

## Mining the world together



**Benefit from tailor-made solutions and full service**

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Mining markets are clearly growing in importance as the global demand for base and precious minerals continues to rise. Moreover, mining companies face some major challenges for sustainable growth. An increase in demand has made performance improvement and cost savings key challenges within this industry. To continue to meet the changing needs, you need a solid and reliable partner.

Team up with Bekaert and discover our unrivalled portfolio of high quality products. Customers all over the world rely on a wide range of wire, mesh, bolt, fiber and rope products, as well as on our technical assistance at job sites. We play a role in almost every step in the mining value chain. We focus on satisfying the needs of our customers in the mining business and civil works, through innovative proposals and technological progress affecting the world. We distinguish ourselves from competition with innovative solutions that enhance mining performance and safety. We can also lower your total costs by reducing labor cost or execution time.

### **Solution provider**

For over 130 years, customers all over the world have worked with Bekaert because of our unique metal transformation technologies combined with our coating know-how. With extensive experience in the mining industry we are a key player in this market. We understand the needs of mining companies, service companies and distributors and are able to offer comprehensive solutions in open pit mining and underground mining.

Find out how we can work together.

# Mined out: tailor-made solutions giving you the edge in your market

Most products in the mining industries could be described as commodities. But if you take a close look, you soon realize that mining is anything but ordinary. That's why Bekaert offers high quality products and value-added service. We have a staff of professionals and experts within each product group to offer solutions adapted to your commercial and technical needs at every step in the value chain.

Discover your advantages:

## Safety

It is clear that safety is critically important in the mining industry. A continuous effort to optimize the mining process safely without loss of attention to speed, ease of construction or installation performance is one of our key concerns. For example Dramix®, our high quality fiber reinforcement for tunnels, can be mixed with concrete without clumping, and has an outstanding reputation when it comes to safety.



## High performance

Maintaining and optimizing the life cycle of your equipment is crucial to have high productivity and profitability. We work on improved product design and breaking load and we focus on better corrosion resistance and excellent ductility. Our aim? Increasing the uptime of your processes with a high performance solution. Our wire ropes and ropes for hoisting applications, and Fleximat® weft for conveyor belt reinforcement are some of the examples where a high breaking load performance drives an optimal solution.



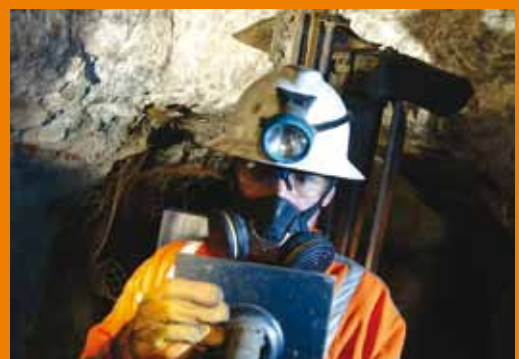
## Reliability

As we have full control over the supply process from wire rod to fiber, wire, mesh, bolt or rope, we can guarantee a consistent quality. Quality at Bekaert goes beyond mere product specifications. We implement a Total Quality Management system in production. Thanks to this intensive quality approach we can offer controlled quality whatever the environments you are working in.



## Cost-saving

The operating cost structures of global mining operations have increased significantly over past years. There are different areas that allow you to lower costs: reduction of equipment downtime and change-over time, optimization of maintenance, etc. Different features of our products, like a longer lifetime, can help you lower your total cost of ownership.



## Worldwide presence – local support

When you choose Bekaert, you will benefit from our commitment to local sales and service, backed by our global presence. Wherever you are located, we can respond quickly.

### Global presence

We are present wherever you do business. You can rely on a worldwide sales network that is responsive to growing market changes. Our highly trained internal experts can perform advanced testing or R&D services to create added value to your business.

### Local on-site support

Our local partners have been building strong relationships with customers for decades. Our specialized and dedicated people have expert knowledge and speak the local language. They offer extremely flexible service and keep an eye on the latest developments in the field and share their knowledge with you. You can benefit from our local on-site technical support and training wherever you are located. In Peru and Chile for example, we have special units offering technology based materials built to international quality standards.

These units include mining professionals (specialists in geomechanics, explosives, operations, etc) and consultants such as academic professors specializing in geomechanics, seismic experts and Bekaert technologists.

### Count on timely deliveries

The last thing companies want is for the activity to stop. You can count on a high delivery capacity and on timely deliveries even in an inconstant demand pattern. Bekaert is never far away with short lead times in all regions.

