Lifting dog tired? Pointy issue resolved with new Overshot

Since Boart Longyear introduced the Q™ Wireline system in 1966, retrieving the inner tube from the core barrel has been handled the same way: an overshot with lifting dogs (spring loaded hooked “fingers”) is lowered or pumped into the hole until it snaps over a pivoting spearhead mechanism affixed to the inner tube assembly. Once the head assembly has been removed from the hole, the driller uses the pivoting spearhead to position the head assembly on their workspace and squeezes the back of the lifting dogs to release.

In all this time, this system (seen in photo on the right) has had the same basic issues:

Spearhead Handling: in up-hole applications underground, a driller is required to manually push the head assembly into the hole by the spearhead. Since it has a pointed end and pivots by design, it can be difficult to handle this operation comfortably.

Inner Tube Handling: When hoisting the inner tube assembly, elastic action of the wireline cable or accidental impact during handling can un-load cable tension and overcome spring loads which allows the hooked lifting dogs to accidentally release the spearhead. The surface ‘Ezy-Lock™’ overshot includes a twist-sleeve that locks onto the spearhead

even without cable tension, whereas competing overshots require cable tension to maintain a lock.

Lifting Dog and Spearhead Wear: To balance strength and wear resistance, lifting dogs and spear points are heat treated to a medium hardness. However, it's difficult to visually evaluate or functionally test the degree of wear, especially in underground applications.

Safety First

Boart Longyear currently provides a secondary safety pin that clips through the overshot, passing just under the spearhead tip. This adds an extra layer of protection in case the lifting dogs are excessively worn or deformed. However, spearheads are loaded cyclically and often loaded 'off-pivot', which deforms the components over time, to the point of disassembly. While the more recent MKII™ version of the spearhead assembly is much more robust, in the case of spearhead failure, the head assembly will release from the overshot regardless of lifting dog or safety pin use or condition.

Enter: Boart Longyear's new Roller Latch™ Overshot

This patent-pending overshot leverages our previous experience with Roller Latch™ head assemblies to create a more reliable and longer lasting system that eliminates spearheads and lifting dogs entirely. The spearhead assembly is replaced by a one-piece socket receptacle (spearhead adapter) that accepts the overshot itself, which has rollers that latch into an internal groove in the spearhead adapter.

Swapping the pointed, jointed spearhead for a simple cylindrical socket makes for much easier handling of head assemblies in up-holes. Surface Quick Descent™ Roller Latch head assemblies don't even

require the spearhead adapter since the internal groove geometry was pre-built into their design.

The increased toughness and hardness of the bearing quality latch rollers have a proven history of outlasting traditional pivoting latches for wear life. The new overshot will also feature the same Nitreg™-ONC surface treatment as Roller Latch head assemblies that drastically improves corrosion resistance (Nitreg is a trademark of Nitrex Inc.).

Safety pin integration in the new underground Quick Pump-In™ overshot now pulls double duty of both locking the overshot from accidentally releasing while hoisting, as well as holding the head assembly and overshot together in case of component failure due to excessive wear. Also, the socket and rollers are not affected by side loading and 'off-pivot' loading during tube handling outside the hole, eliminating gradual deformation or disassembly. The new surface overshot will also include a one-hand twist-lock sleeve to maintain a locked position while hoisting outside the hole, even with a loss of wireline cable tension.

It's also easy to use. Instead of pushing the backs of the lifting dogs together, the driller pushes the two halves of the assembly together, retracting the rollers and releasing the head assembly. This operation takes about the same amount of force as the current overshot, so drillers won't miss a beat.

Additional benefits have been included[CA1] apart from the elimination of the spearhead and lifting dogs. While the current design uses a solid pivot pin that is peened into place (making it difficult to re-build), the Roller Latch Overshot has no pins whatsoever. Everything is held in place by simple threaded connections for easy maintenance.

The Quick Pump-In™ (Q/P, underground) assembly further addresses two issues specific to pump-in applications

First, in the event of a stuck tube, the driller needs to disengage and retrieve wireline cable in order to pull rods. Today, that is done by overloading and breaking a shear pin placed just underneath the cable swivel. In theory this pin breaks at under half the wireline cable's max load capacity, but in practice its strength is highly variable because shear pins are inherently weak and ductile. Many operators remove the shear pin, which removes release capability and may result in excessive wireline cable replacement.

The Roller Latch Overshot features a brand new pump-in cable release system, originally conceptualized and prototyped by one of our expert underground drillers in Canada. A slotted sleeve and pumping seal assembly is placed over the wireline and pumped up to the overshot. The sleeve engages a quick-release mechanism and releases the wireline. This system has proven to be much more reliable, and may be the feature drillers are most thrilled to have going forward. Reports of fewer broken wirelines have been received from several sites testing the pump-in cable release system.

Second, while Q/P Roller Latch head assemblies with built-in brake features have had great success in stopping runaway tubes and creating a safer drilling environment underground, they are perhaps “too” successful. Currently, when retrieving the head assembly from an inclined hole, pressure has to be applied to disengage the brake. Getting this pressure

and procedure exactly right can be difficult, especially with hydrostatic pressure at depth.

To combat this and make Q/P Roller Latch easier to use while maintaining its safety features, a ‘brake release spring’ was created. This spring assembles quickly inside of the spearhead adapter on the head assembly. While tripping on its own, the head assembly brake works normally, but when the overshot latches into it this spring is compressed, disengaging the brake. This feature has also been received very positively by drillers in the field.

A surface-style overshot is also in development in B/N/H sizes. In addition to many of the features outlined in this article, the aim is to add more innovations, including:

- An improved lock sleeve to disable accidental head assembly release and stop drillers from accidentally sending the overshot down the hole while locked.

- A built-in 360° pivot and shorter overall length for increased ease of handling.

Excitement is high as testing continues. Drillers are noting the various positive developments: it’s easier to use, saves on wireline, and makes working with Q/P Roller Latch head assemblies much easier in difficult conditions. We’re looking forward to further field success as testing begins on the surface design.