The production management system in Lubelski Węgiel „Bogdanka” Inc

Lubelski Węgiel „Bogdanka” Spółka Akcyjna

Katowice, 12.12.2018r.

Agenda

1. Compressive strength of strata in the seam’s surroundings maps
2. The concept of production management system
3. The geological model
4. Mine production planning
5. Development trends
6. Summary

Compressive strength maps

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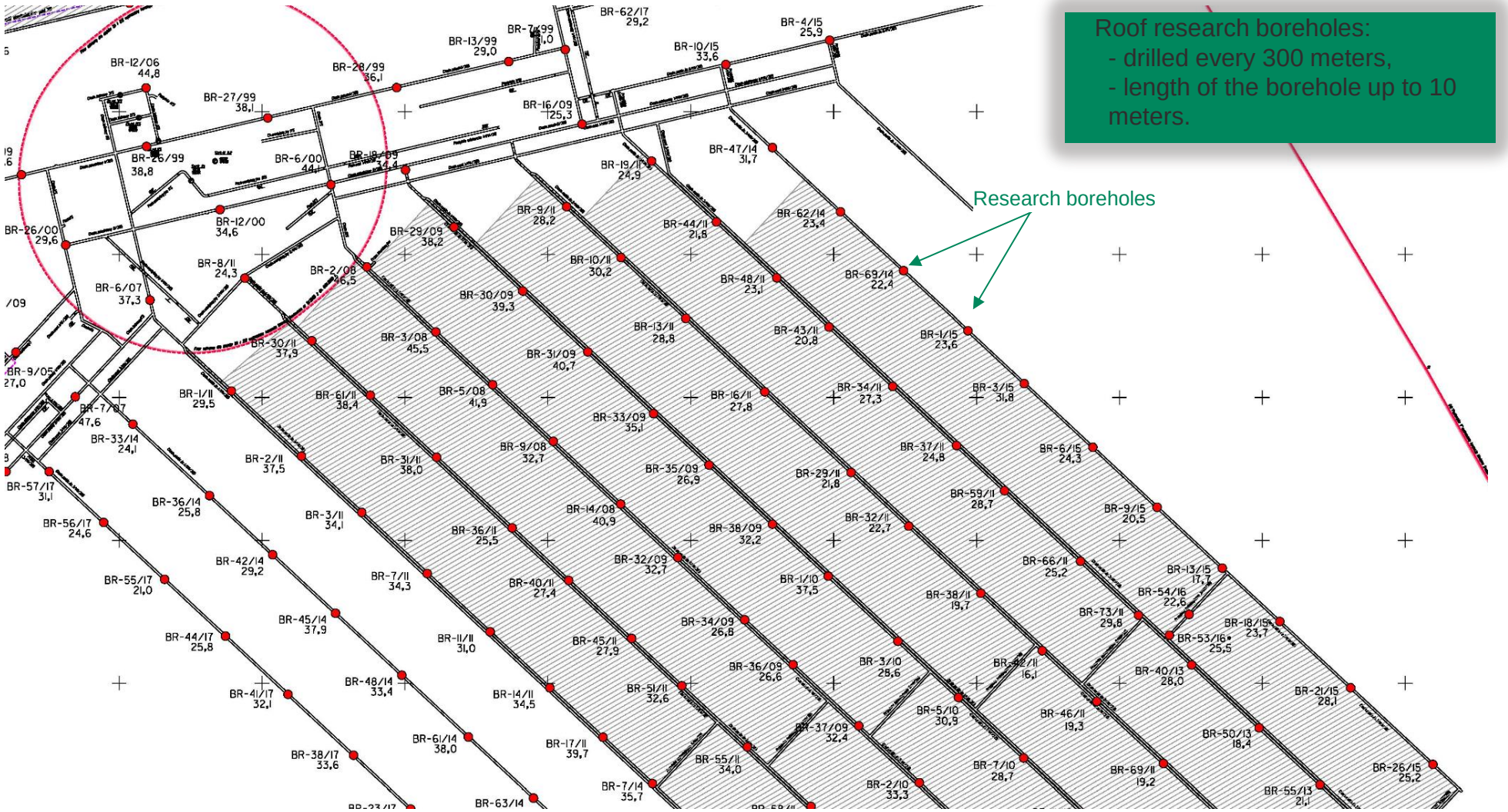
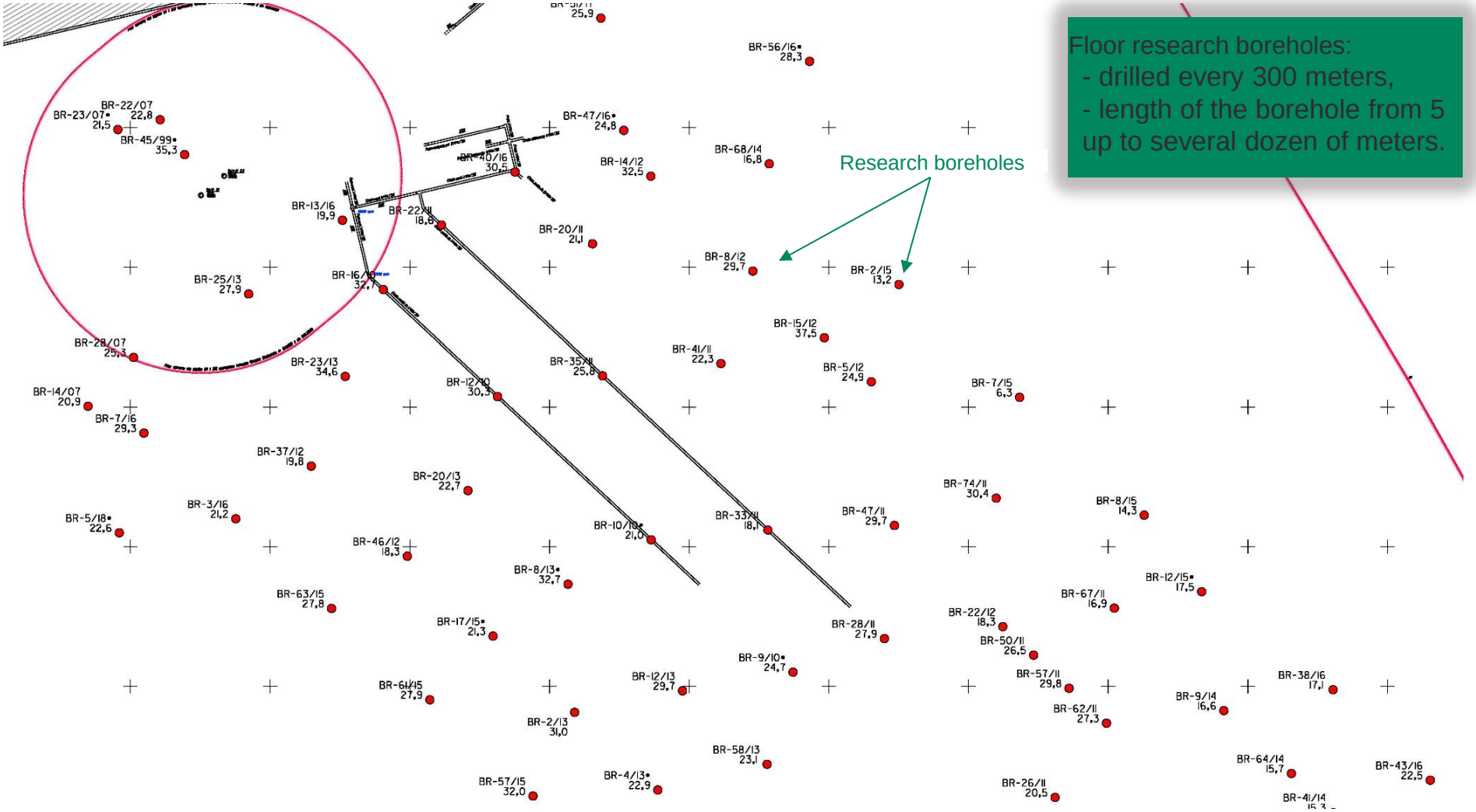
The location of roof research boreholes



