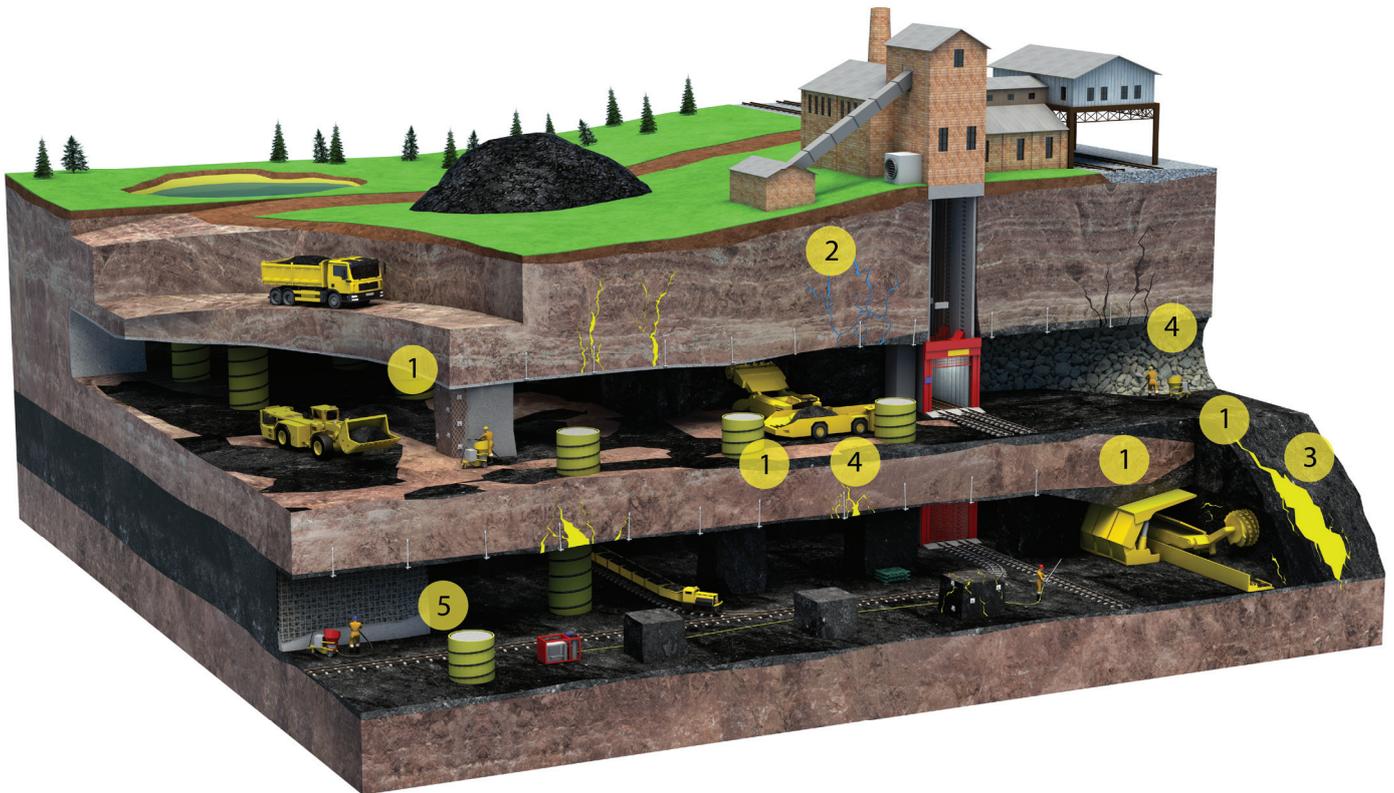


GROUND SUPPORT SOLUTIONS
FOR UNDERGROUND COAL MINING



SECURING PERFORMANCE. TOGETHER.

GROUND SUPPORT SOLUTIONS FOR THE COAL MARKET



Solutions for Coal Mining

1 Strata Control

2 Water Control

3 Rock Fall and Cavity Filling

4 Backfill and Consolidation

5 Ventilation and Air Control

THE FIRST CHOICE FOR GROUND SUPPORT SOLUTIONS



At Minova, we aim to be the leader in ground support solutions. We continue to develop ourselves and our solutions in providing safe environments in extremely fractured and challenging ground conditions in underground coal operations.

Safety, followed by efficiency. Ground support solutions are essential foundations to the safety of today's underground mining operations. Our solutions provide underground operations support with cavity filling and consolidation of fractured ground and void spaces; strata control for stability of rock faces preventing rock fall and roof failures; and provisions for managing water ingress and air control. All of which would threaten the safety and viability of an operation and its personnel.

