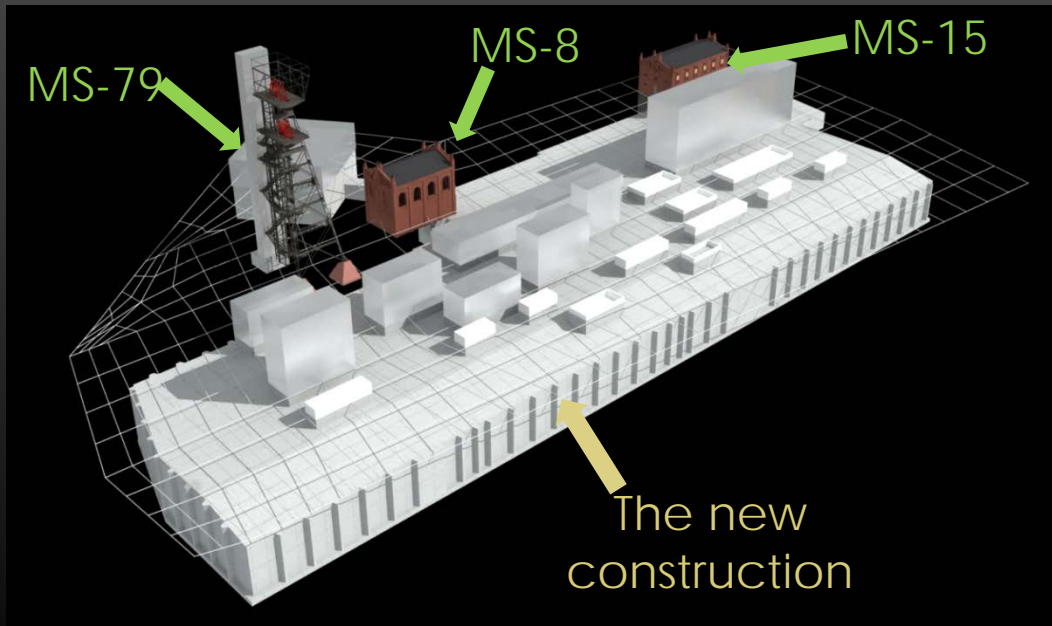
Summary



General information

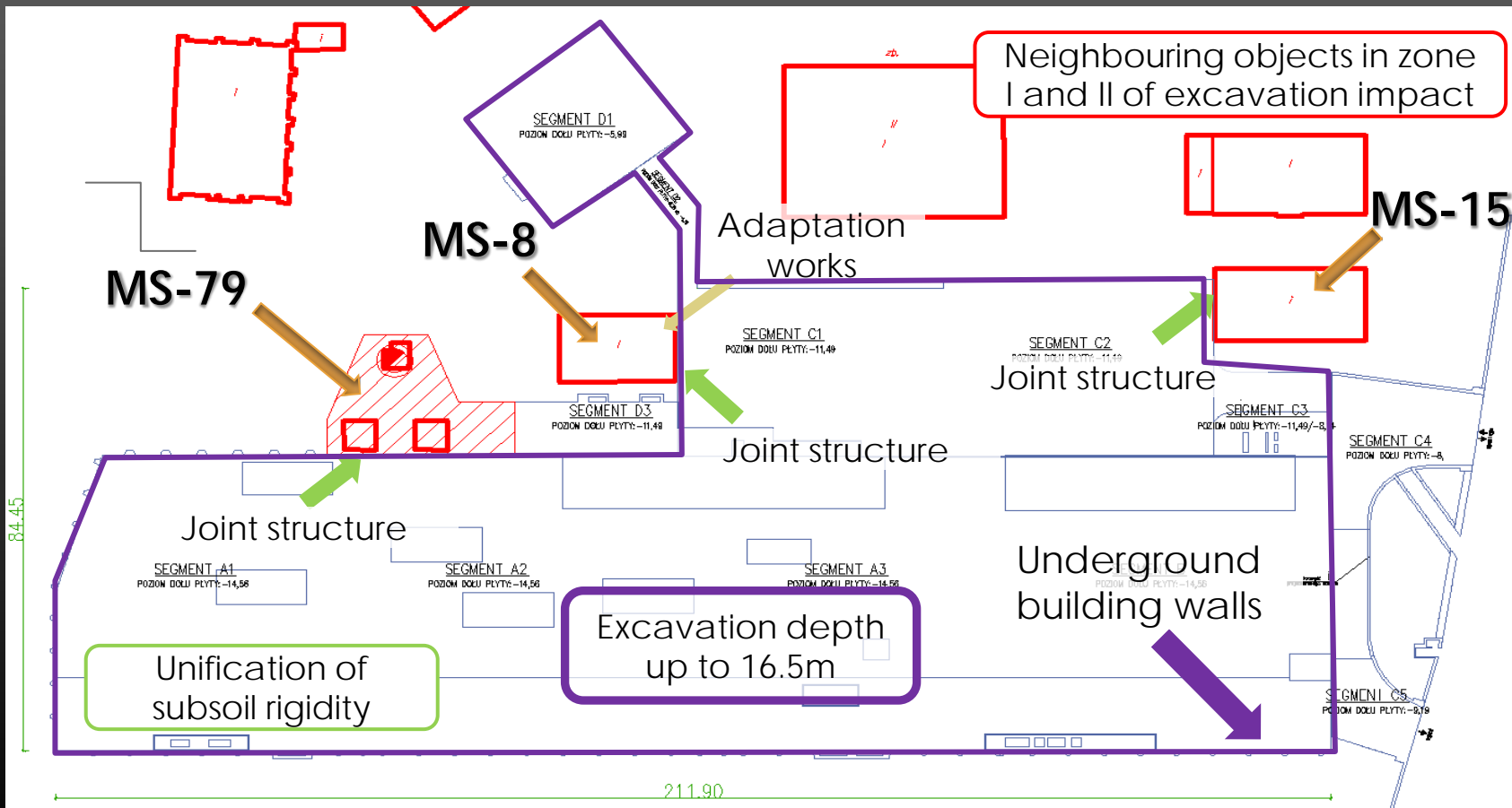


- Situated on the site of former Katowice coal-mine
- The modern new construction located below the ground level (up to 16m in depth)
- Substantial renovation of the old post-industrial 19th and the early 20th century buildings including creating the new underground floor



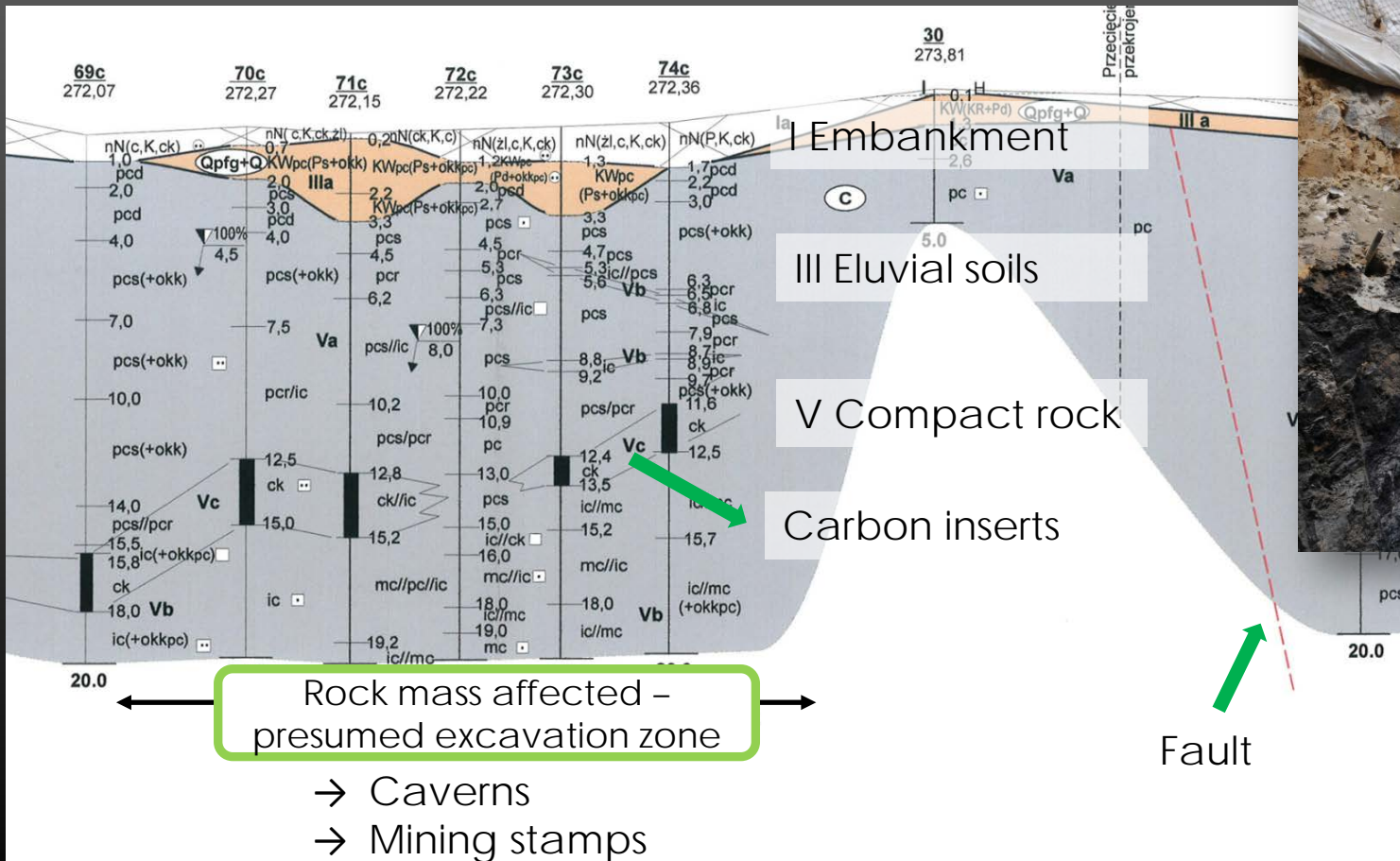
Design challenges

- Support of the deep excavation walls (permanent and temporary)
- Stabilization of the mass movement area
- Preservation of historic buildings located by the edge of the excavation
- Designing the geotechnical support for adaptation works in MS-8
- Strengthening the foundation of old shaft hoisting tower MS-79 and MS-15
- Additional constraints: highly tight schedule and logistical problems