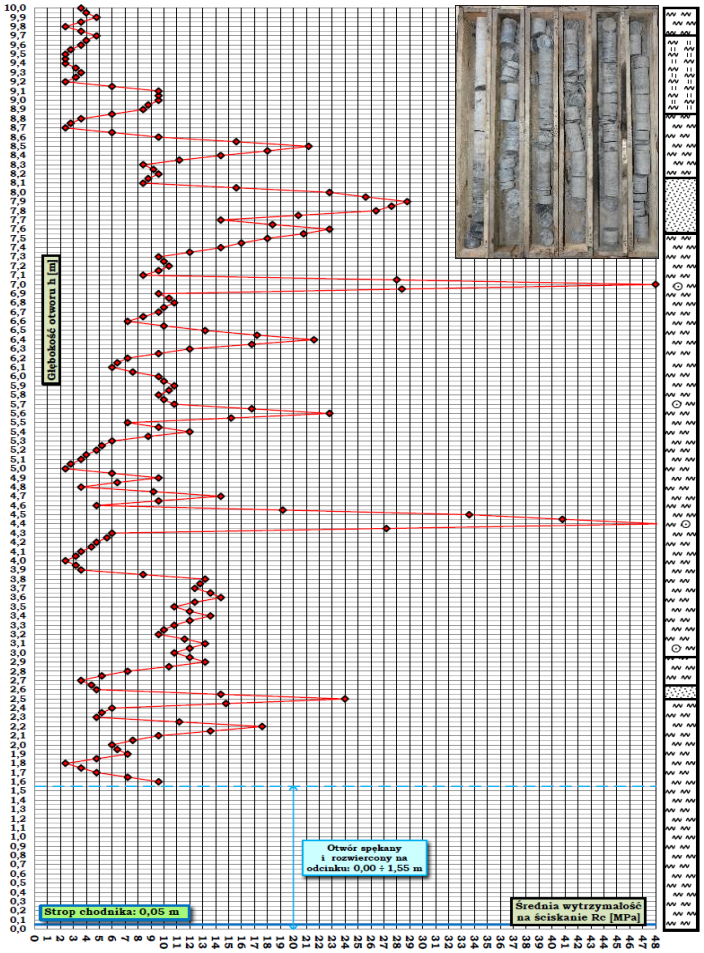
Roof research boreholes:
- drilled every 300 meters,
- length of the borehole up to 10 meters.

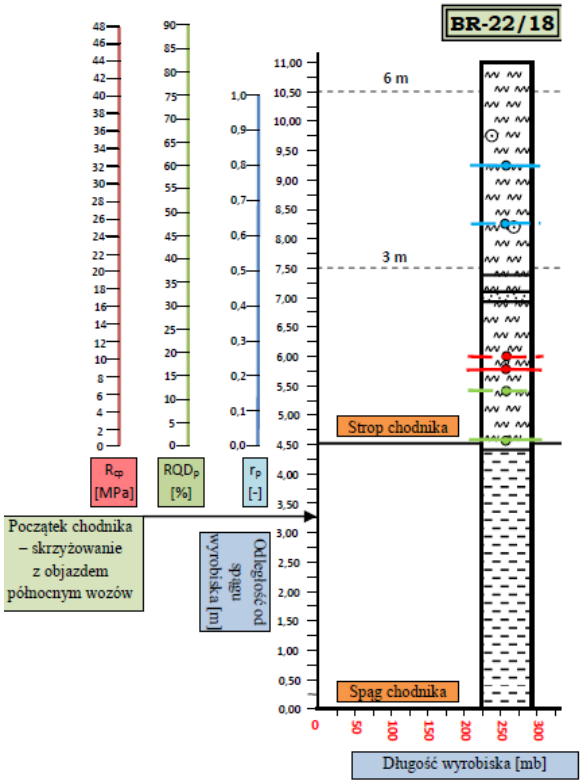
The location of floor research boreholes



Floor research boreholes:
- drilled every 300 meters,
- length of the borehole from 5 up to several dozen of meters.

