Seven key principles to make mines safer and more efficient
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In the early part of the 20th century the mining industry in the USA would typically suffer more than 1,000 fatalities a year.

In the 1990s that figure reduced to less than 100 deaths per year and in recent years the annual total has fallen further.

Technology and increased regulation have led to improvements in mine safety and helped make mining a less dangerous profession.

In 2017 according to the US Department of Labor there were 15 fatalities in coal mines and 13 in metal/non-metal operations.

This year Mining Technology has been trying to help play a part in reducing this number yet further by launching a dedicated Mining Safety section on the site sponsored by Carroll Technologies Group (a supplier of mining safety equipment and solutions to mines in north America).

Here are seven ways mine operators can make their facilities safer (and more efficient).
Invest in wireless underground communications

Swap your hard-wired pagers for a mobile leaky-feeder communications system. This is a handheld radio which every worker who has one to communicate with colleagues underground and also allows miners (and equipment) to be quickly located. Effective communications and tracking technology is essential in case of an accident underground.

A leaky feeder system provides effective and secure communication for underground and above ground operations, incorporating a cable that is stretched throughout the mine, and acts as an antenna for a number of devices to receive a signal. As Carroll Engineering president Allen Haywood explained: “If you have line of sight with that antenna, or are in reasonable distance, you can talk to that cable rather than talking to another radio”.

Key principle
Leaky feeder technology is one of the most secure and reliable ways to ensure effective communication underground and enables mine operators to track both equipment and people.
2 Automation can improve safety underground

Carroll Technologies Group CEO Tom Bannister said:

“If you take human error out of it you can have a lot safer working environment, in most cases. I do [see automation becoming more prominent] and there are a lot of devices in mining that are that way. We’re doing a lot of things with remote, wireless remote controls now, so the individual doesn’t have to be on that piece of machinery to run it – he stays out of harm’s way and doesn’t have to get under unsupported top, or stay out of hazardous areas and check equipment remotely.”

Key principle
Automation can be a key way to reduce accidents in mines by keeping workers out of harm’s way and reducing the chance of human error.

Tom Bannister
Carroll Technologies Group CEO

“Carroll Technologies Group’s motto is having the right products at the right time – contact us now for a no-obligation consultation on how we can help automate your mine processes.”

www.carrolltechnologiesgroup.com
Use data to improve mine safety

Atmospheric monitoring information collected through leaky-feeder devices can be used to provide mine managers with vital safety data.

Carroll Engineering president Allen Haywood said:

“One of the things they use that data for, that they want to look at and serve operations, is air flow.

“It’s critical for these operations to have proper ventilation to keep air flowing throughout the mines underground, and they can measure, on this system, the amount of air flow in particular areas.

“And that’s recorded, in case they want to go back and look and see what that air flow is, they can go back and look at the history of that.”

Key principle
Invest in products and technology so that you can harness data to make your mine safer and more efficient. Carroll’s experts will be happy to visit your mine to explain more.

MSA 5X Gas Detector
The MSA 5x gas detector is a particularly powerful piece of air monitoring equipment, able to measure carbon dioxide, hydrogen sulphide and nitrous dioxide in a single device.

www.carrolltechnologiesgroup.com
New technology comes with its own risks

Mike Parker of Anglo American said:

“Technological advancements and innovation, among other things, have made mines safer. However, with them come new hazards and risks. These include a potential material risk related to governance of electronic control logic and cognitive fatigue.

“For example, consider programmable logic controllers, a relatively simple technology used to control everything from haul trucks and conveyors to processing plants and winding house drive motors. One erroneous dual in-line package switch setting or an undocumented or flawed logic change could be catastrophic.

“Also, given how highly-automated operations now are, cognitive overload and the fatigue of control room operators is another potential emerging concern.”

Key principle

When investing in new technology and processes – make sure you make every effort to mitigate new risks which may arise.
Kit miners out with self-contained rescuers

Self-contained rescuers are a portable device which provides a supply of breathable oxygen to miners should they become trapped underground, or should poisonous gases leak into mineshafts.

The standard SCSR features an oxygen scrubber, which can chemically remove impurities from the atmosphere to provide a miner with breathable oxygen.

Suppliers like Carroll Technologies can also provide an oxygen-producing unit for more specialised operations. This device is rarer in metal/non-metal mines, but is becoming increasingly widespread. It consists of a small tank filled with oxygen to which a miner has immediate access.

Many of the most significant mining accidents occur due to a lack of oxygen or the presence of poisonous gases.

Key principle
Atmospheric issues are one of the key dangers for workers underground – self rescuers are a vital piece of survival equipment miners can carry.
Consider switching from wire to synthetic rope

According to Donna Poll of Samson Rope:

“When wire rope breaks there’s a danger of damaging the surrounding area and people. Synthetic rope has much more predictable recoil properties.”

“The cost advantages realised with increased efficiency and the safety factor cannot be discounted. You can’t put a price on safety.”

She said that because synthetic rope is much lighter than wire there is also less likelihood of strain and sprain injuries when handling it.

President of Carroll Technologies Group, Allen Haywood, said: “We are excited to be working with Samson Rope. It is a unique safety product that fits in well with our focus on safety and enhances our offering.”

www.carrolltechnologiesgroup.com

Key principle

In many cases synthetic rope is a safer alternative to wire.
Put systems in place to avoid collisions underground

Collisions involving heavy vehicles are one of the major causes of injuries underground.

One way to reduce the risks is to install proximity detection devices which sound an alarm when a large piece of equipment is getting close to another one.

Carroll Engineering president Allen Heywood explained:

“As an example, the driver of a large rock truck would actually have a screen – what they call a hardened, rugged screen – and tags would be installed on personnel or smaller pieces of equipment if they just want the monitor to see where those are. They don't necessarily need to see the large piece of equipment; the one that has trouble seeing and identifying has the screen in his vehicle, and they can put one of these tags on anything.”

Satellite tracking technology can be used to avoid collisions between vehicles and equipment on the surface of mines.

Key principle
Collisions involving vehicles and people are a major cause of accidents in mines. You can use technology to greatly reduce the likelihood of these happening.