



8th International Conference VIET-POL 2025
Hanoi University of Mining and Geology
Hanoi, Vietnam
Detailed Program

21 October 2025 (Tuesday) - Day 1

9:30-10:00	Registration – Main auditorium (HT300), HUMG	
10:00-11:30	Opening Ceremony – Main auditorium (HT300)	
10:00-10:05	Introduction	
10:05-10:15	Welcoming speech by Prof. Dr. Tran Thanh Hai, Rector, Hanoi University of Mining and Geology (HUMG)	
10:15-10:25	Speech by Ms. Joanna Skoczek, H.E Ambassador of Poland to Vietnam	
10:25-10:45	Address by Prof. Dr. Jery Lis, Rector of AGH University of Krakow	
10:45-10:55	Prof. Anna Wysocka, University of Warsaw: Polish-Vietnamese Tropical Research Centre - a new opening in scientific cooperation between Poland and Vietnam	
10:55-11:05	Group photo	
11:05-11:30	Coffee break	
11:30-12:15	Plenary session - Main auditorium (HT300)	
11:30-11:40	Overview presentation of 8 th International Conference VIET-POL 2025	
11:40-12:10	Keynote speech: <i>Choosing location for settlement within the areas prone to landslide hazard based on integrated assessment of synergistic geological-morphological-hydrometeorological-anthropogenical impacts: lessons from Lang Nu and Nam Tong villages, Lao Cai Province, northern Vietnam</i> Prof. Hai Tran, Leader of Key research group TGREEN	
12:10-12:15	Question and Answer	
12:30-14:00	Lunch – HUMG Restaurant	
14:00-15:30	Parallel sessions	
	Session 1: Carbon transformation Room: Pho Yen Chair: Prof. Marek Borowski (AGH)	Session 2: Sustainable and responsible industry 1 Room: Thuan Thanh Chair: Assoc. Prof. Do Ngoc Anh (HUMG)
14:00-14:15	Paweł Madejski (AGH) – <i>Integrating Solar Energy and Thermal Storage for the Decarbonization of Fossil Fuel Power Plants</i>	Barbara Tora (AGH) – <i>Offshore mining</i>
14:15-14:30	Szymon Kuczyński (AGH) – <i>Sources and Mitigation Strategies for Methane Emissions in Natural Gas Distribution and Transmission Networks</i>	To Xuan Ban (HUMG) – <i>Flouridated, low-mineralized thermal water in Da Nang City, Vietnam</i>
14:30-14:45	Tomasz Włodek (AGH) – <i>Technical Challenges in LNG Transport and Storage – Implications for Sustainable Energy Transition</i>	Bogdan Samojeden (AGH) – <i>Copper and/or Cobalt-Modified Cenospheres as Catalysts for Low-Temperature NH₃-SCR</i>
14:45-15:00	Ta Quoc Dzung (HUST HCMC) - <i>Preliminary Assessment of CO2 Storage Capacity in Deep Saline Aquifers of the Mekong Delta, Southern Vietnam: a Volumetric Approach</i>	Pham Thanh Hai (HUMG) - <i>Fly Ash Processing of Thermal Power Plants and Orientation of Rational Utilization By-products in the Context of Circular Economy</i>
15:00-15:15	Cichoń Dariusz (AGH) - <i>Comparative Analysis of the 'Fit for 55' Package and Vietnam's Power Development Plan VIII (PDP VIII) in the Context of Energy Transition Strategies</i>	Bogdan Samojeden (AGH) – <i>Alternative Fuels: Innovative Approaches for a Sustainable Future</i>
15:15-15:30	Question and Answer	Question and Answer
15:30-16:00	Teabreak	





16:00-17:30	Parallel sessions	
16:00-16:15	Session 3: Natural hazards Room: Pho Yen Chair: Prof. Barbara Tora (AGH)	Session 4: Sustainable and responsible industry 2 – International Doctoral Contribution (hybrid) Room: Thuan Thanh Chair: Prof. Dao Ba Phong (AGH)
16:00-16:15	Dariusz Więclaw (AGH) – <i>Gaseous Pollutants Emitted During the Self-Heating Processes of Coal Wastes: A Case Study from Upper Silesia, Poland</i>	Do Duy Khoan (PVEP) – <i>Research on Building an Integrating Geotechnical and 3D Geological Models of Shallow Marine Sediments for Offshore Wind Farm Development: a Case Study of Binh Thuan, Vietnam</i>
16:15-16:30	Do Thi Phuong Thao (HUMG) - <i>Potential of Using Satellite Remote Sensing and GIS in Monitoring of Mine Disasters</i>	Abu Al Hassan (AGH) – <i>Predicting Wind Turbine Blade Failures with Smart Data</i>
16:30-16:45	TRAN Tuan Duong (HUMG) – <i>Features of Gravity Anomalies and Their Oil-Gas Geological Significance in the Cuu Long Basin</i>	Debela Alema Teklemariyam (AGH) – <i>CFD-Based Design Optimization of a Perforated Circumferential Diffuser for Horizontal-Axis Wind Turbines</i>
16:45-17:00	Truong Tien Quan (AGH) – <i>Simulation of Air Temperature Changes in Vietnamese Underground Coal Mines Using Ventsim Design Software</i>	Krzysztof Kijanowski (AGH) – <i>A Cluster-Based Filtering Approach to SCADA Data Preprocessing for Wind Turbine Monitoring</i>
17:00-17:15	Tran Anh Quan (HUMG) - <i>Evaluating Drought Evolution in Vietnam Using Cmp6-Vn Climate Projections</i>	Sylwester Szewczyk (AGH) - <i>Condition-Based Maintenance Solutions for Rotating Machinery in Marine Applications</i>
17:15-17:30	Question and Answer	Mr. Nasir H.R. Syed (AGH) – <i>Multicointegration-Based Monitoring Framework for Nonstationary Process Data</i>
17:45	Bus departure to Gala dinner	
22 October 2025 (Wednesday) - Day 2		
9:00-10:30	Parallel sessions	
	Session 5: Social sustainable development Room: Thuan Thanh Chair: Assoc. Prof. Khuong The Hung (HUMG)	Session 6: Miscellaneous Room: Pho Yen Chair: Prof. Anna Wysocka (University of Warsaw)
9:00-9:15	Tung Ha (National Economic University) – <i>The Evolution of the prevention culture in Southeast Asian mining countries</i>	Andrzej Klepka (AGH) – <i>Efficient Detection of Local Defect Resonances in Solids Using 3D Scanning Laser Doppler Vibrometry and Signal Processing Algorithms</i>
9:15-9:30	NGUYEN Duc Thang (HUMG) - <i>Strategic Solutions for Enhancing the Effectiveness of Managerial Talent Attraction in Enterprises under The Vietnam National Coal and Mineral Industries Group, 2025–2030</i>	Artur Guzy (AGH) – <i>Challenges in Estimating Long-Term InSAR-Derived Land Subsidence in the Mekong Delta, Vietnam</i>
9:30-9:45	Le Xuan Thanh (HUMG) - <i>Renewable Energy in Vietnam: Figures and Future Scope for Net-Zero Target</i>	Akarsh Seetharamaiah (AGH) - Application for Selecting Filtering Parameters to Obtain Envelope Spectra
9:45-10:00	Nguyen D. Phong (HUMG) - <i>Research on Labor Safety Risk Assessment in Underground Coal Mining</i>	Dang V. Kien (HUMG) - <i>Research on the Influence of Excavation Seams and Geological Conditions on Surface Movement and Deformation using Geomechanical Digital Models</i>
10:00-10:15	Question and Answer	Magdalena Dumanska-Slowik (AGH) – <i>Microextural Evidence for Magmatic and Postmagmatic Processes in Nepheline Syenite from Phia Ma Massif, Northeastern Vietnam</i>
10:15-10:45	Tea break	
	UNECE technical workshop: Reducing methane emissions in the mining sector Room: Pho Yen Chair: Prof. Marek Borowski 10:45 -	Poster Session Room: Thuan Thanh Chair: Nga Nguyen 10:45 –
10:45-10:50	Opening remarks: Michal Drabik (UNECE)	
10:50-11:05	Artur Badylak (JSW S.A.) – <i>EU Regulation on Reducing Methane Emissions in the Energy Sector – A Challenge for European Mining</i>	Cao Son Nguyen (Lodz University) – <i>Key Motives for the Internalization of Firms: the Case of Polish Enterprises Expanding into the Vietnamese Market</i>





