"The best way to save money is to select the right pump of good quality"

Dr Ing Friedrich Wilhelm Hennecke is an authority on pump engineering being closely associated with the concept of life cycle cost (LCC) for a number of years. In 2001, as pump chief at BASF, he was co-editor of the landmark Guide to Pump Life Cycle Costs, jointly published by Europump and the Hydraulic Institute in the USA.
In 2005, he completed a detailed study in which the life cycle costs of the Hydra-Cell pump are compared with those of other pumps commonly used in metering and other process applications. In an interview with **Balakrishnan Nair,** Dr Hennecke dwells upon cost-saving alternatives to traditional process pumps. Excerpts:

The lifetime of the pump may be reduced due to several causes like ageing of parts, fatigue in spindles and foundation, paint deterioration of buildings, towers and vessels, and increase in discontinued products, etc. What are the factors that need to be taken into account while deciding the life cycle costs of pumps?

Life cycle costs (LCC) do not depend on ageing and repair costs alone. Life cycle costs are all the costs, which occur in the life of a piece of technical equipment.

For pumps the elements are:

$LCC = C_{ic} + C_{in} + C_e + C_o + C_m + C_s + C_{env} + C_d$

LCC = Life cycle cost

C_{ic} = initial cost, purchase price (pump, motor. auxiliary devices etc)

C_{in} = installation and commissioning cost

C_e = energy costs
C_o = operating cost (labour cost of normal system supervision)
C_m = maintenance and repair costs
C_s = down time and loss of production cost
C_{env} = environmental cost
C_d = decommissioning and disposal cost

Very often not the initial costs and not the maintenance and repair costs, but the energy costs are the highest costs.

The life cycle cost of a pump is determined by its use. Can pumps be classified according to life-cycle cost? How much does the life cycle of the pump depend on the fluid handling capacity and other applications of the pump?

Pumps cannot be classified according to LCC. First there is a task for the pump: the pump has to pump a fluid, which may be corrosive, high viscose etc. under specific conditions (flow rate, pressure, temperature etc. And the pump must be reliable. If several types of pumps can fulfill the task, LCC have to be compared. Important are the overall costs for a long time. You always have to make a comparison for the specific case. There may be good pumps, which are working in the wrong range, and therefore may cause high LCC.

How do pump life cycle costs become determining factors in the decision-making about plant design and purchase?

If the owner of a plant wants cost effective pumps over the time he is running the plant, than he will not buy cheap pumps but the pumps with the lowest LCC.

Repair costs greatly depend on ageing of pumps, because the cost of repair and updating are accrued according to the pump life. What kind of pumps do you feel are the potential cost-saving alternative to traditional process pumps?

Repair costs depend on the running conditions of the pump and on good regular maintenance. Condition monitoring may detect failures in an early stage and initiate repairs before a severe damage occurs. Condition monitoring also detects wear, which lowers efficiency and causes high-energy costs. Traditional process pumps are generally good (at least in Europe). But sometimes there is a new type of pump, for instance the Hydra-Cell pump, which has in appropriate circumstances much lower LCC.

What are the salient features of the Hydra-Cell metering pumps?

The Hydra-Cell shares some of the features of traditional (membrane piston) metering pumps and like them meets the performance and accuracy requirements laid down for metering pumps in API 675. Both are based on the principle of hydraulically balanced diaphragms. Both are seal-less pumps, able to handle abrasives, solids in suspension, corrosives and non-lubricating fluids that can cause repair and maintenance problems for pumps with shaft seals and other components vulnerable to rapid wear. Both types can run dry without damage.

Major points of difference are that the Hydra-Cell is simple in construction, less elaborate in design and physically much smaller for equivalent flow/pressure performance. These differences can substantially affect both purchase and operating costs. Multiple diaphragms flexing in sequence are incorporated in a single pump head, minimizing pulsation and avoiding or reducing the need for dampeners. The means by which flow is varied is also different. Instead of an inbuilt mechanism for altering stroke length, the Hydra-Cell relies on its linear relationship between shaft speed and flow rate. This allows flow to be controlled accurately by electronic means, via a frequency inverter. Automation is simpler, with lower control system costs and faster response.

What are the cost-effective solutions offered by Wanner International for its customers?

Wanner has introduced 'Hydra-Cell Metering Solutions' - described by the company as a complete system of pumps, pressure relief and back pressure valves, frequency inverters, reduction gear box, flow meters, calibration columns, motor drives and controllers to give customers a "shopping basket" to choose the right cost effective metering solution for their metering applications in the process industry. The system is designed for easy adaptation to customer needs.

What are the different risks that can be predicted in case of improper use of pumps and how can we relate the prediction with actual management practices of the company?

If you run a pump improperly, there will be high wear and bad efficiency. For instance, if a centrifugal pump runs below minimum allowed flow rate, there will be extreme forces on the shaft and on the bearings. This will cause damage, especially on mechanical seals.

A company can save money by buying cheap pumps and doing no maintenance. At least for a short time, for long term this will cause high costs for repairs and loss of production. The best way to save money is to select the right pump (flow rate, head) of good quality and run it properly with regular maintenance. ■