

AUTOMATION HELPS BAKERY MEET EXPANSION OBJECTIVES

A fast growing baker of high quality, high volume bread has driven new levels of efficiency and accuracy into its production management and traceability functions using a simple MES (Manufacturing Enterprise System) module from Mitsubishi.

In an ambitious expansion plan, the bakery in recent years transformed itself from a small local supplier to a highly respected regional bread manufacturer, serving over 3000 stores. With expansion plans taking its delivery footprint from regional to national status it is set to maintain the constant development and growth of its state of the art bakery, whilst enhancing its already-high reputation of quality and excellence in bread making.

Key to achieving these twin aims is a commitment to automation, with a guiding principle that it will replicate craft skills in order to maintain the standards of the finished product.

Quality starts with the very first processes, mixing, dividing and check weighing of the dough. It is essential to have good repeatability of these, so constant accurate measurement is required, with the data used to fine tune the operations on an on-going basis.

The bakery has two mixers and one checkweigher, each monitored and controlled by a Mitsubishi Q series PLC. These communicate over Ethernet with an FX series PLC and HMI readout. Previously this data was collected in handwritten reports, but it became clear that operating efficiency and traceability would enhance if the process was automated.

The bakery decided to develop a new system that would interface with the existing system and provide the reports and OEE (Overall Equipment Efficiency) data on the process. Initial ideas revolved around the use of SCADA (Supervisory Control and Data Acquisition) to gather the data from the PLCs and pass this up to the management IT computers running an SQL server.

However, the site engineers and their consultants quickly realised that this would take significant Visual Basic coding to make this happen in the SCADA system. To save time spending hours coding, it was decided to benefit from the capabilities of the MES module from Mitsubishi.



Mitsubishi Q Series PLC & MES Module



Mitsubishi FX3U-ENET

- **Automation replicating craft skills maintaining quality standards**

- **Enhanced operating efficiency and traceability**

- **MES Modules facilitates Track and Trace system**

- **Improve overall control**



The MES module allows process data gathered from the PLCs to be directly transferred to the SQL database without the need for an intermediate SCADA. This saves money in terms of products to be purchased and time to bring the system on line; fewer parts also provide long term benefits.



The MES module is easy to use. The configuration tool allows the common Insert, Update and Select commands from the SQL language to be triggered from events in the PLC or on a time schedule.



At the bakery a lot of data is collected very quickly as the weighing, mixing, proving and baking proceeds. All the ingredients are checked for weight or volume; for instance each piece of dough is weighed as it comes off the divider, noting if it is out of weight tolerance and rejecting it if necessary. A plot is made of the variance trends from target weight and the total weight of dough is logged. In addition the system monitors the dough's temperature, the mixing time, time under vacuum (part of the Campden Process to improve protein content) and total energy used in mixing.



The MES module has made it possible to create a Track and Trace system for the process. Each mix now gets a unique ID allocated to it, which transfers with the batch through the steps of the production process. The process information, such as the dough temperature is also linked into any operator changes which are logged with a specific change code.



As a result of the new system, production managers are now able receive up to date reports on their process. A web based reporting system ensures everyone is working to the same data at the same time, making operations far more efficient – and less stressful.



With the system tried and tested there are now plans to extend it by including data from other parts of the plant to further improve overall control.



For further information about this or other bakery solutions, please contact the solutions team at automation@meuk.mee.com.