Determination of the geomechanical parameters

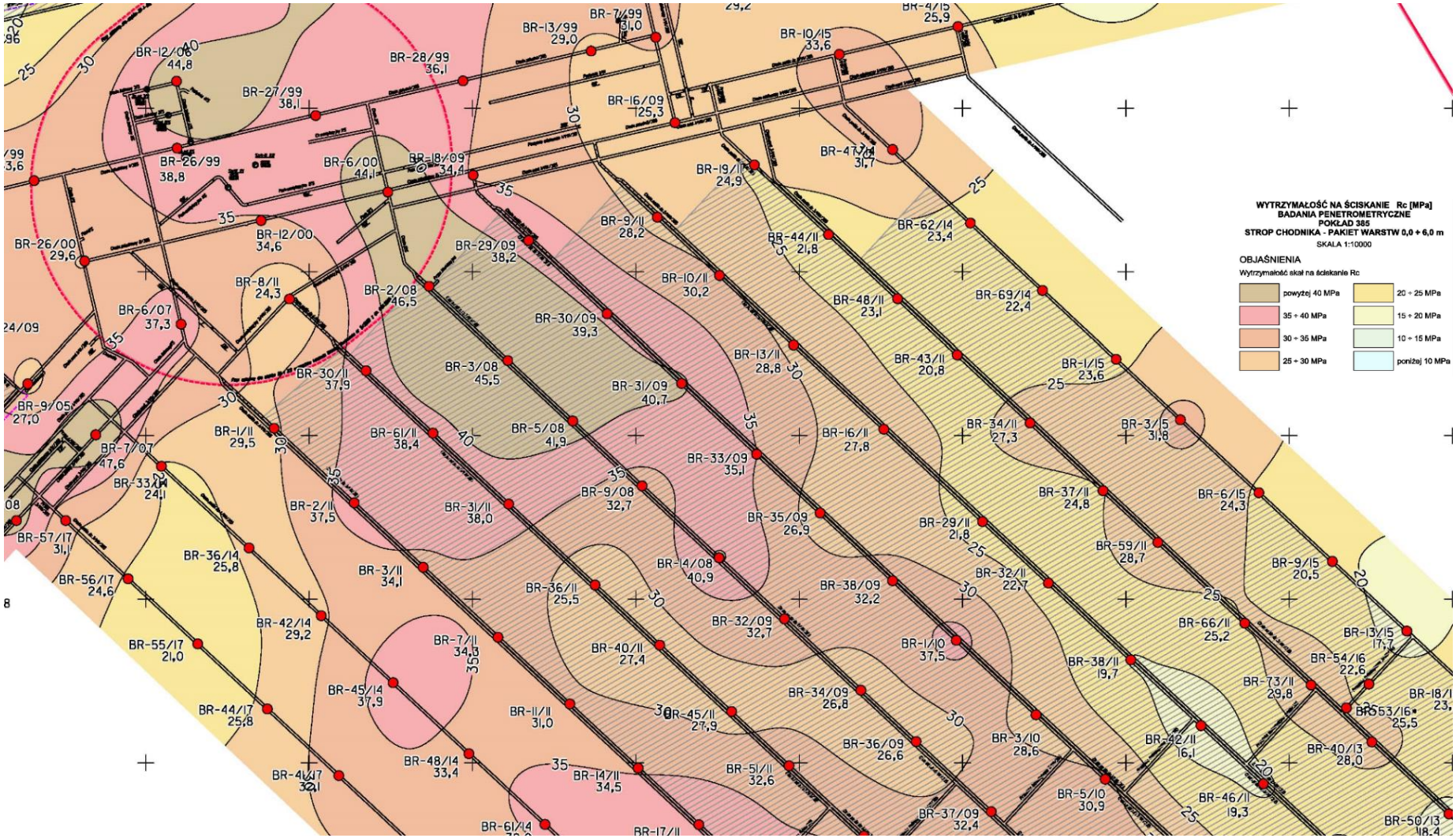




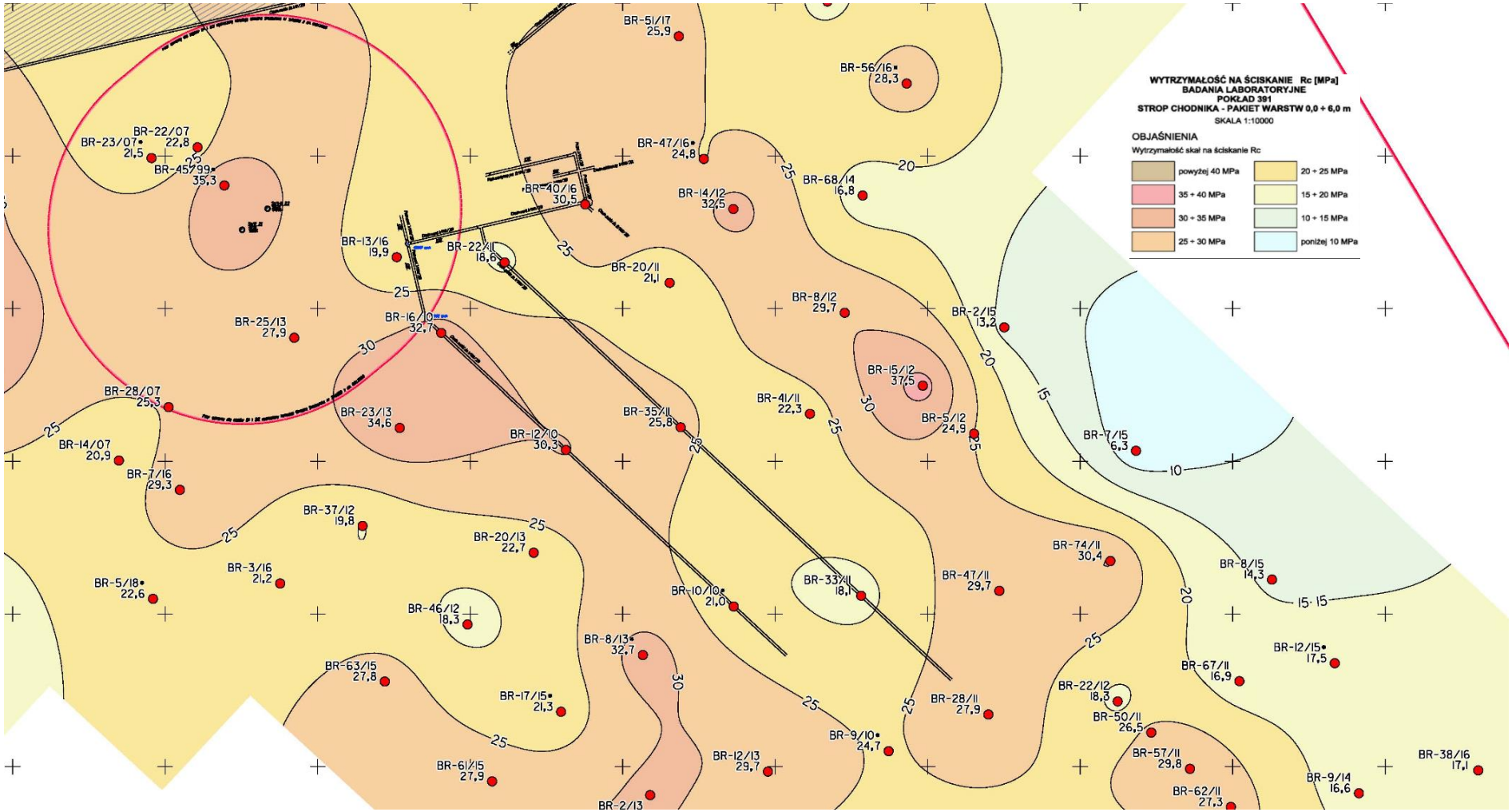
Geomechanical parameters:

- Compressive and Tensile Strength
- Strata sogginess
- Rock Quality Designation (RQD)

Compressive strength of roof/floor strata in the exploited seam's surroundings maps



Compressive strength of roof/floor strata in the prospective seam's surroundings maps



The production management system

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The concept of production management system

Geological Modelling System

- The Stratigraphic Model
  - Structure of the deposit
  - Spatial orientation of the seams
  - Geological anomalies and tectonics
- The Quality model
  - Thickness of seams and partings
  - Quality data

Mine Planning System

- Mine layout designs
- Schedules of:
  - Longwall panels
  - Development workings
  - Roadways liquidation
  - Roadways reconstructions
- The MDM planning database

Production Management System

- Source data
  - Raodways cross-sections
  - Survey reports
  - Material sets
- Production reporting

Źródło: Opracowanie własne

The geological model

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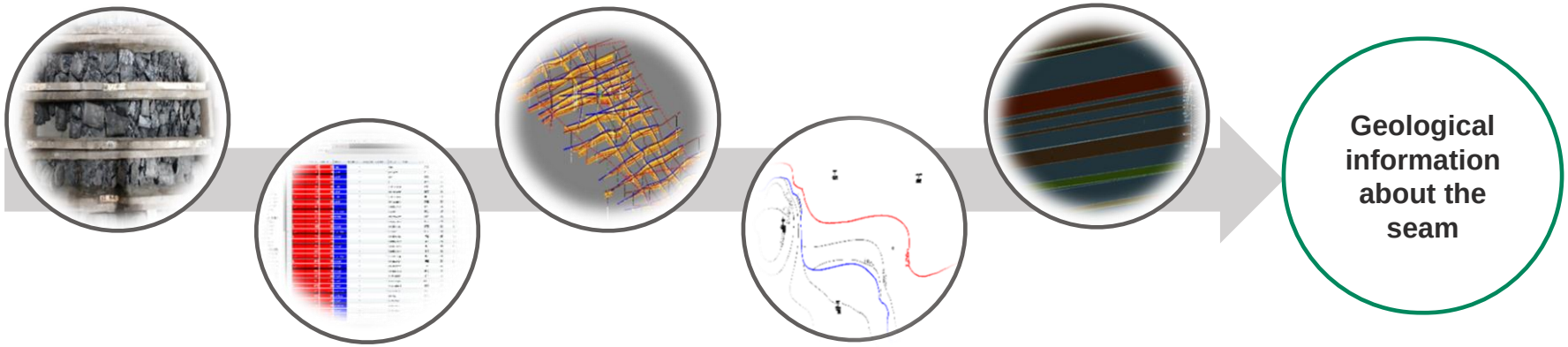
Modelling schema

