

AN INNOVATION TO BLOW AIR OUT OF THE WATER

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In an EU supported innovation project, the Danish company KM Rustfri A/S has developed a valve actuator based on water hydraulics, offering several advantages over the traditional pneumatic activators. The new ‘Hydract’ activator has been successfully tested at Carlsberg’s Fredericia Brewery and was launched at the recent Brau Beviale in Nuremberg where SBR had the opportunity to both observe the significant interest in the Hydract from the big equipment manufacturers, as well as persuade the MD of KM Rustfri A/S, Peter Espersen, to provide this issue of the SBR with the following presentation.

For over 40 years, industries with hygienic requirements such as brewing have been using compressed air to operate their sanitary valves, and this remains the only acceptable solution available in the market – until now. Now Danish company KM Rustfri A/S has decided to finally take the plunge into challenging this status quo and develop a whole novel water powered actuator, with some help from the EU.

‘The idea of replacing compressed air with water hydraulics had been floating around the company for quite some time,’ explains Peter Espersen, the company’s managing director. ‘When I became MD in 2006, I decided to go forward with the idea. I got in touch with a company in Denmark called INNOVAYT A/S who advised me to seek funding from the EU, which was something I had never considered before. By 2007, we had put together a small group of business partners and got the project up and running.’

There are a number of advantages that using water hydraulics instead of compressed air in valves offers users, one of them being decreased energy consumption. Producing compressed air is an expensive process in itself, and there is also the problem of leakage. The extent of this problem is illustrated well by the standard procedures of Carlsberg, the Danish brewery; even when production is completely stopped, it is more

economical for them to keep their compressors running at 35 to 40 per cent constantly just to maintain pressure, such is the loss from small holes throughout the pneumatic control system.

‘It is no secret that controlling a valve using water instead of air is far more energy efficient; it is a very well documented and fully recognised phenomenon,’ continues Espersen. ‘Our tests and simulations have shown an energy cost reduction of approximately 70 per cent when using our actuator, and the EU has confirmed this.’

One of the major limitations with the design of actuators currently being used comes down to the flexibility of compressed air. The actuators work by using a very powerful spring that exerts somewhere in the region of 1,000 pounds of pressure on the valve to keep it closed. To open the valve, the compressed air is pumped in, forcing the spring back. The problem arises because both the spring and the compressed air have a degree of compliance, a bit like backlash, and this means that it is very difficult to know exactly what position the valve is in at any given time. Not only does this mean that there is a lack of control, but it also makes the valves susceptible to pressure impulses, which can lead to cleaning fluid contaminating the product, be it milk or beer. If this sort of contamination occurs,



potentially huge amounts of product have to be discarded, which can be very costly.

Espersen explains how the HYDRACT actuator tackles both of these issues: 'Water is incompressible and this means that we have a much higher degree of control over the valve, making it more stable, reliable and precise, and nullifying the chance of product contamination. The valve can be controlled with such accuracy that it can be used as a regulatory valve rather than just an on/off valve, so HYDRACT offers a much higher level of functionality'.

Another excellent facet to this actuator is that not only can it be used as a new valve, but it can also be retrofitted to an existing valve. This process takes no longer than five minutes and is no harder than untying one clamp, fitting the new actuator and refastening the clamp. Thus, the technology can be quickly and easily tested by potential customers, and costs next to nothing to install. On top of this, the control system from the existing unit linking the valve to the brewery computers can be reused, making it a very painless transition.

The creation of the new actuator has been a long process, and involved the creation of a consortium of people from a number of different countries.

The product has now been tested successfully twice at Carlsberg in Denmark, and the design module of the project has now come to an end. However, the product development is now entering a new phase and, with the support of the EU FP7 programme, is concentrating on performing a large scale-demonstration ahead of introducing the actuator to the market.

'The EU commissioner for the FP7 programme has recognised that there are a lot of projects in which consortia have

developed novel and potentially game-changing products or innovations, but that businesses, especially SMEs, need additional funding to help get the product launched successfully,' Espersen explains. 'Luckily, we have managed to secure 50 per cent funding for just that, so from now on the HYDRACT project will be focused on demonstration activities. Our plan is to launch the actuator this November at the Brau Bevale trade show in Nuremberg'.

'We understand that in offering an alternative to pneumatics we are challenging a solution that has been implemented all over the world, and so it will not be easy to break into the market. We know that tests have been done with electrical actuators, but apart from that we have seen nothing even close to our product. We have already submitted patent applications in a number of different countries, and are fairly confident in them being successfully granted'.

The multitude of advantages that this small but powerful product can provide to so many companies using technology that has been around for decades begs the question as to why this product has not been created already, but it just goes to show that sometimes the simplest ideas are the best ones. ◊

ABOUT THE AUTHOR

Peter Espersen is managing director and owner of KM Rustfri A/S. He is mechanical engineer by academic training and experienced in coordinating and managing large projects. During his career, he has possessed a wide range of positions within general management as well as project, technology and production management at Bang & Olufsen and Bundy Refrigeration.