11:05-11:20	Zbigniew Lubosik (INIG-PIB) – <i>Coalbed Methane (CBM) – Projects Implemented in Poland</i>	Le Dinh Chieu (HUMG) – <i>Solutions to Strengthen Multi-industry Linkages to Promote the Circular Economy in the Vietnamese Mining Industry</i>
11:20-11:35	Artur Badylak (JSW S.A.) – <i>Methane-Related Projects Implemented by JSW S.A.</i>	Michal Karch (AGH) - <i>Experimental Studies of Pressure Changes in the Cage during the Ride in the Mine Shaft</i>
11:35-11:50	Damian Hendzel (LW Bogdanka S.A.) – <i>Monitoring of Methane Emissions into Mine Workings in Hard Coal Mines in Poland</i>	Pawel Madejski (AGH) - <i>Integrating Solar Energy and Thermal Storage for the Decarbonization of Fossil Fuel Power Plants</i>
11:50-12:05	Marek Borowski (AGH) – <i>Comparison of Measured and Simulated Methane Emissions in Vietnamese Underground Coal Mines</i>	Bui Thanh Hoa (AGH), Marek Borowski (AGH) – <i>Comparison of Measured and Simulated Methane Emissions in Vietnamese Underground Coal Mines</i>
12:05-12:20	Renata Cicha-Szot (INIG-PIB) – <i>Design Optimization of Isolation Dams and Drainage LRDD Trajectories Using Integrated 3D Geological Models with Methane Release Forecasting</i>	
12:20-12:30	Closing	
12:30-14:00	Lunch:	
14:30	Bus departs to the city center	
23 and 24 October 2025 (Wednesday and Thursday) - Day 3 and 4		
	Fieldtrip in Cao Bang Geo Park	



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**VIET - POL
2025**

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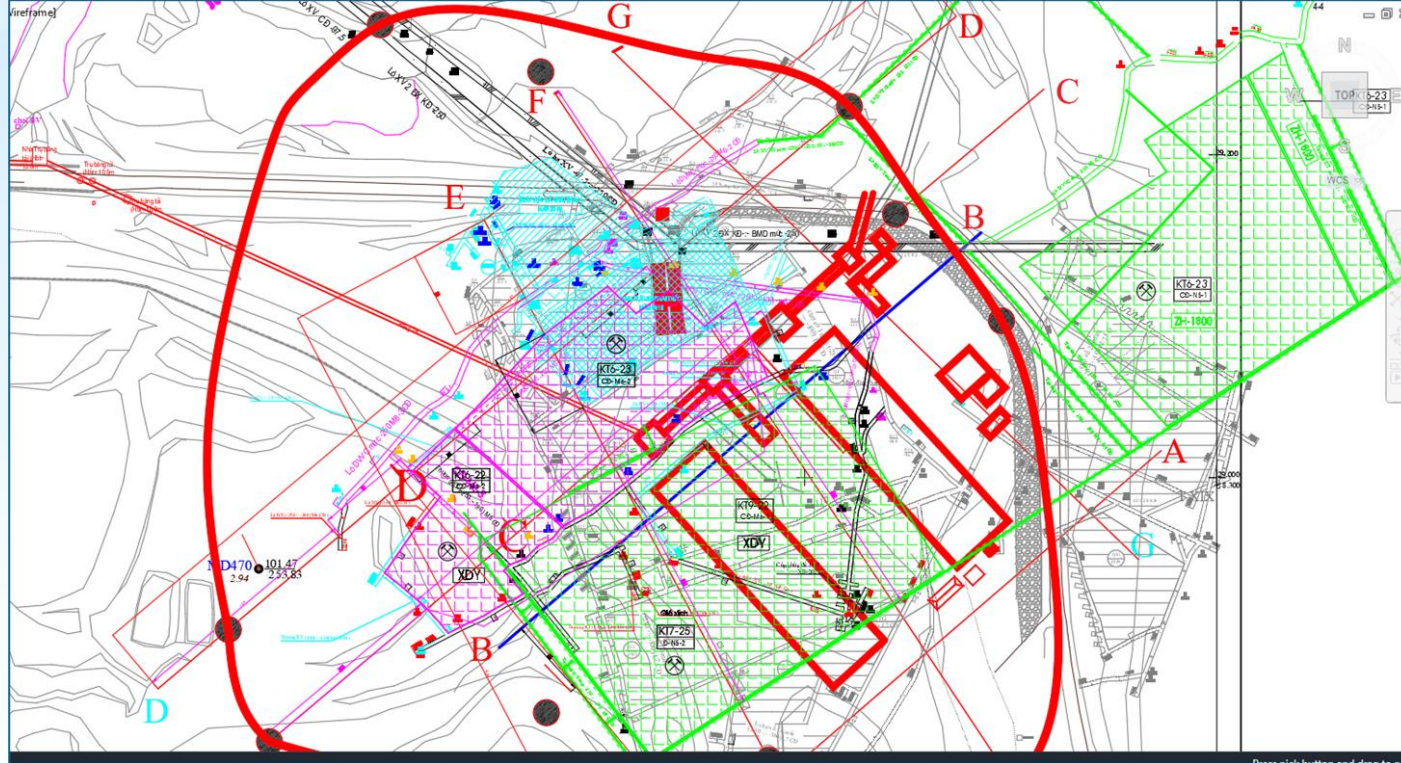


