



## HYDRAULICS OF THE PAST AND PRESENT: FROM LEARNING-BY-DOING TO SYSTEM SOLUTIONS



**Dr. Dieter, hydraulics obviously existed before 1957, but there was hardly any technical literature and no particular trade journal. Where could those who were interested get information? What was it like at that time?**

**How did the regular publication of O+P Fluidtechnik improve the hydraulics industry and its users from 1957 onwards?**

Dr. Werner Dieter is a veteran of the international hydraulic community. He began his career in 1952 at Robert Bosch GmbH. In 1960 he moved to Rexroth, where he became Managing Director a few years later. In 1963 he was a co-founder of HYDAC where, at the age of 87, he is still active today as Chairman of the Advisory Board. For such a biography, it seems only natural to speak with Dr. Dieter about the past six decades of hydraulics.

There was already a book, written by Mr Dürr and Mr Wachter, which built on experience gained in machine tool engineering. In 1960, at the suggestion of Mr Otto Krausskopf (Publisher for O+P at the time), I wrote the "Öl-Hydraulik-Fibel" in collaboration with Mr Herbert Wittholz (Editor of O+P's first issue).

Shortly after that came the rather academic book by Kaimovic. That was also based on experiences in the machine tool industry. Otherwise it was very much learning-by-doing. We looked at existing solutions and tried to find what could be improved.

Straightaway you highlighted the importance of linking development and research areas with aspects of the application. Applications logically play a greater role here. Since then O+P has continued to focus on this, and I view the mixture very positively. Application technology and special solutions which people can use for their own purposes - this needs to be reported. And that is what O+P does.

**Let's look back for a moment. What was the hydraulics industry like 60 years ago – or even before that?**

**Were there any sort of uniform standards at the time?**

**What other milestones have there been in the German hydraulics industry over the past 60 years?**

Your trade journal is a reflection of the industry, which informs people of the latest developments. When reading it, you often come across projects by competitors and this leads to a discussion with your own team. I think that is very valuable and not even the Internet can replace this concentration of specialist information.

There was already hydraulics production in Germany before the Second World War, e.g. by companies such as Jahns Regulatoren in pump manufacturing. During the war Siemens developed and produced hydraulics for the aircraft manufacturing industry. When we began, we looked at Siemens gear pumps and thought about what we could learn from them. After 1945 came the restrictions and there was a break in development. The Marshall Plan then brought hydraulics from the USA to Europe. At that time American companies like Denison, Racine and Vickers took over the market.

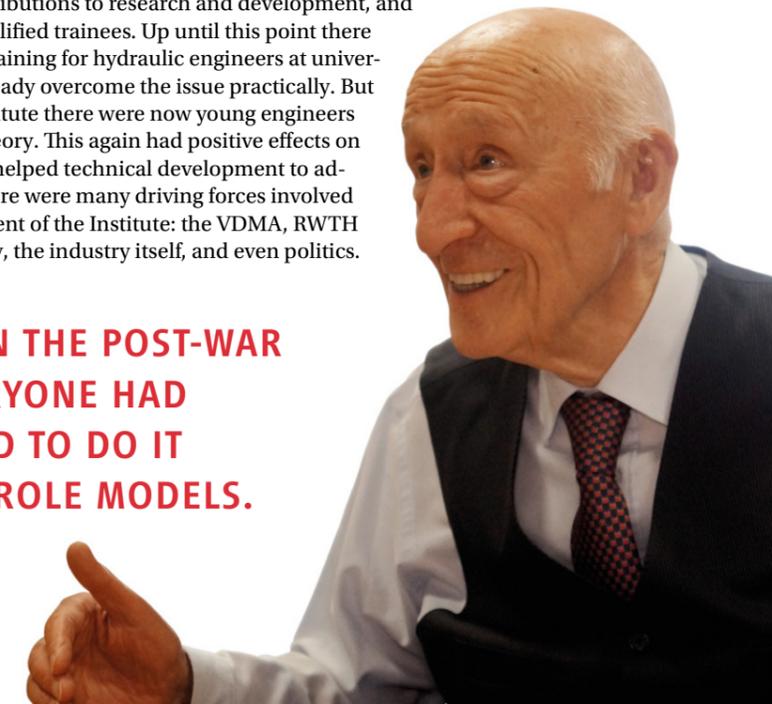
In terms of applications, the machine tool industry, such as the company Heller, and agricultural engineering primarily needed hydraulic components. American machine manufacturers established themselves in Europe and brought American pumps with them. They asked the German manufacturers to look at these and develop them further. This created ample demand, which promoted the development of the hydraulics industry in Germany. We must not forget the innovative strength of that time. During that period many German manufacturers attempted to enter the industry. Everyone had their own idea and wanted to do it better than the American role models. That included many small companies, particularly noteworthy being Kracht, Rexroth, Herion and Hawe from Germany, Sigma in France and Dowty and Towler in England.

