



# + Mining





# Bringing smarter solutions to mining



The mining sector is experiencing one of the most dramatic downturns in decades. Most commodity prices have been sinking for years, and industry analysts are predicting that the recovery, when it comes, will be closer to a crawl than a sprint.

Faced with dwindling demand, companies are doing what they know best—reducing costs and eliminating anything they don't believe adds value to the product...and the bottom line. It's a strategy with serious limitations.

Counterintuitively, many fight back by increasing supply. They flood the marketplace with ever-greater amounts of ever-cheaper product, hoping to starve the competition out of business. A lose-lose proposition, when so many top producers are recording deficits with so many of the minerals they sell.

The pressure has never been greater to deliver high-quality products, control costs, and do it safely. More than ever, mining companies like yours need to implement sustainable business plans, become more competitive, and get the most value from their assets.

It's time to drive change in the industry. To think differently—more innovatively—about transforming the way our operations are run.

That's where we can help.

Our professionals come from many different disciplines, with a world of experience serving the mining industry. That means targeted, state-of-the-art solutions that can enhance your operation.

With today's leading practices as a baseline, we'll take it to the next level. We'll help boost your capacity. Even find new technologies and tools that we can help develop, adapt to your needs, and maybe bring to market.

You'll get expert help, sound advice, and full support with:

- Mine design and planning
- Mine infrastructure design
- Open-pit mining
- Mass mining
- Underground mining
- Shafts and hoisting systems
- Mine ventilation and refrigeration
- Mine dewatering
- Dynamic simulation
- Backfill
- Digital mining platform
- Automation
- Electrification
- Continuous mining
- Operational services
- Project management and procurement services
- Construction management

# Global presence, local focus

All over the world, we have teams of professionals contributing to the mining sector. Fine-tuning machinery. Making processes more efficient. Partnering with you to build new facilities, renew and repurpose existing ones, and support your operation any way we can.

● Hatch offices

● Selected mining projects

## 1 Esterhazy K3 mine, Mosaic Canada

At full production, the K3 mine site will be the largest potash mine in the world, producing 21 Mtpa of ore. Since 2010, we've provided EPCM services, prefeasibility, and feasibility work for this greenfield mining complex, including construction of the 114-metre-high concrete and steel headframe with a Koepe hoist system.

## 2 Nickel Rim South, Glencore Canada

With the project mine infrastructure prefeasibility and feasibility studies complete, we were awarded the engineering, procurement, project and construction management, and commissioning phases. This C\$925-million project was developed for a 1.25 Mtpa production rate and established a new technology benchmark for future underground mines.

## 3 Fruta del Norte mine, Aurelian Ecuador SA Ecuador

Our prefeasibility and feasibility studies helped Kinross develop the plan and design for permitting and constructing the new gold mine and mill. Studies for the project included an underground mine, a processing plant, and the associated infrastructure.

## 4 Chuquicamata underground mine, Codelco Chile

One of the world's largest open-pit copper mines is transitioning into one of its largest, most efficient, and advanced underground mines. We undertook the feasibility study and basic engineering, and the liaison engineering that supported the funding-approval process. Our services included detailed engineering for the mine works, the mine communication systems design, the civil works, and overland conveyor platforms.

## 5 Pallas Green prefeasibility study, Glencore Ireland

Our contributions included the design of the underground mine, dewatering, surface water treatment, concentrator, backfill plant, tailings storage facility, surface infrastructure, utilities, and socio-environmental application process. Numerous options studies were prepared for this sensitive location, including site locations, mining methods, mine throughput, and tailings deposition techniques.

## 6 Kemi mine, Outokumpu Chrome Oy Finland

We were retained to review the mine planning process and the conversion of mineral resources into ore reserves at the Kemi underground mine. Conclusions from the technical review were presented and, as a result, Kemi initiated a program to address the recommendations.