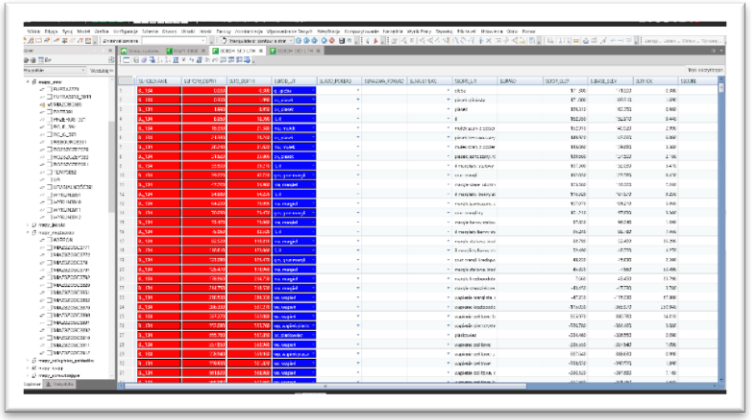


- Reliable geological examination based on the drillholes
- Data input
- „Production” model update
- Model transfer to the DESWIK Software package
- Isoline map plotting
- Maps transfer for further mine layout designing
- Submodels update

Źródło: Opracowanie własne

Geological database - MineScape GDB

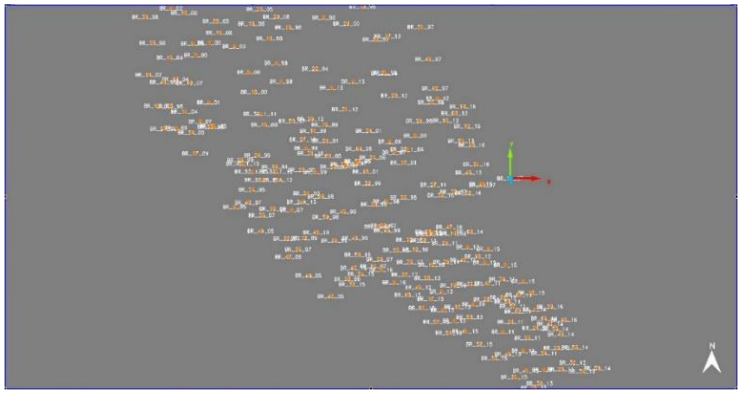
- **GDB**
  - **Drillholes**
    - Surface
    - Underground
    - Penetrometers
    - Quality sample
  - **Survey data**
    - Ordinates of the roadways floors
  - **Hydrogeological data**
    - Water outflows
    - Domestic wells
    - Piezometers
    - Shaft hydroinspection
  - **Other**
    - Virgin rock temperature
    - Geomechanical data
    - Graphical Data, PDF,etc

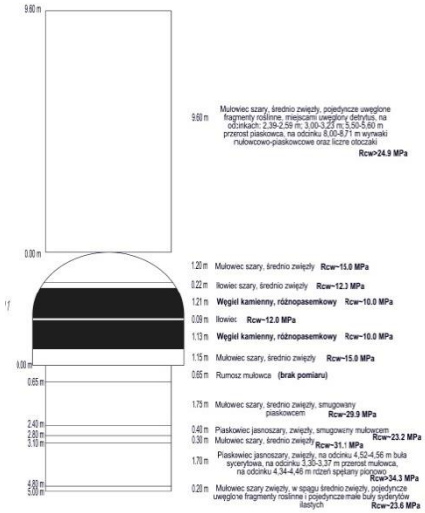


Źródło: Opracowanie własne

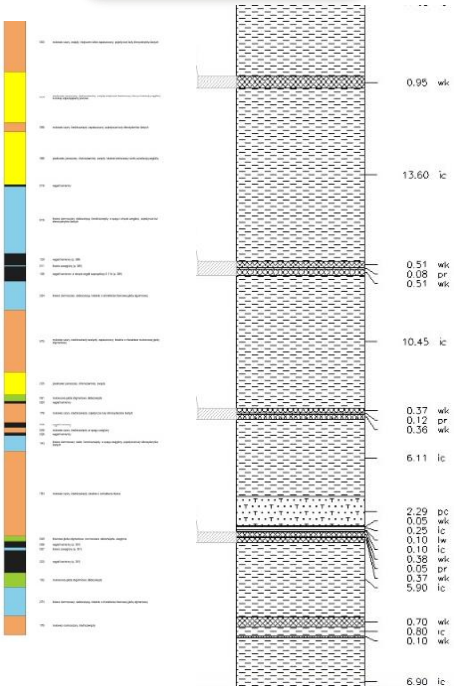
Database spatial visualization in 2D & 3D

