

# To trim or not to trim impellers

The question that was recently posed during an international webinar to Grundfos' senior technical training specialist, Kevin Anderson.

This might seem like a pretty basic question, said Anderson, but in reality not so much. "In the past, the only solution in many cases was to trim the impeller to make it work properly or to close a valve to achieve the right flow. But now, with the use of variable speed drives, we have found new ways of doing things."

The answer, he said, was simply not as obvious as one might think when it comes to trimming an impeller or opting for a variable speed drive.

According to Anderson efficient pumping solutions are of increasing importance in light of the growing focus on energy efficiency.

He said before even making a decision on whether to trim an impeller or not, the most fundamental of all centrifugal pump documents – the performance curve – must be understood.

"Being able to understand, read and interpret the pump curve is critical. It is packed with information that can be used as an aid in not only the selection and specification of the right equipment but also to ensure the equipment is operating as efficiently as possible."

He told participants of the webinar that with the host of information available from this document decisions can be made far easier on the choice of pump, driver sizing and power consumption strategies.

"The pump curve sums up performance and showcases the level of efficiency," said Anderson. "It also acts as a guide as to whether to trim the impeller or not."

## **Long-term solutions**

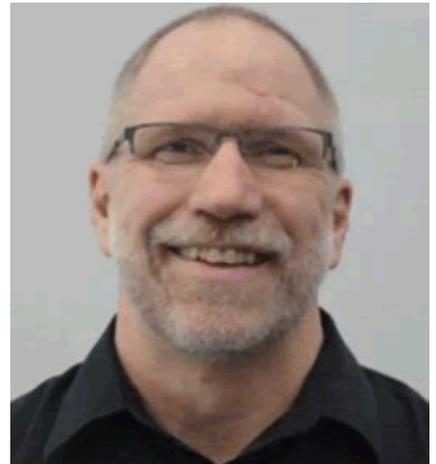
Anderson advised pumps and the performance be viewed with long-term solutions in place rather than focussing on the immediate needs and

requirements. Trimming an impeller can have an impact on this.

"A quick poll of this webinar audience, for example, shows that some 27% of people contact the manufacturer of the pump as the method used to size and select a pump, while some have said they use the product manual or online tools to do this," he said. "We have also determined in a similar poll that more often than not pumps are oversized for the operations they are required for."

Whilst trimming the impeller might seem like the most obvious and easiest of solutions for current pump needs, unfortunately if the conditions of service change to require more flow and head than originally specified, the trimmed impeller size would limit such flexibility.

Anderson said the impeller diameter is therefore not just arbitrarily chosen. With the pump performance curving at various impeller trims there are some guidelines to follow and to consider.



Kevin Anderson

Using an example of a pump with a current flow requirement of 1893 litres per minute and a future requirement of 2650 litres per minute, he said at face value a 45% cost saving could be made using a trimmed impeller at the original design rather than just using the original system, while a 50% annual cost saving could be made with a variable speed at original design.



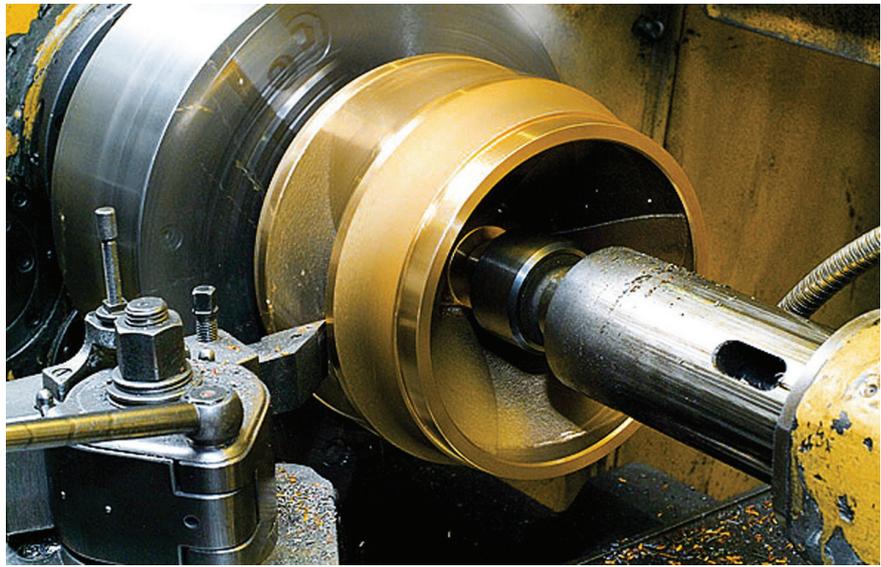
This, however, did not include all the costs involved.

“With a trimmed impeller one has to also consider the cost of the intervention in terms of the logistics required to do it. There is more than one aspect involved other than just comparing the graphs of a trimmed impeller to a variable speed operation,” he explained. “To trim an impeller the system has to be shutdown so there is the cost of downtime that must be factored into the equation along with the actual cost of the trimming.”

According to Anderson it is about factoring in all of the elements rather than just making a quick decision. “You have to consider what size pump you have, what size pump you require at the moment and what size pump you are going to require in the future, what is the labour cost of trimming an impeller and what is the efficiency achieved.”

He said comparing efficiency and cost over time the variable speed pump will show as more cost effective.

Calculations for his pump with a current flow requirement of 1893 litres per minute and a future requirement of



2650 litres per minute using an annual cost based on R1,33 per kWh and 3000 hours per year, show that using a single speed full impeller will cost R43 994 per year and R52100 at its full capacity.

“Trimming the impeller will bring cost benefits in that it will only have an annual cost of R24 307 at its initial requirement of 1893 litres per minute and R52 100 for 2650 litres per minute,” he says. “Variable speed costs

are R22 065 per annum for 1893 litres per minute and R53 136 for 2650 litres per minute.”

According to Anderson it is about accounting for all the variables before making a decision and then implementing.

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