



Radar Gives Mining Loader Operators Just the Right Amount of Warning



PreView® Radar improves underground safety and reduces collisions – without overwhelming operators with false positives.

Summary

Sterling Ventures, LLC runs a 1,000-acre underground limestone mine in Verona, Kentucky. In this dusty, sometimes cramped, 3-level environment, 16-ton L220 loaders must carefully navigate around obstacles to get the limestone into haul trucks. If an operator backs into one of the 50-foot-wide ribs that support the mining area, damage to the vehicle's counterweights can cost as much as \$30,000 to repair or replace.



Sterling mounted PRECO's PreView® Radar on the back of one such loader, and that machine hasn't been involved in a single accident since. With its pilot test successful, Sterling is ready to install the PreView systems on the rest of its L220 loaders.

Sterling Ventures, LLC operates one of the largest underground limestone mines in Kentucky. The mine, which opened in 1998, produces a wide range of limestone products used in everything from road and building construction to lime production.

The company's underground mining chambers are huge, with ceilings (or "backs" as they are known) looming from 30 to 80 feet above. Interspersed every 50 feet throughout the mine are 50-foot square "ribs," limestone the miners have left in place to support the thick layers of limestone between the three levels that constitute the mine.

With the constant rumbling of 16-ton L220 loaders, 40-ton haul trucks, and an assortment of smaller vehicles—along with an enormous rock-crushing machine located in the mine itself—this can be a very noisy, dirty place.

A Large Space, With Lots of Opportunity for Expensive Accidents



"Each level of the mine is a big space, but these L220 loaders are big, too—and they need to navigate some tight spaces around the haul trucks to dump their loads," says Steve Evans, Sterling Ventures' Vice President of Human Resources and Operations Manager. "Add to that pedestrian traffic and small pickup trucks coming up behind the loaders, and the loader operators have a lot of things to think about."

Evans explains that most modern mining equipment comes equipped with backup cameras. The problem he says, is that in an underground mine you can have low light conditions and dust that builds up on camera lenses to obscure operator vision. His goal was to find a solution that would overcome these obstacles and improve operator awareness of obstacles.

According to Evans: "If the loader operator inadvertently swings the backend into a rib, the counterweights can be knocked off the rear of a loader, at a cost of \$30,000 to replace them. If I can prevent an operator from knocking those off of one loader, it more than justifies the cost of the object detection system."

Standing Up to the Environment

When Evans began looking for a supplement to the vision systems, he discovered that most non-visual systems can't function in Sterling Ventures Minedustier environments. He says the company uses water trucks to keep the dust down, but he still wanted something that could work even when it was covered with dust.

"When I contacted PRECO, I began to understand the capabilities of an active safety system, I thought, 'Okay, maybe this thing can handle my environmental concerns,'" Evans recalls. "Then, when PRECO said they'd give me a 30-day free trial—and helped my team set up the radar to fit my exact needs, I said, 'Let's go!'"



Tuning a System Takes Teamwork



One major piece of input about the PreView system came from the operators themselves. Evans and the operators were concerned that the radar would constantly be triggered by all the objects that surrounded the loader. But for Evans, the moment of greatest concern is when the loaders are “mucking out a heading.”

After explosive charges have blasted rock away from the wall, the loader operator has to move back and forth to load its bucket with rock and then turn the

loader to dump the rock into the haul trucks. Most of the damage to the equipment takes place during this process.

Evans and his team installed the sensor on a loader and began testing the sensitivity of the radar. After much experimentation, the team adjusted the system so that the in-cab audible and visual alerts start going off at a low level when the loader is within 18 feet of an object. At 12 feet, the alerts get louder. At three feet, the alert reaches at its maximum setting.

“We lowered the sound of the in-cab alerts, but we will still want the operator to be aware of them,” Evans says. “We want the sound to remind the operator, ‘Okay, I’m moving toward the wall, I’m moving toward the wall,’ until it finally gets to the point where they think, ‘Okay, I’m right up on the wall.’ We want the warning sound—and the warning lights—to be there in the cab when the operators are driving up and down the rib loading the truck because it makes them remember, ‘Be careful. Don’t hit the wall. Don’t damage those counterweights!’”



Creating an Integrated Safety System

Evans says that, like all mines, the company has procedures in place to prevent accidents. Personnel are supposed to radio an operator if they’re approaching a loader by foot or by car, and personnel on foot have helmet headlights they can flash at the operator to let them know they are in the area.

“You can do things to make operators aware of your presence, but human error always comes in,” Evans says. “So that’s the other purpose of the radar system—to make the operator more situationally aware. It gives him another resource to help him be aware that something -or someone- is in the area, or that he’s at risk of either damaging equipment or hurting somebody.”

Taking the Next Step Toward Greater Safety



Evans says that since the PRECO system has been in operation, the loader has not been involved in a single collision of any type. Nor has it had any close encounters with employees or small vehicles. The next logical step, he says, is to install the system on the rest of the loaders.

“Overall, we were impressed with PRECO,” Evans says. “They offered the 30-day free trial. They worked closely with us to make the radar adjustments. And their device worked just the way they said it would, even in our loud, dusty, cramped environment. I wasn’t convinced we’d find a radar system that would help our operators drive more safely—without overwhelming them with constant warnings—but we did!”

Summary of Benefits:

- Reduce costs related to equipment damage by mitigating collisions with objects.
- Active collision avoidance improves operator’s awareness of obstacles, equipment and people.
- PRECO’s PreView systems provides consistent detection, regardless of the harsh environment.