Spatial view of drillholes

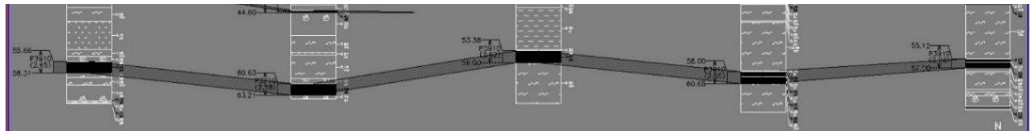




Lithological profiles



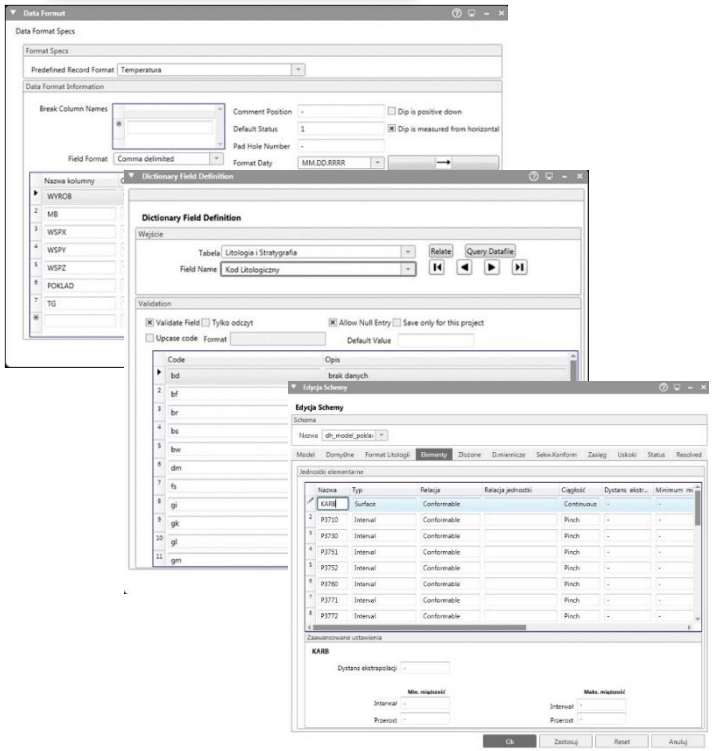
Drillholes correlation



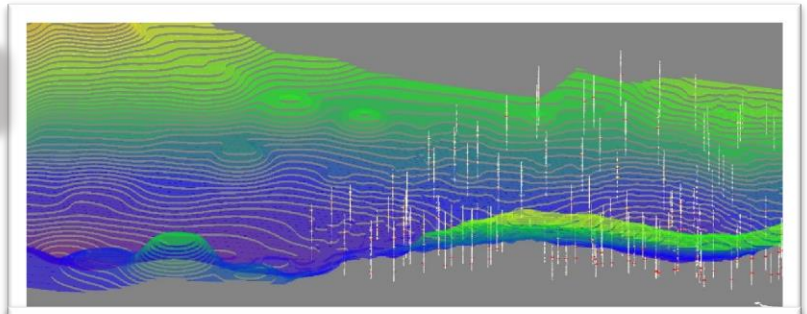
Źródło: Opracowanie własne

Geological modelling

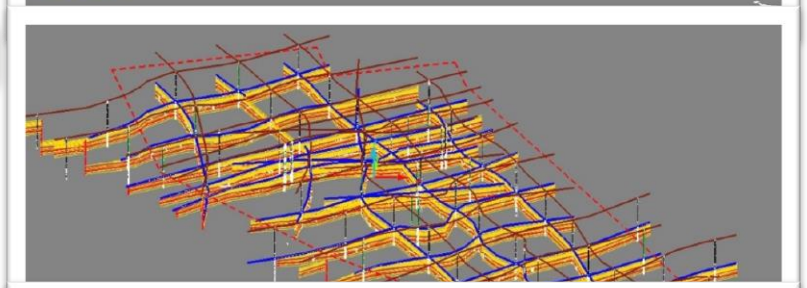
Parameters definitions tabs



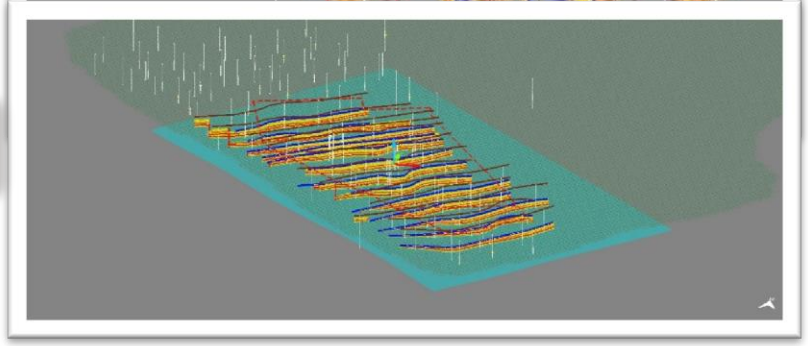
Seam floor surface(surpassed)



3D Cross-section



Spatial orientation



Źródło: Opracowanie własne

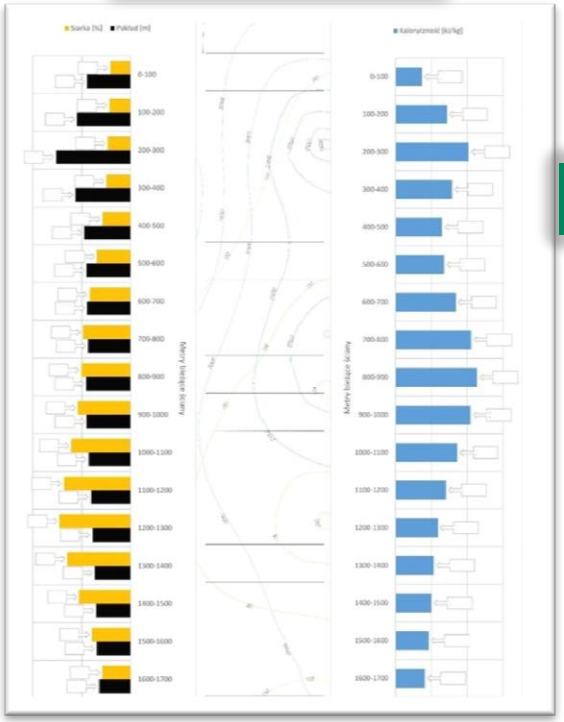
Geological analysis output data

Sulphur content [%]

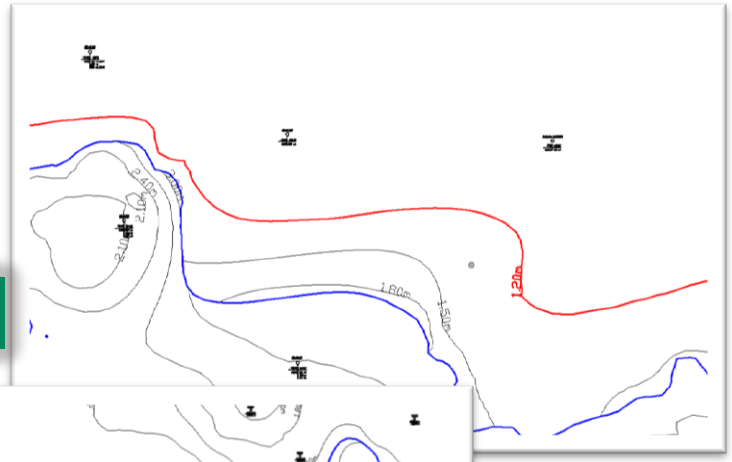
Seam thickness [m]

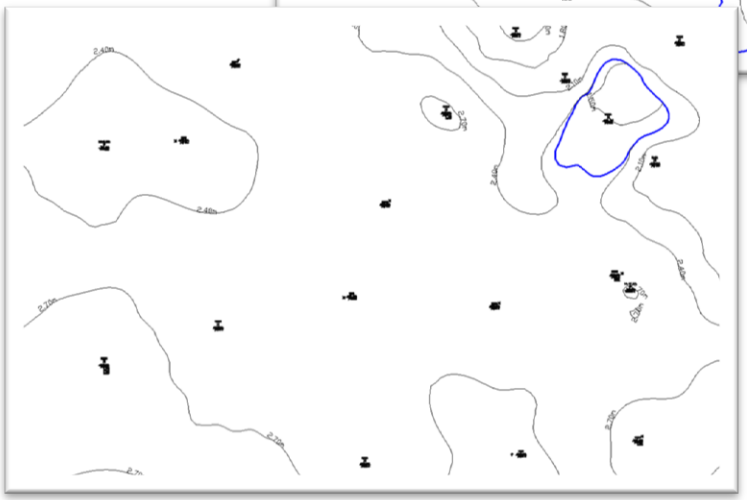
Calorific value [kJ/kg]