## Technological leadership at your disposal

Our core business is transforming steel wire and applying coatings. Your desires stimulate our urge to innovate. Together with our business partners and customers we conduct research and development, focusing on specific problems in mining and related processes. Joint innovation efforts allow us to contribute to sustainable, safer and more cost-effective operations.

Proof of our R&D investments is our Bezinal® family (Bezinal®, Bezinal® 2000 and Bezinal® 3000) - a group of advanced coatings with specific zinc aluminum compositions - offering superior corrosion resistance to steel wire. Using Bezinal® coated wire products ensures a longer lifetime, an important asset for applications in demanding environments like mining.



## Mining the world

Satisfied customers all over the world. That is our aim. We want to help you grow your business. We want to meet your needs and offer you added value for both the short term and long term. Our case studies are illustrative of the remarkable successes built on our *better together* approach.

We are developing a breakthrough steel wire mesh for roof and rib control that offers a superior and cost effective solution compared to the standard welded wire mesh.

“The high energy absorption obtained with Dramix® allowed us to use the shotcrete in large underground galleries and intersections. This made it easier for us to replace the mesh and save considerable time and money.”

Luis Maldonado Zorrilla,  
Geomechanics Manager, Minera Horizonte

Every year, some 4 million square meters of tunnels in Chilean and Peruvian mines apply a reinforcement based on Bekaert wire mesh to secure their people and assets.

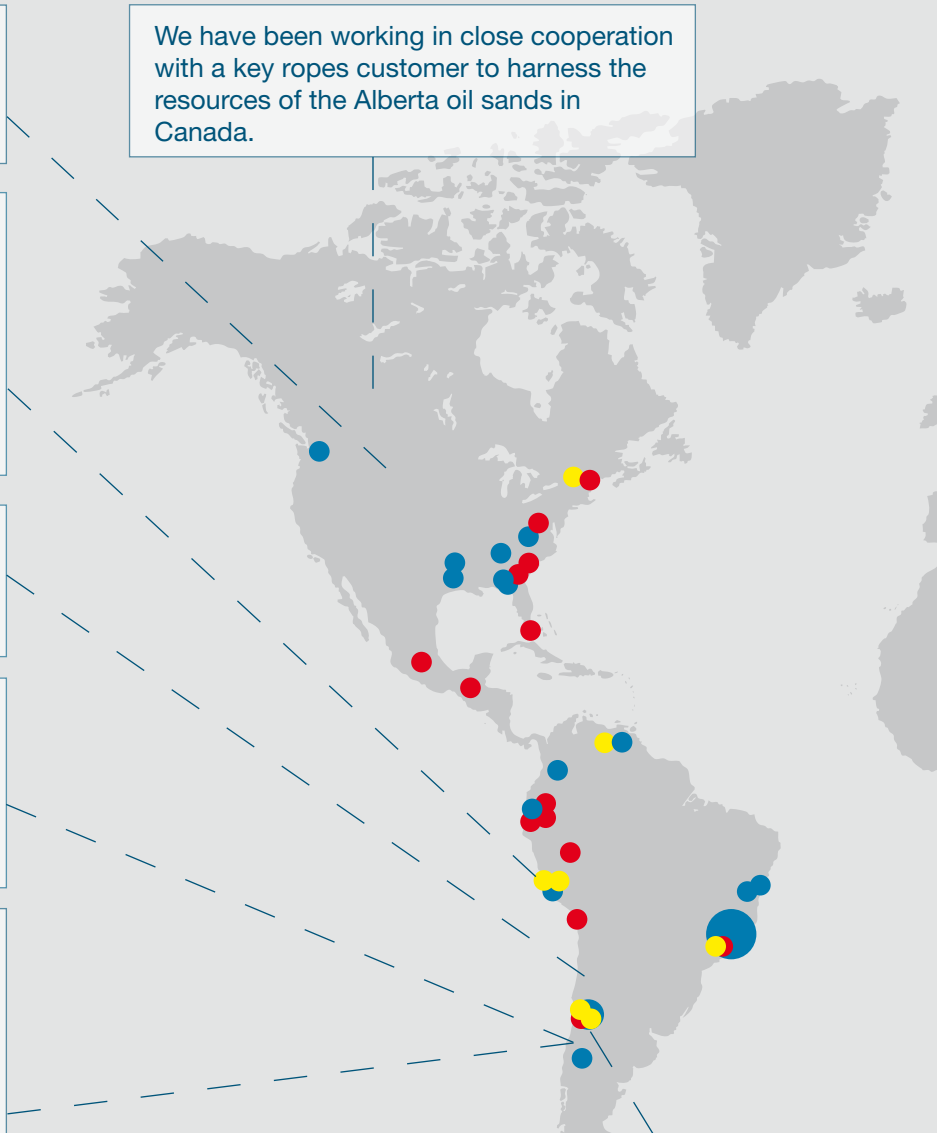
Bekaert wire mesh is used in the largest underground mine. The *El Teniente mine*, located at 80km south of Santiago is owned by Codelco, one of the biggest players in underground copper mining worldwide.

