

For the more adventurous among us, K2 immediately brings to mind the Himalayas' 'other', less famous, mountain. At 28,253 feet (8,611 meters) K2 may lack the label of being the world's tallest mountain¹, but many mountaineers consider it to be the most difficult to climb.

In early 2002, the Korsnas paper mill in Sweden embarked on an ambitious program to fulfill its vision of mill-wide automation and control room consolidation. Building on its decade-long partnership with ABB, a strategy was developed that aimed at creating a new organization and increasing productivity. Like the mountain, the program's code name was K2.

A paper mill optimization program built on ABB automation technology

Mike Dowling



K2

A world-class manufacturer of liquid packaging board, white top, kraft, sack paper and fluff pulp, Korsnas has succeeded in maintaining its market position through sound investment and a strategy built around the use of state-of-the-art technology that includes ABB quality control systems, distributed control systems, web inspection systems and drive systems.

The mill's board line has two paper machines, two recovery boilers, the chlorine/oxidation process, recausticizing lines, three fiber lines, and the wood yard. All of these processes have previously been run from 13 control rooms equipped with automation and control systems from ABB.

Even though the recent investments had benefited both production and quality, the mill managers felt there was still more to be gained.

An in-depth analysis of Korsnas' historical data showed that the most common incidents affecting productivity were occasional sheet breaks, minor process upsets, and delays caused by non-availability of the pulp lines or mechanical equipment. The next big opportunity was therefore perceived to lie here.

K2 project

While realizing that traditional investment, new technology and new equipment bring a predictable return, the Korsnas project team also wondered what else could be done to achieve an overall improvement. Three key goals were identified:

Create a new team organization:

Korsnas, like many mills, had been operating with a traditional, vertical organization with engineering, production, maintenance and planning teams. As in most organizations, problem-solving was often looked at from an engineering, production or operations standpoint. This meant that a change implemented by the maintenance department to solve a pump problem was just as

likely to have an effect on production or quality later on. Also, most problems discovered on an off-shift were deferred to the main day shift, whose staff were able to handle most repairs. These delays had an impact on production and quality.

From this pool of valuable resources, it was decided to create a one-team organization and widen the base to include traditional white-collar jobs. The matrix organization would consist of

Our teams now have the tools they need to do the job, and we have the new matrix organization that will support them in doing it efficiently.

Mats Tornkvist,
Korsnas production manager

cross-functional shift teams that would be responsible for production, repairs and quality issues for their shift, and provide the attention necessary for problem-solving and tweaking process upsets and repairs as they occurred.



Each shift would appoint a team leader who would be responsible for everything from the wood yard to roll handling, in other words everything from 'chip to ship.'

Consolidate control rooms: Some paper mills are built these days with a single, central control room. When the mill is constructed on a greenfield site, a central control room presents few problems. However, transforming a site with 13 control rooms into one with just one or two control rooms is quite another task, and can present a considerable challenge.

The mill's goal over the 10 years it has been working with ABB has been to automate all areas where automation makes sense. In recent years, this strategy has resulted in automation of everything from the wood yard to shipping.



Korsnas paper mill. The site, which previously had 13 control rooms, now only has two. ABB's integrated automation solutions make this possible.

¹⁾ K2 is the world's second-tallest mountain. The height of Mount Everest is 29,031 feet (8848 meters).



mill's policy of utilizing new technology as it becomes available. Acquiring new technology built on existing architecture is a cost-effective way for the mill to remain competitive. ABB's broad product portfolio provides further benefits to the mill by providing distributed control systems, quality control systems, drives, advanced controls and collaborative management systems, all in an integrated solution.

When the time came to consolidate the control rooms, any doubts Korsnas had been having soon vanished. Since the mill's current systems were from ABB, operator training was minimized. To provide further standardization, ABB updated all legacy operator stations with new Operator human-system interfaces. This ensures that the operator stations all have the same look and feel, yet are still compatible with existing controllers.

The long-term vision has been to consolidate the 13 control rooms into two control rooms. With the new team organization in place, control room consolidation was the next logical step. Although there had been no major process issues over the years, equipment availability was sometimes a problem and process bottlenecks did occur. It was seen that concentrating all the automation and mill-wide information in two centers would provide the new shift teams with the right information at the right time. And, as everybody knows, well-informed operators make the best decisions.

