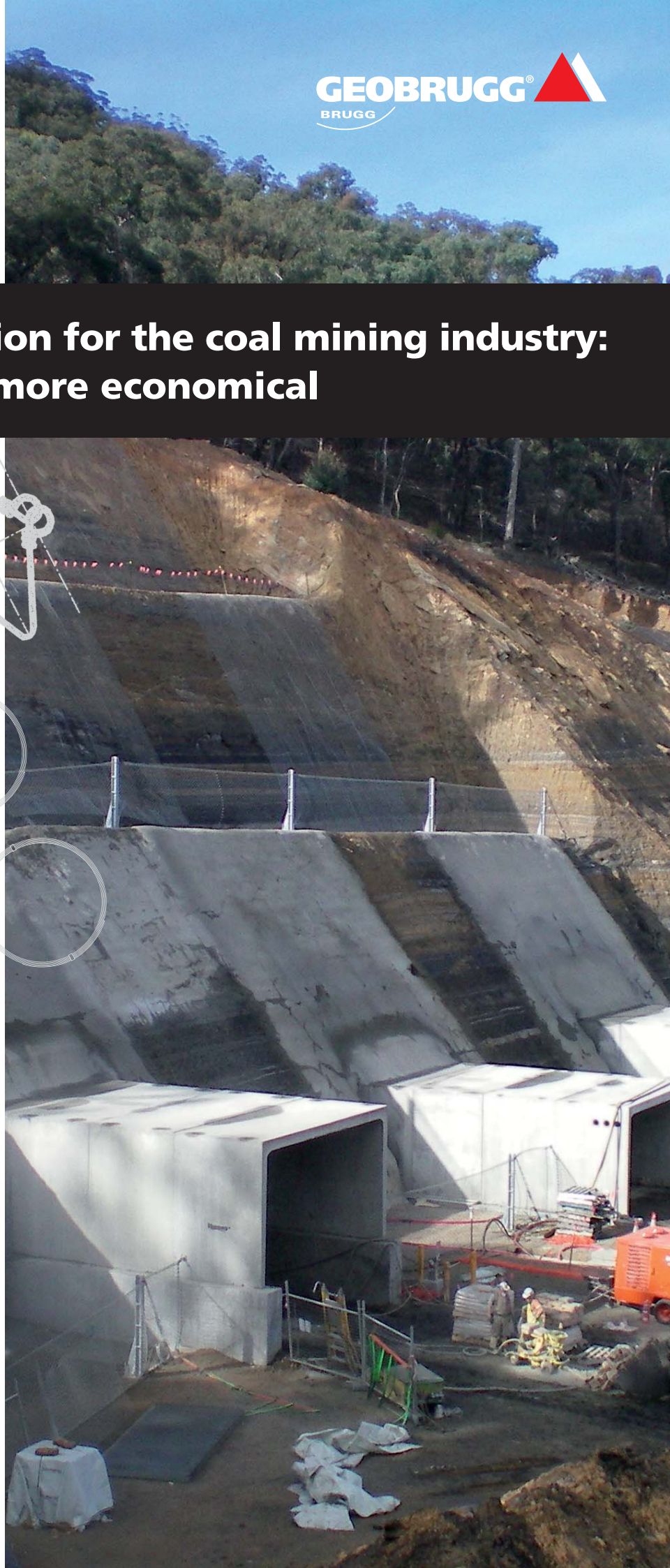


Rockfall protection for the coal mining industry: Safer – faster – more economical

**Fully tested and easy to
install flexible geohazard
solutions will increase the
mine safety in open pit
and underground mining**



Products to suit a wide range of applications



In open cast coal mining, faults, joints or groundwater may have an influence on the slopes stability. State of the art geohazard solutions will offer protection and increase the safety of miners and equipment.

The DELTAX® rockfall drape

DELTAX® mesh, manufactured from a 2 mm high-tensile steel wire with a tensile strength of 1770 N/mm², is used as a rockfall drape to protect rock slopes above mine portals. The rockfall drape is fastened to a support rope at the top and hung over the rockslope. Rockfall events therefore take place in a controlled manner between the mesh and the rockslope and are directed into a catchment zone at the base.

Installation

DELTAX® is rapidly and simply installed in rolls of 3.5 x 30 m. The non-overlapping linking of the mesh panels using our special tool less connection clip essentially reduces the installation time. Anchoring takes place with dome plates and rock nails.

Flexible rockfall barriers

Flexible rockfall barriers can also be used to protect portal entries, access roads and miners from falling rocks, either standalone or in conjunction with DELTAX® drapes. A full range of tested and approved rockfall barriers are available for impact energies from 100 kJ up to 8'000 kJ.

