Dewatering system eradicates drift conveyor spillage

The assembled Newstan dewatering system before delivery.

Continual downtime and production losses at a longwall mine have been dramatically reduced by installing a new "run of mine" product dewatering system that removes excess water from the coal on its conveyor belts.

Water being delivered into the mine's underground bin would subsequently cause wet coal to spill from the main drift conveyor.

These major drift belt spillages are now a thing of the past. In turn, potential for secondary damage to the drift belt has been reduced.

Supplying 3.5Mtpa to domestic and export markets, Newstan Colliery near Toronto in NSW is one of several underground longwall mines owned by Centennial Coal.

Newstan's engineering manager, Trevor Hartley, recognised the need to solve the excess water problem.

"High water influxes are regular events at Newstan's longwall face," Hartley said.

"We are mining downdip with water migrating from the goaf."

"Depending on longwall face gradients, water accumulates from time to time in low points along the face. This water is difficult to remove by normal pumping methods."

"On start up the water is then transported along the AFC with the coal and ends up in our underground bin," Hartley said.

The bin provides surge capacity of 600 t and is 30 m deep with an 8 m diameter, according to Hartley. Vibrating feeders under the bin deposit coal directly onto the 1:3.5 inclined main drift conveyor.

The San Juan dewatering system assembled prior to shipment to the USA.

"Water gravitates to the bottom of the bin to form a slurry. This can cause a surge of wet coal onto the drift belt which the feeders just cannot control," Hartley said.

Not only did this inundate the area under the bin with coal slurry but it would regularly cause material slippage on the drift belt resulting in large tonnage spills, lengthy production stoppages and an on-going clean-up regime.

"Dewatering systems made by Brain Industries in Sydney have become known as proven performers within our industry," Hartley said, " So I contacted their principal, Keith Hobbs."

Hobbs visited the mine with his design personnel to assess the availability of suitable existing conveyor transfer stations where a dewatering system could be installed.

"Unfortunately none of the existing transfers proved to be suitable," Hobbs said, "but we informed Trevor Hartley that a tripper could be introduced into a conveyor to accommodate our system."

This had immediate appeal and the 3.5 kilometre long South West trunk conveyor (SW1) that feeds the underground bin was targeted.

The Newstan dewatering system chute and loading station.

This conveyor is a three degree downhill regenerative conveyor of 3000 tonnes per hour capacity. If a tripper had to be introduced to accommodate the dewatering system, then a braking pulley could be installed to stop the conveyor more efficiently and control another periodic problem — spillage caused by overfilling the bin.

If the bin is full and the SW1 trunk conveyor does not stop in a timely manner, the resulting overflow can bury the head end of the conveyor. Relocating the brake unit from the conveyor drive head to the tripper also has the advantage of reducing the effects of braking forces within the whole conveyor.

A cut-through was identified towards the tail end of the SW1 with sufficient space and roof height to install the system.

Hobb's team formulated a design that incorporated tripper, head pulley, braking pulley and snubbing pulleys, dewatering system, armoured soft landing chute, loading station, side walls, access ladders and platforms, all at an acceptable price.

The pulleys had to be interchangeable with those already in use within the pit and the loading station had to utilise existing idler rollers.

The tripper and loading station was designed specifically so that it could be placed into position below the existing roof mounted belt whilst still in operation. The head pulley was then pulled up into position and the belt cut and re-routed through the tripper. The final underground installation was completed in one weekend.

"It was a big job but we managed it, it works extremely well," Hartley said.

There was a lot of behind the scenes input at Brain Industries.

"We assembled the whole structure in our yard once it was fabricated, with a bolt in every hole," Hobbs said.

"That is the only way you can be entirely confident that it will go together perfectly on site."

That was a very important factor in a similar unit that Brain has just delivered to BHP Billiton's San Juan Coal Mine in New Mexico, USA.

Mine executives visiting Australia from San Juan Coal asked Brain to design and supply a dewatering system for them after seeing one operating at BHP Billiton's Crinum Mine in central Queensland.

"We designed the unit to retrofit to an existing transfer station on a trunk belt," Hobbs said.

"It was all done to CAD drawings e-mailed to us from the US," Hobbs said, "and once again it was fully assembled in our yard prior to being containerised for sea freight to Los Angles."

Both units were installed with minimum disruption and downtime. Newstan's unit continues to operate efficiently as it approaches its first year of service. San Juan's unit is operating well after six months of continuous duty.

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