


System 800xA

Ventilation governed by needs reduced costs by 30% at Boliden



Ola Johansson, Electrical Manager at Boliden Kristineberg where a lot of money has been saved thanks to the new ventilation system.

Ventilation is responsible for a large part of the energy costs in a mine. For this reason, in collaboration with ABB, Boliden has installed an automation system for ventilation that is governed by needs in the mines in Kristineberg and Garpenberg.

“This has reduced the costs for ventilation by at least 30 percent,” says Mats Isaksson, development engineer at Boliden.

In the breaking rooms in a subterranean mine, among other things, air is polluted by diesel vehicles and blasting. Creating the ventilation required to remove the pollutants is a complicated business.

Kristineberg is one of Sweden’s deepest mines operating at a depth of more than 1.100 meters. The ventilation system has a capacity of all of 550,00 m³ per hour and the first generation of systems for ventilation governed by needs was already installed in 1997.

“This was an important piece of the puzzle to even allow mining to continue in Kristineberg. In this way, we could push an expensive investment in a new ventilation shaft into the future,” says Mats Isaksson, development engineer at Boliden.

He also established that prior to the investment it was difficult to get the air to suffice.

Boliden selected 800xA as the new automation platform

However, the ventilation system from 1997 is limited to three positions, off, half speed and full speed. In 2007, Boliden decided to invest in developing the system and chose ABB as its partner. This time, they would substantially increase the precision in governing by needs. ABB’s 800xA automation system was selected as the platform, where all automation would be handled in one and the same control system environment. ABB’s static frequency changer was already being used from earlier.

This has resulted in one of the world’s most modern ventilation plants for subterranean work. The plant ensures that the air flow is automatically adapted to activities in the rock shelter in question. The fans are programmed to only operate in those rooms where an activity is in progress. On vehicles used in the mine, there are transmitters with unique identity numbers. When the transmitter starts, ventilation is increased according to a pre-programmed volume to the vehicles in the breaking room. This volume is calculated in accordance with Boliden’s norms. The fan operates for approx. 14 minutes after the last vehicle has left the room in order to vent residual exhaust gases.

“Full capacity is required in a room with a loader, while fans for breaking rooms without vehicles operate at approximately a quarter speed,” says Fredrik Ekenstedt, project leader for the Technical Staff at Boliden.



A lot of air is needed down in the mine. Large fans press down fresh air a thousand meters using ABB's Automation System 800xA. "It works very well," says Emil Fjellner, electrician at the mine in Kristineberg and person responsible for the ventilation system.



Currently, approximately 30 percent of the fans in Kristineberg are frequency-controlled.

"Our aim is that all fans should be retrofitted to frequency control so that the air flows are even more customized to needs," says Fredrik Ekenstedt.

Energy usage went down

Garpenberg, another Boliden-owned mine, has a similar control system for a part of a new major mineral deposit, Lappberget, which will substantially extend operations in the area. The system, which was taken into service in May 2009, consists of twelve fans in Lappberget between a level of 985 and 1,080 meters. After the installation, current consumption for these fans fell by approximately 500 A or 200 kW, signifying a reduction of around 40 percent.

"This has made it possible to remove the current limitations on all room fans so that these can run at a higher speed pressing in more air when a load is in progress. Consequently, the energy savings even contribute to better air quality," Fredrik Ekenstedt maintains, interjecting that the investment also means that the electricity grid will not have to be expanded, which otherwise would have been inevitable.

At Garpenberg, approximately 50 fans will be connected to the control system in the initial phase. The company estimates that this will be completed during 2010.

"Energy savings will be so extensive that within a period of three years we will have recovered the investment," says Fredrik Ekenstedt.

“In the long term, our goal is that all fans will be retrofitted to frequency control so that the air flows are even more customized to the needs.”



Lars Brännström, ABB's sales supervisor for the projects at Kristineberg and Garpenberg and Fredrik Ekenstedt, project leader for Boliden's Technical Staff, are both pleased with Boliden's savings.



System 800xA is discrete but an effective “brain” in the Kristineberg mine ventilation system.

All photos: Patrick Degerman.

At present we are carrying out a major study of the possibilities of further expanding the mine.

“The new solution for ventilation will play a major role for ventilation in the study,” Mats Isaksson stresses.

Prioritizing operations

Both Mats Isaksson and Fredrik Ekenstedt are very pleased with how collaboration with ABB has worked.

“The problem with this kind of project is that it takes an awfully long time.” The mining environment is very special and the production staff must always prioritize operations,” says Fredrik Ekenstedt

Before the system is taken into service, many hours have been spent on simulations at ABB's laboratory in Umeå.

“These tests have made the installation a great deal easier,” Fredrik Ekenstedt states.

Lars Brännström, ABB's sales supervisor for the projects at Kristineberg and Garpenberg, is also pleased with the collaboration.

“This is an fine example of how customer-based development can work. Boliden is a demanding customer, but we have shown that we can satisfy their requirements,” he says.

Mats Isaksson is convinced that Boliden will install this type of ventilation system in all new subterranean mines that are established.

“The energy savings it provides clearly increase the chances for profitable mining.”

Boliden

- Boliden is a European metal company with operations in two business areas; Mines and smelting plants.
- The main metals are zinc and copper; other important metals produced are lead, gold and silver.
- Boliden is the third largest supplier of copper and zinc metal in Europe.
- The recycling of metals is a different, growing part of operations.
- Boliden has approximately 4,600m employees.

ABB's supply

- A automation System 800xA adapted and simulation-tested for controlling mine ventilation.

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