

CC-Link In Action

OPEN NETWORKS

CC-link Fieldbus helps MilkLink cut energy costs and water wastage

The power requirement for the water management system at MilkLink dairy has been reduced by up to 173kw per hour, giving a pay back period of only 19 months for the entire system, based on a CC-Link network solution and PLC control.

The engineering team at Milklink's dairy (formerly Express Dairies) in Crediton, Devon, prides itself on constantly improving efficiency. Their latest energy saving project, involving the site's water management system, has shown what careful planning and implementation can achieve.

The site has its own two bore holes that can produce all their water requirements, but can also connect onto mains water if necessary. Water is an essential commodity at the dairy and is used for a host of water services such as wash downs, cooling etc. The water is softened before use, to avoid leaving any residue on the production surfaces.

The old water control system had inherent problems, such as water wastage due to leaks in the old system, lack of capacity to meet new production demands (the dairy produces 1.5 million litres of UHT milk per week), high energy expenditure and no centralised control and monitoring.

Raw water was stored in a large 38k litre Braithwaite tank and fed via a water softening system to two other tanks for use by the boiler house and the factory production lines (with 38k litres and 135k litres capacity). The tanks on the system were not able to hold enough water to meet peak demands, such as the wash down periods which happen each night between 2-5 a.m. and so the water extracted from the boreholes had to be supplemented with mains connected water, which considerably increased costs.

Head pressure from the old system was also very low and to compound everything the old system used DOL starting for the pumps which, due to the huge initial start-up pressures and torques, required large 15kw motors.



After careful examination of the shortfalls of the old system Ken Mason, Electrical Systems Manager for the Dairy and his team put the plans for their new water management solution into practice based around CC-Link, the open Fieldbus, as the communication medium to link together all the newly installed pumps and control equipment.

Ken Mason stated "The objective of the project was to simplify the operation of the system, save energy and operating costs, reduce downtime, reduce water wastage, improve leak detection and be as environmentally friendly as possible".

Firstly, they installed two new raw water 69k litre silos, a soft-water silo with 145k litres capacity and replaced the entire water supply piping. The new storage tanks capacities allow the stored water to match all the production requirements, with the tanks being constantly topped up when required with enough capacity to take care of all high volume water demands.

To improve the pumping of the water around the entire site and achieve controlled matched local measurement and control to pumping requirements, Milklink used Variable Speed Drives (VSDs) and a modular PLC to control the whole operation.

The PLC acts as the brains of the system, automatically controlling all aspects of the new water management system. It measures water demand points, takes this collated data and works out appropriate pumping solutions. It then communicates to the VSDs and line PTY pressure transmitters (used to measure water pressure in the pipes) over CC-Link. The line pressure of the water system is between 0-4 bars, but for optimised use it is held at 3 bar to an accuracy of 0.1 bar via the efficient fieldbus network.

All the pumps speeds are controlled by PID loops in the PLC with data sent to the VSDs via the 10MB high speed CC-link connection. The reaction time of the entire CC-link network is a mere 15mS, giving instantaneous control of the entire water management system. Due to the fast control of the VSDs, and high speed matching of pumping requirements via CC-Link, the pumps motors frame sizes are now down from 15kw to 7.5kw giving a considerable saving in energy costs.

The actual changeover from the old to the new water management system took only three months, with all panel building and installation being done on site by the Milklink engineering team.

John Bater assistant project engineer said, "Using CC-link on this system made the whole installation much easier. We now have remote control and programming of the entire system and were pleasantly surprised how quickly we managed the entire changeover".

The power requirement for the water management system has now been reduced by up to 173kw per hour, giving a pay back period of only 19 months for the entire system. Additional benefits include reduced water costs, less actual water waste and increased ease of maintenance.

Ken Mason says of the chosen Fieldbus technology "CC-Link is now the preferred site standard. It was chosen because it is fast, easy to configure and has never failed to operate correctly, even in the most testing of environments".

The system has been so well received by the senior managers of the dairy that they will soon be expanding the system to use CC-Link to extract even more data and connect onto other upper levels of the management network.