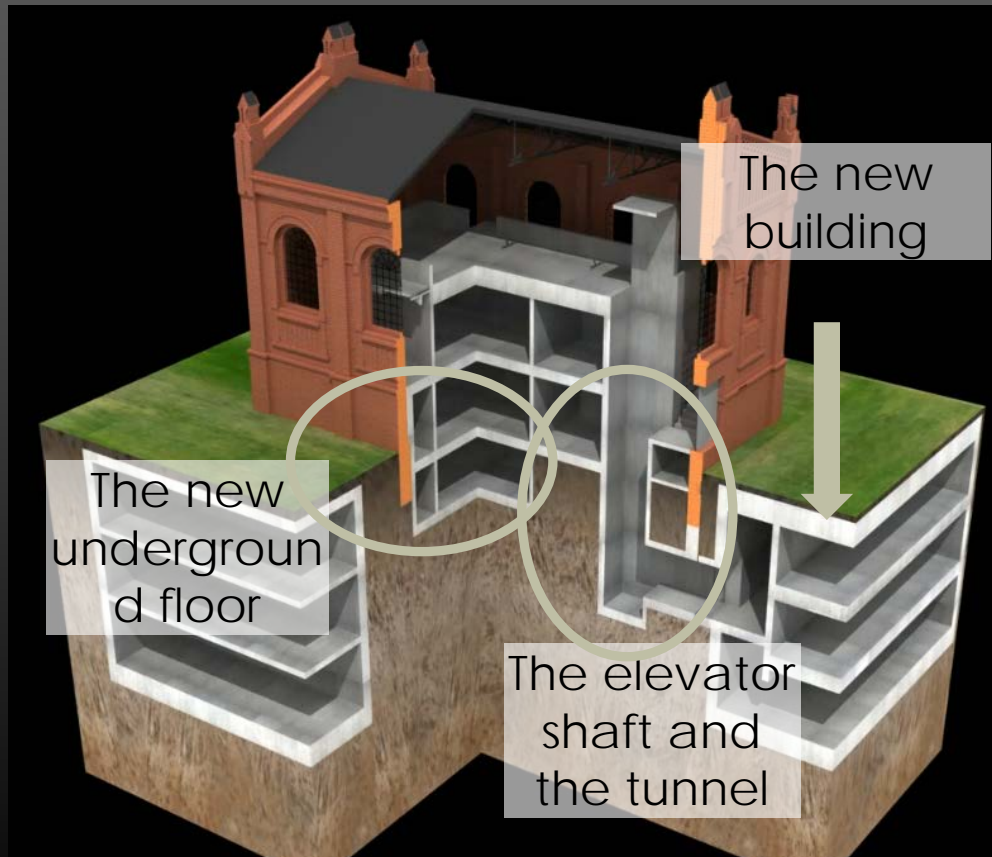
Geotechnical and hydrogeological conditions

- Quaternary formations (anthropogenic and glaciofluvial) and carboniferous (weathered mudstone and sandstone with carbon interbeddings)
- No contiguous water level, seepage and subsurface water
- Tectonic disorders (faults and minor quasi-continuous disturbances)
- Post-mine cavities, cracks, loosened zones, old stamps
→ adopting of observational method of design