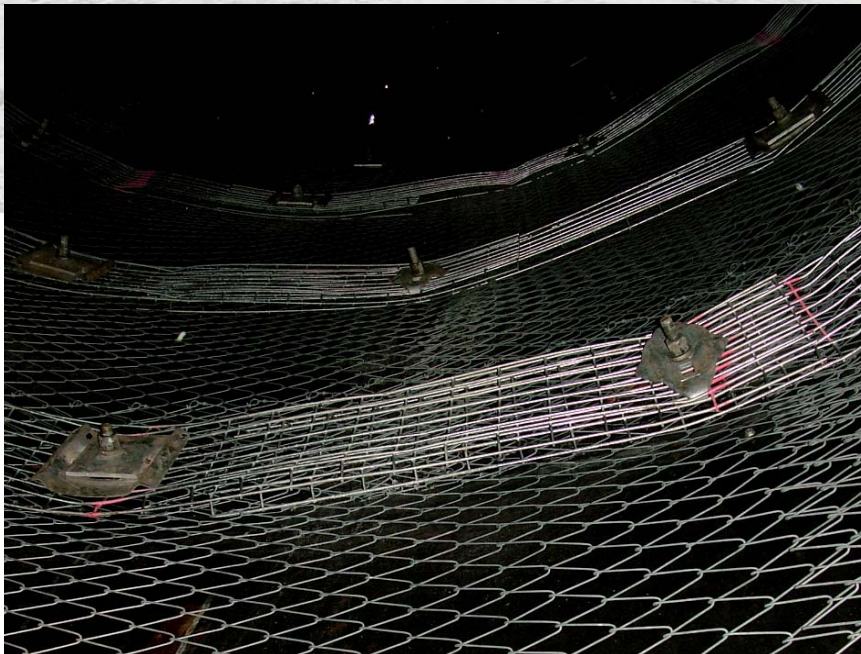
Simple installation

With foundations in line with available drilling diameters and the wide post intervals, Geobrugg rockfall barriers can be rapidly installed. No special installation equipment is required. Following a rockfall event, the barrier with or without retaining rope can simply be cleared out.

Maximum mobility

Once mine activity has moved on to another sector of the mine, the flexible barriers may be dismantled and re-installed where required.





Shaft protection in underground mining

Underground shaft linings may be secured with TECCO® chain-link mesh, manufactured from a 3 mm high-tensile wire, which has a tensile strength of 1770 N/mm². With a tensile strength of 150 kN/m, TECCO® mesh is particularly suited when there are high horizontal movements and deformation.

Installation

TECCO® chain-link mesh is supplied in rolls of 3.5 x 30 m, however it can be tailored to fit the shafts' circumference. The non-overlapping linking of the mesh panels using tool less connection clip helps to simplify and reduce the installation time. Anchoring takes place with TECCO® spike plates and rock nails with the resulting active tensioning on the mesh preventing subsequent break-outs and visible deformations.



Ground support

For ground support with the MESHA® installation handler, compatible with all multi-arm drilling jumbos, DELTAX® or TECCO® mesh is unrolled onto the roof in roll widths up to 3.5 m and bolted by the jumbo operator in the same working process, thereby providing a fast, safe and fully mechanized installation. No operator or off-sider is working in unsupported ground.

Geobrugg: A dependable partner with a worldwide presence

- 
- ▲ Production facilities
 - ▲ Branch offices
 - ▲ Sales offices
 - ▲ Representatives

The corrosion protection concept

The DELTAX® and TECCO® mesh are supplied with the zinc/aluminum coating GEOBRUGG SUPERCOATING® or GEOBRUGG ULTRACOATING®, the 3rd generation of our zinc/aluminium coating. Comparison tests with galvanised wires demonstrate in salt spray tests a working life of ten times longer for wires treated with ULTRACOATING®, and three times longer for those treated with SUPERCOATING®. The spike plates as well as posts of the rockfall barrier are supplied hot-dip galvanized.

Engineered geohazard solutions

It is the task of our engineers (and partners) to analyze the problem together with you in detail and then, together with local consultants, to present solutions. Painsstaking planning is not the only thing you can expect from us, however; since we have our own production plants on four continents, we can offer not only short delivery paths and times, but also optimal local customer service. With a view towards a

trouble-free execution, we deliver preassembled and clearly identified system components right to the construction site. There we provide support, if desired, including technical support – from installation right on up until acceptance of the structure.

About "Product liability"

Rockfall, slides, mudflows and avalanches are natural events and therefore cannot be calculated. This is why it is impossible to determine or guarantee absolute safety for persons and property with scientific methods. This means that to provide the protection we strive for, it is imperative to maintain and service protective systems regularly and appropriately. Moreover, the degree of protection can be diminished by events that exceed the absorption capacity of the system as calculated to good engineering practice, failure to use original parts or corrosion (i.e., from environmental pollution or other outside influences).

Further reading

- Brochure "Rockfall protection in the mining industry"
- Brochure "A new approach to ground support"
- Reference list "Mining industry"



Geobrugg AG

Geohazard Solutions
Aachstrasse 11 • CH-8590 Romanshorn • Switzerland
Phone +41 71 466 81 55 • Fax +41 71 466 81 50
www.geobrugg.com • info@geobrugg.com

A company of the BRUGG Group
ISO 9001 certified