



Case Study

When Soufflet needed to upgrade the obsolete Square D SY/MAX PLC infrastructure at their Burton maltings, they turned to Astec to ensure the work was completed with the minimum risk.



Partner
Digital

Astec IT Solutions Ltd
Edric House
Towers Business Park
Wheelhouse Road
Rugeley
WS15 1UW
United Kingdom
+44 (0) 1543 888134

enquiries@astecsolutions.com
www.astecsolutions.com

An essential ingredient

Background

The maltings were previously part of the extensive Bass brewery facility in Burton upon Trent and acquired by Molson Coors in 2000. In 2015, Molson Coors agreed to the sale of the historic maltings business to Malteries Soufflet, part of the French agricultural conglomerate Soufflet Group, who annually produce more than 2.2 million tonnes of product from their 25 malt plants. The Burton site produces malt for the brewing and food industries, with Molson Coors remaining a significant customer along with Unilever, who have an adjacent Marmite production facility.

Malted barley provides unique colour and flavour to the beer and also supplies the sugar which fuels the fermentation process. Different beers are produced from a wide range of malted barley including lager, pale, toasted, roasted and chocolate malts.

In a maltings, the barley is soaked in water to initiate the germination of the plant from the seed in a process called steeping. The barley is then germinated which starts the process of converting the seeds starch into sugars and amino acids before being drained.

The sprouting seeds are then dried in a kiln to stop the germination and dry the grain for storage until it is ready to be used in the brewing process. The entire malting process from raw barley to malt barley takes approximately one week.



System Situation

In acquiring the maltings from Molson Coors, Soufflet inherited all of the existing control system infrastructure, which was based on Square D SY/MAX PLCs and iFIX SCADA from GE Digital for visualisation and control. While the iFIX system had a very obvious and straightforward upgrade path that would allow it to continue to play an active role in the operation, the Square D SY/MAX equipment dates back to the 1990s and is now obsolete. With no direct upgrade path to a current product and spares limited to second hand or refurbished equipment, the ongoing reliability of the malting system posed a very real threat to production. The current production schedules mean that the maltings are in operation 24 hours a day, so any scheduled downtime is kept to an absolute minimum.

“Any failure would likely render the maltings inoperable until a full system replacement could be completed, a process that would take many months during which time production would be unable to continue,” reports Andy Tripp, Managing Director of Astec. “The cost to Soufflet in terms of lost sales and customer confidence would have been extremely detrimental to their business so they needed to find a way to bring the system up to date, with current and supportable hardware without significant system downtime.”

Due to the limited availability of Square D PLC equipment and the complexity of performing code modifications, the upgrade and expansion of the plant are currently kept to a minimum. This prevents Soufflet from performing plant and process improvement initiatives that they would like to implement to increase production capacity, streamline operations and generally optimise their operations, further emphasising the importance of a maintainable and expandable control system.

Solution: PLC Migration

Soufflet wanted to ensure that they were not left with an obsolete system in the future and as they utilise Rockwell PLCs in other parts of the facility, their appetite was to migrate from the Square D SY/MAX PLCs to a Rockwell ControlLogix platform.

This would require replacement of the steep, germination and kiln Square D PLCs and associated I/O cards within the existing panels and migration of the SquareD PLC programs to ControlLogix. With thousands of instructions across three PLCs to migrate, performing this task manually would have been incredibly labour-intensive and error-prone, with a requirement for extremely lengthy testing and commissioning to verify every operation of the system.

Chris Barlow, Technical Director at Astec explained “We understood the baseline requirement for as little system downtime as possible so the most effective approach would be to break the overall migration into phases that would enable as much work as possible to be done in advance of any physical rip and replace. Therefore we suggested a migration roadmap with incremental milestones that would eventually lead to a situation where we just needed the plant for long enough to perform the physical PLC replacement. We knew that the phases prior to that would yield a fully tested and simulated PLC programme for Soufflet’s ControlLogix standard.”

Astec was able to propose migrating the software through their proven migration tool, which takes the existing Square D PLC program and converts it – including I/O and internal tags – to a format ready for import to the ControlLogix PLCs.

As the output from the migration tool had been previously tested and verified against all individual instructions and tag types, the testing time was minimised. The converted code will, as closely as possible, maintain the existing structure and comments, ensuring engineers maintain familiarity and the converted code has the same ease of diagnosis.

“We have a very iterative and modular approach to the development of the migration tool,” explained Chris, “which means we can essentially define the transformation for any legacy PLC program to a modern equivalent including Rockwell, Siemens and Mitsubishi.” He continues, “It’s even possible to initiate a pre-migration confidence check and determine whether there are potentially any areas of the program that the tool cannot deal with as effectively and assess the impact of those areas on the overall migration project.”

The software from the Square D PLC in each of the three malting process areas (steep, germination and kiln) was converted to ControlLogix using the migration tool. This was downloaded to a ControlLogix processor and thoroughly tested against a written test specification to verify the expected system operation.

A conversion of the iFIX SCADA project was also undertaken, to support ControlLogix addressing and communications which provided both a user interface for testing of the PLC logic and a SCADA project for use with the converted PLC project. Once the internal testing was complete, the customer witnessed the formal Factory Acceptance Tests (FAT) and signed the project off for installation.



Outcomes and Conclusion

Soufflet have mitigated the risk of a Square D SY/MAX PLC failure causing unlimited downtime for the maltings by having the PLC software successfully migrated to ControlLogix. This allows them to schedule the necessary plant downtime to enable the physical hardware to be replaced during a future period of routine shutdown.

Astec are now working closely with Soufflet to identify a suitable window when the physical PLC replacement can be scheduled which should now be possible within a matter of days rather than weeks or months. Various options are being explored, including PLC replacement in the existing PLC panels, PLC panel replacement, I/O panel replacement, or a staged approach. If the work associated with the selected option can be carried out in phase with the product moving through the process, there should be no loss of production and all customer orders can be fulfilled with no changes to planning.

Importantly, Soufflet are provided with the confidence that if a failure were to occur before a planned outage, the system would be ready to go and the physical PLC replacement could begin immediately, significantly reducing the potential plant downtime.



Background

Astec uses best in class industrial software to deliver Smart Manufacturing Solutions into manufacturing and other industrial sectors.

Our core capabilities are focussed on the provision of Manufacturing IT and OT solutions including IoT, MES/MOM, SCADA, Batch Execution, Workflow, Cyber Security, Reporting and PLC systems, supplemented by a dedicated support desk and field service team. Astec works seamlessly with clients' Engineering and IT departments to ensure all monitoring, control, visualisation and analytical systems make best use of existing infrastructure investments – while providing simple, effective and highly available solutions which can be used for many years.

Further Information

For further information relating to this case study please contact:-

+44 (0) 1543 888134
enquiries@astecsolutions.com

Edric House, Towers Business Park, Wheelhouse Road, Rugeley, WS15 1UW
Registered UK Company: 4062330 (VAT: GB754536318)