Be objective driven: Over the years Korsnas had come to rely on a set of key performance indicators (KPIs). Recording tracking and trending with KPI data consistently provided an analytical insight into problem solving. Much of the K2 project has been based on this data; the team's challenge was to achieve long-term success and sustainability through a solution that would allow daily monitoring and feedback on performance.

Project implementation

The K2 project was launched in January 2002, after a period of intense planning. Of the total project costs, 40 percent

went on automation, another 40 percent on civil and other engineering, and 20 percent on training and miscellaneous activities.

The overall automation strategy for the mill was driven by four common requirements:

- It must easily interface to existing systems.
- It must link to PI historian.
- It must be reliable and serviceable.
- It must be easy to use.

A long-term automation strategy

The K2 project points to an emerging industry trend – that of long-term strategies and partnerships between mills and their automation suppliers. ABB and Korsnas have pioneered this trend and can already look back on a long history of close cooperation.

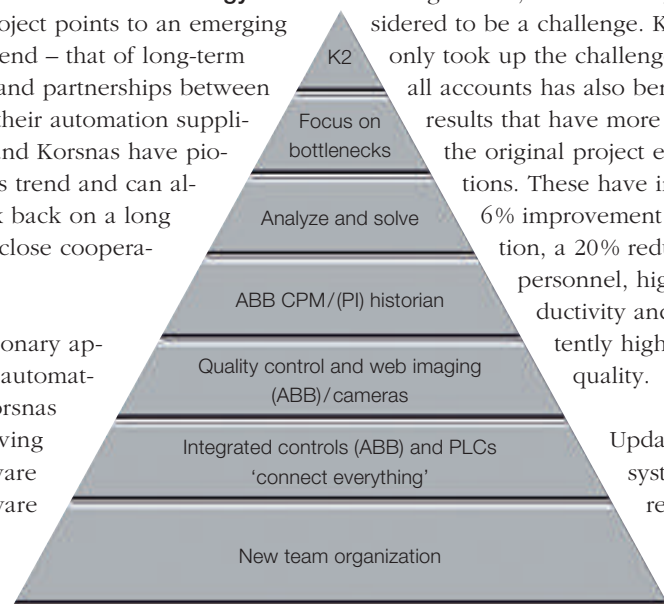
An evolutionary approach to automating the Korsnas mill, involving both software and hardware migration, is ensured by the

Productivity up by six percent

As already mentioned, when constructing mills on greenfield sites the trend today is toward having one central control room. Such a site is the Visy mill in Australia. Equipped with ABB paper automation solutions, this mill is controlled entirely – from the pulp process through manufacturing to warehousing – from one control room.

Consolidating multiple control rooms on existing sites is, nevertheless, still considered to be a challenge. Korsnas not only took up the challenge, but by all accounts has also benefited from results that have more than met the original project expectations. These have included a 6% improvement in production, a 20% reduction in personnel, higher productivity and a consistently high product quality.

Updating the systems and reducing the number of control rooms



from 13 to 2 has not only provided a way to consolidate data, but also allowed a more comprehensive approach. With the best possible data immediately

A project like this is an ongoing process. We've climbed K2. Now we are looking forward to the next challenge.

Mats Tornkvist,
Korsnas production manager

available, operators are able to make more reliable decisions, and make them faster than before.

Sustainability – the key to success

Like changes in any organization, the changes undertaken by Korsnas need to be sustainable in the long term to be successful. How an organization embraces such changes is at the heart of every successful operation. At Korsnas, daily shift meetings are used to reinforce the message and make sure team members focus on the same goals. To this end, the teams have developed a matrix of common goals and objectives that are reviewed daily. These data are evaluated together with statistical data from the previous shift in a trend analy-



sis of key process indicators such as quality, production, sheet quality, caliper weight and cross-direction profiles. Also reviewed are roll quality and customer orders, plus the production results from the last 24 hours.

This focus is reinforced throughout the mill by real-time performance monitors that provide on-line updates of 'time

between sheet breaks', the machine's speed, production and other performance figures. All team members are kept informed about the mill's status at all times.

The K2 project points up the strengths of the long-term partnership between Korsnas and ABB. Installing new ABB technology based on existing architecture assures the mill of a fully integrated control and automation solution. The mill's strong results since the upgrade are a powerful argument for such a strategy.



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