

## Mining Services

Our profession for more than 150 years

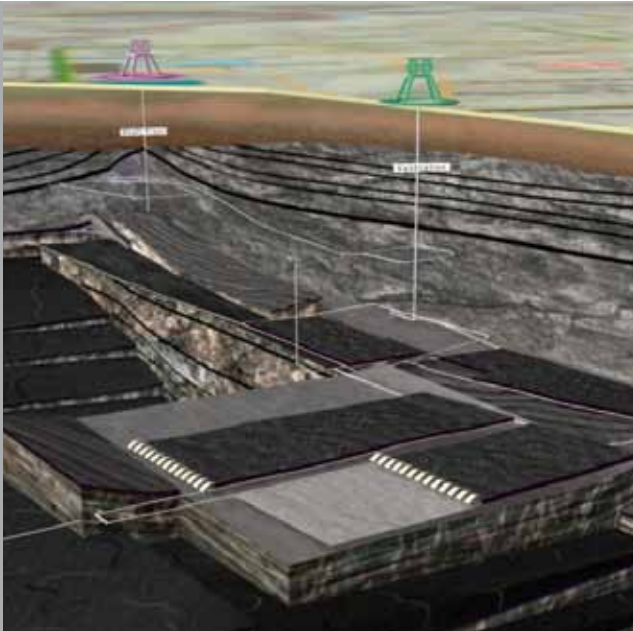


### Exploration and deposit modelling

You can make use of our expertise well before you launch actual mining operations. We plan, supervise and carry out exploration work (including 2-D and 3-D seismic and in-seam seismic) to give you a detailed picture of the deposit at an early date. We use the geological information to model the deposit, to evaluate the recoverable resources in accordance with internationally recognised standards, and to conduct a preliminary risk analysis.

### Studies

In the next step we prepare scoping studies, pre-feasibility and feasibility studies for both surface and underground mining. Inquire about due diligence, obtaining a second opinion or specific risk analysis. Every year DMT – together with its affiliates in India, Russia, Great Britain and Canada – prepares more than fifty studies for underground and opencast operations.



## Mine planning

Our planning starts by selecting the appropriate mining methods and includes all the “classic” elements (mine layout, extraction sequence, winning, transportation etc.). In addition to taking account of the usual economic, technical and operational situation, we also pay close attention to geo-technical aspects and the risks associated with the deposit.

Mentioned by way of example is the estimate of the amount of gas expected to be encountered when extracting coal. Faulty or insufficient evaluation can result in a gas outburst or gas explosion. Moreover, the profitability of a mining operation can be impacted when, for instance, gas prevents full exploitation of machinery performance capacities. That is why our ventilation planning also includes measures to control the gas.



## Strata control and support technology

Insufficient strata control often leads to unsafe and unprofitable mining operations. Roof falls or collapse and other failure of mine openings can cause operational shutdowns and can threaten miners' life and health. Pillars that are too slender are not stable while overly wide pillars reduce the amount of coal recovered. Insufficiently dimensioned support is unstable while over-dimensioned support will reduce profits.

We have more than fifty years of experience in the fields of strata control and support technology. Thus we can offer customized solutions for the mine layout and for the control of all mine openings – from the shaft, pit bottom and roadways up to the longwalls or to the depillaring area.

For opencast mining we care for slope stability and optimised slope design.



## Mine closures, rehabilitation and subsequent use

Once extraction operations have been wound down we plan the systems required to control mine groundwater and secure mine openings e.g. backfilling off shafts and cavities near the surface in order to stabilise the surface over the long term.

In the framework of securing long term social and environmental sustainability, we perform rehabilitation and recultivation design studies of remaining pit areas.

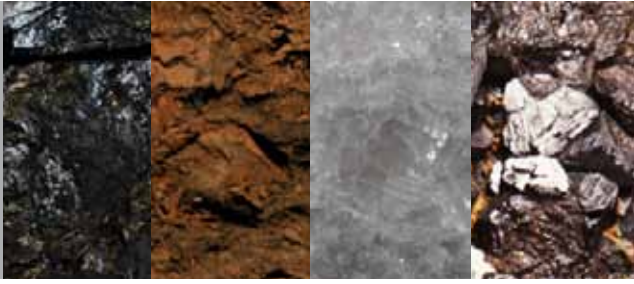
Neither does our work end with planning rehabilitation projects since, with concepts for methane gas drainage, we also ensure that abandoned mines can be reused both safely and profitably.



## Operations consulting

When dealing with existing mines we examine the operational processes in order to optimise the mine layout and support, winning and transportation technologies and other factors, as well.

We prepare the safety concepts needed for fire, gas and dust explosion protection and take care of environment protection as well. We can improve groundwater and mine water management and help to avoid subsidence damage.



## Our services in review:

- Planning and supervision of exploration work
- 2-D and 3-D and in seam seismic wave technology
- Deposit modelling and evaluation
- Preliminary and feasibility studies (technical and business aspects)
- Social and environmental risk assessment
- Mining planning
  - Selection of the mining methods
  - Planning the mine layout and extraction sequence
  - Planning for winning and transportation
  - Ventilation, climate control and gas drainage technology
  - Mine water and ground water management
  - Planning for construction material production plants
- Strata control and support technology
  - Dimensioning of support for mine openings (shaft, pit bottom, roadway, face etc.)
  - Calculating the distribution of stresses for single-seam and multi-seam mining operations
  - Cavability assessment and roof control
  - Customized instead of standard pillar dimensioning
  - Slope stability analysis and design for opencast mines
- Operations consulting
  - Optimising mine operations (extraction, support, conveying and transportation technologies)
  - Enhancing safety
  - Environment protection
  - Preventing rock burst
  - Preventing gas outbursts
- Mine closures
  - Securing mine openings (e.g. shafts and open pit areas)
  - Planning mine rehabilitation activities
  - Mine and groundwater management
  - Recovering mine gas from abandoned mines

## About DMT

DMT GmbH & Co. KG, headquartered in Essen, Germany, together with its IMC consulting subsidiaries, is an independent engineering and consulting company operating at international scale. About six hundred employees (of whom more than seventy percent are engineers, scientists and technicians) render services in the form of individualised consulting and assistance tailored specifically to client needs. DMT personnel also serve as impartial assessors. The firm's activities focus on the fields of natural resources exploration, construction and infrastructure projects, mining, coke making technology, product testing, measurement instrumentation in industrial settings and safety in buildings.

Mining services have been our profession for more than 150 years and are performed worldwide in more than 150 countries. DMT is a member of the TÜV NORD Group.

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