Lenzing Fibers

Lenzing Fibers, Grimsby, 24/7 production

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Lenzing Fibers Grimsby chooses Astec to gain the full benefits of migrating GE Fanuc software

The fibre manufacturing plant on the outskirts of Grimsby, now owned by Lenzing, has been producing the man-made fibre, Lyocel, for 10 years. The highly automated production processes had been controlled and monitored by GE Fanuc Proficy® HMI/SCADA – iFIX with Classic Desktop software. In order to gain the benefits from migrating to the latest version of iFIX Workspace and thus releasing the potential for developing its MES system, Lenzing Fibers Grimsby called on Astec IT Solutions with its wealth of experience in developing and migrating applications with GE Fanuc software in a wide range of industries.

The Lenzing Group is a world leader in the marketing and manufacture of man-made cellulose fibres. TENCEL®, Lenzing Modal® and Lenzing Viscose® fibres are primarily used in the textile industry, while special non-woven fibres are used for hygiene, medicine and cosmetics. Fibres are the group's core business, textile and non-woven fibres making up around 80% of the company's activity, the remainder being in plastics, paper and general engineering.

The Lenzing Group is headquartered in Austria, from where the company coordinates its global production sites and network of sales and marketing offices. Lyocel Fibre production, primarily from eucalyptus and beech wood, takes place in Grimsby, Austria, and the USA. The wood is obtained from forests which are managed according to sustainability regulations detailed in forestry legislation, leading to Lenzing Fibres Grimsby being awarded the FSC (Forest Stewardship Council) Certification.

TENCEL®

TENCEL® remains the latest man-made fibre, coming into commercial production around 1991. It offers a unique combination of the properties of man-made and natural fibres – soft as silk, strong as polyester, cool as linen, warm as wool and as absorbent as cotton. TENCEL® is used mainly to produce woven textiles for clothing, sold by a number of High Street clothing chains, and for various types of bed-linen. Non-woven commercial uses include surgical wipes and various filter media.

Nanofibrils are the key to the performance of TENCEL®. It is the first cellulose fibre to use this nano-technology, the controlled arrangement of the nanofibrils gives rise to properties such as optimised absorption of moisture (50% more than cotton) with excellent cooling properties. With a smooth finish and high moisture absorption it is also ideal for people with sensitive skins. Manipulating or controlling fibrillation, the creation of very fine hairs on the outer fibres, during the production process creates a wide variety of finishes – from a smooth, silky feel to a suede-like finish.

TENCEL® production at Grimsby

TENCEL® is made from 100% cellulose, making it eventually bio-degradable. The eucalyptus woodpulp raw material for Grimsby is imported via Immingham deep-water port, a short distance further up the Humber estuary. Integrated production under computer control involves the whole manufacturing cycle from raw woodpulp processing through to fibre production.

TENCEL® is produced using the Lyocell process, in which woodpulp is dissolved and directly converted from solution into fibres. The process makes economical use of energy and water. The solvent, an amine oxide which is mixed with the woodpulp, is highly water soluble and can be easily removed from the fibre in later stages of the process: it is environmentally sound, biodegradable and 99.5% recycled.

Tencel spinning/washing

As well as being committed to the principles of sustainable wood management, Lenzing Fibers is committed to very high environmental standards – resulting in the European Award for the Environment in 2000, and the Eco Label of the European Commission in 2002 (a first for a fibre manufacturer).

The production process involves a number of key stages – mixing of the raw materials, dissolving, filtering and finally spinning, when the fibre filaments are formed by forcing the processed cellulose through fine jets. The speed at which the fibre is drawn through the jets controls the diameter of the fibres: the use to which the fibre is put determines the customer's choice of fibre diameter.

The fibre is then washed, enabling the recovery of the amine oxide, and various finishes are also applied depending on the final application of the fibre. For example, soft finishes can be applied, as well as anti-static coatings. The addition of enhancers can be used to minimise fibrillation. Finally the fibre is dried to a given moisture level and baled ready for transportation to the customer.

Production automation

The process at Grimsby is heavily automated, working to close tolerances controlled by 24 PLCs. The plant was running GE Fanuc Proficy® HMI/SCADA iFIX with FIX Classic Desktop using 7 SCADA nodes, 15 View nodes and 20 Terminal Server iClient nodes. The Level3 MES system itself was ageing, which would lead to eventual support problems, the potential for developing the existing UNIX-based MES system was limited.

