

Press release

Contact **Ulrike Mätje**
Phone **+49 69 66 03-1296**
E-Mail ulrike.maetje@vdma.org
Date **September 9, 2019**

International Rotating Equipment Conference 2019
Opportunities outweigh risks in digitisation

Frankfurt, 9 September 2019 – On 24 and 25 September 2019 the International Rotating Equipment Conference will take place in Wiesbaden for the fourth time. At this industry meeting, manufacturers and users will have the opportunity to exchange information on the latest technological developments, areas of application and experience. Experience has shown that the conference is also a platform for a dialogue with science. In preparation for the event, the VDMA offers an expert discussion on important topics that are currently being discussed in the industry – with Prof. Dr. Andreas Brümmer from TU Dortmund and Prof. Dr. Paul-Uwe Thamsen from TU Berlin. The two scientists are the chairmen of the program committees for compressor and pump technology at the conference.

Digitization will be the central topic of the conference. Where is pump and compressor technology currently located?

Prof. Andreas Brümmer: Digitization is a process that is picking up speed more and more. Nobody in industry can afford not to participate. Digitization is increasingly affecting machines, from the design of a machine to its production, operation and recycling. In the past, for example, a compressor was switched on by a technician. He had to check the local instruments to see if everything was in order. Today, some of the information is still read on the spot, but at the same time it goes to a control room where an operator checks whether the compressor is running correctly or whether adjustments need to be made. The next step will be for the compressor to monitor itself and communicate with other components in the plant. So we move from manual to central to autonomous control.

Prof. Paul-Uwe Thamsen: In pump technology, digitization is far more important than networking production. In its application, the pump is always part of a pump system. In a complex infrastructure, many pumps can be networked with each other and with other components of the pump system and can thus

implement advantages for the entire pump system. There are new approaches for these tasks, such as machine learning, in-time optimization or fast data processing. The advantages are easy to grasp. For example, a digitally networked pump system can prevent flooding in a city during heavy rain, because the pumps always switch on where they are urgently needed.

One application benefit is condition monitoring, i.e. the monitoring of machines. Where can pump and compressor technology be found here?

Prof. Thamsen: Condition monitoring and the resulting support of availability and economy have long been the focus of pump users. Further progress will also be made here. However, the networking of components in the pump system also results in new approaches. The centrifugal pumps are integrated into the complex systems or networked with them. It should be emphasized that today's computer performance makes it possible to simulate the process of the entire system in real time and to use the results as a decision-making aid for control technology. This makes it much easier to eliminate malfunctions or achieve other economic goals.

Prof. Brümmer: The digitization process actually started here 30 years ago. Since then, compressors have been equipped with sensors whose signals have been processed in a computer. Now it goes one step further. The aim is to bring the different trades together so that they can communicate with each other. This is the path we are currently taking. This new type of condition monitoring, for example, has already led to new business models. There are compressor manufacturers who no longer sell their machines, but only rent them out. The plant operator then only buys a certain quantity of compressed air, for example. In order to optimize costs, the manufacturer then has to monitor his compressors remotely. If the manufacturer uses this method to monitor a large number of compressors worldwide in various plants, he has a large amount of data at his disposal. He can, for example, evaluate this data via digital processes such as AI and thus optimise the use of compressed air in each individual plant and, of course, optimise his machines to customer specifications.

Are the companies prepared to exchange data with an external manufacturer?

Prof. Brümmer: Yes, that works in this case. For many companies, compressed air consumption is not a relevant trade secret. In this respect, the operator can let these data go to the outside world, especially since the described model of purchasing compressed air can partly reduce his costs. If, on the other hand, the compressors are part of a process that represents a key competence in a company, I am rather sceptical as to whether the operator will give his consent to the data transfer.

Prof. Thamsen: The users of centrifugal pumps are usually very cautious. Of course, no chemical factory or refinery wants to give its process data to third parties and the situation is similar in water supply and wastewater disposal. Nevertheless, there is a need for condition monitoring for process plants, pumping stations, water treatment plants and sewage treatment plants, the data of which usually remain within the operators.

Interfaces play a major role in networking. How important are open interfaces such as OPC UA?

Prof. Thamsen: Networking the various components is actually the biggest challenge for implementing digitization. Operators will be looking for manufacturer-independent solutions. OPC UA is therefore certainly a step in the right direction. However, the current trend towards using the Internet or the cloud directly to facilitate data communication is also conspicuous. Many small companies that offer low-cost sensors and implement online networking with little effort are on the move here. These solutions are particularly interesting for smaller municipalities that are looking for a low-cost solution for monitoring and control of pumping stations or sewage treatment plants.

