



# Training pump-system experts for a measured ROI

UNIDO Pump expert Harry Rosen has begun to incorporate UNIDO's knowledge transfer approach into TAS Online and 2KG pump training courses in South Africa. He talks to *MechChem Africa* about incorporating practical site-based energy efficiency projects into training so as to create onsite 'junior' pump experts.

TAS Online and 2KG Training have been offering pump operation and maintenance courses for plant operators, managers, engineers, pump operators and maintenance personnel in process environments for many years. "Our courses apply to the water and wastewater industries, mine dewatering, sugar, pulp and paper and the chemical process industries and deal with clear liquids from water to fuels all the way through to viscous liquids such as bauxite, ash slurries from power stations as well as mill-circuit slurries on mines and the waste slimes being pumped onto the dumps," begins Rosen.

"Traditional training courses always include theory and practice, but they often lack a clear focus as to what the trainees need to be able to do by the end of the course," he says.

"Ideally, training needs to be able to prove a candidate's competence rather than simply issuing a certificate of attendance. In order to do that, one needs to be able to combine theoretical course material with real opportunities for candidates to implement what they have learned in a practical way. And this needs to

be directly relevant to the day-to-day needs of the plant from which each candidate comes," Rosen believes.

"So, depending on the industry, we as trainers need to find a specific practical project to enable trainees to apply knowledge and prove competence," he says.

A recently completed 2KG training course delivered by Harry Rosen in Secunda has achieved just that. "This training course culminated in an energy efficiency project to reduce the amount of energy being consumed by the plant's pumping systems and, as an ultimate measure, to reduce the amount of steam consumed by the plant," Rosen explains.

The Sasol Secunda plant has established plant-wide efficiency targets across its energy-saving projects, which are linked to incentives for all Sasol personnel. Through his experience as a global UNIDO Pump expert, Harry Rosen has been able to use these incentives to bring a new focus to 2KG's Pump Training courses.

The UNIDO energy efficiency programme promotes sustainable energy savings through a combination of onsite expert training fol-

lowed by implementing improvements to the plant: this while continuously transferring skills to the companies involved so that efficient operation can be sustained. "Expert training empowers plant personnel to identify energy savings opportunities and optimise their pumping systems, at the same time fixing site-based problems affecting plant reliability. A major focus is evaluating pump performance and putting in place measures to track and monitor ongoing energy and operational performance," Rosen says.

"After making recommendations, we teach local people how to implement these changes and operate their pumps at the best possible efficiency," he says, adding that over the years he has presented numerous UNIDO knowledge-transfer-based expert training courses in South Africa, as well as further afield in Indonesia, Thailand, Philippines, Malaysia and Russia.

This approach is now being introduced into 2KG training courses. "During the Secunda Pumps training course, we set as the practical project the identification of opportunities to save additional energy so as to contribute to meeting the plant's savings targets.

"Pumps offer a significant opportunity to save electrical energy on most plants. Some 15 to 20% of the energy consumed by electric motors is attributed to pumping, so massive savings opportunities can be identified," Rosen says.

The Secunda training followed a successful auditing and improvement project at Sasol's Phenol Solvent plant, where TAS Online was able to immediately implement R2.5-million per year in savings, with a further R8- to R10-million per year that will be realised once other measures are implemented.

"This proof-of-concept project successfully convinced plant managers that energy savings were readily available from their pumping systems. The Phenol Solvent plant pumps gas liquor at temperatures ranging between 80 and 140 °C and was designed some 40 years ago to use a single pump with a second backup on standby. Over the years production rates have increased and the plant began to use both pumps in parallel to achieve higher flow rates.

"Anyone who has attended a 2KG pumping course knows that running two pumps in a system designed for only one causes the friction head to increase and both pumps run at lower flow, which puts the operating point far to the left of the pump curve. Not only did this result in wasting 43% of the energy used by the motors, but the reliability of the pumps is also substantially reduced."

The solution? "Making changes to the system and flow control valve to allow a single pump to be operated on its own. In one system, a 27% efficiency improvement was achieved, saving in the region of 600 000 kWh/year. Along with another two systems in the same plant that reduced energy consumption by 32%, total savings of R2.5-million per year accrued.

"This case study formed a central part of the theoretical aspect of the Secunda Pump training course, exemplifying the real value of adopting the practical audit-based approach," Rosen informs *MechChem Africa*.

Efficiency saving and opportunities identified during training also have a massive additional benefit: better pump efficiency always leads to better pump reliability.

Rosen quotes Sasol's Jurgens Louw, senior engineer – energy efficiency: "Every opportunity identified has the potential to turn into a multi-million rand saving opportunity. Also, the meantime between failure (MTBF) of critical equipment is improved along with reliability and parts availability.

"Using a set of measurable KPIs established at the plant, pump operators and maintenance staff attending the course are enabled to easily identify opportunities for savings. Running a pump close to its best efficiency typically improves the pumps MTBF from as little as three months to over two years – and pump operators from the Sulphur and Tar, Gasification and Water and Ash plants can all benefit," Rosen notes.