## 7 Dvoinoye gold mine and mill, Kinross Gold Corporation Russia

In this extreme subarctic climate with minimum winter temperatures of 58°C, we provided a scoping study and feasibility study consisting of underground mine design, cemented rock-fill, surface infrastructure, an all-season road between Dvoinoye and Kupol, and an expansion of the Kupol mill to increase output from 3,000 to 4,500 tpd.

## 8 Mopani Copper Mine, Mopani Copper Mines PLC Zambia

Our detailed engineering design services and assistance in procuring the hoist and headgear packages updated Mopani's operations, which include four underground mines, a concentrator, and a cobalt plant. We reviewed conceptual work, provided cost estimates, and conducted the feasibility study.

## 9 Kangra Coal Kusipongo expansion, Kangra Coal South Africa

To extend the underground workings to the new Kusipongo ore reserves, we helped determine requirements and provided the conceptual study, prefeasibility study, and feasibility studies. These determined geomechanical stability, ventilation, mine scheduling, and mining infrastructure to extend the life-of-mine of the colliery and maintain the mine throughput at 3 Mtpa.

## 10 Gold mine debottlenecking, Confidential Western Australia

To increase haulage from underground operations and improve throughput, we mapped the mine's design and linked a dynamic model to its planning software, tracking the flow of goods, people, and machinery. Productivity and expansion options were evaluated and a model devised to increase production by 50% over five years.



# Essential services, sound strategies

From brownfield upgrades to planning and implementing major new integrated developments, our objective is always the same: to address your most serious challenges and solve your toughest problems.

## Mine design and planning

With worldwide expertise in the design, specification, selection, and optimization of different mining methods, we make the most of your operation. Base metals, industrial minerals, precious metals, rare earths, and other mined commodities—we cover surface and underground operations, including the transition process.

## Mine infrastructure design

Our experts can provide design, layout, selection, and specification of surface and underground infrastructure, facilities, utilities, and systems. This ensures full integration of the overall mine design and associated infrastructure-designs execution, achieving the highest standards of safety, quality, sustainability, and value for your operation.

Our full range of engineering and project delivery services minimize the engineering and construction interfaces you need, and maintain continuity from the initial design through to the implementation of your project.

## Open-pit mining

By working costs and commodity prices and offering smart, efficient solutions to operating issues, we can maximize the value of an open-pit deposit for a given set of mining conditions. We use today's leading software to assess the resources' sensitivity to variations in costs, revenues, and slope constraints. Then we design the optimum shell to help you reach the desired production rate, net present value, or any other metric.

## Mass mining

For caving or very large non-entry mining methods, our experts bring both technical and operational experience in designing and developing block cave, sub-level cave, and open-stopping mines. From concept to final design to implementation, we help you shorten your project execution timeline. Then we move on to provide assistance that improves your capital and operating cost expenditures with production optimization and scheduling; design and extraction of undercut, drawbells, and extraction-level development fragmentation modeling; and operational geomechanical design.

## Underground mining

With a diverse range of design expertise in shaft and ramp-accessed deposits, our team has experience with many different underground mining methods and can produce operationally-ready designs. We strive to always identify the best methods to help you meet your financial, social, and environmental objectives, focusing on the mining, labor, energy, and capital intensity of your project. Our team can maximize the value of your deposit.

## Shafts and hoisting systems

We know mine shaft and hoist design. Hoist duty cycles are calculated and specifications drawn up to identify and obtain the exact equipment your mining operation needs. Shaft and station steelwork are custom-designed, conforming to codes developed specifically for high-speed and high-capacity hoisting systems.

Headgears are laid out to match your mine's shaft and hoist configurations, always conforming to internationally recognized codes and standards. They can be steel or concrete, situated on the surface or underground. We can help you fully automate rock handling in the shafts, maximizing output while reducing the need for human interface.

Hatch provided EPCM services for the Gahcho Kué Diamond Mine, the fourth largest diamond mine in Canada's Northwest Territories





Hatch completed EPCM services for the Grosvenor underground coal mine execution, delivering the project seven months ahead of schedule and US\$100 million under budget

### Mine ventilation and refrigeration

Our clients count on us for complete service packages to design and install state-of-the-art ventilation, heating, and cooling systems. This includes large, environmentally friendly and sustainable refrigeration systems using hydrofluorocarbon (HFC) or ammonia refrigerants. We work the entire scope, from conceptual design to detailed engineering and implementation.

