

DRIVE

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Couplings Put to the Test

PAGE 6

Covering the Markets
as a Team

PAGE 7

The World of Automation

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Under Realistic Operational Conditions

Dear readers,

without training for it, you would not dare to climb Mount Everest. It would obviously be foolhardy to do so. Without adequate preparation you would not manage the ascent. In any event you would put your life at risk if you did not train under realistic conditions. In order not to have to permanently go to your physical limits on the mountain, you need to prepare so that you always have something in reserve to cope with extreme situations.

It's a similar story with components in heavy-duty use, for example in power-generating wind turbines. Here outages would be disastrous, therefore all the relevant components need to be thoroughly tested under realistic conditions beforehand – including sufficient safety-margin reserve capacity, to cover all eventualities. Special test rigs, which can simulate practical conditions with a high degree of repeat accuracy, are available for this purpose. You can read about how specially developed R+W solutions are helping in these situations from page 3 onwards.

We would like to use our preface to this edition of Drive to thank our readers for their superb collaborative efforts this year and wish all the best for 2015 – R+W's anniversary year.



Jörg Stang



Jörg Stang, Sales Manager

In this issue:

02 Contents & Editorial

03–05 Products & Innovations

Couplings Put to the Test

06–07 R+W News

Covering the Markets as a Team

The World of Automation

Couplings Put to the Test

Where precision determines safety and efficiency, backlash is a no-no. Measurement process inaccuracy cannot be tolerated, especially in the case of test rigs on which features have to be reproducible. Special solutions developed by R+W show how this pans out in practice.

Test rig measurements are vital for testing the limits of newly designed components and subassemblies as well as for repeatedly guaranteeing requisite technical performance characteristics under dynamic conditions, especially where exceptional requirements apply. Here components are subjected to testing under normal operating conditions or in extreme circumstances to ensure they meet safety and functional standards, even in exceptional situations. Readings must be reliably accurate and must not be influenced by external factors.

Here's a practical example: a test rig operator complained about inaccuracies. When measuring torque, mass moments of inertia caused imprecise readings. The reason for this was a steel disc-pack coupling made entirely of steel, the weight of which resulted in unwanted torsion and vibrations.

Customized unwillingness to compromise

"This is where we came into play: we were contacted, given our strengths in developing specific custom solutions", Jörg Stang, Head of Sales at R+W Antriebselemente GmbH, relates. "We have already developed special solutions covering many aspects of test rig construction where mass moment of inertia has caused problems." Lightweight design re-

duced the impact of these problems in a range of different applications. In this specific case there was only a small installation space available. Mounting length and diameter specifications had to be complied with and torsional stiffness and torque requirements had to be met.

Following several technical experiments to check torsional stiffness and the required torque, R+W developed a solution in the form of a double-flex steel disc-pack coupling (see sketch on page 5), whose variable spacer tube and hubs are made entirely from high-performance aluminum. Both the coupling's shaft and hub connections are fitted with a double-slotted clamping hub and flange detail. The smart modular principle, on which R+W couplings are based, enables a wide range of different hubs to be combined. The weight of the proposed Series 700 LP2 was reduced by approx. 1 kg by using high-performance aluminum. Despite the lighter material, R+W's design engineers achieved the torque required by the customer and the necessary torsional stiffness. The conventional specification of the steel-made coupling states rated torque at 350 Nm and maximum torque of 700 Nm at torsional stiffness of 220×10^3 Nm/rad. The newly developed design features a slightly reduced maximum torque – the required rated torque >>



has been exceeded by a long way. The problems caused by moment of inertia that previously arose on the customer's test rig have been significantly minimized and the desired degree of test reading reproducibility achieved.

The design of the disc-pack coupling provides a further benefit for the customer. A frictional-engagement, force-locked connection between the hubs and the disc pack allows it to utilize the entire rated torque as well as the maximum torque, even in reversing mode. This allows the customer to use a torque-specific coupling and avoids the need to offset any loss of rated torque in reversing mode by employing a larger coupling. This contributes considerably to cost efficiency and in energy terms the drive train can be configured to minimum.

Torque up to 840,000 Nm

R+W couplings need to meet some of the most stringent standards when used on heavy-duty test rigs for wind turbines. The generator and all drive elements need to be able to withstand immensely powerful forces in order to perform to the required level of cost-effectiveness. All components are resilience-tested on special test rigs in a controlled environment and pushed to their limits.

The test rig has to be able to generate and withstand every possible stress scenario and be guaranteed to repeat the required performance characteristics during dynamic operations. This requires absolute long-term reliability and a high degree of precision when measurements are taken. At certain

points on these heavy-duty test rigs, the torque limiters have to be able to withstand maximum torques of up to 160 kNm and the torsionally stiff connection shafts need to cope with peaks of up to 840 kNm.

R+W addressed two separate issues: an overload coupling is required to ensure the transmission's stall torque. "The extreme-load-generated frictional heat to which some components are exposed is so high that in the event of a jam the entire wind turbine may not only be seriously damaged, but could even catch fire", is how Jörg Stang illustrates the need for perfectly customized couplings. "The coupling needs to be able to sever the engine/transmission connection within just a few milliseconds." The ST range of ze-



Operation in high performance test-rigs for wind power stations: torsionally stiff connection shaft based on the BX industrial drive coupling series



Covering the Markets as a Team

International Sales Meeting in Niedernberg

Sales staff from nearly 45 countries met up last summer. Co-workers from the global sales network regularly compare notes and on this occasion they spent several days in the Bavarian town of Niedernberg, close to R+W's headquarters, renewing international relationships with

colleagues and representatives from various countries and making new contacts. Staff talked about their experiences in various customer industries – what are the current challenges in these industries? How can one help to meet these challenges now and in the future? “How can we

be more closely involved with customers and their requirements?”, was how Frank Kronmüller, Executive Vice President and Authorized Officer at R+W Antriebselemente GmbH, formulated the key issue. By focusing on customers and their needs, the international network was energized and sales staff used this opportunity to take a shared look at future product developments.

In addition to technical discussions and presentations, the meeting provided a great opportunity to communicate on topics other than the daily work routine. ■



R+W's global sales team

The World of Automation

Successful trade fair showcase at Motek in Stuttgart

To remain competitive, companies these days have to meet high standards of efficiency, quality and flexibility, whilst keeping costs as low as possible. In many industries plant automation is the imperative key to success and a company's continued existence. Motek 2014 kicked off based on this premise, which has gained considerable prominence during the last few years.

A wide range of exhibitors at the international trade fair for production and assembly automation in Stuttgart focused on zero-hitch operations and managing highly engineered systems/plants.

State-of-the-art systems, which meet increasingly stringent requirements, are dynamic and deliver precision – especially if robots are used. Here any slack in the system jeopardizes positional reliability and synchronization. Couplings play an important role in meeting these high standards.

R+W had a successful trade fair, during which many customers and potential customers visited the booth. Existing relationships were nurtured and new contacts, which the company is sure to see again at Motek 2015 and in between times, were made. ■



The R+W booth at Motek provided the space for conversations and communication on technical subjects with decision-makers.

DO YOU ONLY BELIEVE WHAT YOU CAN SEE WITH YOUR OWN EYES?



Our protagonist takes you on a tour of the world of metal bellows couplings – state-of-the-art metal bellows couplings. As a market leader we are constantly enhancing our range of options and designs. Curious to find out more? Then take a close look:

www.rw-kupplungen.de/news/videos.html





Thank You

for the teamwork!

All the best

for the New Year!

Order the Catalogs



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