

Sigma helps detect excessive energy consumption at manufacturing site

REXAM

Rexam Beverage Cans is a multi-site manufacturing company with 20 locations across Europe and Asia. The Milton Keynes site, which operates 24/7, employs over 150 people and produces over 4 million aluminium cans a day. The site's introduction of TEAM's *Sigma* Monitoring and Targeting (M&T) software has resulted in significant gas savings and enabled electricity and water to be monitored more closely.

Rexam wanted to improve the tracking of energy use across the company and benchmark sites against each other. The company required M&T software which would interface with their metering system and TEAM *Sigma* HF met the specification.

Garvin Chung, Engineering Assistant, summarised the site's energy usage: "The site uses over 30 gwh of gas and electricity and 200,000 m³ of water per year. It has three production lines which are all extremely energy intensive. There are multiple ovens on each production line and up to three burners per oven. Each burner has been sub-metered and logged through the software".

Garvin added: "It takes at least 30 minutes for a can to undertake the entire process. TEAM *Sigma* has been essential for detecting discrepancies at various stages of this process which would otherwise go unnoticed".

TEAM *Sigma* savings

Gas

The cans are washed and rinsed with demineralised water and passed through a drying oven, which is fired with natural gas. TEAM *Sigma* is used to monitor the energy performance of the ovens.

Garvin explained: "During a two week period we noticed that TEAM *Sigma* had thrown up some major exceptions in the half-hourly data. The data indicated that 50% more gas was being consumed compared to normal. After some investigation we discovered that a gas control valve was not actuating correctly. As soon as the valve was repaired, consumption went back to normal".

"Without using TEAM *Sigma* HF it would have been difficult to identify we were overspending significantly on our gas. Post calculations indicated that we could have been faced with a £40,000 overspend, equivalent to an additional 3,000,000 kWh per annum, if this exception had not been picked up".



Above: Garvin Chung with example cans from various stages of the process.

Electricity

A good example of how Rexam uses *Sigma* to proactively analyse consumption and drive forward improvements is a project involving the site's air compressors.



Garvin said: "A large proportion of the site's electricity is consumed by air compressors. Good energy management practice recommends that low-pressure air compressors should be installed as an energy saving measure. We decided to replace some of our compressors and use *Sigma* to monitor their efficiency. We are still in the process of implementing this project and are expecting *Sigma* to present some interesting results".

Water

Rexam has made a commitment to the Integrated Pollution Prevention Control (IPPC) and as part of an agreement with Milton Keynes Council, a water efficiency audit was conducted. The audit included all the equipment that consumed water, however, it was the findings surrounding the assembly line washers that provided the most surprising results.

Garvin said: "The cans are automatically conveyed to the washer where they are cleaned and etched in a multi-stage process using acidic solutions. On average, 560m³ of water is used by the washers per day. *Sigma* highlighted that each production line was using different amounts of water and that the washers were not automatically switching off during maintenance periods. New procedures were put in place to rectify these anomalies".

Garvin concluded: "The work we have undertaken indicates that M&T software is essential for detecting waste. TEAM *Sigma* makes it very easy for us to compare the performance of each production line and take the appropriate measures to help make valuable cost and energy savings".

Additional work

Rexam has also benefited from TEAM's partnership with Cranfield University. A recent project involved a student using *Sigma* to apply detailed analysis techniques at the site. Benjamin Brullon carried out the work as part of his MSc Process Systems Engineering.

The aim was to improve the utilisation of *Sigma* at the site and learn more about using M&T

software efficiently in a manufacturing environment.

Exception reports from *Sigma* were used to carry out an analysis of the Specific Energy Requirement (SER). This valuable exercise involved calculating the amount of energy needed to produce a certain number of cans and determining whether targets were being met. The SER analysis was carried out for gas and electricity and was also applied to each production line separately.

The achievements included:

- Reorganisation of the database and the configuration of the software
- Reduced energy consumption by fixing targets and reporting system with *Sigma*
- SER analysis in order to improve knowledge of site energy consumption and ability to further compare production lines
- Better understanding of the relationship between energy consumption and production through regression analysis

Sigma has been reconfigured to take into account the findings of the thesis. This includes modifications to the database and creation of new variables for the SERs and target-setting.

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