

Breakthrough Dewatering Solution

FLYGT BIBO ALPHA SUPPORTS NEW BOLIDEN'S PLANS FOR WORLD'S FIRST AUTONOMOUS MINE

Ever since the first gold discovery in the mineral rich lands of northern Sweden more than 100 years ago, world-class metals company, New Boliden, has been exploring, extracting and processing base and precious metals at mining locations across the world. The company has established an impressive global footprint, with operations in Finland, Ireland and Sweden generating annual revenues 6.7 billion USD. The Boliden Tara mine in Ireland is Europe's largest zinc mine, while the Finnish mine, Boliden Kevitsa, operates in one of Finland's biggest mineral deposit areas. New Boliden also manage Boliden Kylylahti, one of the most geologically interesting mines currently in operation.

In Sweden, the company has operations at the Boliden Garpenberg underground zinc mine and the Boliden Aitik open-pit copper mine, as well as the successful mining network of the Boliden Area. Home to the Renström, Kristineberg and Kankberg underground mines, the Boliden Area processed around 1,898 ktonnes of ore across the network in 2020, forming metal concentrates containing zinc, copper, lead, gold, silver and tellurium.

With such expansive production sites at locations around the world, New Boliden recently began the process of introducing automation into its mines. A leader in the industry, New Boliden first began experimenting with digital solutions in 2012, and was the first to employ a combination of wireless networks, IP telephony and positioning at its Kristineberg location. The introduction of automated technical solutions across its network is one of New Boliden's most prioritized areas of work in terms of research and development, and the end goal is to further improve health and safety, energy efficiency and overall mine productivity.

Challenge

In any mining application, dewatering is one of the vital processes that ensures resources can be mined efficiently and effectively. If an underground mine holds excess water or floods, production is halted, and revenue lines are



Photo from Boliden

immediately impacted. Furthermore, as mines expand to reach supplies with each new excavation shift, removing production water and excess groundwater becomes critical to the effective extraction of minerals. As a result, smart dewatering solutions have become an important part of New Boliden's mining inventory. New Boliden's Renstrom mine in the Boliden Area is one of Europe's deepest mines, producing more than 440 ktonnes of gold, silver, copper, zinc and lead in 2018. Over the years, the abrasive process of turning rock into valuable commodities has exposed the mine's dewatering equipment to significant wear, impacting operations. Working to improve overall mine productivity through advanced automated solutions, New Boliden partnered with global water technology company, Xylem, to test solutions that would complement its wider automation programme and improve efficiencies at Renstrom.

New Boliden's Renström mine in the Boliden Area is one of Europe's deepest mines, producing more than 440 ktonnes of gold, silver, copper, zinc and lead in 2018.

Solution

As a next generation drainage pump, Xylem's new Flygt Bibo Alpha is more robust and reliable than any other dewatering pump currently on the market, sharing the same platform of integrated power electronics as Xylem's renowned Flygt Concertor. Compact and light-weight, Flygt Bibo Alpha breaks the mould of traditional dewatering pumps with its robust design, built with 30% fewer components for a more stable operation, and reduced need for inventory.

With built in intelligence Bibo Alpha will cover a range of traditional drainage pumps since it adapts speed and performance covering a field instead of a static curve. The pump's fully embedded Variable Frequency Drive (VFD) automatically controls the motor's speed and rotation, without any hands-on intervention or configuration by the operator.

Snoring is also a common problem in typical dewatering practices, causing significant system wear over time as the pump continues to operate at full-speed without enough water inflow. Flygt Bibo Alpha's advanced technology optimizes pumping and overall performance, and by only pumping when needed, it eliminates snoring to significantly extend the lifetime of the pump and reduce service time and maintenance costs.

As Xylem's Flygt Bibo Alpha is the first submersible dewatering pump which can adjust itself to the water inflow, its optimum performance is determined in direct response to its operating environment. The pump comes equipped with two-running modes, Adaptive and Level, which can be interchanged depending on the application.

