

An industry on the precipice of change

Changing application demands and regulations, a new generation fueling the workforce and innovation are driving the hose and hydraulics industry evolution

Hose and coupling systems are the arteries of many hydraulic, industrial, and engine applications across multiple industries, including agriculture, heavy manufacturing, and construction. Modern application demands have increased and government regulations have introduced new challenges for these applications and industries. At the same time, materials and processing are advancing to extend and introduce new product capabilities into the market. Add in a digitally-native millennial generation that is entering the fluid power workforce, and you have the makings of a disruptive industry evolution fueled by innovation and technology.

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Agriculture applications like the one depicted above commonly use hydraulics.

Changing application demands driven by equipment innovation

Across industries, hose and coupling application demands are morphing, driven in large part by higher-performing equipment with increasing features and capabilities. That same equipment is also decreasing in size and becoming more compact. This creates greater capability expectations and loading of hydraulic systems while also increasing the premium for packaging space. The results are often increased pressure requirements, more complex hose assembly routings or different coupling solutions in order to make connections or service equipment. For example, hydrostatic drives are not new by any means, but they are being used more frequently in applications because of

advantages in speed control and efficiency. These drives can present routing or serviceability issues while creating new application-specific performance requirements.

As the cost of equipment or the value of the equipment output increases, taking equipment out of the field for repairs comes at a higher cost. That can change the design criteria for determining which products to apply and their expected longevity. Although that can sometimes increase the costs, longer life in hydraulic hose assemblies can usually be achieved through smarter routing or application expertise.

There are new hose and coupling challenges outside of hydraulics as well. For example, emissions regulations have





Coolant hoses have become increasingly complex with multiple branches and connections.

driven adoption of Selective Catalytic Reduction (SCR) systems which require heating to thaw frozen Diesel Emission Fluid (DEF). The market is growing and evolving as the first and second generation of applications are better understood and further refined for better performance, simplified constructions or addressing specific application issues. Early SCR systems – beyond just the hose and couplings – have improved with streamlined designs enabled through broader field-based application insights and improved test methods.

Staying with non-hydraulic applications a bit further, coolant hose assemblies are perhaps the best representation of changes being driven by both increasing equipment content and regulations. In an effort to become either lighter or

more aerodynamic, engine compartments are becoming smaller, while at the same time the number of features or systems in equipment is increasing. More content with less space drives the need to evolve from a simple, one-piece curved hose to complex modular hose assemblies.

Going beyond traditional standards

Faced with these changing application demands, hose and coupling manufacturers must rise to the occasion and look beyond traditional standards to develop products that meet actual performance criteria.

The historical challenge for manufacturers has been to ensure their hydraulic hoses not only withstand the pressure and impulse cycles, but also at a specified minimum bend radius (MBR) and operating temperatures. Hose and coupling manufacturers often tout their product capabilities in these terms, but the consumers aren't always knowledgeable about the nuances of testing parameters and how their real-world application is represented by these laboratory tests. What many high-volume consumers value is the repeatability of hose assembly performance over time which requires tight manufacturing controls, sound engineering design and a commitment to process improvement.

While regionally focused standards still play an important role in helping consumers specify products, the International Organization for Standardization (ISO) standard ISO 18752, for example, distinguishes performance through



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multiple levels of impulse cycle performance and operating temperatures. This allows manufacturers to differentiate their products on a more demanding application scale.

Another area of change can be seen in hose construction. As the performance parameters continue to increase, a robust, engineered hose/coupling system is required to avoid leaks and other performance issues. Traditionally, specifications dictate construction requirements used for coordinating hose and couplings. As ISO 18752 is further adopted, this allows for construction agnostic designs that focus on performance criteria, which allows the manufacturers to find the most innovative way possible to meet performance requirements while extracting additional benefit for the end user.

Equipment manufacturers are also continuing to evaluate their applications and weigh the benefits of tubing versus hoses. In some cases, choosing a hybrid hose-tube combination is a strong option for a variety of reasons, including reduced installation time, serviceability, or access issues, appearance, routing access, and others.

The rise of digitalization and data

Another area that demonstrates proof of an evolving industry is in the digitization of critical data. For example, crimp data was previously provided in a printed format and not continuously updated. Now, online databases have made that critical, current information easily accessible by operators at all times. This has also presented an opportunity for hose and coupling manufacturers to devise innovative ways to deliver that data to the crimper operator. The availability of this data and connectivity of equipment will offer transformational opportunities within the industry – some of which is already being seen.

Modern equipment also has increasing capabilities in terms of data collection, inter-component communication and overall application tracking. Tractors can monitor field conditions, equipment health and crop viability. Skid steers can assess time in the field, fuel burn and equipment efficiency to reduce total operating costs and minimize reactive maintenance time. Access to this data presents an opportunity for enhanced field issue evaluation, proactive replacement cycles or inter-connectivity of component “health.”

Empowering a new workforce

The final component of the evolving industry is the emerging workforce. Millennials (and eventually Generation Z) are moving into new positions as experienced generations of workers retire. The competencies, education, and experiences these employees bring to the positions vary from what we’ve seen in the past. Employee turnover is expected to be more prevalent in the hydraulic hose and coupling industry at distributors, factories, and plants that are largely dominated by employees nearing retirement.

The next generation is expected to be much more transient in their careers – both from a company tenure perspective and in terms of changing industries. Simplification and error-proofing – of product, process or both – will enable the next generation to be more impactful. They also have



Hydraulic hose and coupling interface is highly engineered and critical to assembly performance.

experiences and expectations around digital interfaces – for equipment operation, simple selection, and additional training – that must be met.

In addition, the new workforce will be much more inquisitive, challenging status quo, and finding new, innovative solutions to processes – perhaps leveraging technologies from other home or industrial applications. They rely less on personal networks and relationships, and more on social media and the internet for information. Tapping into this pipeline of new thought will be an important step in modernizing the industry.

The future of the industry

So, where does this all lead us? How will our industry look in 5, 10, 20 years?

Hose assembly will become more and more automated, eliminating the potential for human error and increasing efficiency. Performance demands will continue to intensify, requiring increased hose performance and longevity likely driven by materials improvements not yet available to the industry.

And finally, hose specifications will converge and eliminate a reference to construction, instead allowing customers a simplified decision based on parameters important to their application. This simplification will also drive down the inventory carrying requirements of the industry – for manufacturers, distributors, and consumers.

As this industry continues to evolve and progress, the sky is the limit to what we can achieve together when we move technology and a workforce forward in order to meet the changing demands of applications yet unknown.

ABOUT THE AUTHOR

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