2KG courses deliberately cater for the broad spectrum of people engaged in pump systems: process engineers; system designers; area managers; fitters; artisans; and maintenance personnel. "It doesn't help to remove a pump when it breaks, fix it, and put it back into service where it will most likely fail again. In many cases the problems are caused by the way the pumps are being used in the system. By targeting everyone's understanding of the causes of failure, a fitter who sees a high pressure gauge reading can alert the process engineer to a potential problem. And following a failure, they will ensure that the restored pump is being run at its optimal duty point to avoid a repeat occurrence. Long term, all role players need to be involved in order to sustain the efficiency and reliability benefits in the long term," Rosen says.

"Training in South Africa is also attracting a



Delegates at the Pump Operation and Maintenance course in Secunda.

lot more focus through the new B-BBEE legislation, which requires companies to spend a percentage of their revenue on training previously disadvantaged staff. This can be turned into a major opportunity for companies to both comply with new legislation, as well as address energy efficiency issues and realise cost savings.

"We at 2KG are striving to empower all

of the people involved to be 'junior pump experts', who know when a pump is not being run optimally and what to look for when trying to improve the energy efficiency and reliability of a pumping system. This is a far better approach to training than we have adopted in the past," concludes Rosen, adding: "It ensures that plant managers get a real and measurable return on their training investments." □

## Dura 5s and 7s advance HPLV hose pumps

The Verderflex Dura is the first real advance in hose pump technology since the high-pressure hose. The Verderflex Dura 5 and Dura 7 combine a close-coupled pump's compactness with traditional long-coupled pump benefits in superior high-pressure low volume (HPLV) dosing pumps.

Unlike traditional high shear pumps that reduce flocculent particle sizes and result in both increased chemical use and higher operating costs, the Verderflex Dura 5s and Dura 7s bring gentle pumping to sub-litre per hour flow rates. Off-gassing liquids, such as Hypo, often cause traditional pumps to vapour-lock, however, the Verderflex Dura 5 and Dura 7 readily pump these liquids with ease.

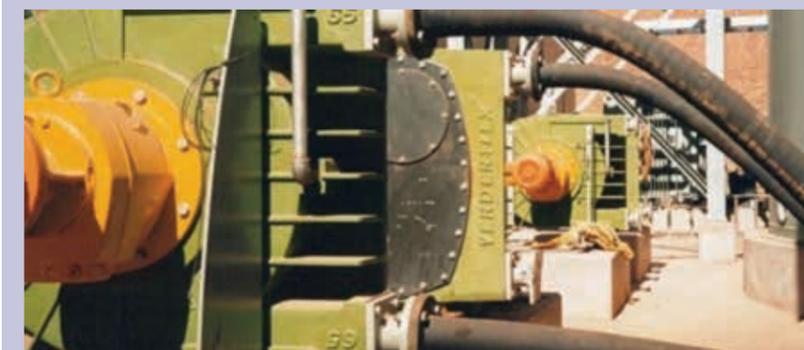
With no valves or stators to wear, Verderflex Dura 5 and Dura 7 can pump

lime and similar highly abrasive chemicals at pressures of 5 to 8 bar with minimal downtime.

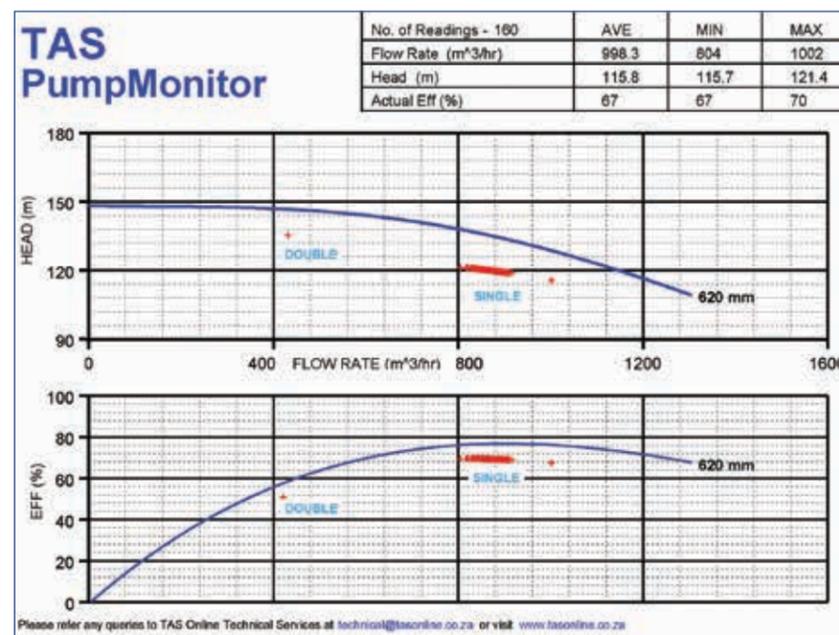
Other features of Verderflex Dura 5 and Dura 7 pumps include:

- Carefree dry running capabilities.
- No clogging maintenance costs.
- Long life, heavy-duty hoses.
- True dry priming, eliminating pre-wetting and priming.
- Superior secondary containment and viscous performance.

In addition to the above advantages, the simple-to-use Verderflex Dura 5 and Dura 7 provide scalable performance and low maintenance. They are an excellent chemical dosing solution for water-treatment, brewing and food industries with much lower operating costs. □



Verderflex Dura 5 and Dura 7 HPLV dosing pumps bring gentle pumping to sub-litre per hour flow rates.



Pump graphs showing the advantage of running a single pump, compared to two pumps in parallel. The pump is 20% more efficient in single pump mode, and its reliability will be dramatically improved.