21 - 24 OCTOBER 2025
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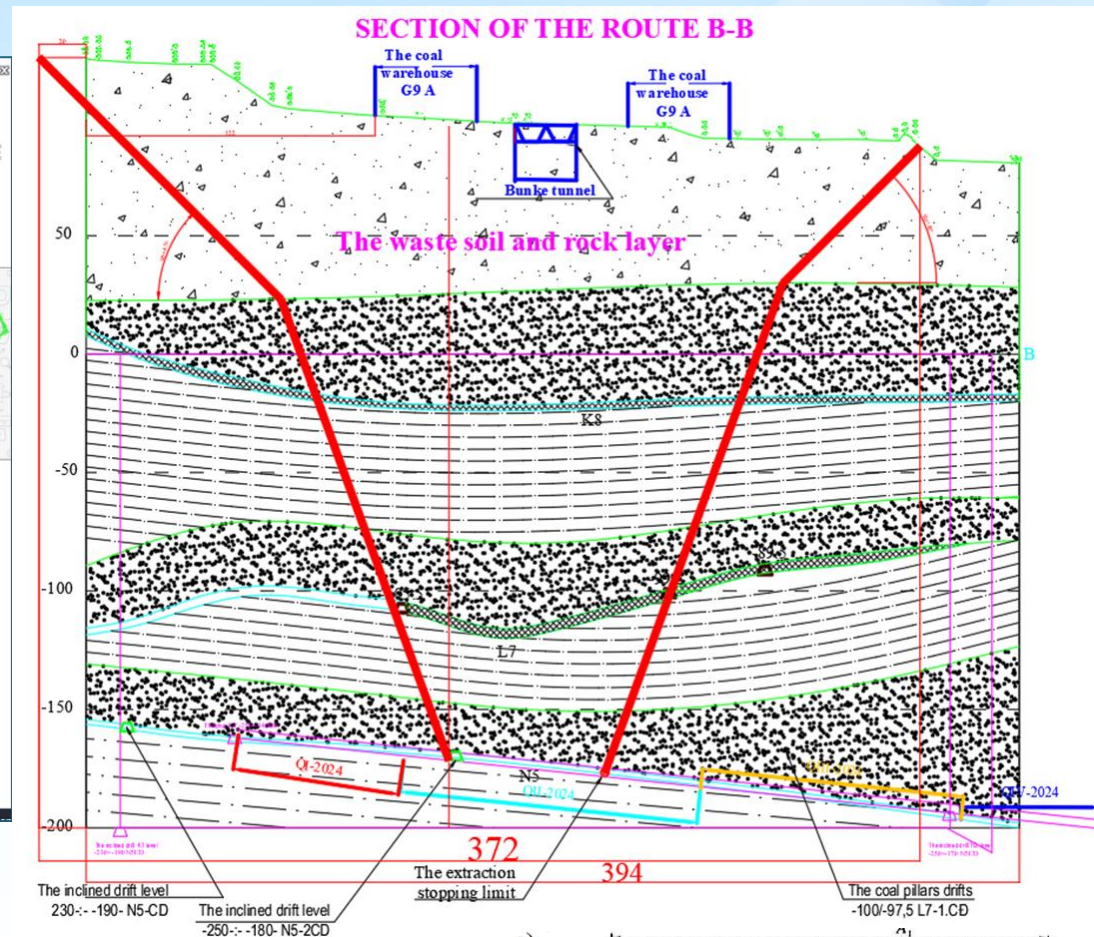
Research on the Influence of Excavation Seams and Geological Conditions on Surface Movement and Deformation using Geomechanical Digital Models



INTRODUCTION



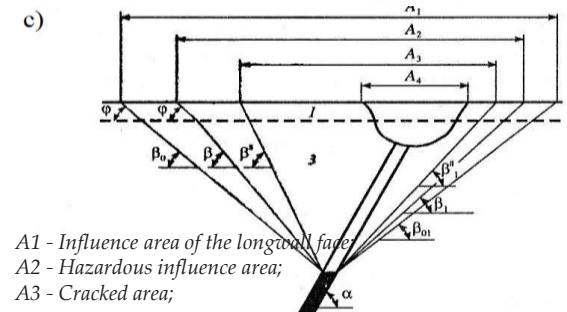
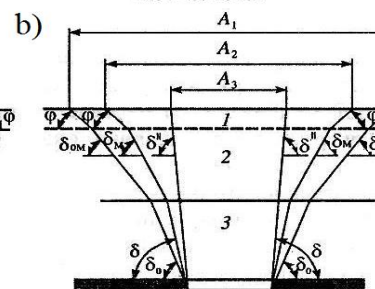
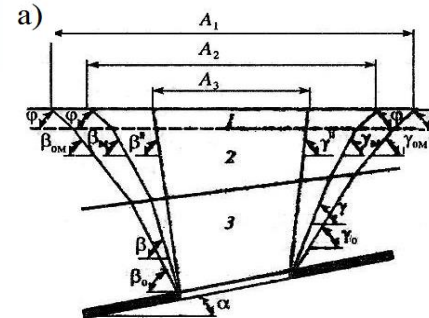
The plan of the coal warehouse G9



➤ Surface movement and deformation, also known as subsidence, occur when the ground surface lowers due to underground mining activities:

Various factors, including:

- The extraction of minerals, the collapse of underground cavities, and changes in groundwater levels, geological conditions...
- The extent of settlement can vary significantly depending on factors like the type of mining, geological conditions, and proximity to structures.
-

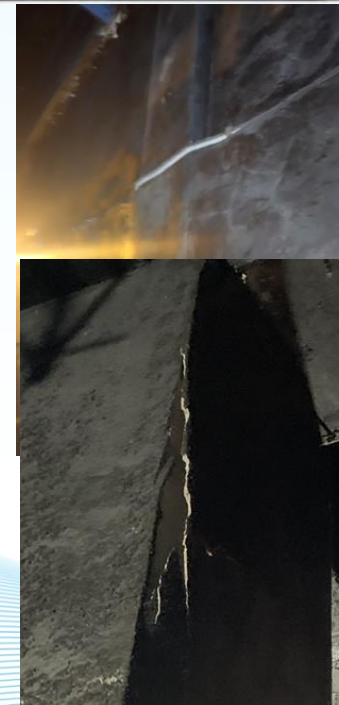
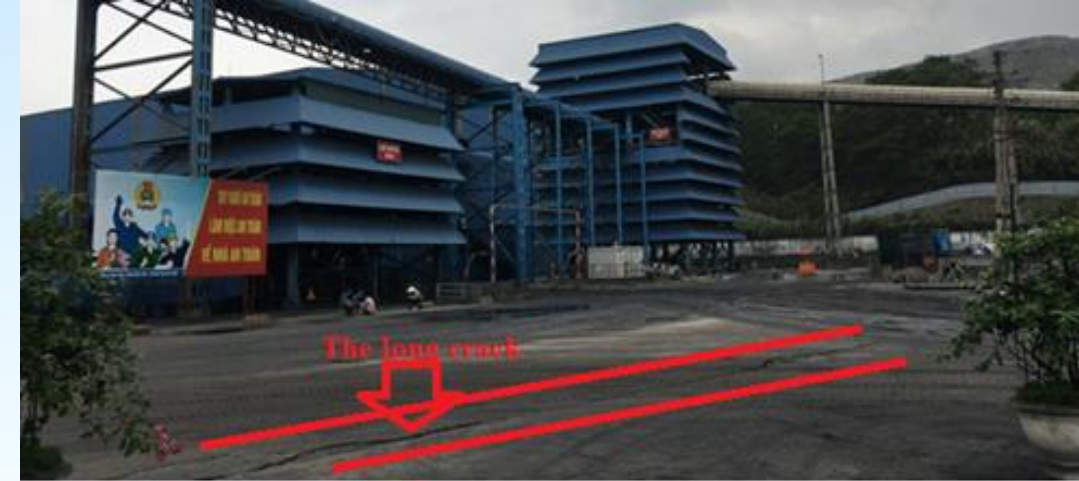


