

WHEN IT COMES DOWN TO THE WIRE

NEW UNDERGROUND DRILLING TECHNOLOGY IS LIFTING SAFETY AND CORING.

Drilling for the mining sector presents a number of unique challenges not typically faced in other industries.

These challenges are multiplied when it goes underground. When it comes to underground coring it is no different.

The average surface hole is anywhere between minus 60 degrees to minus 90 degrees in angle.

In this range of dip, gravity typically pulls the inner tube – the assembly that collects core – to the bottom of the hole and prevents inner tubes from accidentally coming out, except when drilling into pressurised aquifers.

For underground coring holes, the angle is typically between minus 20 to plus 90 degrees which means drillers need to get inner tubes to the bottom of the hole and it allows for the possibility of an uncontrolled ejection and injury due to gravity – an issue not faced in surface mining.

When wireline coring was first intro-

duced – in 1958 – flat and up-holes were not addressed and were cored conventionally by tripping rods to retrieve core. By the 1970s wireline systems that were pumped was introduced however they did not indicate when the inner tubes were in place i.e. latch indication, and were prone to uncontrolled releases.

While Boart Longyear released the Quick Pump-in Link Latch underground coring system in 2003 to provide latch indication, there were still a few steps to go to increase productivity and safety.

To lift safety during up-hole coring, it has now released its Quick Pump-In Roller Latch system with the first hold-back brake used in any wireline coring system.

If the inner tube moves due to gravity in an up-hole, the spring-driven retracting case deploys brake rollers.

This braking action prevents movement of the inner tube under loads as high as 89 kilonewtons, limited only by the strength of the drill rod's material.

“Only when the wireline is under tension will the brake rollers retract, allowing for a controlled recovery,” Boart Longyear said.

“In the event of a blow-back or free-fall situation, the rollers automatically engage and immediately stop the head assembly, protecting drillers from a hazardous falling inner tube. The brake has the added benefit of providing a virtual ‘extra set of hands’, holding in place once inserted into the rods, allowing operators to manage loading chambers and water swivels.”

While other underground coring systems use spring loaded latches to lock into place at the bottom of the hole that rub along the inside of the rods as the tool descends, the new system uses brake and latch rollers which create less friction due to their rolling action.

“Reduced friction contributes to the significantly reduced inner tube tripping times, as much as 30 per cent faster than the previous Quick Pump-in Link Latch system,” Boart said.

In addition to its primary latch indication function, the system also has a fluid seal on pump-in and a fluid bypass during retrieval, increasing the overall speed of the operation.

It also has an optional up-hole bushing that blocks water from passing through the head during retrieval, eliminating the usual delays faced as fluids drain from the rods.



THE BRAKE ROLLERS ALLOW FOR A CONTROLLED RECOVERY

Water control can further be improved through a fluid retention spring and bushing the overshoot.

During inner tube retrieval the wireline cable may stick, in which case the stock overshoot needs to be retrieved and redeployed; with the fluid retention spring installed it forces the ball back into the bushing, allowing fluid pressure to be maintained until the overshoot has landed.

The new system also prevents stuck tubes.

In traditional pivoting latch systems, axial clearance and axial movement is required during wireline retraction.

This technology employs rollers that directly retract or deploy without needed axial clearance or movement of the inner tube.

“This prevents the inner tube from jamming when it is over-filled,” Boart

Longyear said, “also, conventional latch mechanisms can be difficult to retract against a jammed ‘core block’, where the rollers will simply drop back in upon wireline retraction, eliminating this source of lost productivity.”

Operator safety has also been in focus.

The significantly lighter V-Wall rods are reportedly 30 per cent lighter, and create less driller fatigue during operation and rod handling.

The design of the v-lip seal elastically adjusts to the interior of the drill rod, quickly changing its size and shape to accommodate the changes in mid-body diameters. **AM**

