

# Anglo American Coal Mine

Goedehoop Colliery, South Africa (2018)

## PRODUCTS USED:

**Krytonite™ Swelling Waterstop** **Krystol® Leak Repair System**  
**Krystol Bari-Cote™**

### OWNER:

Anglo American

### ENGINEER:

Semane Engineering Solutions (Pty.) Ltd.

### ACCESS SPECIALIST:

SkyJacks

### DISTRIBUTOR:

Sanika Waterproofing Specialists

## BACKGROUND

As the backbone of South Africa's economy, the mining industry has had a long history of activity in the region. And part of this industry activity includes the work of Anglo American, which has been a key catalyst for improving South Africa since 1917. As a result, the region has been safer, stronger, healthier, and more sustainable.

To first get those results, however, Anglo American needed properly functioning mines. That meant fitting them with the right ventilation system to get air to flow to the working areas of the mines. The primary part of this system included an intake (also known as a downcast shaft). It would allow fresh air to get to where it needed to be in the mines. The air would then pass through an exhaust (also known as an upcast shaft) after having been ventilated.

It is a crucial system that would directly impact the mine's safety and operational capacity if it were ever interrupted. Unfortunately, that situation was looking likely for Anglo American's Goedehoop Colliery.

Built in the 1980s, the mine was initially fully operational, with an approximately 60-meter-deep (197-foot-deep) concrete Block 7 mine ventilation downcast shaft. Over time, however, that downcast shaft had experienced a growing ingress of water. Years later, this issue became increasingly obvious through the shaft's joint interface. It was a warning sign that the downcast shaft's existing concrete liner would potentially soon experience flooding and deterioration.

By 2017, it was no longer a warning sign. The buildup of underground water broke through the downcast shaft, letting in an excessive amount of water into the mine. The situation was so dire that the ingress of water into the shaft had increased to the rate of around 7,000 L per minute. And its pressure was just as significant, creating torrents of water that were around 300 mm (11.81 in) in width.

To run the mine on a normal schedule during this predicament, the excessive leaking had to be pumped out daily. But the mine needed a permanent solution soon. Otherwise, there was a very real possibility that the area would need to be closed down.



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To get that permanent solution, the engineering company for the mine, Semane Engineering Solutions (Pty.) Ltd., contacted Sanika Waterproofing Specialists, the exclusive distributor for Kryton products in South Africa, as they had success working with them before.

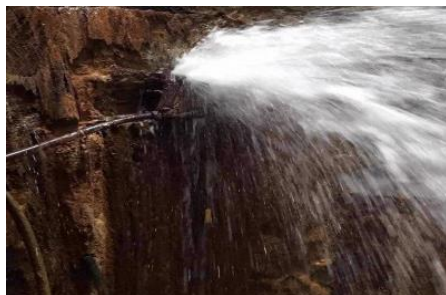
## SOLUTION

Hired to repair the mine, Sanika Waterproofing Specialists determined that they would be able to effectively repair and waterproof the mine using Kryton's crystalline Krystol® technology. It was a promising evaluation as this technology has had a successful track record for similar projects for over 40 years.

However, that technology first needed to reach the area in need of treatment. To do that, Sanika Waterproofing Specialists needed access to the seven-meter-deep (23-foot-deep) shaft. Such access wouldn't be easy as the mine itself was under about 20 m (65.62 ft) of water. But after enough talks and on-site tests, SkyJacks, the mine's chosen access specialist, developed a safe form of access. It would use a cradle system that would need to be stabilized against the sides of the shaft. This stabilization would then limit the amount of movement the workers would feel once the cradle system slowly lowered them into place.

Before that could happen though, the team knew it was critical that they inspect and prepare the site. As a result, they equipped a borehole with a camera and placed it in the water ingress to see what the damage looked like from the positive side. With the help of GPRS equipment, this inspection revealed that the safety and integrity of the structure was still intact. Keeping that information in mind, the team decided that Kryton's Krytonite Swelling Waterstop, Krystol Leak Repair System, and Krystol Bari-Cote were the best solutions to repair leaks of this size.

To start the repair process, the team first prepared the site for the application of these solutions. They cleaned out damaged sections of concrete and prepared them with dustless sandblasting and an ultra-high-pressure cleaning system. From there, they used chisels and concrete cutting machines to create chases along the entire length of each water ingress point, construction joint, and crack.



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Once the site had been adequately repaired, the team used the Krystol Plug™ from Kryton's leak repair system and the Krytonite Swelling Waterstop to stop the flow of water. They went on to fill the cold joints with the leak repair system's Krystol Repair Grout™.

Then, they coated the entire concrete structure with Krystol Bari-Cote and the leak repair system's Krystol T1®. Both of which would permanently prevent any further water ingress by transforming the concrete itself into a waterproof barrier using Krystol technology. They do that by enabling the concrete to chemically react to water and unhydrated cement particles. That reaction forms insoluble interlocking crystals to block pathways for water and waterborne contaminants and even gives the concrete an ability to self-seal. So whenever water is reintroduced into the atmosphere, the concrete will then initiate that chemical reaction to ensure permanent waterproofing protection for the life of the treated structure.

Using this Krystol technology helped restore the mine to a safe, dry, and impermeable state, allowing the mine to return to its original operational schedule. This result was such a success that in the end, it helped Sanika Waterproofing Specialists win the Award of Excellence from the International Concrete Repair Institute for their work.