Prof. Brümmer: OPC UA is a good thing that should prevail. Defined open interfaces are very valuable. The goal is to agree on this standard across companies. Unfortunately, this is particularly difficult for manufacturers who hold a dominant market position and want to set their own standards on this basis. As long as this dominance does not exist, however, I believe that there is a good chance of introducing such a standard. In this context, customers can also increase pressure. It would be important for global players to get involved in the discussion and support the idea of OPC UA. The establishment of such standards would thus be significantly promoted.

Will open interfaces and generally stronger data exchange - even across company boundaries - make data security more difficult?

Prof. Thamsen: The question of data security always comes up. Of course, data misuse and manipulation must be prevented. On the other hand, we should not obstruct the added value of digitization - which does not work without data exchange - for fear of data theft. With regard to other industries, such as energy technology, traffic control and banks, a very high level of security in the processes already seems feasible today.

Prof. Brümmer: Absolutely! Digitalization offers opportunities and risks. This applies in particular to security. On the one hand, digitization can increase the security of processes by digitally recognizing more quickly that a plant is running out of a permissible range and thus becomes unstable. On the other hand, there is the risk that the digitisation of processes is only as intelligent as the person who programmed them. There are two directions here. Either the

programming is based on AI and thus on large learning data. In this case it is a statistical question which process data was used to train these AIs. There is a risk that the statistical basis for AI is too thin. Then it can happen that in a critical case, for example the failure of a central component, the digitization based on AI may not make the right decision. There may be a security risk. On the other hand, digitization is fundamentally a challenge for IT security. How do you protect against external attacks?

What other topics are currently occupying pump and compressor technology besides digitisation?

Prof. Brümmer: There is not one single topic, the industry is simply too broad for that. We have the vacuum world, we have the compressed air world, we have the process machines and every world has its own detailed problems. These detailed problems are increasingly coming to the fore because the machines are already very good in principle. If a manufacturer then wants to achieve an increase in energy efficiency or availability, he has to think more and more about detail problems. In addition to the topic of digitization, we will also have various presentations at the conference on various detailed problems, such as axial forces in compressors or the optimization of impeller side space pressures. It will also be about new materials, such as those that change dynamically during operation.

Prof. Thamsen: Energy efficiency is always a big issue. After all, centrifugal pumps are the number one in energy consumption. The energy is not consumed by the pump itself, but by the fluid system. This is precisely where the greatest potential for energy savings still exists, which can be exploited by analysing the operating mode and reducing system losses. However, many more technical advances will be presented at the conference. For example, new findings from research on characteristic curves, partial load behaviour, cavitation and new solutions for CFD and other simulation methods will be presented. Condition monitoring and availability of pumps will also be a topic.

What will the conference participants take with them?

Prof. Brümmer: What is always more important at the conferences than you think, apart from the quality of the lectures, is what takes place outside the lectures, the cooperation. Precisely because this conference brings together very different industries: Pumps, compressors, vacuum and compressed air. This is unique and one of the very important incentives to attend the conference. Where else can you talk to insiders from such different companies and find that they all have the same or at least similar problems? The cross-industry knowledge transfer at the conference works very well in the face-to-face discussions. In addition, it is always easier to ask for advice from someone you have already met in person, for example at this conference.

Prof. Thamsen: That's how I see it. At least as important as the high-quality presentations will be the opportunity to exchange ideas with experts from the industry. The exchange will be facilitated by the beautiful setting. One highlight will certainly be the dinner cruise on the Rhine. The many testimonials from different users are also important. Since the conference is traditionally used by universities to present current research results, it also offers a good platform for young scientists.

Around 750 participants from over 30 countries attended the "International Rotating Equipment Conference" in 2016, the world's leading conference for pumps, compressors and vacuum technology. The venue is the RheinMain CongressCenter in Wiesbaden. The extensive conference program with almost 70 lectures and 28 sessions emphasizes the application relevance. In addition, it offers a trade exhibition on around 700 square metres as well as participation opportunities for sponsors - available online at <https://www.introequipcon.com>.

The VDMA represents more than 3200 companies in the medium-sized mechanical and plant engineering sector. With around 1.3 million employees in Germany and a turnover of 232 billion euros (2018), the sector is the largest industrial employer and one of the leading German industrial sectors overall.