A1 - Influence area of the longwall face;
A2 - Hazardous influence area;
A3 - Cracked area;

OVERVIEW OF THE COAL WAREHOUSE G9

- The coal warehouse G9 has a large area that can hold over 110,000 tons, with an average coal supply for the thermal power plants of about 7 million tons per year...
- The G9 coal warehouse area includes: 2 coal warehouses and an underground bunker tunnel, the conveyor belt above...
- Currently, in the southeastern area of the G9 coal warehouse, adjacent to the underground area, many cracks, subsidence, and signs of expansion continue to appear. The concrete wall of the coal warehouse (the end of coal warehouse number 1) has also cracked significantly;
- Behind coal warehouse number 2, a crack extending up to 90 meters has appeared, along with the phenomenon of heaving subsidence damaging surface drainage structures and the yard are.

❖ **These phenomena pose a serious safety risk to the structural integrity of the facilities and require urgent assessment and evaluation...**

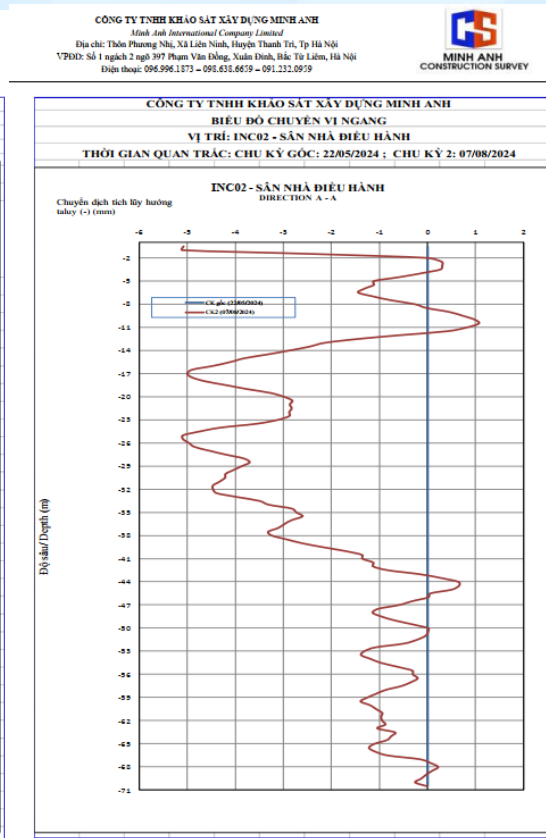
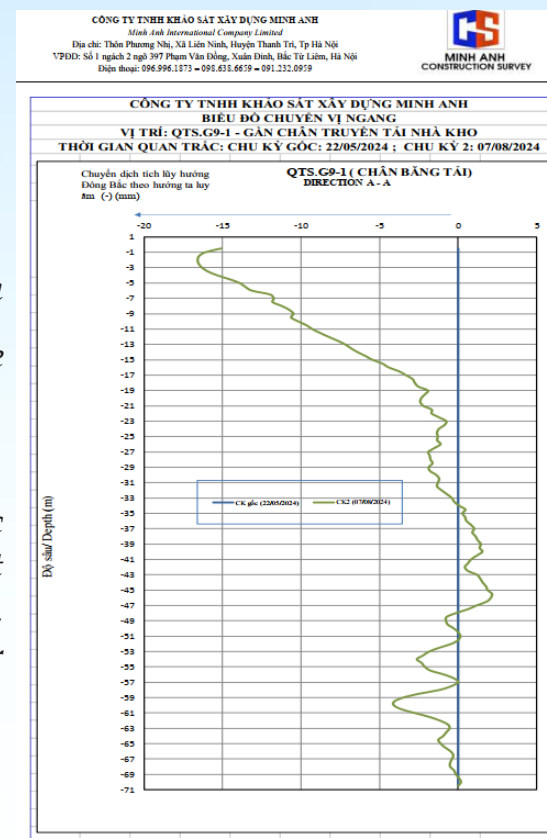


MONITORING METHODS

- Due to the significant surface displacement of the coal mine, it affects production, so we use deep monitoring methods to track the movement
- Use the deep observation method with an inclinometer through a 70m deep borehole and monitor the movement over time.
- According to the results of the inclinometer displacement monitoring in the report on horizontal displacement monitoring for Cycle 1 and Cycle 2, the positions in the horizontal displacement report include (Minh Anh CO., LTD, 2024) (Table 1).
- According to the results of the Technical Monitoring Report on the dynamic subsidence in the area of the G9 coal warehouse yard - Cam Pha Port and Transport Company - Vinacomin, the maximum subsidence value is -93mm (benchmark CT121), -88mm (benchmark CT122), -78mm (benchmark CT123) (Area of the conveyor supports in the coal warehouse G9 number 1).

Table 1. Horizontal displacement monitoring at the coal warehouse G9 location

Location	The location of the largest horizontal displacement	The value of the largest horizontal displacement	Displacement rate mm/month
Base of conveyor QTS.G9-1. Surveyed at a depth of -0.5 to -70.5m	-2.0 m	16.58mm	-6.63
QTS.G9-2 operating yard Surveyed at a depth of -0.5 to -70.5m	-1.0 m	5.1mm	-2.04



NUMERICAL MODELLING

MATERIAL FAILURE CRITERIA AND BOUNDARY CONDITION

The model has dimensions including a height of 300m and a width of 500m. The left and right boundaries of the model are fixed horizontally with zero horizontal displacement at the boundaries; vertical displacement is free. .