Quality parameters of the seam



Thickness seam maps





Źródło: Opracowanie własne

Mine production planning

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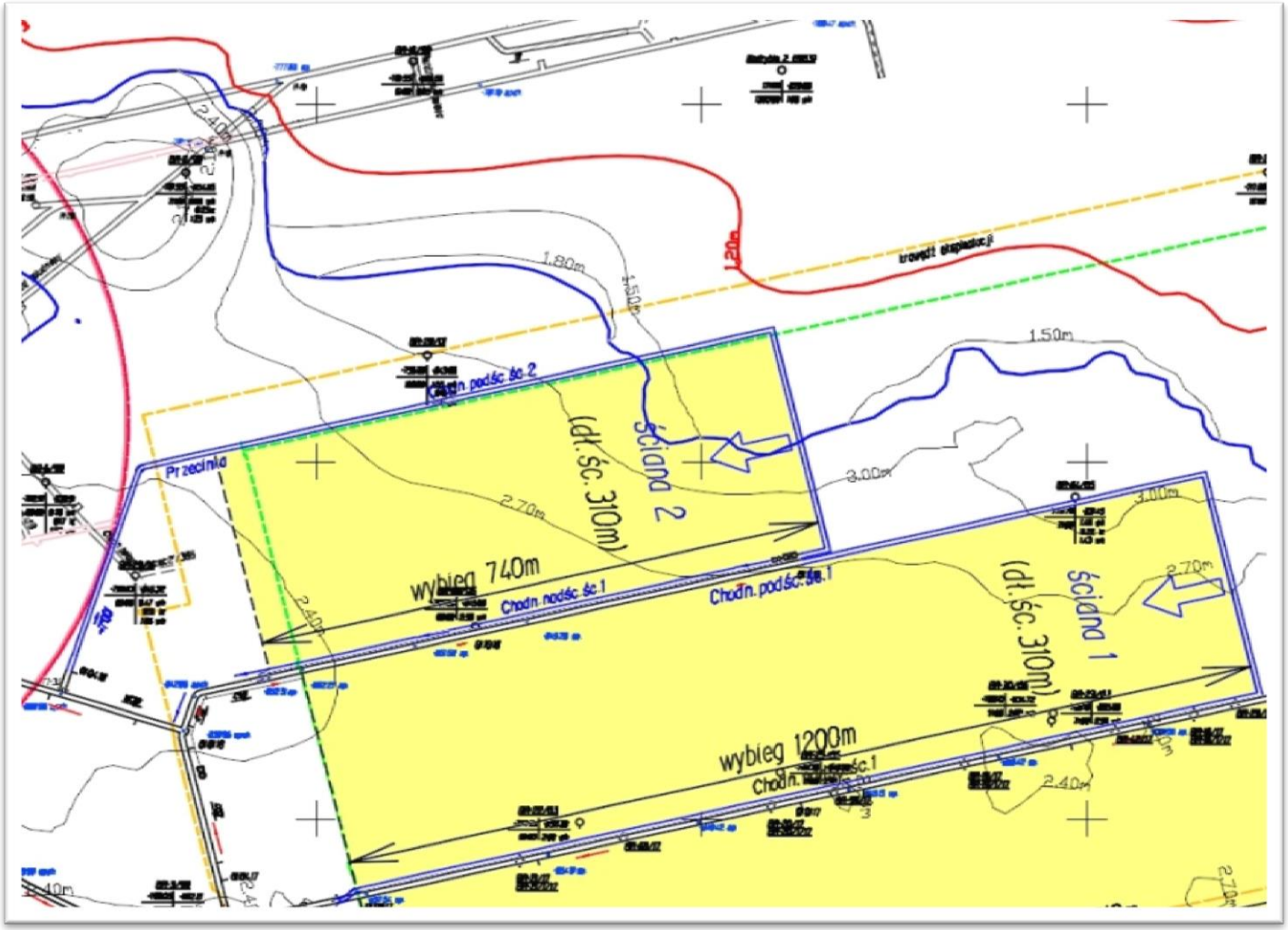
Mine layout design based on geological data



Mine production plan – creating a schedule

Deswik.CAD

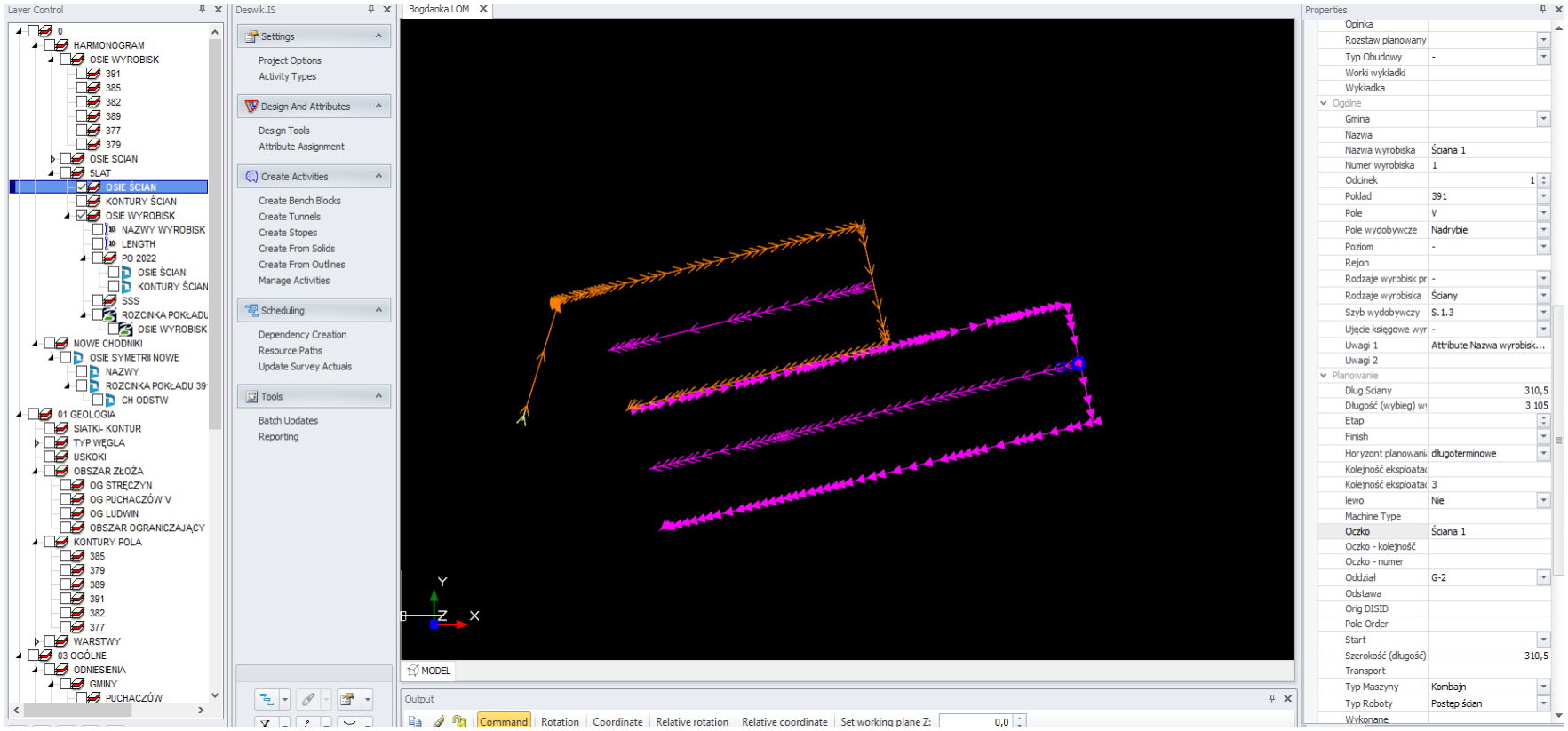
Deswik,Sched

1. •Deswik Geo Model model creation.
2. •Input of mine layout design into Deswik.CAD.
3. •Creating task solids and polygons and adding them into the schedule.
4. •Resource assignment.
5. •Recognition and input of production constraints.
6. •Resource levelling