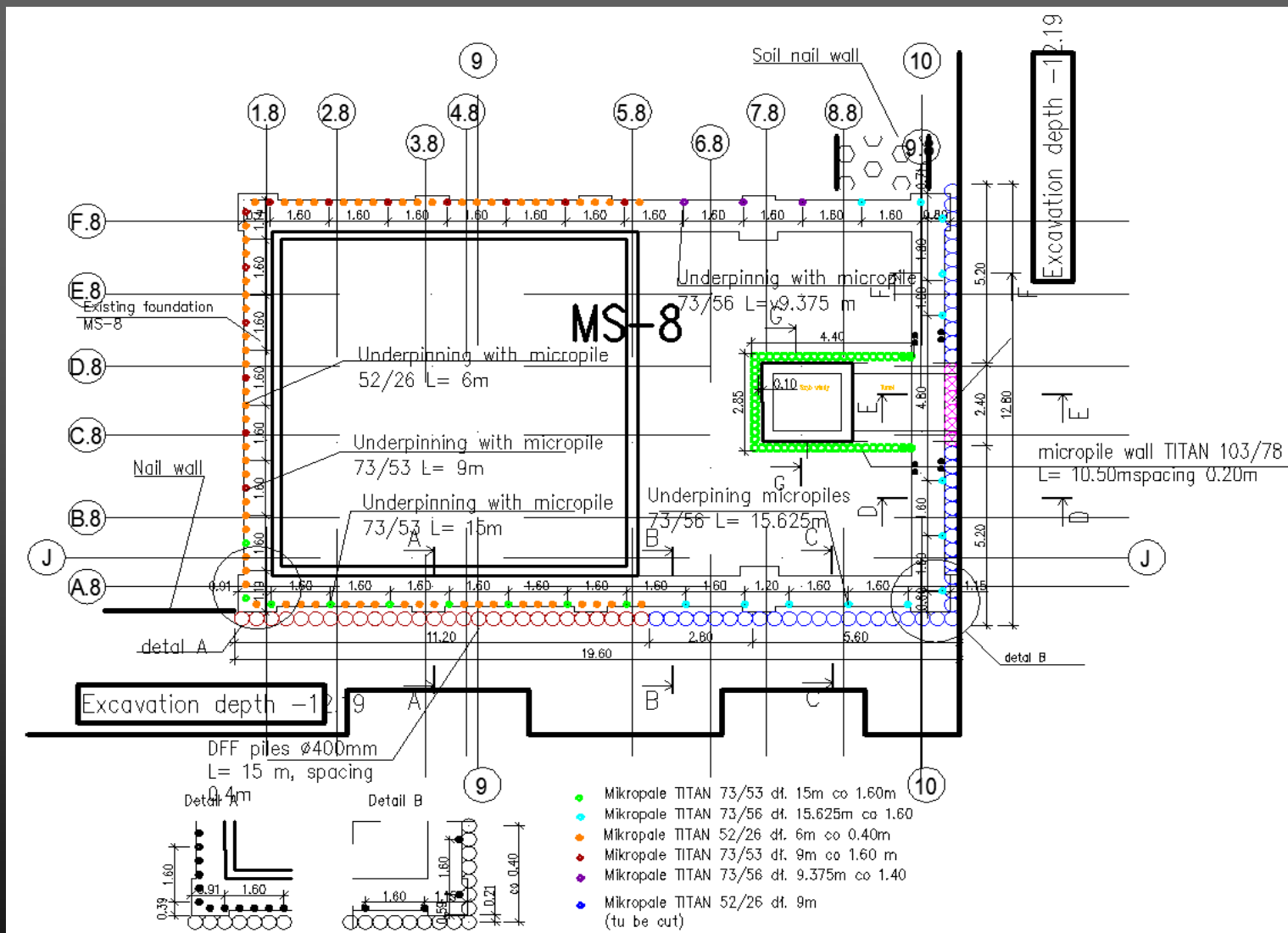


Building of the shaft hoisting machine MS-8

- Reducing the influence of the excavation on the sensitive structure
- Supporting the existing structure for the adaptation including creating of a new underground floor and a tunnel below the construction
- Stabilization of the deep excavation directly next to the existing buildings
- Micropile technology suitable for the ground conditions