Going underground must always feel safe, and with costs involved, the demands on productivity are higher in a mine than in most other work sites. A mine must always be 110% safe for the people working on site, and support is always applied considering ground conditions and risks. That's why ground support is the most important part of the underground.

Minova strives to maximise safety and sustainability.



Strata control is a fundamental requirement for the integrity and safety of underground mining operations.

To minimise risk of major injury or damage to mine assets, it is critical to control roof reinforcement, prevent rib failure and stabilise floor movement within site specifications.

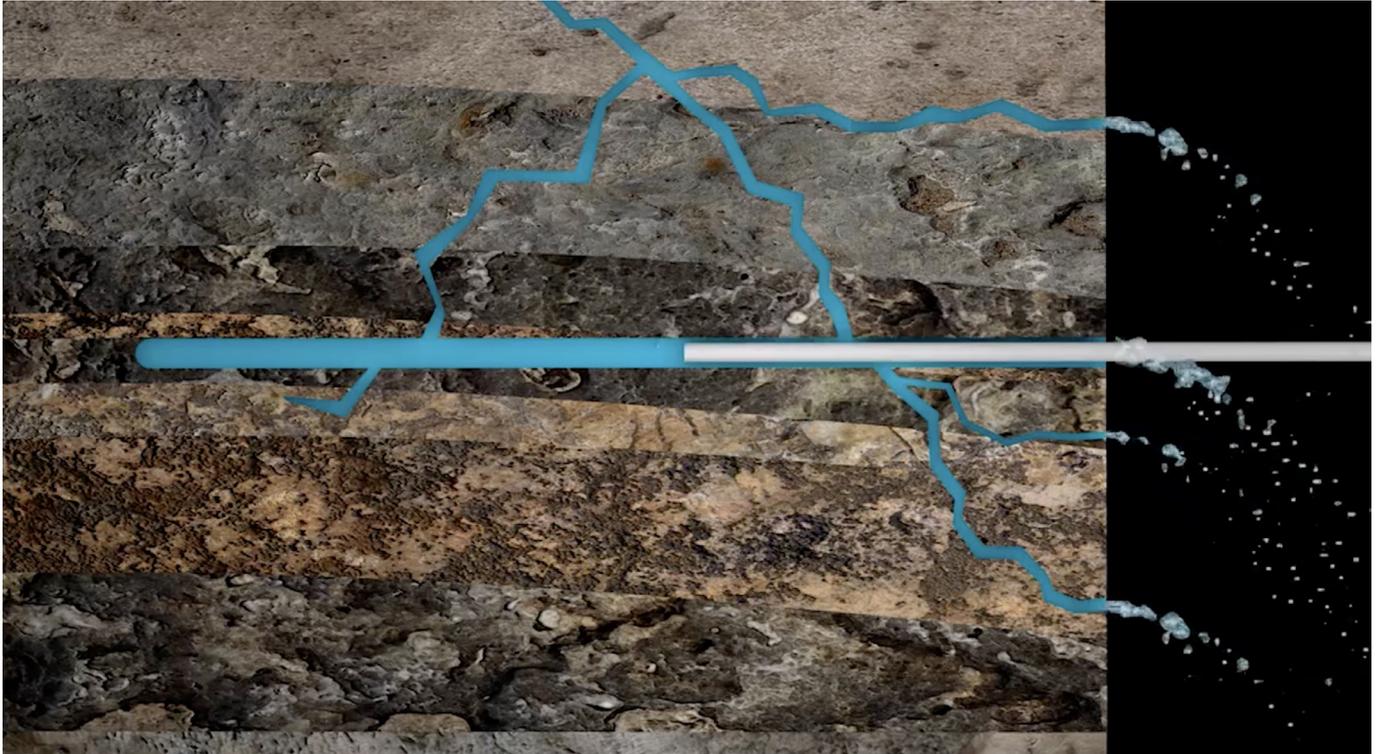
Incidents can also cause substantial delays and interruptions which impact production and the economic performance of a mine. Minova offers a comprehensive range of reinforcement and support solutions that control and stabilise rock in excavated or unstable areas.

Benefits

- Strata reinforcement in challenging geotechnical domains including weakened or fragmented rock zones
- Anchoring in unstable ground conditions
- Collapsed roadway recovery
- Installation of roof support, providing increased safety for operational personnel and more cost effective mine production
- Ground support for high water flow and corrosive conditions