Mine Production Schedule

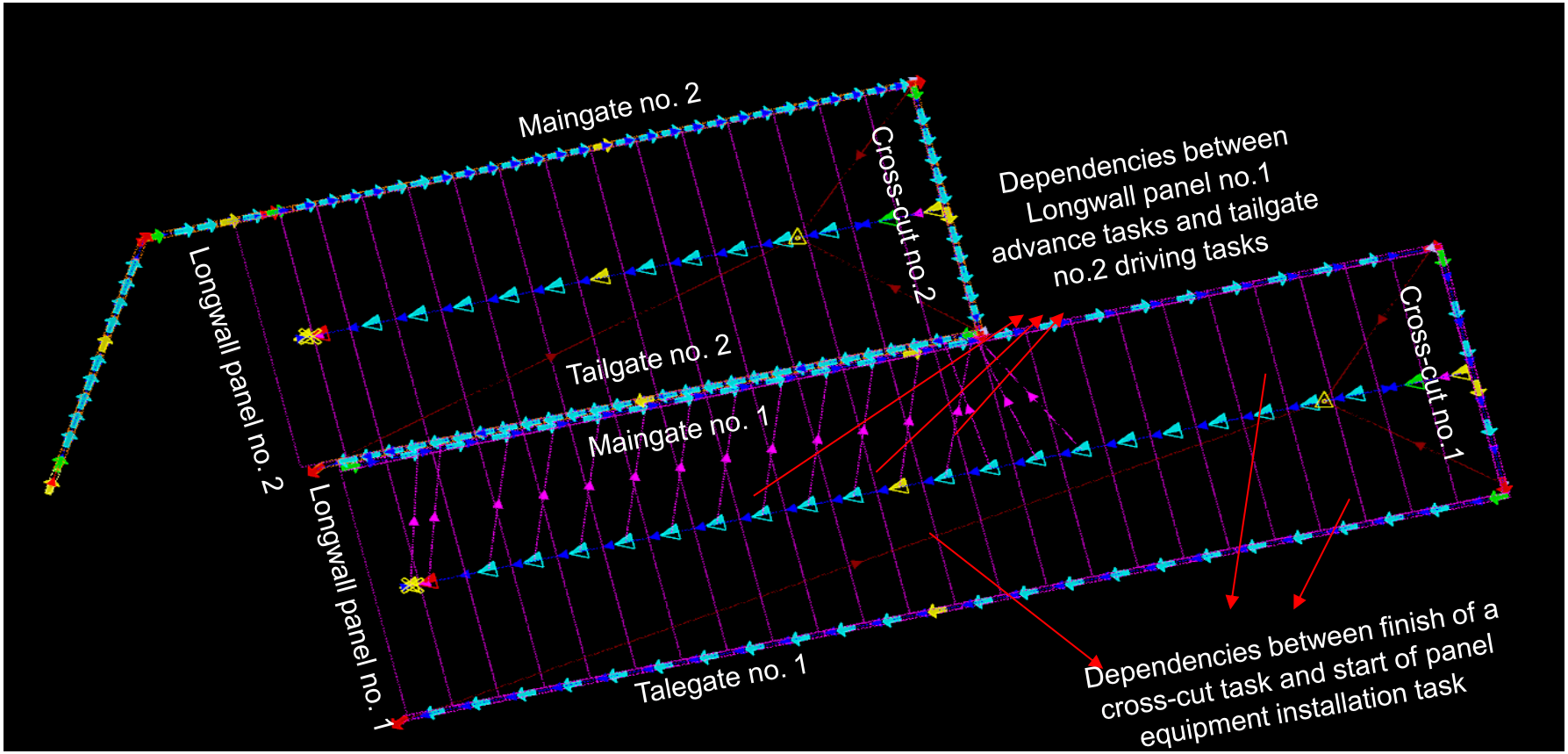
Źródło: Opracowanie własne

Deswik CAD - heading centerlines with attributes registered to seam floor



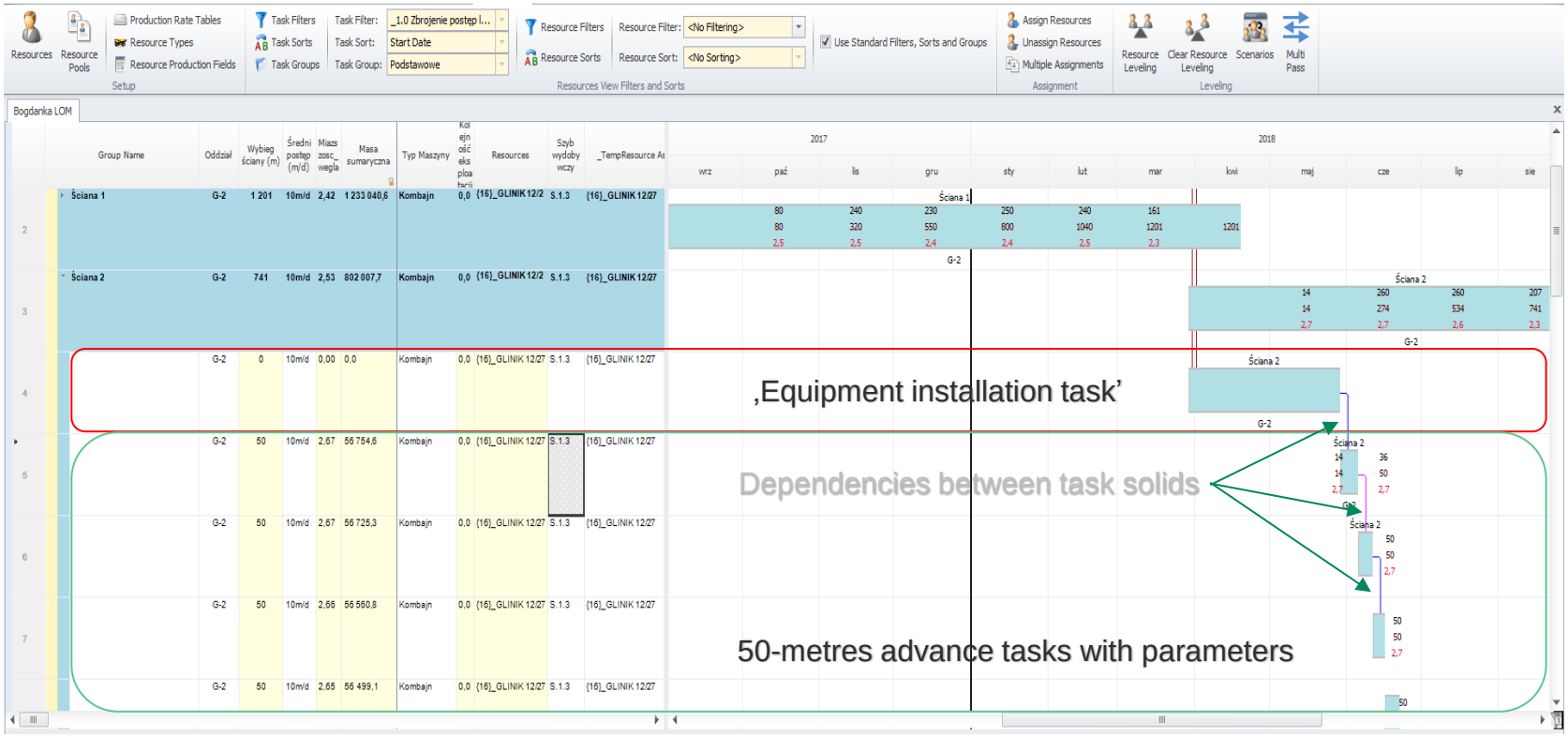
Źródło: Opracowanie własne

Task dependencies – tailgate drivage behind longwall face

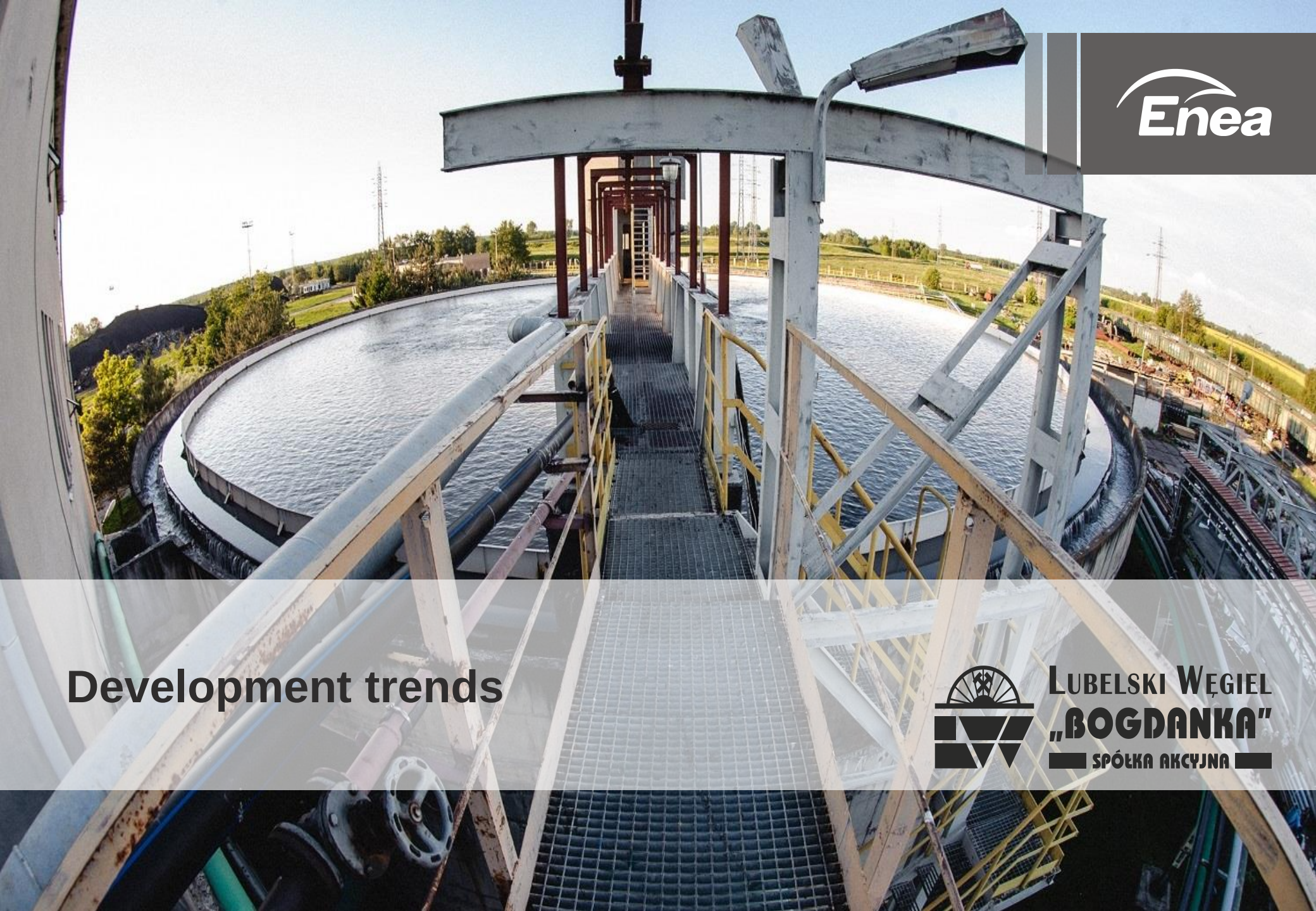


Źródło: Opracowanie własne

Deswik Scheduler – Gantt's chart



Źródło: Opracowanie własne



Development trends

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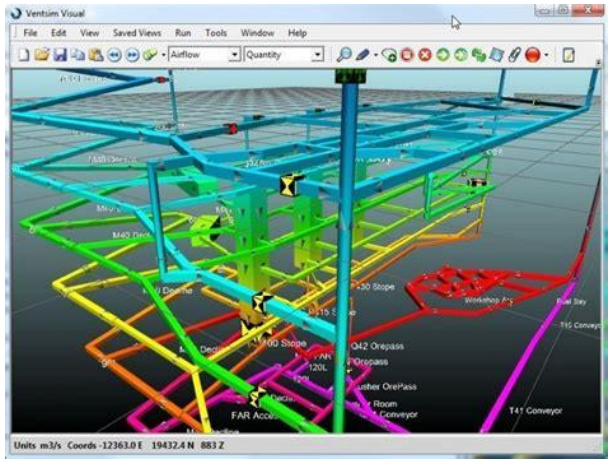
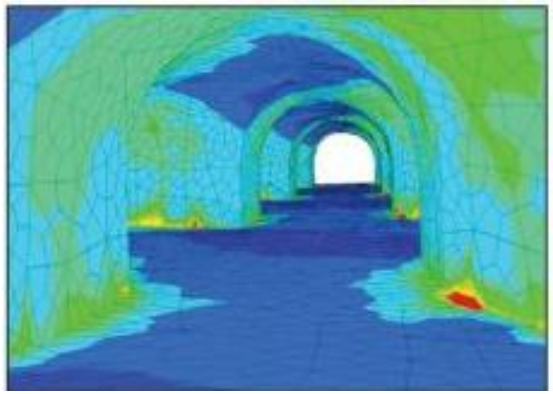
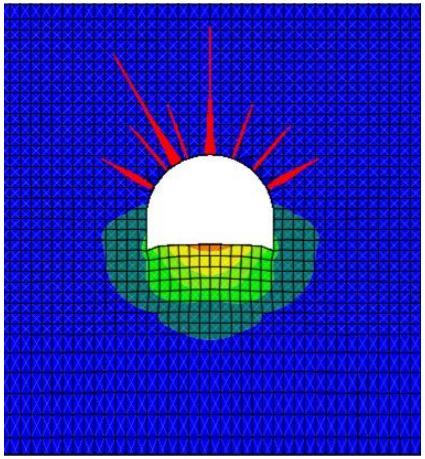
Implementation of tools supporting mine ventilation system management

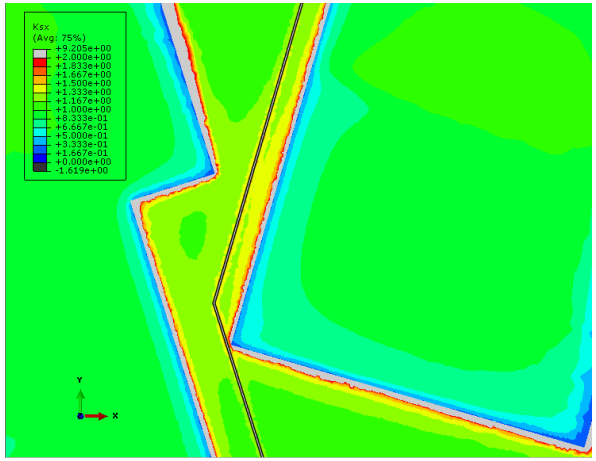


Źródło: Opracowanie własne

Implementation of geomechanical model of the deposit







Źródło: Opracowanie własne

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SUMMARY

- Geological and geomechanical examinations allow to define the geological structure of the deposit more precisely.
- Mine layout designs are set up and based on geomechanical reconnaissance and geological model of the deposit. This allows to minimalize the risk of unexpected events, increase the resource recovery ratio and allows to predtict the quality of output material.
- Mine production schedules are made upon created mine layout design and geological models.

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Thank you for your attention

Dziękuję za uwagę

dr inż. Łukasz Herezy

Director of Innovation and Development Department