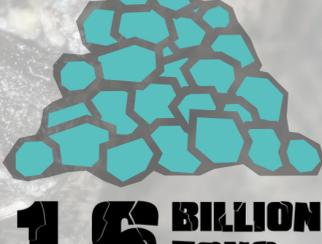


MINERALS MINING: THE FOREFRONT OF TECH INNOVATION

At each stage of the mining process, the mining industry uses advanced technologies to access vital resources, improving efficiency and production, and reducing costs and environmental impacts—all while increasing miner safety.

UNMANNED EXPLORATION:

Electronic sensors can now locate deposits in up to 175° F conditions—enabling us to dig deeper than ever before.¹



1.6 BILLION TONS

of ore will be produced by Rio Tinto in Arizona over the next 40 years.



Drones are sent into mines to complete 3-D mapping, survey mine walls and inspect equipment.²



DRONES

expand the search area by charting unknown sections while miners stay safe on the surface.

DEVELOPMENT: NEW OPPORTUNITIES IN EMERGING FIELDS

Many of today's miners are also digital and tech specialists, and mines leverage the technical expertise of professionals including:

Electronic device monitors and technicians

Data system and software managers

Mechanics

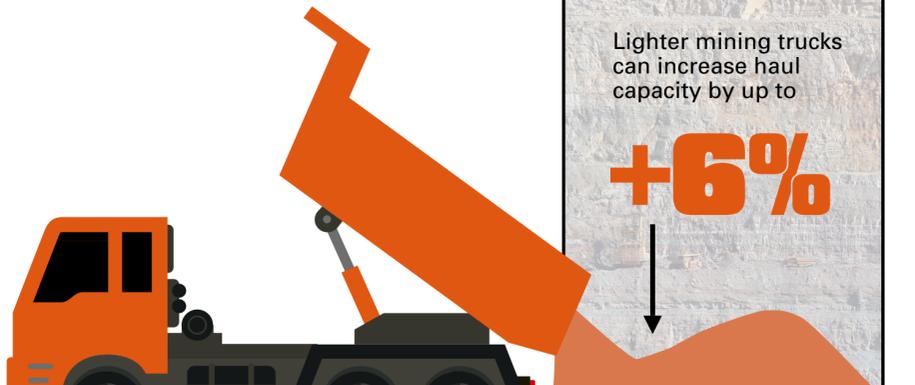
Geographic Information System (GIS) specialists

Autonomous vehicle and drone operators



CONSTRUCTION: BUILDING A TECH-DRIVEN STRATEGY

Mining and equipment manufacturing companies collaborate to develop technology and equipment tailored to the unique conditions of mines and project needs, while improving overall efficiency.



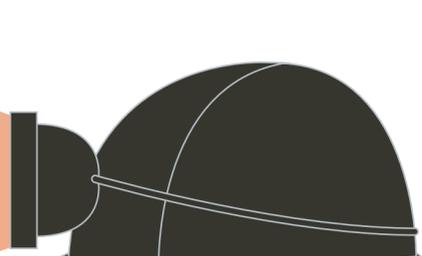
Lighter mining trucks can increase haul capacity by up to

+6%

Maintenance and assessment software helps people do their jobs more effectively.³

BARRICK GOLD'S

Asset Health tool centralizes maintenance information to catch failures before they happen and streamline mechanic work effort.



OPERATIONS CULTURE + SAFETY: DETECTING HAZARDS BEFORE THEY HAPPEN

Sensors and drones detect specific conditions like shifting rocks and vehicle locations.



INCLUDING ZERO PARTICIPANT FATALITIES IN 2017.⁴

Autonomous vehicles remove the risk of human error — keeping miners safe while ensuring accuracy.⁵

RECLAMATION + SUSTAINABLE OPERATIONS: LEADING THE FUTURE

Mining has always been a leader in sustainable tech—introducing hybrid vehicles in the 1950s. Today, we continue to work with manufacturers to improve vehicle fuel efficiency, durability and haul capacity.



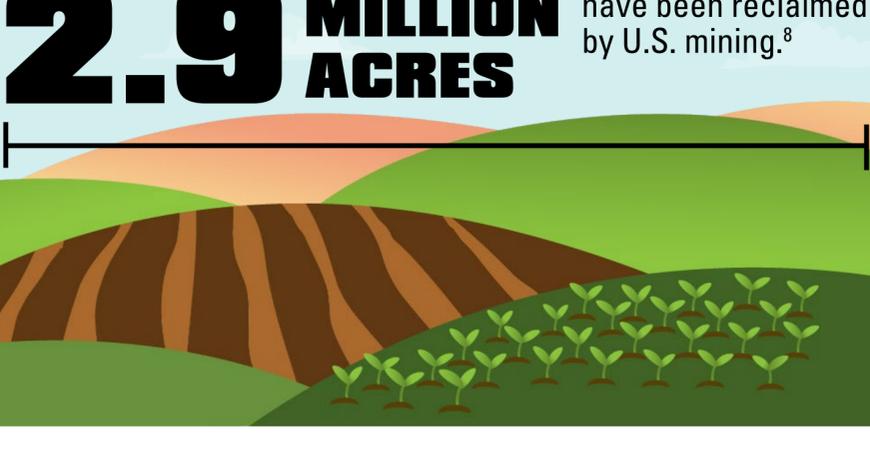
HYBRID TECHNOLOGY leverages regenerative braking and kinetic energy to store energy.⁷



SWITCH RELUCTANCE (SR) TECH can move at faster speeds and move more tonnage. Meanwhile, controlled wheel slip means less fuel burn.⁶

Mining's GIS technology and modern environmental impact software have facilitated award-winning land reclamation solutions.

2.9 MILLION ACRES have been reclaimed by U.S. mining.⁸



The tech revolution is changing the way we operate, creating a new generation of miners who are advancing the industry while honoring the traditions that have sustained mining communities and our economy for more than a century.

Visit MineralsMakeLife.org to find out more.

SOURCES

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³<https://nma.org/2018/03/15/freepart-mcmoran-using-cutting-edge-tech-to-monitor-the-mine-environment/> ⁴<https://mining.komatsu.com/technology/controls-and-drives/arc-hybrid-drive>
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