Product solutions

- **Injection Chemicals**
Phenolic, polyurethane or silicate resins including Carbomine, Carbofill, Bevedol / Bevedan, Geoflex, ,
- **Bolts**
M24 Rock Bolts, Cable Bolts and Self-drilling anchors
- **Specialty Steel**
Galvanised steel for highly corrosive environments
- **GFRP Bolts**
Glassfibre Reinforced Plastic
- **Plates**
Dome, Strata, Combi, Crown and Flat plates that provide optimal surface support in a range of strata conditions
- **Anchoring Resin and Cement Grouts**
Tekthix, Stratabinder, Conbex, FB400, Carbothix
- **Resin Capsules**
Lokset resin capsules
- **Mesh**
Glassfibre Reinforced Plastic and Steel Mesh
- **Sprayed shotcrete and liners**
Rappass, Sprayplast, Tekflex
- **Services**
Tekpak pumpable crib systems, auditing, pull testing, technical advice, training and equipment
- **Accessories**
Pumps and couplings



Water ingress into an underground mine can represent a major risk if not recognised and rectified. It can compromise the integrity of the ground support system while an uncontrolled inrush of water can hinder any further progress in the operation.

Our flexible product range can be utilised to counteract water inrush and to stop water penetration from flowing through rock fractures. Minova's range can be utilised in a large range of water temperatures and conditions to control and manage water ingress.

Benefits

- Consolidate fractured strata with injection products to control water ingress
- Avoid operational delays, hindrances or expense
- Enhance operational efficiency
- Enhance safety and risk management
- Reduce risk to in-service life of ground support
- Reduce risk to assets and mine infrastructure

Product solutions

- **Injection Chemicals**
Phenolic, polyurethane or silicate resins
Carbomine, Bevedan / Bevedol, Geoflex
- **Sprayed Cement Systems**
Tekflex, Rappass, Sprayplast UW
- **Accessories**
Pumps and couplings
- **Services**
Minova have a fleet of application equipment including pumps, hoses, equipment/material PODS and injection consumables. Other services include emergency response and application advice

CAVITY FILLING



Increasing pressure on rocks from mining activity and geotechnical conditions can cause fractured ground and if not reinforced may lead to incidents of rock fall or roof collapse. Quick action is critical to protect people, assets and infrastructure, while ensuring continued operations and productivity.

To improve mining productivity and safety, mines can consolidate fractured strata and fill voids. Our solutions reinforce the integrity of the surrounding geological structures by pumping product into the cavity or void to reinforce the strata.