Steve Knight, Systems Manager, Lenzing Fibers Grimsby, explained:

"The US plant at Mobile operates a very similar process, also using iFIX Desktop. We have made a huge investment in our control systems. Our internal expertise is in using GE Fanuc software. Thus our vision is to use GE Fanuc iFIX as the core application for all manufacturing control processes.

"This would lead to a project to expand the current system, migrating the Unix based MES system into the GE Fanuc iFIX software. The enhanced features in the iFIX Workspace provided us with the toolset to develop the new MES system inside the iFIX system. So we chose to migrate both systems to full iFIX Workspace. Migrating also maximises the benefits from our investment in running the latest GE Fanuc software technologies and negates the need, for example, for major re-training in other applications.

The plant operates 24/7/365, with a main plant shutdown every 5 years for essential maintenance,"

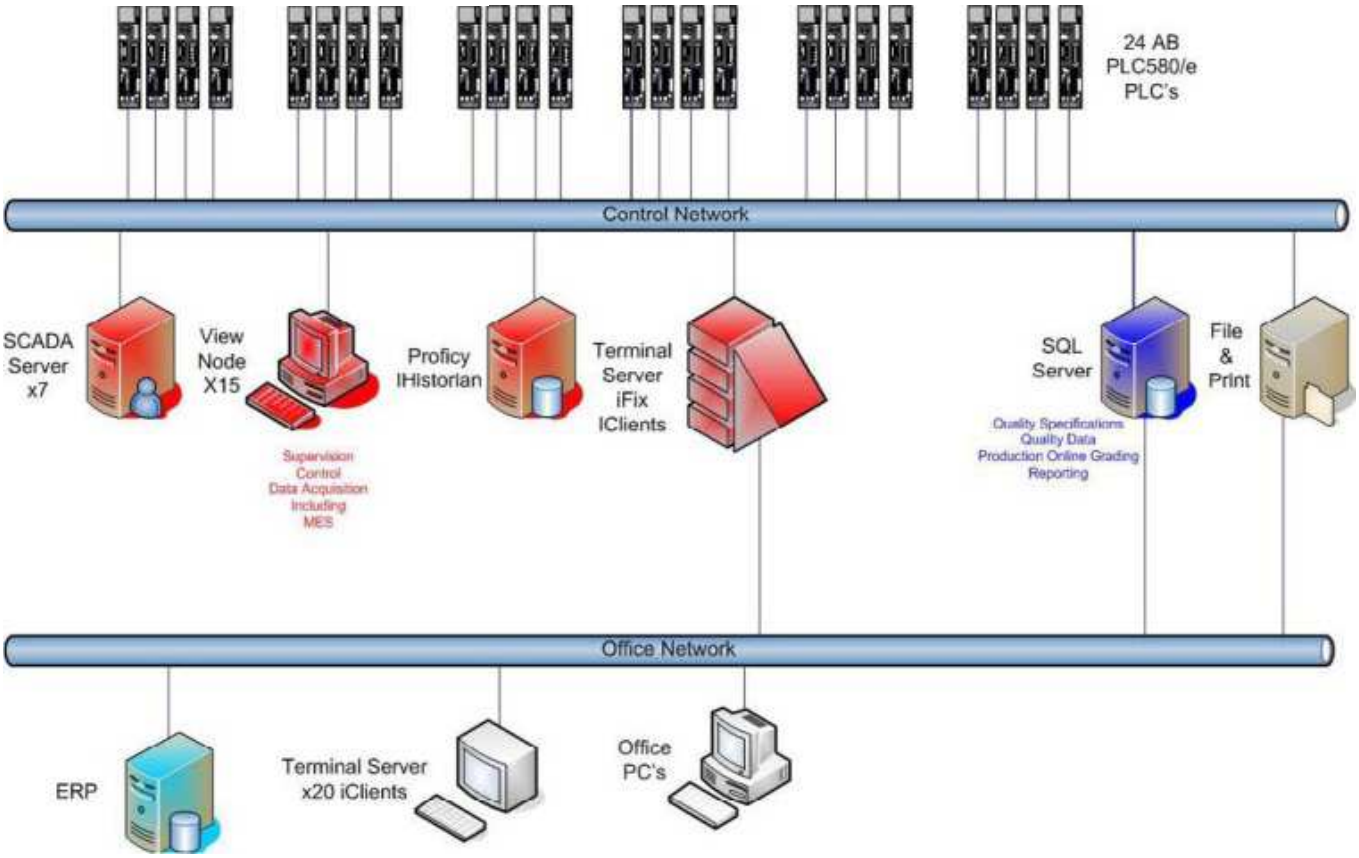
Knight continued. *"It is vital therefore that any work on the SCADA or other computer systems does not impact on production. Upgrades must take place without outages. With around 3500 different mimics and 7000 tag groups, with naming conventions possibly conflicting with the Workspace restrictions we knew we had an uphill task on our hands, especially as our IT team is only 3 strong. How could we make best use of the new software, and how could we effect the change within a given timescale with limited manpower?"*