Dramix® steel fibers are the preferred reinforcement for the access tunnels in the challenging Codelco project “Nuevo Nivel Mina” Division El Teniente. The 2 access tunnels have a diameter of 9.4 meters and a length of 8.9 Km, and have 30kg/m<sup>3</sup> Dramix® shotcrete reinforcement. The construction of the tunnels started in June 2011 and will end by 2015.

For erosion control or slope stabilization, customers rely on Bekaert gabions.



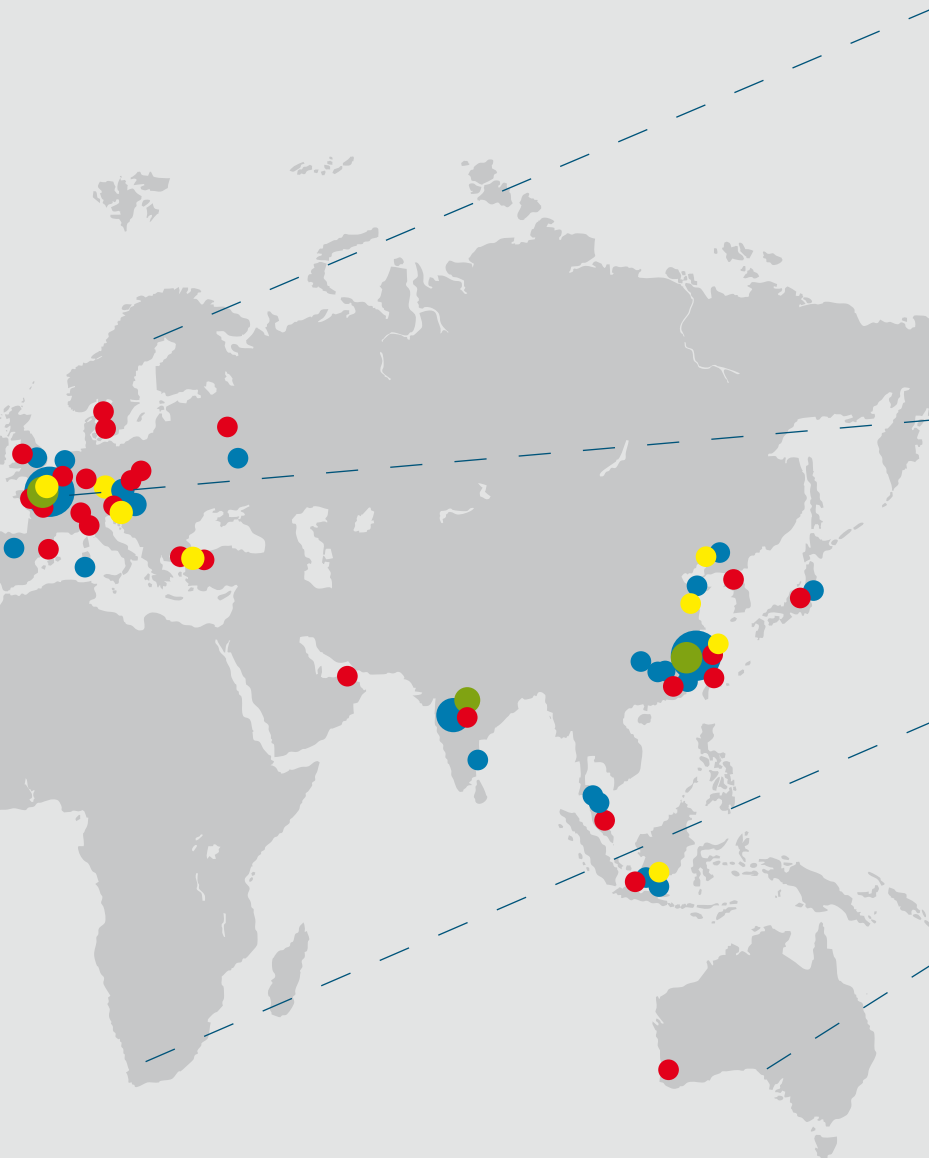
We have been working in close cooperation with a key ropes customer to harness the resources of the Alberta oil sands in Canada.