Table 2. Mechanical parameters of reinforced concrete shell, concrete tunnel for the coal warehouse G9 flooring, the coal warehouse G9 structure, and barrette retaining wall

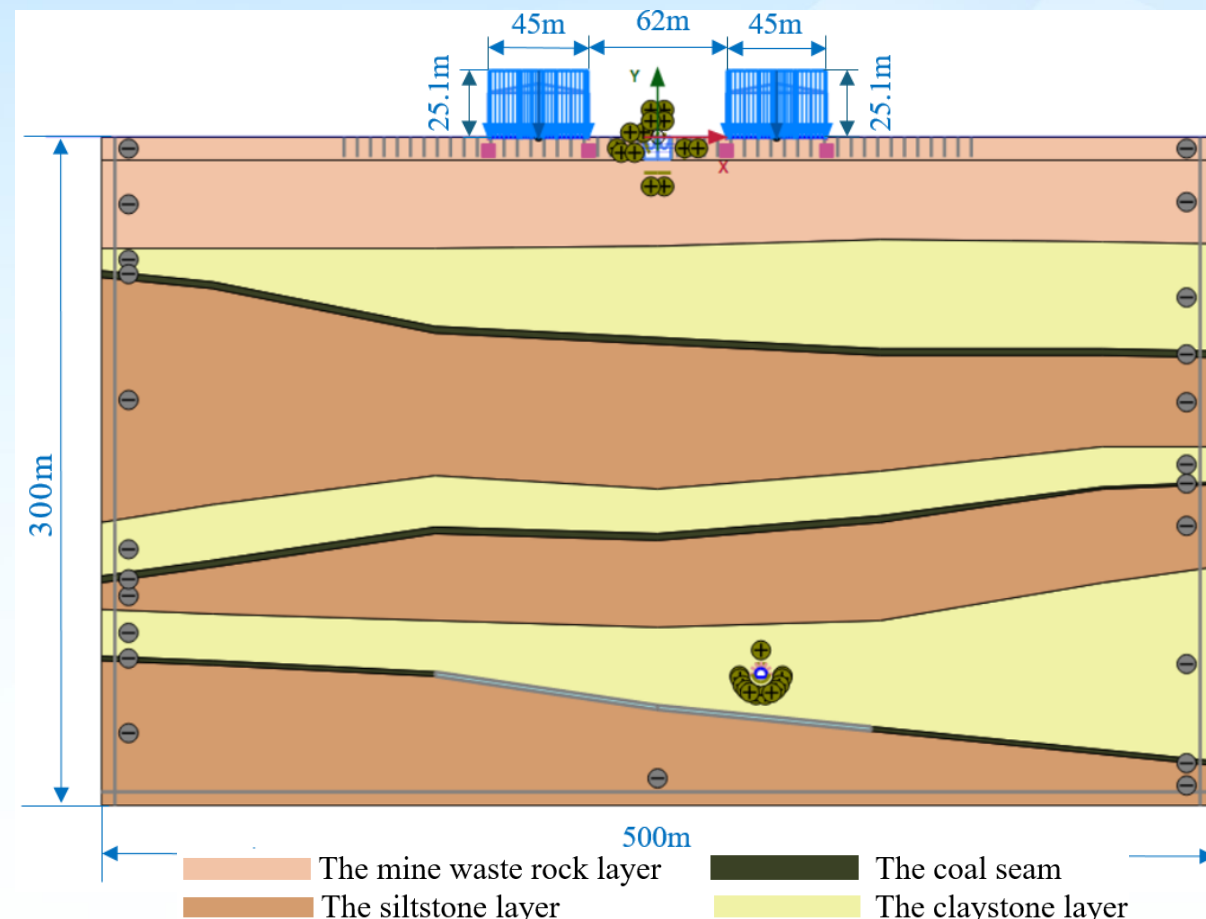
Parameter s	Unit	Reinforced concrete shell for walls and roof of the bunker and tunnel.	Reinforced concrete shell for walls and ground of bunkers and tunnels	Concrete floor slab for the coal warehouse	Structural frame columns and roof beams for the coal warehouse G9, H1300	Structural frame columns of the coal warehouse G9, I500	Retaining walls barrette
Thickness, m	m	0.3	0.4	0.15	-	-	0.6
Poisson coefficient, ν	-	0.2	0.2	0.2	0.15	0.15	0.2
Normal stiffness, EA	kN/m	7.875×10^6	18.66×10^3	8437.5	265.8×10^3	186.7×10^3	540×10^3
Flexural Rigidity, EI	kN.m ² /m	10.5×10^6	14.0×10^6	45×10^5	15.75×10^6	14×10^6	18×10^6
Weight, w	kN/m/m	9.6	9.6	7.5	11.25	10	14.4

- In this model, the G9 coal warehouse area includes: 2 coal warehouses and an underground bunker tunnel, along with the proposed reinforcement solutions.

The self-weight of the surface structure: The weight of the coal in the coal warehouse G9 is calculated as: $G_{\text{coal}} = \gamma_{\text{coal}} * H_{\text{warehouse}} * B_{\text{warehouse}} * 1 = 1.3 * 20 * 45 * 1 = 1170 \text{ T}$.

The layer of mine waste rock that has not been completely moved;

The dynamic loads of the conveyor belt above.



Phase number	Construction works
Phase 1	Establishing initial parameters and setting boundary conditions.
Phase 2	Reduce the modulus of the rock mass in the area of the drifts being excavated
Phase 3	Constructing 02 the coal warehouse G9 and setting up the injection boreholes on the ground of the coal warehouse G9
Phase 4	Excavating the bunker and installing the reinforced concrete bunker shell
Phase 5	Run the model with the material model of coal/rock.
Phase 6	Analyze and evaluate the results of the model.

NUMERICAL MODELLING

NUMERICAL MODELLING

and subsidence calculations for the coal warehouse G9 ground according to the phenomenon of subsidence in the coal warehouse G9 foundation before