Adaptive mode is typically used when there is a requirement to maintain a constant low water level in the sump. In this mode, the pump will never stop running, though it will regulate its speed after inflow. If snoring is detected, the pump will slow down to reduce wear. When water starts to enter the sump, the pump will speed up, and it will continue to increase its speed until the water level is low again. By letting the pump run continuously, there is no need for any additional sensor - the incoming water triggers the pump to start, so it will always be ready to respond to changeable conditions in the field.

Level control allows operators to pump between two pre-set levels, a start level that is controlled with a built-in

pressure sensor to detect water levels, and a stop level that is triggered when the pump detects snoring. As the pump only operates when water is present, it optimizes efficiency and reduces energy consumption and wear. The pump also comes equipped with a control device with an active alarm, so that operators can choose between the two running modes and receive real-time alerts if something goes wrong.

The 'plug and play' capability of Flygt Bibo Alpha has allowed the pumps to slot easily into the existing operation at Renström, without the need for reconfiguration or adjustment by operators. As the pump constantly adapts to its environment, each 8 kilowatt (kW) pump can cover an equivalent range of between 2kW and 10kW - enabling greater flexibility and allowing standardization to fewer pump models.

This flexibility is paramount to a mine like Renström, which is constantly adapting and evolving its operations to meet operational requirements. Previously, operators at Renström would have to change to a different pump model every other shift due to the variable duty points across the different pumping stages as the mine expanded.

Result

The Flygt Bibo Alpha prototypes have revolutionized the way dewatering processes are carried out at the mine. Due to the adaptive capabilities of the pump, operational wear at the mine has been reduced by 80%, leading to less pump downtime and disruptions to production. In addition, maintenance costs as a result of service call-outs have been reduced, with the mine experiencing periods of trouble-free pumping up to four times longer when compared to traditional pumps, representing a cost saving of 20% per year. Fleet management at the mine



has also been simplified, as the Flygt Bibo Alpha can handle a wide range of applications, limiting the need for pumps of different sizes and parts on site.

Commenting on the field test, Bodil Wiklund, Senior Global Product Manager, Submersible Dewatering Products at Xylem said, "We are excited to be partnering with New Boliden to develop new dewatering solutions, such as the new Flygt Bibo Alpha, for one of Europe's deepest mines. Throughout the product development phase, we knew this pump had the potential to revolutionize dewatering practices in the mining industry, and the results of the field test at Renström have increased our confidence in this game changing technology. We look forward to building on our partnership with New Boliden by offering new solutions that can help them shape the world's first autonomous mine, while also strengthening our position

After three years of field testing at Renström, Xylem's Flygt Bibo Alpha has produced product and repair savings of up to 40% due to its integrated intelligence, and New Boliden has reduced the cost of its dewatering processes by almost 30%.

as a global leader in intelligent dewatering practices." The field test at Renström has been so successful that New Boliden has placed a sizable order for more Flygt Bibo Alpha pumps, to advance its goal of developing the world's first fully autonomous mine. Having been awarded an exclusive service contract, Xylem's team of experienced engineers will also be responsible for pump maintenance at the Renström mine over the next three years.



Photo from Boliden

Commenting on the partnership, Mats Isaksson, Senior Development Engineer at New Boliden said, "As we began the process of automating our mining operations at Boliden, it became clear that automating the underlying processes that support our day to day activities would be integral to the success of the project. The installation of the first Flygt Bibo Alpha prototypes at Renström brought a significant change to the way we approach traditional dewatering practices due to the pump's ability to utilize intelligence beyond standard solutions. For the first time, we had access to a pumping system that could automatically adapt to its environment, working only to accommodate real-time conditions in the field. This

was a game-changer for us as it optimized pumping performance without the need for hands on intervention, allowing our mining processes to continue without interruption.

"Having worked with New Boliden for more than thirty years, I have watched the mining network evolve into one of the world's busiest mining operations. The move towards becoming fully autonomous is no mean feat, but with trusted partners like Xylem who bring innovative solutions to the table, we are well positioned to reach our goal of becoming fully autonomous."