

Couplings: Designed to Carry the Pay(load)

Jack McGuinn, Senior Editor

Couplings. There certainly is no shortage of couplings—or things to couple them with. There also seems to be no lack of applications for them. You say you need to reduce the transmission of shock loads from one shaft to another? That's a classic application for shaft couplings; but really, couplings are application-intensive. They're everywhere.

A coupling is defined as a device that links two shafts together at their ends for transmitting power. If designed and installed correctly, couplings do not typically allow disconnection of these shafts during operation. However, there are—and this is just *one* example—torque-limiting couplings that sometimes slip or disconnect when things get too, well—*torquey*—and a specified limit is exceeded. Indeed, the primary purpose of couplings is to join two pieces of rotating equipment while permitting some degree of misalignment or end movement—or both. (Think of coupled rail cars and how they bob and weave their way down straight and curved track.) By careful design, best-for-application selection, and expert installation and robust maintenance of couplings, significant savings can be realized in reduced maintenance costs and downtime.

A partial list of coupling types includes:

Clamped or *compression-rigid* couplings are bi-sectioned and fitted around a shaft, thus forming a sleeve; *flanged rigid* couplings are intended for heavy loads or industrial equipment; a *sleeve* coupling is a pipe with a bore finished to the tolerance needed and to accommodate a specified shaft size; sleeve couplings feature case shaft ends that are, yes—*coupled* and fixed against each other and then encased by a *muff* or *sleeve* coupling.

Meanwhile, IMTS fever runs rampant, with exhibitors busy strategizing, finalizing booth design and doing

whatever else it takes to ensure a good showing. But in an attempt to obtain a better grasp of today's coupling technology and some industry insight, we were very lucky to catch up with a couple of gracious-but-busy guys that made some time to answer a few questions for us. That would be John Malik, Altra Industrial Motion, couplings business development manager, and Andy Lechner, R+W America product manager, flexible vs. rigid Couplings.

Just to get it out of the way, we asked the current elephant-in-the-room question.

How are the tariffs—real and threatened—and other ongoing trade machinations affecting your business and or industry?

John Malik (JM). Tariffs are driving cost increases for raw materials used by domestic manufacturers. In some cases, this puts domestic production at a further disadvantage vs. imported finished components which are not subject to tariffs. In addition, the tariff implementation requires significant resources to determine and pass along the resulting price increases. On the other hand, due to the tariffs, we've seen increased business as domestic metal mills ramp up their production.

What if any supply chain issues have arisen due to the tariffs and trade war back-and-forth? (With supply chain meaning either materials availability or available strategic manufacturing partners like, for example, machine shops and/or power transmission components?)

Andy Lechner (AL). Most likely the other commercial issue aside from potential tariff issues you don't need to hear about is the strained supply chain. It's hard to find a machine shop or power transmission component manufacturer that isn't really



ACV tri-bushing from Altra Industrial Motion (photo courtesy Altra Industrial Motion).

busy right now. But that's not limited to couplings.

JM. The first issue has been reduced supply availability because companies are buying and hoarding material in advance of tariffs. We are also seeing escalating raw steel costs. Re-shoring of production, where it makes sense, is consuming available machining resources internally and at subcontractors.

There appears to be increasing demand from certain sectors of the marketplace for both higher speeds and torque—pushing the application envelope, in fact. How is your company dealing with that?

JM. Our recent coupling product development initiatives have been focused on increasing capacities to meet these demands. We've recently increased the torque capacity of our Sure-Flex Plus elastomer couplings by 30%. We also frequently alter our gear and disc coupling products to accommodate higher torques and speeds. Applications requiring these performance increases seem to happen more frequently as time goes on. In our high-performance disc coupling range, our new patent-pending Tri-Bushing technology allows for a 33% increase in axial misalignment

capacity. This improved capability is critical in higher speed and torque applications using steam or gas turbines.

AL. One of our niche industry sectors, rotary test stands for automotive, aerospace and power generation applications, is constantly pushing the demands for high speed and high torque. Coupling speeds which we had historically only seen for lower torque applications continue to climb into larger transmission components. This can dramatically increase the required surface speeds for larger diameter couplings, and is requiring lighter materials, full speed spin testing prior to delivery, and more creative design in general.

It has been reported that certain coupling speeds typically needed only for lower torque applications are now being specified for larger transmission components. How does that affect your business?

JM. We have seen steadily increasing demand for couplings in the larger end of our product ranges. This has required us to develop larger sizes in some product lines. It's also driven significant investment in manufacturing capacity and technology as outsourcing options are more limited in larger size ranges. Higher operating speeds are driving demand of higher precision products with tighter fits, dynamic balancing and other modifications.

The popularity of full-service, one-stop (vertical) suppliers continues to grow. Do you find that to be accurate, and if so how is your company dealing with that?



This high-temperature, precision elastomer coupling's stainless steel mesh inserts allow for compact solutions (Photo illustration courtesy R+W.)

AL. We are also encountering increased demand for full service supply. This means providing minor hardware like accessory shafts and keys, as well as complete inline coupling housing / motor mount kits, and fully designed belt drive housings. This has been working out well for R+W America thanks to our new location with increased space, and our increasingly hands on technical staff. This trend of consolidating suppliers into packaging increased portions of a system is not new, but seems to be increasing.

JM. Altra Industrial Motion has continued to grow our portfolio of coupling product solutions. In recent years, we've added Guardian Couplings and Stromag to our family of world-class coupling brands that also includes TB Wood's, Ameridrives, Bibby Turboflex and Lamiflex.

Many of the larger scope projects we get involved with require a variety of coupling types to meet a wide range of specific application requirements. Our goal is to provide customers with optimized product performance combined with time-saving, single-source convenience. This capability is especially important when dealing with customers that have operations around the world.

Another advantage of Altra's multi-brand approach is that the engineering teams from various coupling brands routinely collaborate to analyze specific customer applications and then apply the latest technologies in design, materials and manufacturing. This added engineering depth provides value to our customers as it yields optimum coupling solutions more quickly, whether a modified standard product or a custom solution is required.

We have been successful as a one-stop supplier in key industries including Petro-Chem, Metals, Power-Gen and Oil & Gas with products in virtually every category of flexible couplings. We are also more focused on repair and renewal services.

In heavy-duty industrial applications, there are reports of a growing reliance on modular ball-detent torque limiters, rather than the more traditional means of protecting against overload damage in high-powered drive systems. As more production capacity is being used, the downtime to replace shear pins and reset less advanced overload devices becomes more of an issue. As self-contained, mechanically resettable torque limiters reduce downtime after overload disengagement, their value is increasing. Could you please respond to this assessment?

JM. We agree with this assessment. We have seen large increases in sales of our Bibby Modular Torque Units. These units have been designed specifically to offer an alternative to shear pins where their accurate release torque repeatability reduces downtime. These torque limiters can be factory preset or set in the field and can be combined with many of our flexible coupling products.

AL. On the heavy duty industrial side of our business, we're seeing increased usage of modular ball-detent torque limiters instead of traditional means of protecting against overload damage in high powered drive systems. The downtime to replace shear pins and reset less advanced overload devices is becoming more conspicuous as more production capacity is being used. Since one of the key advantages of a self-contained, mechanically resettable torque limiter is reduced downtime after overload disengagement, their value is increasing under favorable economic conditions. **PTE**

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