Bekaert made a vital contribution to the rescue of the 33 trapped Chilean miners through its local joint venture company Prodinsa. It provided a rotation resistant rope to be used as back-up wire rope for the hoisting of the rescue capsule.



- mining related production plants
- production plants
- offices and distribution centers
- technology centers



For more than a decade already, we have enjoyed preferred supplies status for Dramix® with the Swedish mining companies LKAB and Boliden.



Our conveyor belt reinforcement solutions have been applied in several major mining projects all over the globe including RAG's Prosper Haniel Mine in Germany, Los Pelambres in the Chilean Andes, lignite mining from RWE in Germany and Sasol in South Africa.

Our hot gas filtration solution based on metallic sintered fibers has proven succesful in continuous operations monitoring the particulate materials emissions at the Rustenberg smelter plant operated by the biggest platinum producer in South Africa.

The Olympic Dam, the largest mine in Australia, owned by BHP Billiton, relies on Dramix® reinforced concrete.

**Technological innovation in practice:** Minova and Bekaert are working together to establish a new design for galvanized cable bolts for roof control. The cable bolts have increased strength and anchorage with a lower insertion force providing for a safer, faster, and stronger roof control system.

Bekaert mesh products are being used to secure the surroundings of the mine.



# An integrated presence in the mining industry

Driven by the steady demand for all kind of materials, Bekaert is omnipresent on the mining scene. With innovative technologies and solutions we enable our customers in various sectors to extract, transmit, produce, and distribute resources in an efficient way. Our presence starts at the construction of the mine and is continued through the supply of steel fibers, all kind of meshes and other reinforcement materials.

## 1. Reinforcement

### Dramix® steel fiber reinforcement

Dramix® is the most cost effective reinforcement for shotcrete applications in tunnels and other underground structures like inverts. Thanks to its high performance in the concrete matrix, as well as its technical advantages and tight quality standards, Dramix® steel fibers can be used to obtain higher reinforcement performance even at low dosages. Our fibers enhance the structural behavior and durability, permitting your team to work faster and safely.

#### Your advantages

- A full product range of fibers, in steel or polymer, loose or glued, adapted to your needs
- Faster, less expensive and safer solution
- Easy to shotcrete at areas with difficult accessibility
- Full quality controlled steel fiber concrete that allows important deformations without failure



Every year, 120 000 m<sup>3</sup> of concrete reinforced with Dramix®, are sprayed in Peruvian mines.

“ With the addition of Dramix® steel fiber in the concrete I have been able to solve complex problems in tunneling reinforcement.

Luis Maldonado Zorrilla, Geomechanics Manager, Minera Horizonte

### Mine Mesh

Mine mesh provides surface support coverage to ceilings and walls in underground mining.

#### Your advantages

- Stronger and lighter per square meter for easier handling underground
- Product supplied in rolls for faster, safer installation
- Several metallic coatings (Zinc, Bezinal® 2000) for a longer life
- Lower cost per square meter



With strength of 3 500 kg/m<sup>2</sup>, our chainlink mesh offers a safe and reliable reinforcement solution.

### Stranded roof bolts

Roof bolts strengthen and reinforce roof structures

#### Your advantages

- Stronger than conventional roof bolts for enhanced safety
- Cable provides flexibility for easier and faster installation underground
- Eliminates or reduces the need for crib support
- Galvanized coating for corrosion protection and long life





## A strategic alliance with Minova in the mining sector

Prodac, Bekaert and Minova Latin America have become partners in the mining sector.

The alliance has been created to provide integral and innovative solutions to satisfy the increased safety and productivity demanded in the Peruvian and Bolivian rock support business.

Our strategic partner MINOVA is one of the largest and most recognized mining companies for rock support and reinforcement worldwide.

## 2. Equipment/Machinery

### Special belt reinforcement solutions

The transportation of minerals from loading to the disposal point is a critical activity and one of the most vital components of mining operations. Many mining sites choose conveyor belts over truck transport due to lower total cost of ownership and terrain obstacles. Still, the weak point in conveyor belts remains their poor resistance against cuts, rips and impact, which reduces their lifetime.

To keep belt rips to a minimum Bekaert has been working with several conveyor belt manufacturers to develop an integrated 'self-protecting conveyor belt': a belt which is reinforced from its inside core, using steel cord. Fleximat<sup>®</sup> is a woven steel cord fabric with steel cord in transversal and/or longitudinal direction fixed together in one ply and used for impact, cutting or heat resistance.