### Mine dewatering

Dewatering pumps, along with the water distribution system—sumps, settlers, piping, and slimes handling equipment—play an essential role in operating the dewatering system. Our specialists have experience with both clean and dirty water systems. They can help you choose the right one for your operation.

### Dynamic simulation

Our experts can produce dynamic life-of-mine simulations for complete mine systems and processes. From rock breaking at the face to loading, stockpiling and transporting rock; from logistics and moving personnel and materials for deep ore bodies to large open-pit operations. We have it covered.

### Backfill

Selecting the optimal backfill system, method of distribution, and materials handling processes are major considerations in underground mine design, planning, and production. All over the world, we've helped operations like yours make the right choices. We've got the expertise to establish backfill system characteristics, and can determine the highest quality, most cost-effective mixture, and delivery method to support your mine's production requirements.





Over 800,000 hours were worked  
on the Mary River project under  
Hatch management with zero LTIs

### Digital mining platform

Digital Mining Platform - transforming data from “unseen” to fully “visible” validated information in real-time.

Underground mining has been handicapped by not being able to “see” what is happening at the right time and frequency to drive effective business decisions. The current paradigm of cost cutting and traditional continuous improvement has not resulted in sustained bottom line value. Costs continue to escalate while productivities diminish, or stagnate under declining commodity prices.

Our Digital Operational Management System (D-OMS) is a structured approach to sustainably delivering higher productive capacity through “short interval control” (SIC). A mature D-OMS is transparent at all levels setting the stage for an agile workforce in mining.

### Automation

Standardizing and automating practices can make huge differences to the bottom line. We work with you to help minimize variation in your processes, finding and implementing systems that create high-value results.

### Electrification

The mining industry relies on diesel-powered prime movers for surface and underground mobile equipment as well as for power generation at remote sites. Reducing reliance on diesel fuel and electrifying even the smallest pieces of equipment can produce positive results and help cut greenhouse gas emissions. We can help define and evaluate the benefits in terms of capital and operating costs, and find value when electrifying mobile equipment fleets and renewable power installations.

### Continuous mining

Challenging current drill-blast-clean methods in mining can reduce costs and drive significant improvements in safety, automation, and efficiency. Continuous mining equipment and methods enhance the selectivity of ore from waste at the mine face and produce favorable comminution compared to blasting. By using data derived from innovation in underground technologies and applying our in-house expertise, we can define meaningful differences in efficiency between continuous and non-continuous mining methods.







## Operational services

We can help define needs, identify risks, and develop strategic plans. Then we move on to the tactical work involved in developing and deploying the procedures, systems, and workplace tools you need to successfully operate and maintain a new or upgraded facility. Together with your operations team, we deliver faster ramp-up and then follow through for smooth, sustained operation of newly created assets.

## Project management and procurement services

You need projects delivered reliably and efficiently. Our international knowledge, decades of experience, and technical expertise are your assurance. We can help you manage capital programs and process-area construction projects anywhere in the world. You'll have the full range of procurement services, provided competently and thoroughly. From the selection and management of contractors and suppliers to the arrival of goods at the project site, we deliver. On schedule. Within budget.

## Construction management

Using state-of-the-art technology and innovative construction methods, we build consistency and reliability across the entire range of your operations. The highest standards of safety, performance, quality, cost, and schedule are always top-of-mind. Our integrated approach to construction management makes the best use of people, places, and things.



Hatch completed studies with a world-class safety record, reaching 5.7 million hours with zero LTIs at the Nickel Rim South mine in Canada





# About Hatch

Whatever our clients envision, our engineers can design and build. With over six decades of business and technical experience in the mining, energy, and infrastructure sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient, and innovative. We draw upon our 9,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

[hatch.com](http://hatch.com)