

On the potential and sustainability of water hydraulics

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The Corona crisis and climate change pose new challenges. Political promotion of the economy in Germany and the EU now deliberately includes environmental and climate protection. Water hydraulics can contribute to the implementation of the political goals that have been set.

We are at a societal turning point, where we have to deal more intensively with issues of environmental protection and sustainability. In many industrial sectors, there is a rethinking towards environmentally friendly processes, renewable energy and more sustainable materials.

This development does not stop at hydraulics as a drive technology, and so there are multiple efforts to replace the mineral oil currently used as standard with more environmentally friendly and sustainable alternatives.

However, our highly competitive industries find it difficult to justify increased investment and operating costs just for environmental protection.

What can be justified in terms of price increases in the consumer goods sector through a sustainable image and good marketing can only be implemented in many other industries by means of legal requirements or incentives.

First steps for legal regulations for more environmental protection in hydraulics

Efforts and first steps for legal regulations for more environmental protection are already in place.

For example, the use of environmentally friendly hydraulic oils in forest machines is regulated by certificates and has been mandatory for years. Other industries should follow suit in the next few years and enable the widespread use of environmentally friendly fluids despite economic hurdles.

Further development of water hydraulics only in a few areas

Due to the high power density of hydraulic systems, the medium mineral oil has largely established itself in hydraulics. Due to the technical advantages of mineral oil over other fluids such as water, the focus in the hydraulics industry, both in system and component development and in research, was largely on oil hydraulics in the 20th century. New, less polluting oils were developed, but water hydraulics, the origin of power transmission through fluids, has seen little further development.

Advantages: flame retardancy, environmental compatibility, atoxicity

Water-based hydraulic fluids are currently only used in areas at risk of fire where a high level of safety in terms of flammability is required. Aspects of the environmental compatibility of the basic medium water have so far often been left out. In addition to the advantage of non-flammability, the atoxicity is also a good argument for further development and wider use of water hydraulics.

Additional advantages of clear water are the high worldwide distribution, good availability and low costs. These properties of water are already leading to widespread use in application areas such as the food and pharmaceutical industries, descaling systems and mining.

Increase in research activity

In recent years, research and development in water hydraulics have increased again. The development of new materials and fluids is constantly being promoted in this area. An important goal is to achieve the pressure ranges of oil hydraulics with compact drives also in water hydraulics. The main focus here is on replacing the often oil-lubricated drives in clear water hydraulics with compact, self-lubricated drives.

The development of innovative additives and thickeners plays a crucial role in fluids. Attempts are made to use environmentally friendly and bio-based products for fluid formulation with clear water.

Conclusion: water hydraulics very promising

With regard to the promising topics of sustainability and environmental protection, water hydraulics are very promising. The establishment of water hydraulics is conceivable in the future in other areas as well as in today's application areas such as mining.

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