#### Your advantages

- Increased uptime and cost-saving operation
- Impact and cutting resistance
- Longer life performance

### Off the road tire and rubber track reinforcement

Off the road (OTR) mining equipment often work in very harsh conditions due to climates, bad road surfaces and heavy payloads. OTR tires and rubber tracks are the first contact with the road surface and as such critical to guarantee that your rolling equipment is operational at all times. The expectations of the end-user are high: long lifetime, even at high speeds and payloads, strong traction, riding comfort with limited wear, better fuel consumption, greater resistance to puncture or cut and on-site repair, retread and recycle service. These expectations are best met with a radial OTR tire or steel cord reinforced rubber track.



#### Your advantages:

- Complete product portfolio for the rip protection of belt, carcass, bead and chafer
- Steel cords improve the overall lifetime of the tire in terms of durability, load capacity and footprint
- Solution avoids accidents and down-time by making the tire more resistant to cuts, heavy impacts and corrosion
- Technical and commercial service from a global team

## Ropes and rope wire

Bekaert offers a wide range of rope wire and ropes for a variety of applications, in underground and open pit mining. We have production and service centers in America, China and South East Asia. For our highly specialized ropes, we run specific innovation programs with customers. Moreover, all main high performance rope manufactures rely on our wire product portfolio.

### Rope products for the open pit mining market

In surface mining, huge equipment components, such as mechanical shovels, are used to remove overburden and ore from the ground. Our strong and long-lasting wire rope is key to maximizing the efficiency of these machines.

We also specialize in hoist wire ropes and dragline wire ropes, as well as a full range of pendant assemblies. Dragline excavators are known to be one of the most demanding rope applications in the world. We offer both six and eight-strand dragline ropes, based on customer preferences and operating conditions. The use of plastic coverings to protect the core has also been pioneered by Bekaert. We offer solutions that improve operating efficiency in electric mining shovels, outperforming any existing shovel rope on the market today.



#### Your advantages:

- Improved overall rope service life enhancing increased uptime and saved costs
- Excellent after sales support
- High service degree and high delivery reliability
- Complete range in terms of diameters and breaking load
- Solutions for improved corrosion resistance in order to cope with the harsh environments

### High performance portfolio for the underground mining market

We have a full range of products for use in underground mine hoisting, and have developed special underground ropes to overcome the obstacles that many mining companies face: both Koepe and drum hoists, including full-lock coil, half-lock coil, flattened-strand and multi-strand ropes for hoisting and balance ropes, including the patented cushion balance ropes.

#### Your advantages:

- High tensile strength leading to increased breaking load, the ideal solution for digging deeper
- Support from a highly specialized technical support team
- Excellent ductility for optimal bending fatigue
- High service degree and high delivery reliability
- Solutions for improved corrosion resistance in order to cope with the harsh environments



## Filtration solutions

Smelter plants are directly linked to mining, and producers usually face issues with their emissions of particulate materials to the environment. Efficiency, reliability and maintenance of the existing but older technologies are a major concern. Bekaert filtration technology finds its best fit in hot gas applications such as dedusting in smelter plants for platinum, copper, bauxite, nickel, gold, etc. We offer custom made filter system designs using Bekiflow® metallic elements made of Bekaert Bekipor® sintered fibers, a medium characterized by high porosity and a thin and multilayer structure, allowing state of the art surface filtration. Combined with the properly designed blow-back unit sizing, you can benefit from compact and efficient solutions with long-life performance and longer cycle time.



Your advantages:

- Emissions down to 1 mg/Nm<sup>3</sup> for particulate materials
- High efficiency media up to 99,9995% at 1μ
- Continuous & reliable operations with increased cycle time and long life performance
- Compact designed filtration unit that allows small floor area footprints
- Corrosion and high temperature resistance (up to 800°C)

“ Bekaert’s glued Dramix® fibers have proven their quality throughout the years: for mining companies it is crucial that there is no clotting of the concrete which can cause obstructions of the shotcrete equipment with production losses as a result. Dramix® never let us down in this respect. In the years to come, we will invest heavily in mines; after all, the demand for mining products is on the rise around the world. Our need for rock support will therefore increase.

Tomas Larsson from LKAB



## The future rocks!

To find out more on how the Bekaert products can give added value to your business, contact us on [mining.bekaert.com](http://mining.bekaert.com)