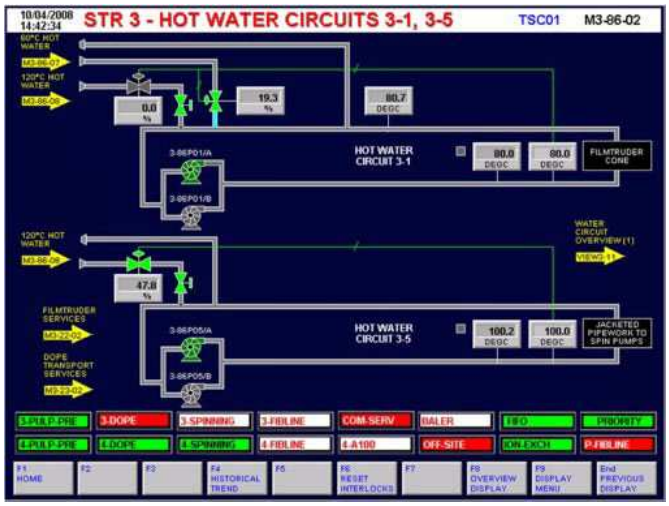
"Rather than expand its team temporarily, Lenzing decided to look outside the organisation, and obtained quotes from experts in the development of GE Fanuc software.

"We looked at a range of potential partners. This was the first time we had worked with a systems integrator, and, of course, it was very important to us to choose the right one," added Knight.

"Astec IT Solutions brought ideas to the table, offering alternative approaches and giving the pros and cons of each so that we were able to make an educated choice. The company's knowledge and experience of developing solutions using GE Fanuc software is excellent. The combination of these attributes led us to choose the Astec team."

New architecture





Hot water circuits screenshot

Migrated System

There are 3 levels of automation: level one being the PLCs and device sensors, level 2 the SCADA system, and level 3 the MES systems. The Grimsby IT team is responsible onsite for all systems.

For each plant area, the migration process went through 4 main stages. First, Astec converted all the screens relevant to the area, using the standard iFIX migration tools. This had a success rate of approximately 85%. Astec then developed an enhanced migration tool set which was used to complete the migration process. This enhanced tool set improved the conversion performance up to 99.5%.

The migrated iFIX Workspace mimics were then checked and tested offline, one by one, by Lenzing. The second stage involved online testing on a development node for all screens in the given upgrade area. Once all the plant area mimics were approved, they were then made available to the Terminal Server iClients (Read-only) and used for 1 month to get comments and feedback. In fact there were very few changes required. Finally they have been applied to the live View nodes, one area at a time.

On-going development

All plant areas View nodes and Terminal Server iClients at Grimsby have been successfully switched from Classic Desktop to iFix Workspace. The next key stage to the project work will begin using the capabilities of iFIX Workspace and the real-time data it is recording to develop a powerful new MES system. The SCADA system is continually capturing data from the PLCs and storing it on the iHistorian database.

Whereas previously the UNIX-based MES system would independently interrogate the PLCs further, other GE Fanuc software in the suite of Proficy® Intelligent Production Solutions can now be used to immediately make use of the real-time data. This will lead to reduced costs, with fewer software licence fees and reduced maintenance.

The MES development will be broken into 2 main stages. First the woodpulp process – scanning the inventory entering the pulping process and tracking it. Second – the more complex fibre quality tracking. Diagnostics produced from looking at data stored on iHistorian, bale by bale, will enable exceptions to be identified.

While Mobile was originally the first plant to use FIX32, the functionalities of iFIX Workspace now being implemented at Grimsby make it the lead plant for Mobile to follow. Once proven at Grimsby, similar HMI/SCADA and MES systems will be installed at the US plant.

A plant View node

Conclusions

Steve Knight concluded: *"I do not feel that Astec pushed us down any particular path. They were happy to work alongside us using the approach Lenzing Fibers Grimsby ultimately chose and was most confident about. Astec was also very flexible with timing: we negotiated a timetable that suited both of us. They also minimised contract costs as they were able to carry out most of the development work at their office, allowing us to log into their system as needed.*

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