Not officially. The standardised American connection dimensions were effectively the norm. And once the European manufacturers decided to adopt these, it meant they could produce a broader range of products with even higher quantities. With that came globalisation, and products could be more widely supplied, even abroad. Flexibility for machine manufacturers increased, which opened up new markets. Due to this standardisation and developments in gear and piston pumps, as well as control components, German companies were able to tackle the market internationally on a broad scale and strengthen their position within hydraulics. The American manufacturers underestimated this development to some extent, and were perhaps too sure of their position. German manufacturers significantly improved the quality of their valves, both in terms of pressure and general performance. That development allowed the German industry to establish a leading position first on the European market, and later on the global market.

Technically, the entry into proportional technology was of major importance. The German industry had a head start over foreign manufacturers, and this secured us a large part of the global market.

In the 1960s and 1970s German hydraulics started to venture abroad. First we set up sales companies, and later assembly and production followed. Today German hydraulic manufacturers play a leading role internationally. Also of great significance was the establishment of the Institute for Hydraulic and Pneumatic Drives and Controls (IHP) at RWTH Aachen under the direction of Professor Backé in 1968 (today the IFAS). It made outstanding contributions to research and development, and also provided qualified trainees. Up until this point there was no focused training for hydraulic engineers at universities. We had already overcome the issue practically. But thanks to the Institute there were now young engineers also trained in theory. This again had positive effects on the industry and helped technical development to advance further. There were many driving forces involved in the establishment of the Institute: the VDMA, RWTH Aachen University, the industry itself, and even politics.

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**Have there been any failures in the German hydraulics industry within the past 60 years? What could have been done better?**

**In the foreword of O+P's first issue in June 1957, Ludwig Erhard, Minister of Economics at the time, wrote: "When used appropriately, hydraulics and pneumatics can lead to considerable material savings and simplifications in the construction of machines and units". Do you think this is still true today?**

**What else will change in the coming years?**

Even today this is still one of the greatest challenges when it comes to international competition: we need to make sure that universities produce qualified trainees. HYDAC therefore actively supports appropriate institutions, whether it's endowed professorships in Karlsruhe or traditional institutions such as in Aachen and Dresden for example, or foreign institutions, e.g. in Scandinavia.

You can always look back and regret things, but I don't think we can criticise ourselves for much. If you look at the markets you can see that the German hydraulics industry technically holds a leading position globally, both in industry and in mobile hydraulics. Technically we are the benchmark in many sectors. German hydraulics progressed quickly – the competition within Europe helped this – and competently established a global market position.

That is true, even today. Over the last ten to twenty years the industry has taken a leap forward – mainly due to the development of proportional technology and its connection with electronic control systems and sensor technology. An enormous field of development for hydraulics opened up in this sector and we knew we had to use it. Linking electronics and hydraulics will provide further potential. The old mantra still applies: electronics is the brain, hydraulics is the brawn.

The search for system solutions also leads to ever greater advances. Leading companies are combining their hydraulic and electronic expertise and developing further: from component suppliers to solution providers with engineering expertise in the respective application. I believe that is the future.

Obviously there will be further improvements when it comes to components, but these products have already reached a certain level of maturity. The great advances are to be found in systems and solutions. For example, at HYDAC we have a test facility where we can regularly welcome leading OEMs who provide us with their machines, requesting that we search for optimisation potential with our entire portfolio. The progression of hydraulics lies in complete solutions for machines. Outstanding component quality and ongoing development are both expected by the market. Systematic thinking, knowledge in electronics and software as well as knowledge about the application, is the challenge of tomorrow

It's all linked to the change in requirements we've just spoken about. The job description will change. Hydraulic experts will also be responsible for electronics in many areas. The frequently expressed concern "What's next for hydraulics?" applies to every sector. We've had to compete with electricians in some areas of application, but at the same time we've opened up new fields to a greater degree. It is crucial to identify developments in good time and, with the help of hydraulics, provide solutions which benefit the operator. That way you gain access to new business areas. Having said that, there are applications which simply can only be solved using hydraulics, for example heave compensation at sea. However, people remain the basis for this: without driven and motivated employees, no industry will progress.

[www.hydac.com](http://www.hydac.com)

*Interview conducted by Michael Pfister and Peter Becker from the O+P Fluidtechnik editorial team*

## ABOUT HYDAC

In 1963 Dr. Werner Dieter was a co-founder of what is today HYDAC International GmbH. Founded at the time as a supplier, HYDAC is now a comprehensive solutions provider with expertise in electronics, hydraulics and software. For example, the company presented the MATCH development environment at the Hannover Messe trade fair: It links system definition, application programming, simulation/test and commissioning.

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