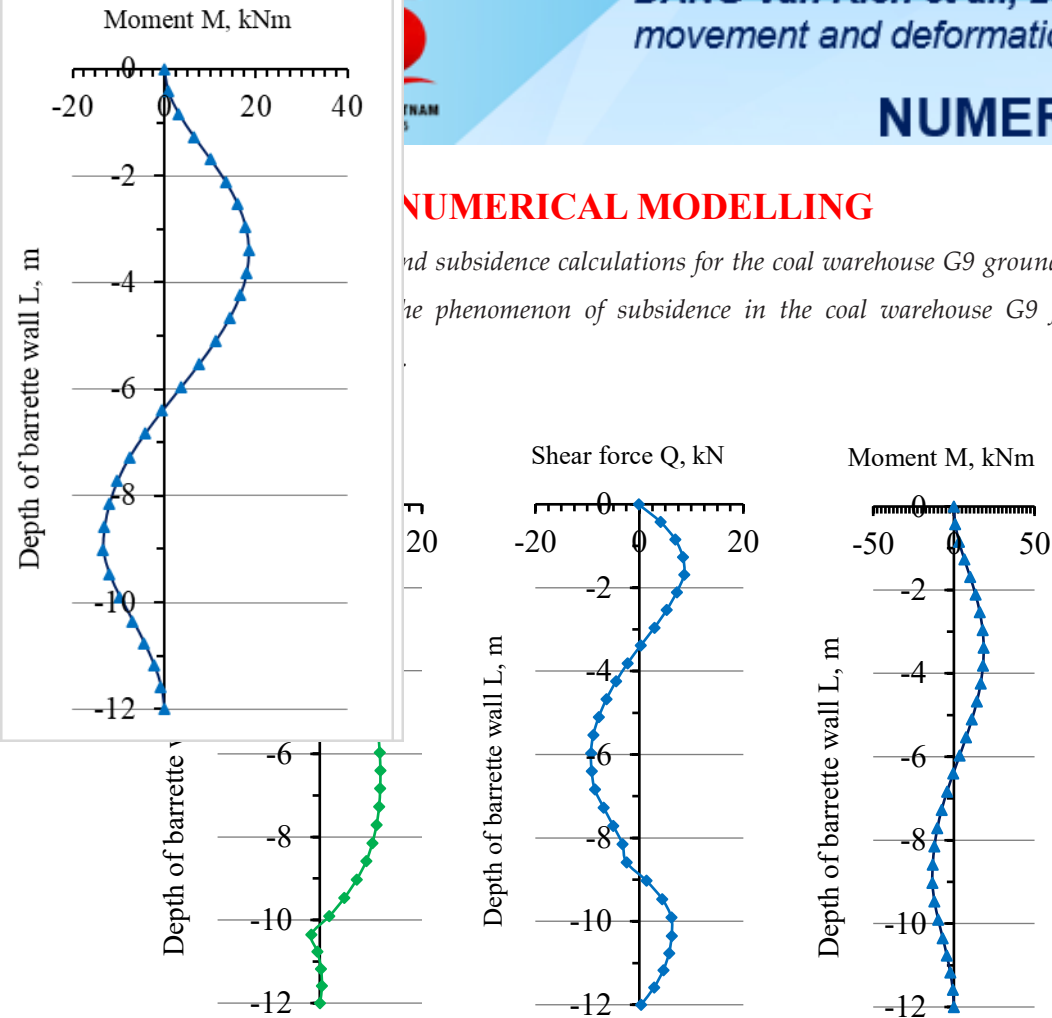


Fig 10. Distribution of internal forces in the barrette wall at the location of the bunker

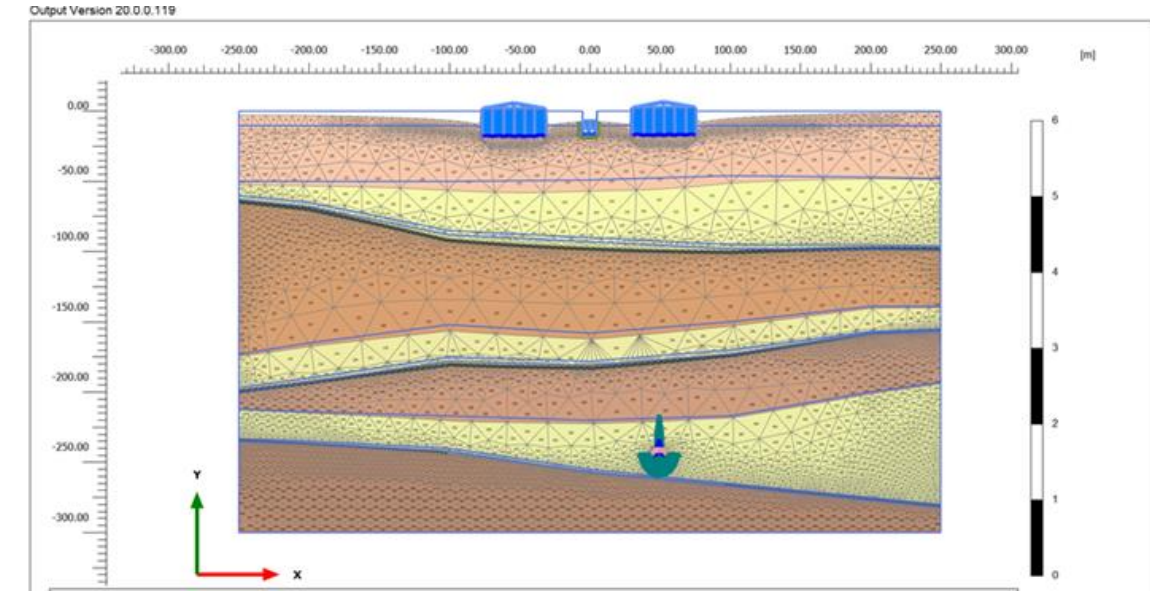


Fig 7. Results of ground displacement and subsidence before reinforcement

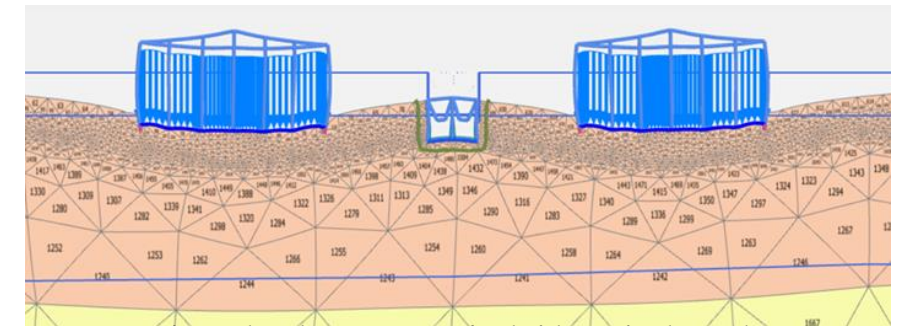
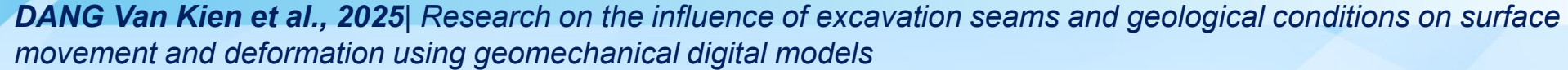


Fig 8. The phenomenon of subsidence in the coal warehouse G9 foundation before reinforcement

- The maximum ground displacement and subsidence occur is at the ground of the coal warehouse G 9 with maximum value is 0.3640m (364.0mm);



REINFORCEMENT SOLUTIONS

- + On the surface of the coal warehouse G9, the method of grouting cement is used with drill holes with a diameter of D105, L 9m, and the distance between the drill holes is $l = 3 \times 3$ m. At the position far from the area of the two coal warehouses, the method of grouting cement is used with drill holes with a diameter of D105, L=6m, and the distance between the drill holes is $l = 3 \times 3$, as shown in Fig.12
- Along the underground bunker tunnel, the barrette wall is used with a wall depth of $L_B = 12$ m and a wall thickness of $\delta_B = 0.6$ m to increase stability and reduce the occurrence of settlement deformation for the underground bunker tunnel line (Fig.13).