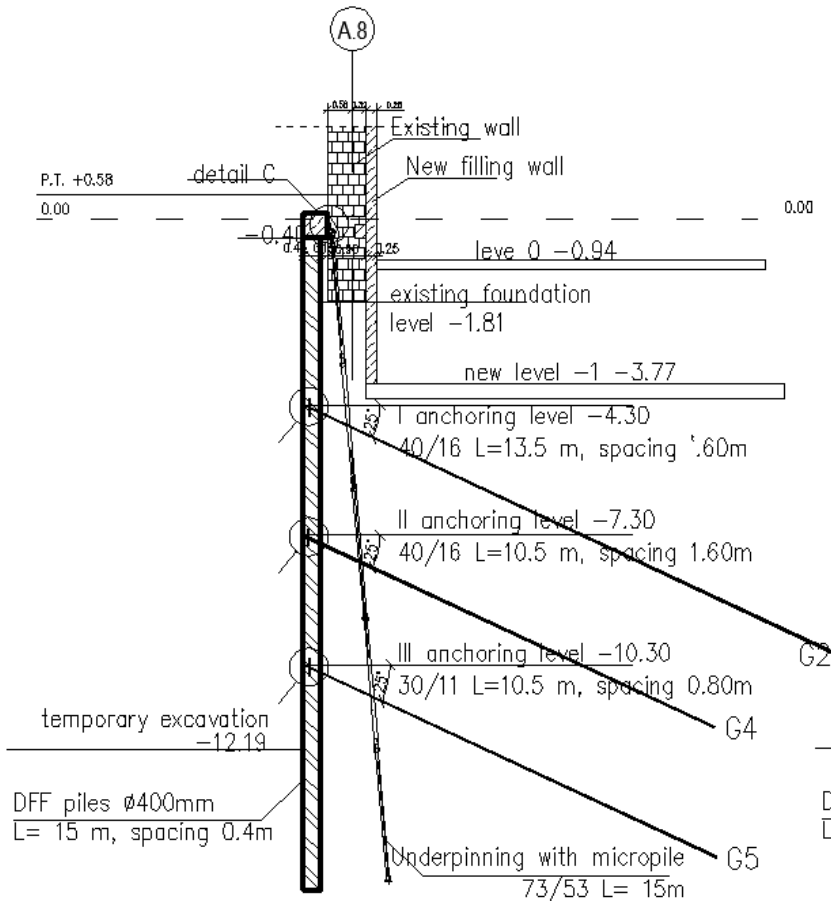


Building of the shaft hoisting machine MS-8

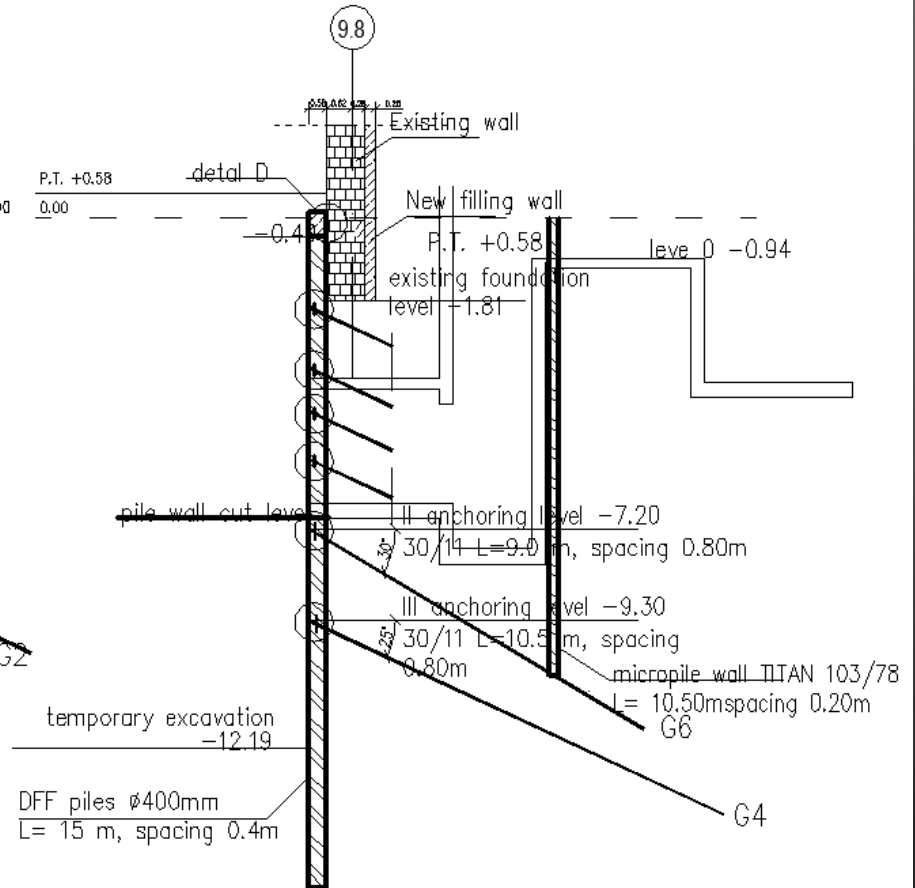


Building of the shaft hoisting machine MS-8

Section A-A

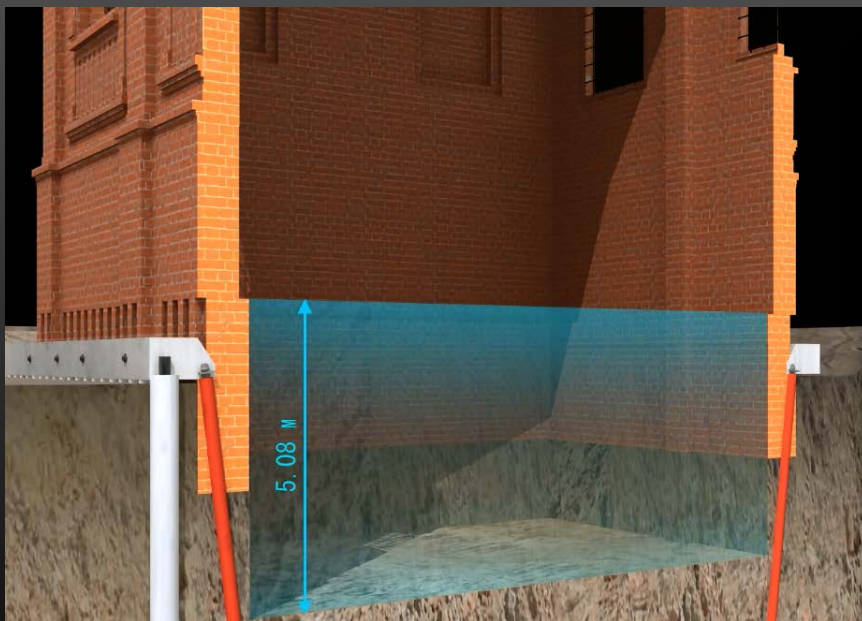
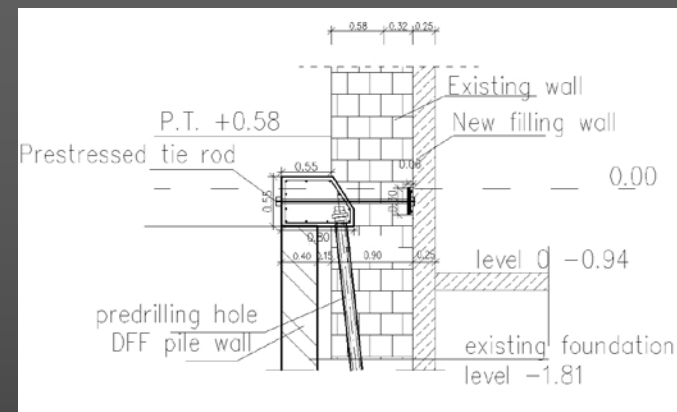