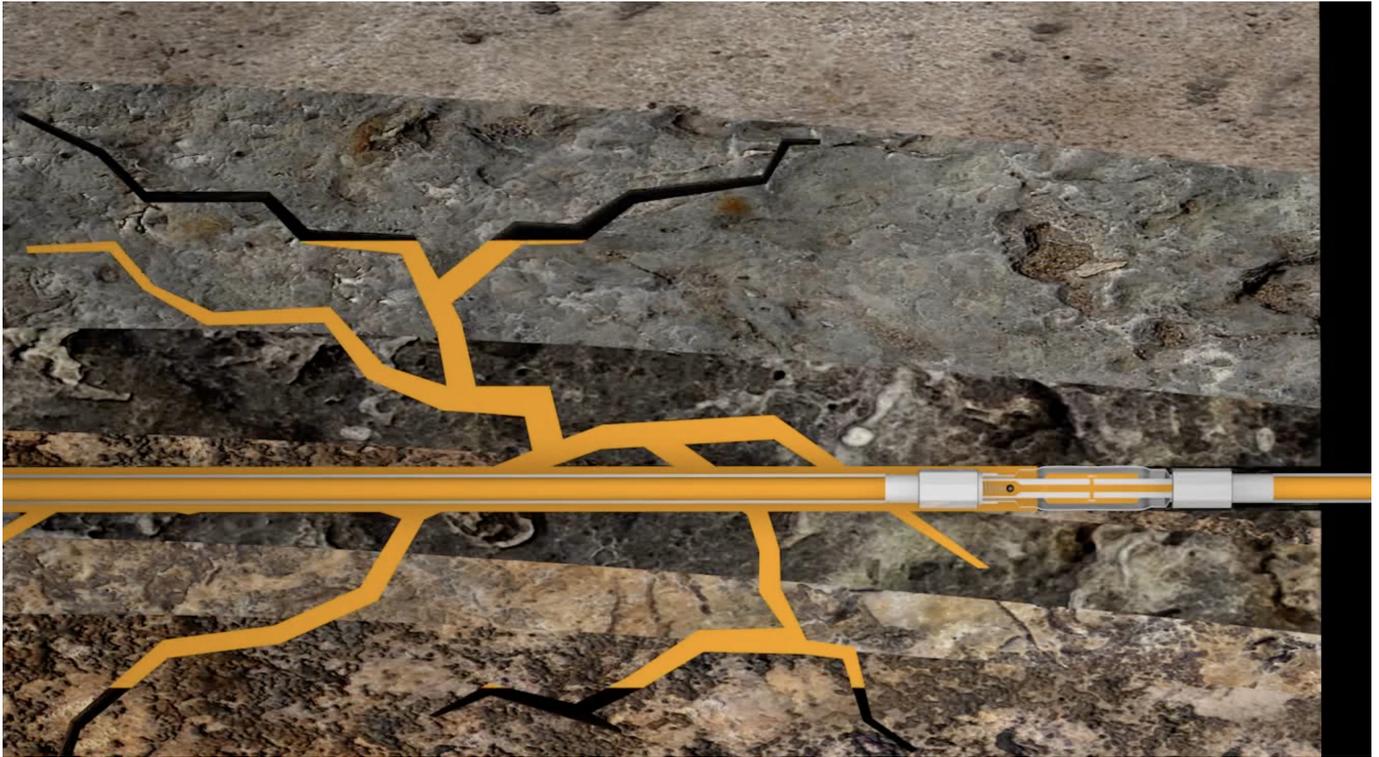
Benefits

- Pre-consolidation of the ground to reduce risk of unexpected rock falls or roof collapses
- Stabilise longwall faces in underground coal mines
- Prevent ground falling during production
- Preventive measure before mining or subsequent to mining when poor conditions are encountered
- Cavity filling from roof collapse above longwall mining supports
- Cavity filling in the development roadways
- Cavity filling behind steel sets and arches to stabilise the ground and prevent movement
- Goaf stabilisation / isolation
- Proven product performance with consistency in quality and reliability

Products solutions

- **Injection Chemicals**
Cavity filling Phenolic foams and silicate resins including Carbofill, Geofoam
- **Powder Products**
Cavity filling cements including FB200, Geofill, Rockfast, Tekseal
- **Services and Accessories**
Product application, emergency response, application advice, and onsite training

BACKFILLING & CONSOLIDATION



When the coal face encounters fractures or porous ground, the operation is at risk of rockfall and roof failure. To ensure the integrity of the mining area, we provide injection of chemical or cementitious products to reinforce the affected zones and to prevent rock falls by consolidating the ground.

Benefits

- Secure integrity of geological disturbances in the mining space
- Improve safety and productivity
- Avoid operational delays and expenses
- Stabilise the coal face to prevent roof failure
- Consolidation and stabilisation of highly convergent wet or dry strata

Products

- **Injection Chemicals**
Phenolic, polyurethane or silicate resins, Carbomine, Carbofill , Bevedan, Bevedol, , Geoflex, Geofam
- **Powder Products**
Consolidation and void filling with FB200, Tekseal and CMT Grout
- **Bolts**
M24 Rock Bolts, Cable Bolts and Self-drilling anchors
- **Services and Accessories**
Product application, emergency response, application advice and onsite training



VENTILATION AND AIR CONTROL

Adequate ventilation is a necessity to maintain air quality for every underground mine site. For a safe operating environment, it is essential to retain fresh air, prevent cross contamination of return air, and prevent gas build up from cavities without ventilation in place.

Minova have provided Australian coal mines a complete installation service for ventilation control devices, stoppings and seals for over 20 years. Our VCD's are certified by a registered RPEQ engineer (Registered Professional Engineer of Queensland) according to Coal industry guidelines.

Benefits

- Complete ventilation solution including site evaluation, design and installation of underground mine ventilation structures and bulkheads
- Sealing around ventilation structures and containment barriers to insulate, fill and seal gaps and voids
- Management of secondary air control of underground mining areas requiring access at a later stage
- Reduced dust, DPM and heat load in underground mines
- Tried and tested explosion resistant steel, seals and stoppings*
 - *Live explosions tested at Lake Lynn USA test facility and Londonderry Explosion Gallery NSW Australia

Our products

- **Ventilation Seals and Bulkheads**
FB200 and Tekseal plug seals, Meshblock concrete seals
- **Stoppings**
Sprayplast and Sprayplast UW, Rappass, Concrete and Flexistop flexible stoppings
- **Steel Fabricated VCD's**
Vehicle access doors, overcasts, air-locks, man doors, coffin seals
- **Accessories**
Pumps and couplings
- **Technical Services**
technical advice, installation, maintenance and inventory control



EXPERT TEAMS. PRACTICAL SOLUTIONS.

Our mining customers look to Minova engineers to be trusted partners that add value to their operations, help improve safety and boost productivity.

Minova employs a broad team of technical consultants and engineers who work in tandem with customer engineers to design the safest, most efficient application of the products that we manufacture and supply.

With an average of 28 years of mining and construction industry experience, each of our sales consultants brings an unparalleled knowledge of strata control thus complimenting the technical team.

As either highly respected professional engineers or industry veterans, you can be confident that the members of our technical team will recommend the products and services that you need, not necessarily the ones that we sell.

280+ years of combined experience working with you.

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