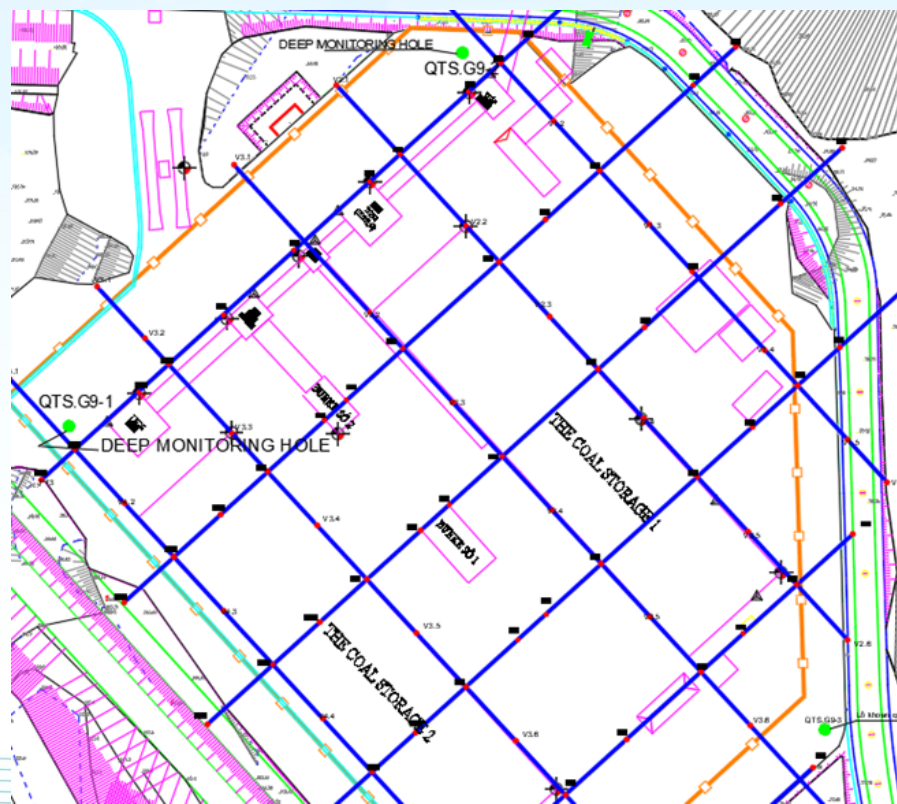


Fig 12. Reinforcement diagram the coal warehouse G9 by grouting cement method.

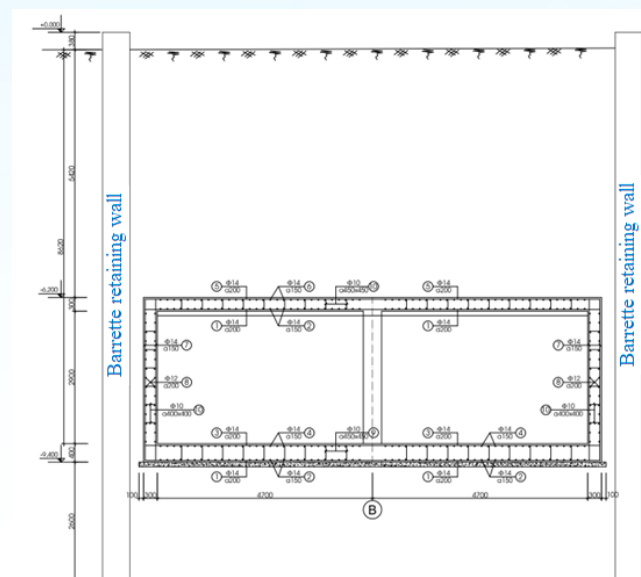


Fig.13 .Reinforcement solution for underground bunker using barrette diaphragm wall

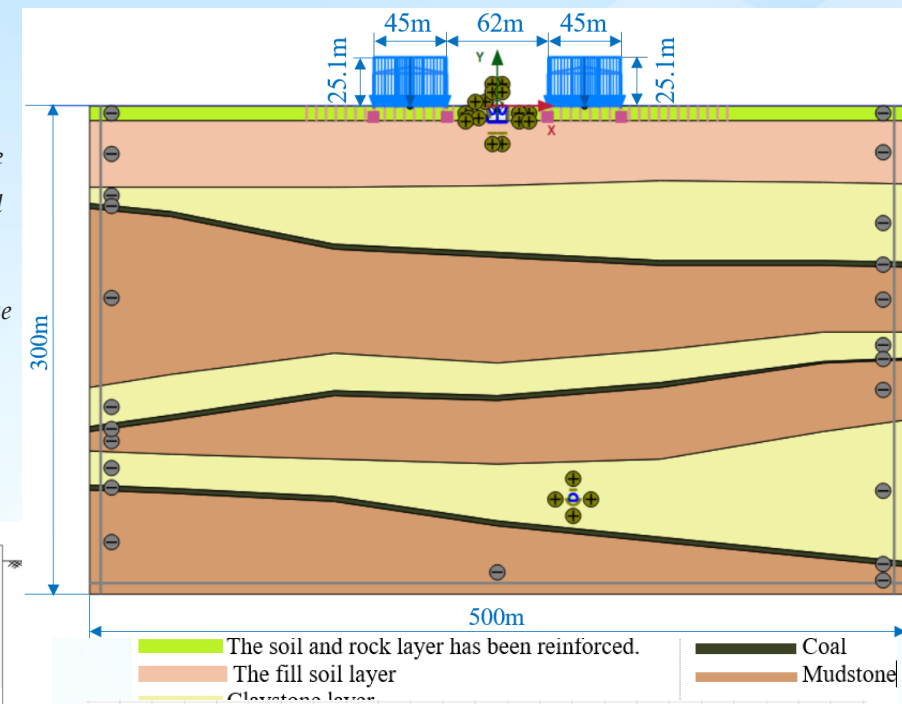


Fig 7. Results of ground displacement and subsidence before reinforcement

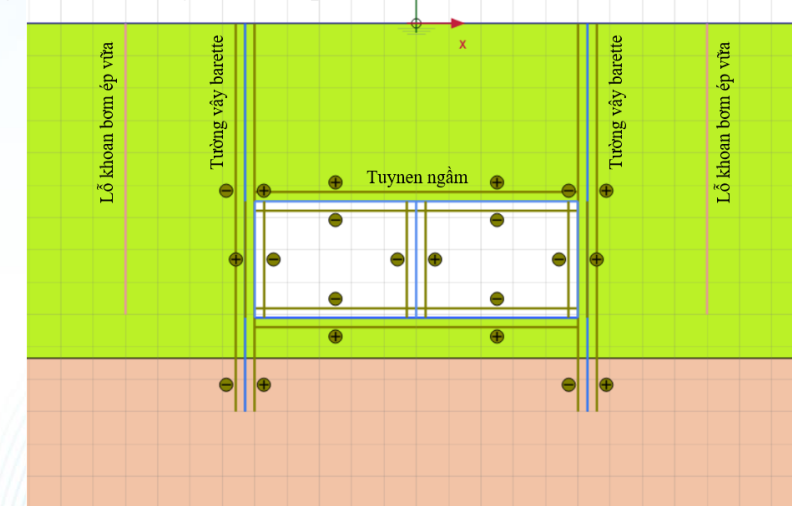


Fig 14. Simulation diagram of the underground bunker on the model

RESULTS OF THE REINFORCEMENT SOLUTIONS

Results of distribution the internal forces in barrette retaining walls at the bunke location

+ By using the reinforcement solution, the displacement and settlement value of the coal warehouse G9 floor at the underground tunnel location with a vertical displacement of 18.58mm is observed.

+ The distribution of internal forces and displacements of the barrette retaining wall at the underground tunnel location is shown in Fig. 17 and Fig. 18 as follows.