Section E-E

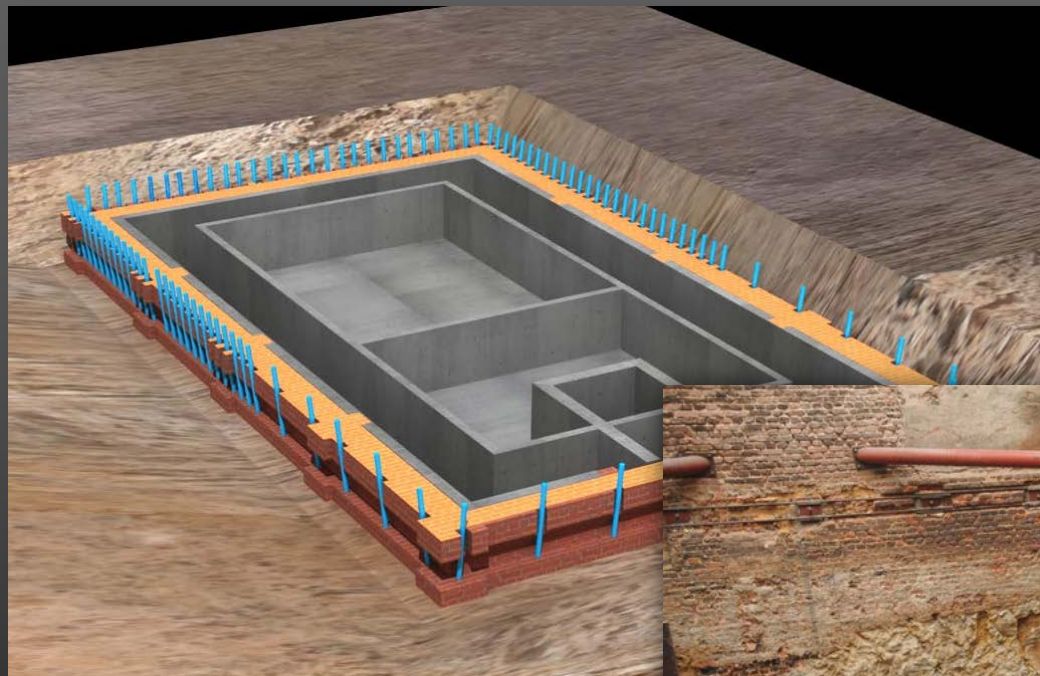


Building of the shaft hoisting machine MS-8

- Underpinning of the walls with micropiles 73/53 and 73/56 L=15m to reduce the settlements
- Underpinning of the original walls with micropiles 73/53 L=15m and 52/26 L=9m (as filling micropiles) to enable excavation inside the building at one step
- Connected to the upper structure with concrete beam braced with prestressed tie rods

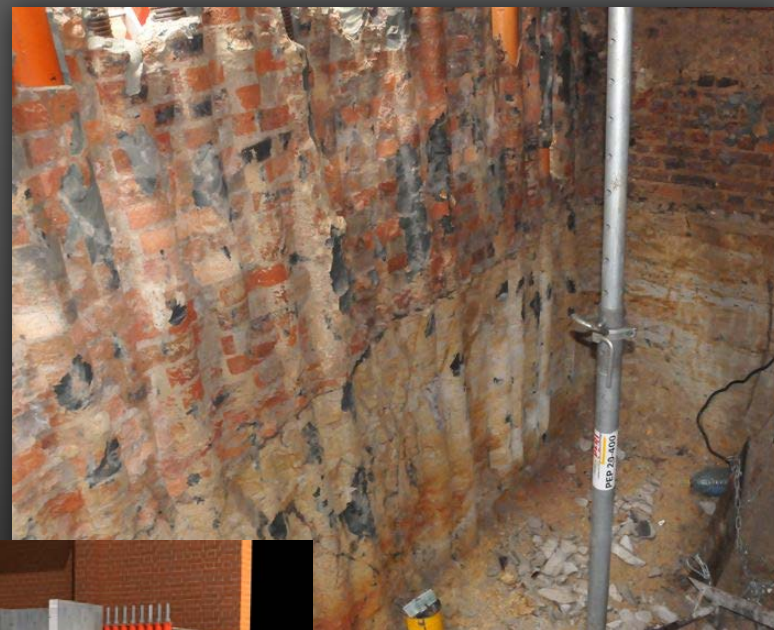
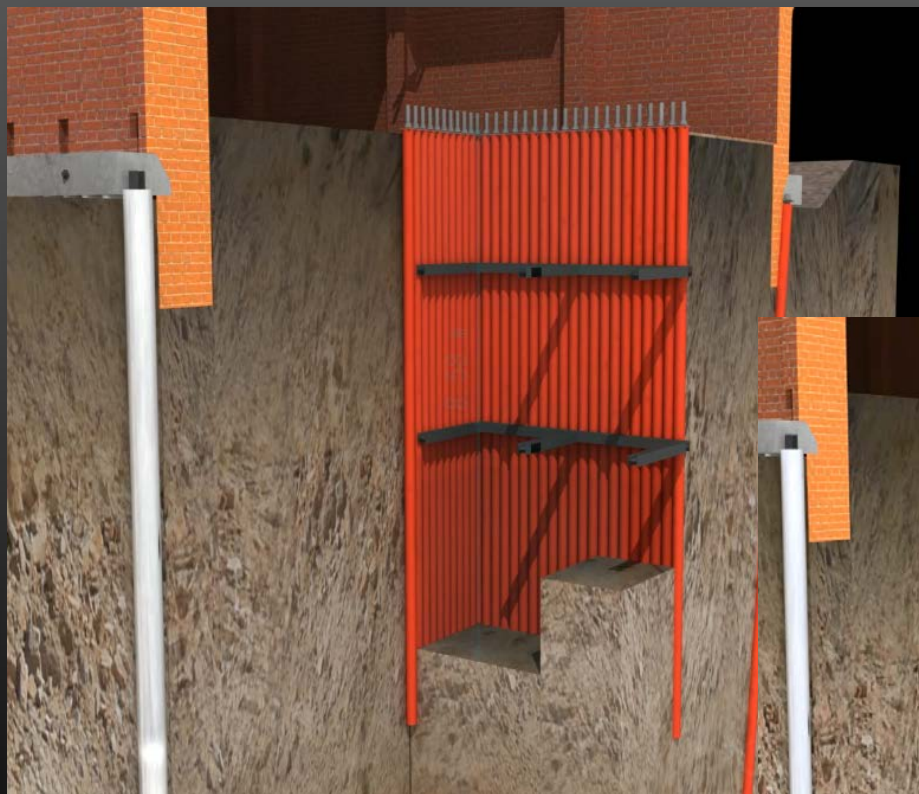


