

Collision avoidance systems face change management roadblock

A wider deployment of collision avoidance systems (CAS) is stuttering as operators struggle with implementation issues

By Max Schwerdtfeger

Change management and post-deployment maintenance have arisen as critical areas in underground mines' efforts to improve safety and efficiencies through collision avoidance systems. Success will depend on greater flexibility from original equipment manufacturers (OEMs) and on-site operators.

While there has been considerable development of collision avoidance systems and understanding of how they can make an underground mine safer, there remain numerous challenges in the way of long-term deployment.

Despite enthusiasm for collision avoidance technology at the executive level, demonstrating to on-site management that the technology can make operations safer and more efficient is the biggest hurdle to long term implementation, including post-delivery maintenance.

According to sector experts, stakeholders will need to remain dynamic and flexible as they imple-

ment collision avoidance systems in underground mines.

CHANGE FROM THE TOP DOWN

Collision avoidance systems are designed to prevent or decrease the severity of a vehicle collision in heavy industrial operations, and as mine operators have to meet increasing demand for minerals, their importance in underground operations is growing.

Approximately 30-40% of mining fatalities a year can be attributed to failures in vehicle interaction controls, and half of these include pedestrians and occur in underground mines.

Many collision avoidance systems utilise AI technology and GPS location information to alert the driver of a vehicle to an imminent collision.

The latest tier of collision avoidance systems, Level 9, is designed to have high detection precision, powered by time-of-flight antennas, sensors and other software on each side of a mining vehicle.

Innovations in this space, such as Hexagon's HxGN MineProtect, enable a 360-degree operator awareness of surrounding vehicles and equipment in almost any underground environment and collision avoidance functions based on path prediction.

This is designed to cut the risk posed by blind spots underground, slope instability and other environmental hindrances and prevent operational stoppages by allowing vehicles to continue to move in heavy traffic.

According to William Howard, vice-president of Product Management of Newtrax Technologies, a developer of underground mining technologies, an impediment to deploying collision avoidance systems can be associated with change management at the site level.

Howard said the more successful implementations occur when the on-site teams are heavily involved in the system implementation from the



Operators need to have greater trust in collision avoidance systems

beginning as change management is critical right down to the operator.

"That is the biggest challenge because you are implementing something new they haven't had before and even though it is there to help them," Howard told Mining Magazine.

According to Howard, underground mining companies recognise at the executive management level that they need to move onto the next stage of safety upgrades and task their teams with implementing new initiatives key to reducing accidents, such as collision avoidance technology.

However, implementing such technology has sometimes seen projects scaled back or abandoned due to the necessary time and investment.

But today, this is less of a problem because mining companies are now more determined to complete technological upgrades, Howard commented.

Suppliers need to encourage on-site operators to have greater trust in collision avoidance systems. To do so, they must provide a collision-avoidance system that can be installed on every vehicle regardless of how old the existing infrastructure is.

Executives are eager to deploy collision avoidance systems in underground mines because the technology has worked in specific areas, such as soft rock coal mining.

However, another hurdle is that the same technologies don't automatically translate into other underground mining environments, such as hard rock, where gold, zinc, and copper are extracted.

This disparity occurs because, in underground hard rock mines, the ore bodies are physically different in tunnel size and composition, so specific technologies are needed to suit this environment.

IMPROVING VISION AND INSIGHT

Collision avoidance systems have been implemented in other industries and areas of mining – but the specific challenges of the underground environment have been a hindrance to implementation, and this has increased to on-site reservations.

Florent Garin, product manager at Hexagon, sees the same challenge in

achieving full buy-in from all stakeholders on-site.

Additionally, he said collision avoidance systems in underground mining are still in the early stages of adoption.

Garin said it is challenging to place sensors on machines' bodies, hindering deployment.

This view is shared by Vladimir Sysoev, Global Portfolio Manager 6th Sense at Epiroc, who said the underground mining environment is dynamic with continuously changing conditions.

According to Sysoev, collision avoidance systems need to be regularly updated to meet the rapidly changing environment. Sysoev described this as a continuous process that consists of new development, verification and identification of new areas of improvement.

Underground mining equipment can have a lifetime of several years, which, according to Sysoev, creates hurdles for technological development.

For that reason, Sysoev said Epiroc is exploring new business models that will allow it to continuously develop technology without the need to change machines to the more recent equipment models.

Sysoev said this would involve a subscription service that provides the user with regular updates of software and hardware, which are continuously developed in an agile way.

As demand for minerals increases along with scrutiny of mining operations, companies are looking to work with companies that can provide "comprehensive, easy to use solutions," according to Garin.

For suppliers, this means providing more than just equipment but "one-stop shops" that offer dedicated digitalisation upgrades and aftermarket services.

"They [the miners] are looking for a way to move from point solutions, so they want to have a one-stop-shop that can deliver comprehensive and easy to use solutions," Garin said.

According to Garin, the need to involve operators on-site is especially evident at smaller, more remote mining sites, where successfully implementing a collision-avoidance system depends on who is on-site.

This need for flexibility from suppliers could lead to a further flurry

of acquisitions as companies build their technology portfolios, a trend that Garin said is already well underway.

Garin said while mining companies of all sizes can make the most of collision avoidance systems, the real test is maintaining it after implementation.

Deploying the technology is not a problem, but miners need to be mindful that the technology needs maintenance to be implemented successfully, Garin explained.

MAINTAINING INNOVATION UNDERGROUND

Overcoming the uncertainty at underground mine sites and deploying collision avoidance systems in a complex and unforgiving environment requires substantial suppliers' training.

According to Howard, in the past, some underground mine sites have sought to implement collision avoidance systems and switched them off within a year.

To prevent that and help miners utilise collision avoidance technology requires a lot of help from suppliers such as Newtrax, which includes change management.

"In a whole mine, it could take up to six months deployment to get people familiar with a CAS system, but then they have the keys and need to maintain it, that is probably the biggest challenge.

"You go back after 12 months, and because the system is peer-to-peer, if there is one lapse with one machine, the whole system breaks down."

Howard said Newtrax has learned lessons from previous deployments and is defining use cases of collision avoidance system projects which helps build a training set of data that can improve deployment in the future.

He added that Newtrax is receiving requests from customers for more sophistication, specifically about how a machine should act near a person or a vehicle.

He predicted that the next advancement in the technology would be the vehicle detecting people and stopping, whereas if it were another vehicle, it would slow down to pass by.

"Those interactions between people and vehicles will be the next step and the integration between the technology and machines." ♥

"Better interactions between people and vehicles will be the next step"
