



# Case Study

Tarmac required a comprehensive upgrade of its obsolete PLC and SCADA system at its Buxton Lime plant, to create a production facility suitable for the 21st Century



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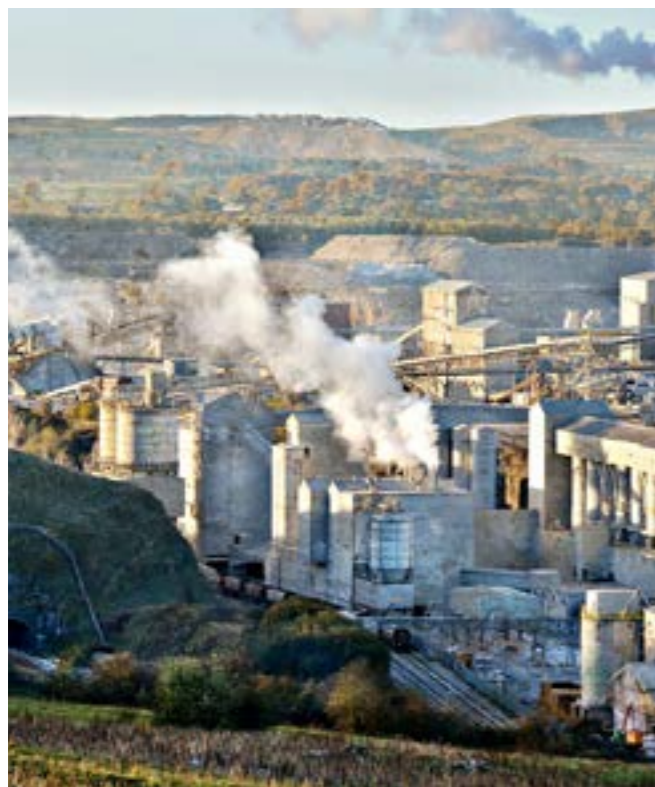
# In the limelight

## Background

Tarmac, part of the CRH Group, is the largest manufacturer of lime products in the UK. Tunstead Quarry, which was opened in the 1920s, and Old Moor Quarry, its more recently-established near neighbour, is one of the biggest mining operations of its type in the UK. The two quarries extend to over 340 hectares (840 acres) and their combined extraction output is up to six million tonnes of limestone a year. Tunstead was established to provide a consistent supply of high purity industrial limestone for use within the chemical and other industries.

The operation uses computer-aided techniques to dislodge somewhere around 30,000 tonnes of stone per blast, which is then loaded onto tipper trucks and carried to the primary crusher in 100 tonne batches. The crusher processes up to 30 truckloads of stone per hour. Conveyor belts then transport the rock to a secondary unit, which crushes the stone down to a range of sizes, from 125mm to dust. As well as powders, the Tunstead site also produces aggregates for the construction industry.

The rocks and stones are fed into 10 huge hoppers, which hold various grades of stone, ranging from fine dust to big rocks. The final makeup of the bagged and despatched products depends on the applications.



## System situation

Tarmac called upon the services of Astec Solutions, with a brief to upgrade the MES software, which was obsolescent, and to improve reliability and consistency of output.

“The system the company was using had been in place since the 1990s,” said Andy Tripp, Managing Director of Astec Solutions. “Handling of the material as it was mixed had been by a manual system; the operator would type in the percentages required and then set things going.” The human involvement inevitably meant that consistency between batches was not totally reliable. The time taken to manually input data also affected output and productivity.

The site was using out-of-date Mitsubishi PLCs and an MX32 SCADA system, which was also obsolete. Although the site – at 340 hectares – is physically large, the control systems are not and so the cost of replacing the PLCs was not as much of a hurdle as could have been the case.

## Solution: renewal and capability upgrade

“Tarmac had the appetite to upgrade to the latest Mitsubishi PLCs, which offer improved performance and better availability of spares,” said Andy. “The company has the in-house capability to undertake the electrical work, including control panel and code changes.” However, while the PLCs could be upgraded the MX32 system was more problematic, as there was no continuity available in that form. Astec’s solution was to implement a ‘ground-up upgrade’.

“We were able to take certain things from the existing MX32, including the I/O scheme, the equipment list and the way the equipment was visualised,” Andy explained. The system was migrated from MX32 to GE Intelligent Platforms’ iFix; Astec Solutions is GE Intelligent Platforms’ Premier Partner in the UK. “We created a virtually new MES system and recipe and used a modified SCADA system to provide plant visualisation and operation.” A big difference to the previous set-up was that Astec implemented SCADA within the IT system itself.

“Lifting the solution and leveraging within the IT world gave more functionality,” he continued. “We took that route in order to get all the functionality required with as little custom code as possible – we kept it as close to standard as could be.” Such an approach would have consequent benefits during the system’s lifetime. Using ‘best in class’ software products enabled Astec to provide the solution that was the most supportable, extendable and adaptable to Tarmac’s future demands as could be achieved.

“We used MS SharePoint to provide the product specification and recipe package and we were able to do so using completely standard SharePoint methods,” he said. “This provided Tarmac with a recipe management system that has version control, workflow, validation and security, with a familiar and easy to use Intranet web-based interface.”

Because all the significant elements of the system were essentially ‘off the shelf’, implementation was comparatively low cost. It is easy to support and extend and is also more flexible than the system it replaced. Production lists, recipes and specifications can be maintained and accessed from anywhere within the Intranet - from an office or a completely different location.

The production list will respond to the market. Customer demand will drive through to logistics, planning and scheduling, which will in turn drive production. The SCADA system will read the data store; production operators will select the required product and quantity.

“The operator simply identifies the desired product from the list, selects the required quantity and then presses ‘go’. Room for error is greatly reduced,” Andy explained. The possibility of errors was further cut by the fact that Tarmac now had a database-driven application.

Andy continued “The company now has full ‘track and trace’ and, consequently, vastly improved quality control. The system can store all loading data for reporting and the operators and management have full access to information on the volume and recipe version each truck was loaded with.”

The site had a number plate recognition system and the system had the capacity to connect the stone filling, loading bay and station data together.

It is possible for the system to be updated to completely automate the process. Individual trucks would be recognised and directed to the right bay for filling with the correct formula - and recipes are protected as well. Access to version control is secure; any amendments to recipes or formulae have to receive approval before they will be actioned.

Andy Tripp is proud of how the upgrade and migration was achieved, the system that is now in place and the speedy delivery of the entire project.

“After the client completed their responsibilities, the project was turned round on three months. That’s a pretty impressive timescale for a major change,” he said.

Astec exploited virtual technology using VM ware. On a single physical server it installed multiple Windows 2008 servers to run the platform, each with a particular function. It made use of client server architecture and terminal services to eliminate PCs completely; the facility now uses thin clients and Remote Desktop services.



## Outcomes and conclusion

- Tarmac’s Tunstead Quarry complex now has a modern, scalable, adaptable, visible and controllable production and execution system. It is transparent, secure and delivers greatly improved quality control, efficiency and consistency
- The system is fully supportable, as it has been implemented largely with standard, “out of the box” commercial software
- It provides improved visibility through Intranet interface and access, including access from off-site
- It is reliable, being based on modern PLCs, for which spares are widely, easily and much less expensively available
- Quality control and product specification has been greatly improved, through a database of approved recipes that require authorisation for any amendments
- Implementation of a completely new system was achieved in just three months



## Background

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

The core capabilities of the business include provision of Industrial IoT, MES/MOM, SCADA, Batch Execution, Workflow and reporting solutions, 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:-

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