Building of the shaft hoisting machine MS-8



Building of the shaft hoisting machine MS-8

- Installation of micropile as a temporary retaining wall of 9m depth trench for the elevator shaft and the tunnel
- Micropile wall used as a sacrificial scaffolding
- TITAN 103/78 micropiles L=10.5m



Building of the shaft hoisting machine MS-8

- External excavation stabilized with DFF pile wall in conjunction with anchor piles:
- Excavation depth up to 13m
- Piles $L=15\text{m}$
- TITAN anchors length up to 13.5m, spacing each 2 or 4 piles



Building of the shaft hoisting machine MS-8

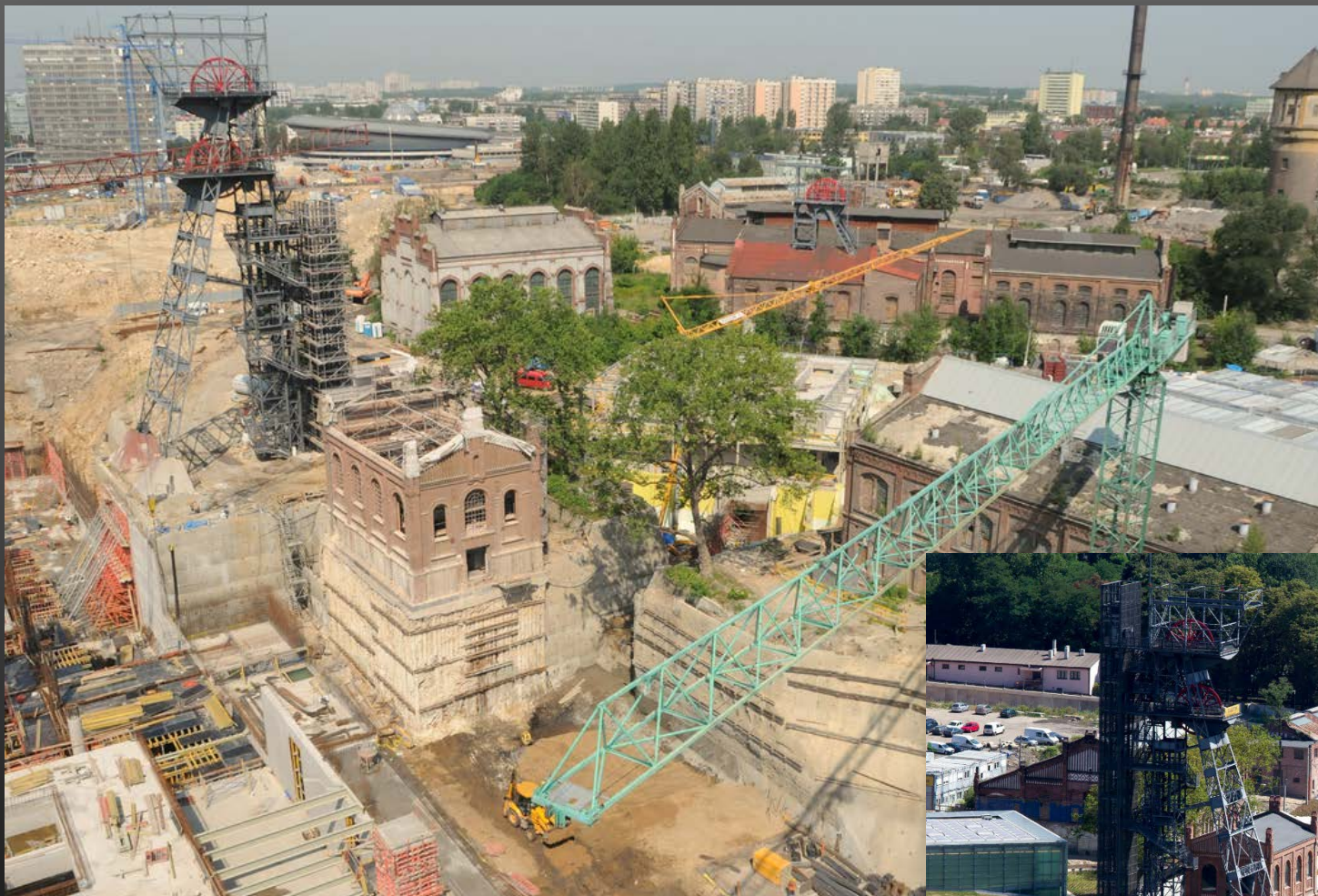


Building of the shaft hoisting machine MS-8 and the tower MS-79

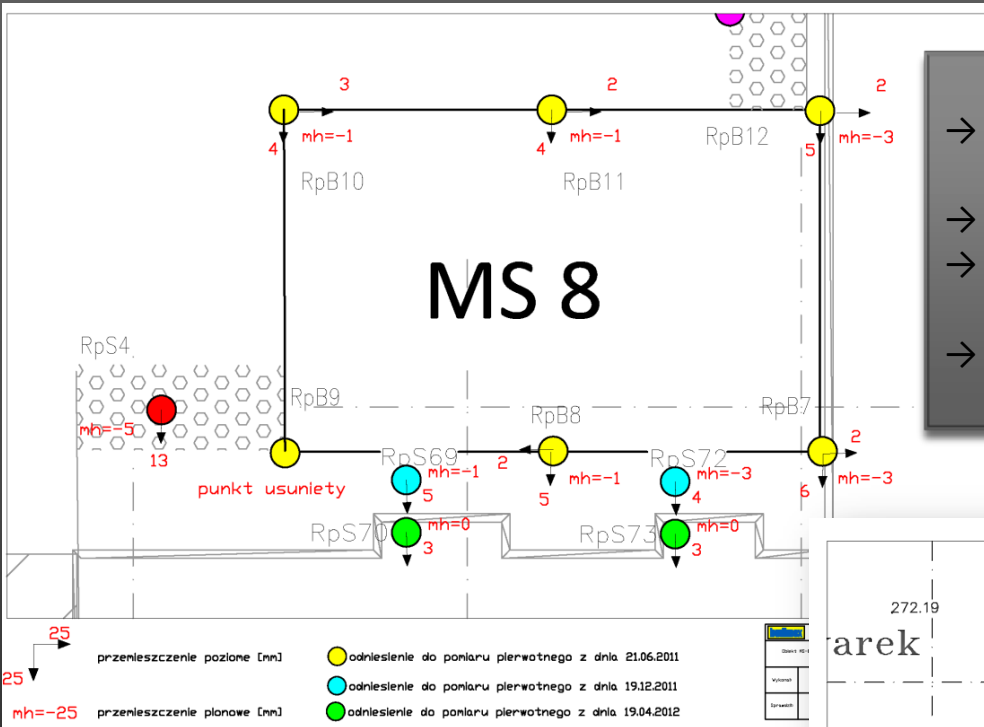
Building of the clothing store MS-15



General view on the construction site

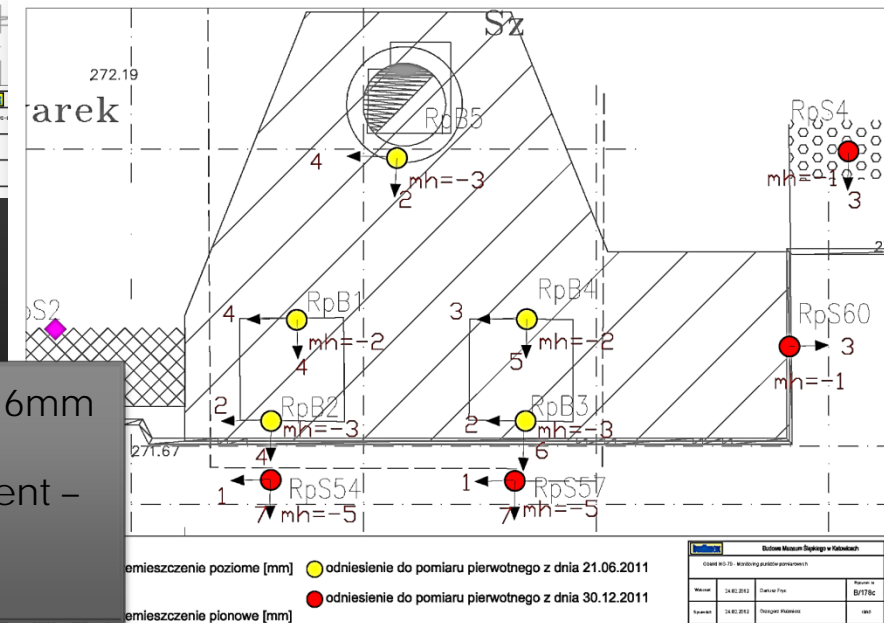


Multi-factor monitoring system



- Theoretical settlements of walls – 6mm
- Measured – 3mm
- Theoretical horizontal displacement – 36mm
- Measured – 7mm

- Theoretical settlements of walls – 6mm
- Measured – 3mm
- Theoretical horizontal displacement – 45mm
- Measured – 26mm



Summary

- The demanding project successfully completed
- Works lasted 12 months
- Self-drilling injection micropiles in total length of 1,400 running meters were used for underpinning the renovated historical buildings nearly 15,000 running meters of TITAN 30/11 and 40/16 soil nails were installed.
- Over the 9,000 m of self-drilling injection micropiles were used as the retaining walls and the stabilization system of anchored micropile barriers in the area of dynamically active rock mass.
- Over 15,000 m of soil nails installed
- Over 3,800 m of anchors for pile walls
- Close cooperation of the geotechnical engineers, the designer and the contractor was the key to the success.



THANK YOU FOR YOUR
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