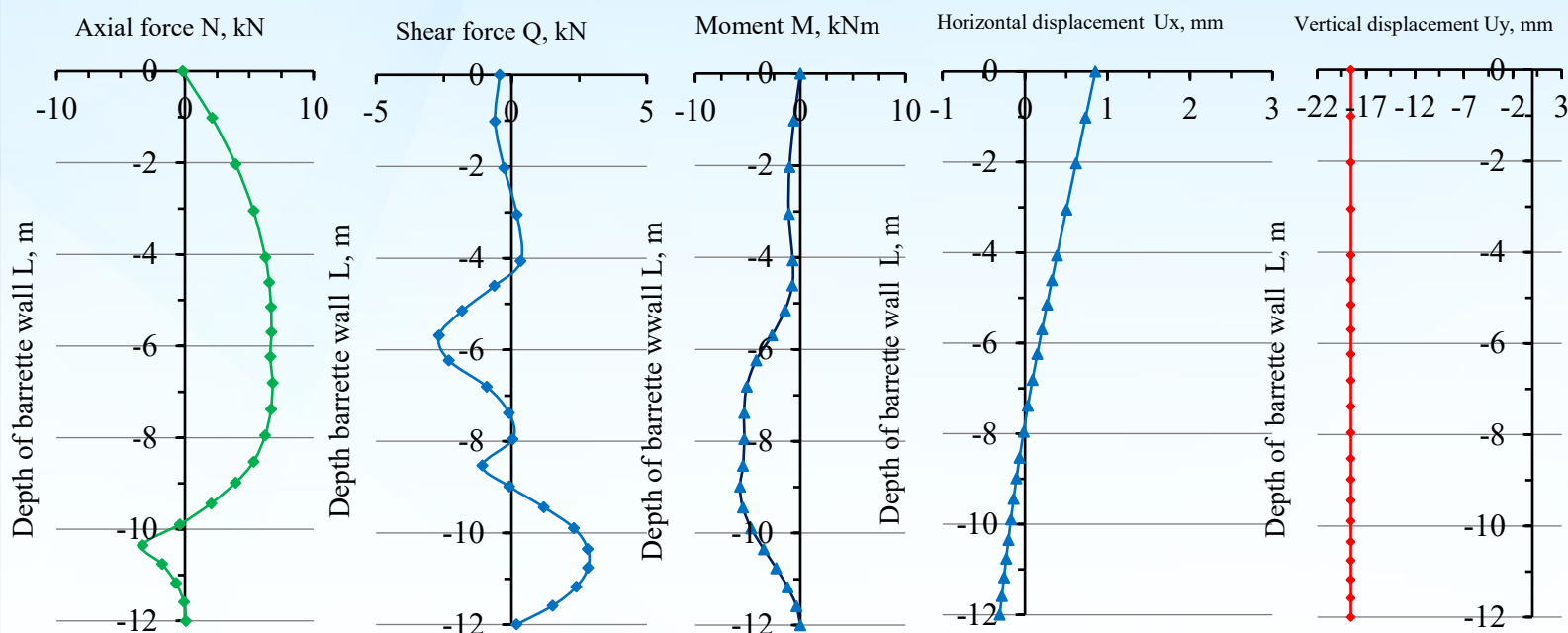


Fig 17. Distribution of internal forces in barrette retaining walls at the bunke location.

- The maximum horizontal displacement occurs at the surface with a value of 9 mm.
- The vertical displacement is 18.58mm.
- These displacement values are smaller the one before using reinforcement solutions indicating that the retaining wall solution effectively limits the horizontal movement of soil and rock particles into the tunnel void, thereby reducing the lateral pressure exerted on the tunnel walls.

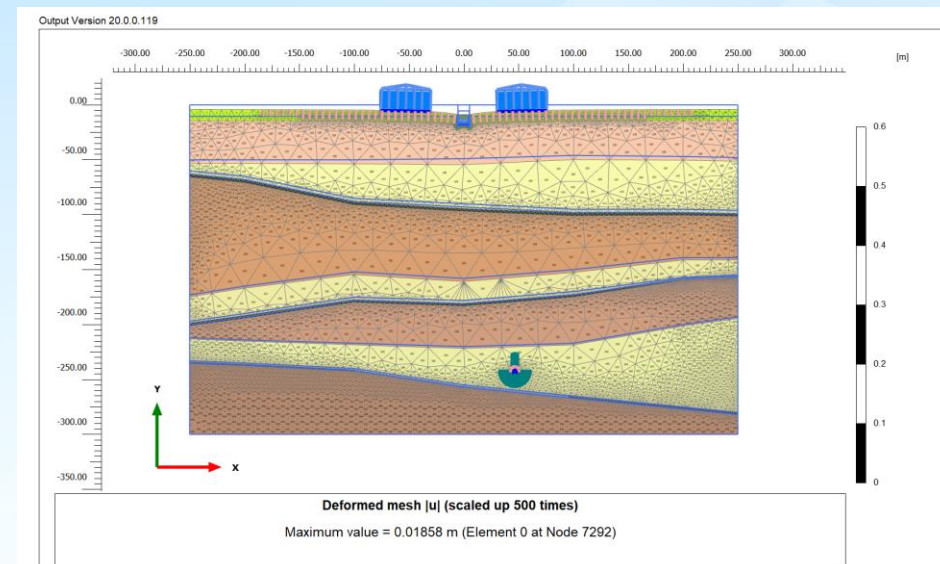


Fig 15. Results of displacement and subsidence of the coal warehouse G9 ground during applying reinforcement solutions

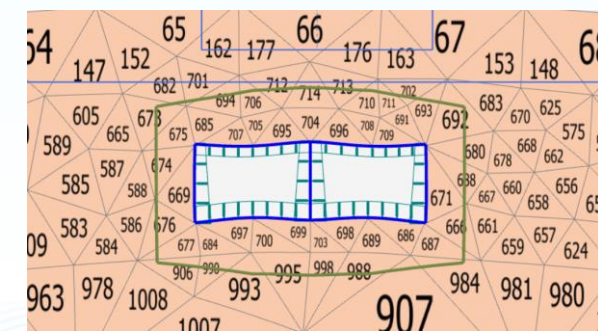


Figure 16. The phenomenon of displacement and subsidence of the coal warehouse G9 ground at the underground tunnel location

CONCLUSION

- The research results of the paper show that the cause of the destruction of the structures on the surface of the coal warehouse G9 is due to the exploitation of the coal seams below, geological conditions, especially the layer of mine waste rock that has not been completely moved, the self-respecting of surface structures, and the dynamic loads of the conveyor belt above.
- The article presents a geomechanical model simulating the reinforcement results of the coal warehouse G9 in the Mong Duong area, which has experienced subsidence due to being located on an old mine waste dump site.
- Based on the Mohr-Coulomb model, numerical simulation tests were carried out on the failure law of overlying strata by using the command flow, and the influence of mining of the lower 1 and excavation of coal seams on the overlying strata subsidence and surface penetration were obtained.
- The simulation results indicate that reinforcing the foundation of the coal warehouse allows for a reduction in surface subsidence, leading to more stable surface structures. For the underground bunker, the use of a retaining wall system is necessary to reduce horizontal deformation that could damage the bunker walls.



THANK YOU FOR YOUR ATTENTION !

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