

ENERGY

focus



'Bumper' energy saving on plastic extrusion machines

Following the introduction of the Climate Change Levy, energy reduction is now a critical issue for large energy users. A major motor manufacturer, with Mitsubishi's help, is showing the way by dramatically reducing energy consumption at its main manufacturing site.

As a major car manufacturer producing over 340,000 cars per annum, its energy bill is extremely high. In particular, the Press and Plastics department, where they use large plastic extrusion machines to produce car bumpers, is piloting new ways to save energy. Their latest energy saving project is a Load Optimisation System (LOS) for the hydraulic systems of their huge 2,500 and 3,500 tonne extrusion presses.

The problem was approached by testing three different manufacturers' proposals. After extensive testing, the solution from Mitsubishi Electric, and its Energy Centre partner LC Automation, was selected.

solution



PRODUCT
F540L / FX2N
Variable Speed Drives PLC



SAVINGS
£34,000 pa



PAYBACK
Under 24 months

A trial LOS system was installed, and left on site, to prove the technology and energy saving capability. After 3 months of continual evaluation, the energy saving capability was clearly shown and the go ahead to retrofit another 4 machines was given.



The new systems incorporate Mitsubishi Electric F540L Variable Speed Drives (VSDs) and FX2N PLCs. These combine to create an intelligent solution that pushes energy saving potentials to the maximum and have brought about a 22% reduction in energy expenditure on the hydraulic control systems.

The VSDs (between 75kW to 280kW, depending on pump rating) control the hydraulic pumps on the huge plastic presses, which have between 1 and 4 pumps per extruder. The presses run 24 hours a day, 7 days a week and must produce bumpers in a highly reliable "just in time schedule" to meet the needs of the car assembly lines.

All the pump controls were retrofitted in a weekend onto the existing extruders, with the compact VSDs replacing conventional Direct On-Line (DOL) and Star Delta low voltage switching of the pumps, which had been used at the factory for the last 15 years.

The system control is very simple with hydraulic oil being continually circulated in the press and sent to rams when required or diverted back to a tank when not needed. The oil pumps are controlled by a F540L Drive, which connects onto a FX2N PLC that acts as the system controller.

The Drives are connected to the PLC via a 0-10V analogue output, which represents the load power. The motor demand is converted into an analogue signal to give a digital speed

reference to the current demand. The PLC program monitors the analogue input value and, at pre-determined points, initiates speed changes to cope with load demand changes (using the FX2Ns integral closed loop PID control functionality to optimise the pumping requirements).

When the VSD sends the current requirement back to the PLC, it calculates the required 'set speed' to optimise the energy consumption. Each press cycle is 75 seconds long, with the PLC changing set speeds at least 6 times during each cycle to optimise energy use. Spare capacity on the FX2N allows acceleration cycle times to be calculated, helping to improve energy efficiency even more.

Benefits of the new solution include the dramatic reduction in the interface requirements to the whole machine, greatly reducing additional hardware and construction costs.

Another major benefit is the extended life cycles of the motors on the extruders, as they have less mechanical load, which reduce the heat on the motors, giving less mechanical stress on the motor couplings.

The company's Facilities Engineer (and energy saving specialist), says of the LOS system "We chose to use Mitsubishi Variable Speed Drives as they are extremely reliable, very energy conscious, cost effective and well supported by their local Energy Centre partner, LC Automation.



We will easily see a return on our capital expenditure costs on the new system within 2 years and have produced energy savings of over 32% on the overall installed systems, equating to a saving of £34k per annum which certainly justifies the

system costs. During the trials, Mitsubishi's F540L VSDs were far more energy efficient than any of the other competitor products because of their faster reaction time to changing load demands".

The results from the pilot system, and subsequent roll out of the other new retrofitted LOS systems, have encouraged the company to expand its Energy Management Program. This will include integrated monitoring equipment and further rollouts to existing machines in other departments.

As part of the Energy Centres, EnergySMART initiative,

LC Automation also provide a wide range of support and specialist advice on issues such as energy audits, legislation, training and latest technology.

THE MELSMART ENERGY CENTRE
 P.O. Box 324, Travellers Lane, Hatfield
 Hertfordshire AL10 8WZ
 Tel: 01707 276100 Fax: 01707 278695
 e-mail: info@energycentre.org

www.energycentre.org



FAXBACK TO 01707 278695

I am interested in the following. (Please tick as appropriate)

- | | | | |
|-------------------------------------|---|-----------------------------------|---|
| <input type="checkbox"/> Free Audit | <input type="checkbox"/> Full Site Audit | <input type="checkbox"/> Leasing | <input type="checkbox"/> Trial Products |
| <input type="checkbox"/> Advice | <input type="checkbox"/> Power Management | <input type="checkbox"/> Training | |

Name: _____ Position: _____

Address: _____

Postcode: _____

Tel: _____ Fax: _____ Email: _____

The Energy Centre is a Mitsubishi Electric MELSMART initiative

If you do not wish to receive literature in the future please tick box here
 Data Protection Act: The information you provide will be held by Mitsubishi Electric Europe for use in direct marketing campaigns by Mitsubishi Electric Europe. If you do not wish to be included in such activity please tick box here.