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Platzhalter
297.0mm x
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Opportunity and potential

Dear readers,

"With 1.2 bn people and the world's fourth-largest economy, India's recent growth and development has been one of the most significant achievements of our times." This quote taken from the World Bank's India Country Overview from 2013 indicates the rising significance of India as a country in the global community and as an emerging economic super power. Many experts expect India to become one of the three leading economic powers by 2050.

It's a long and rocky road to get there. But the current Indian government has got the ball running with, e.g., reforms to boost the country's infrastructure or initiatives to encourage the use of energy efficient technology. Of course, this has positive consequences for the drives and hydraulic markets – both in regard to the rising demand for technology supplied by foreign companies as well as for the manufacturing sector in India itself.

This expectation is shared by our experts in this issue of MDA TECHNOLOGIES. For instance, Paladugu Srinu, Senior Manager Voith India, states that the expected addition of power plants in order to meet India's growing power need may benefit drives manufacturers. Hydraulic specialists are in demand to respond to the needs of construction equipment manufacturers as India's construction market is forecasted to become the third-largest in the world by 2025. India's role as an emerging economic giant is reflected by its selection as partner country of Hannover Messe 2015, too. As you can see, there is huge potential for engineering technology manufacturers in India. Therefore, it might be beneficial for you to travel to New Delhi in December. From 10 to 13 December, World of Industry (WIN) India opens its doors for the second time at the Pragati Maidan fairground. We give you a comprehensive overview of what to expect at both fairs, the one in India and the one in Germany. And, as usual, you will find plenty of application stories regarding motion, drives and automation in this issue of MDA TECHNOLOGIES.

Yours sincerely,



Peter Becker

– MDA Technologies –




Meike Sauer

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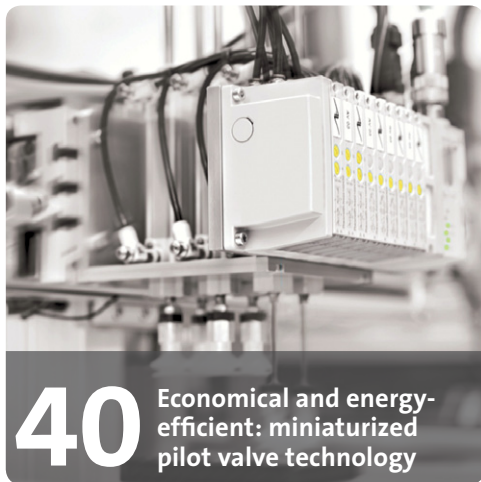


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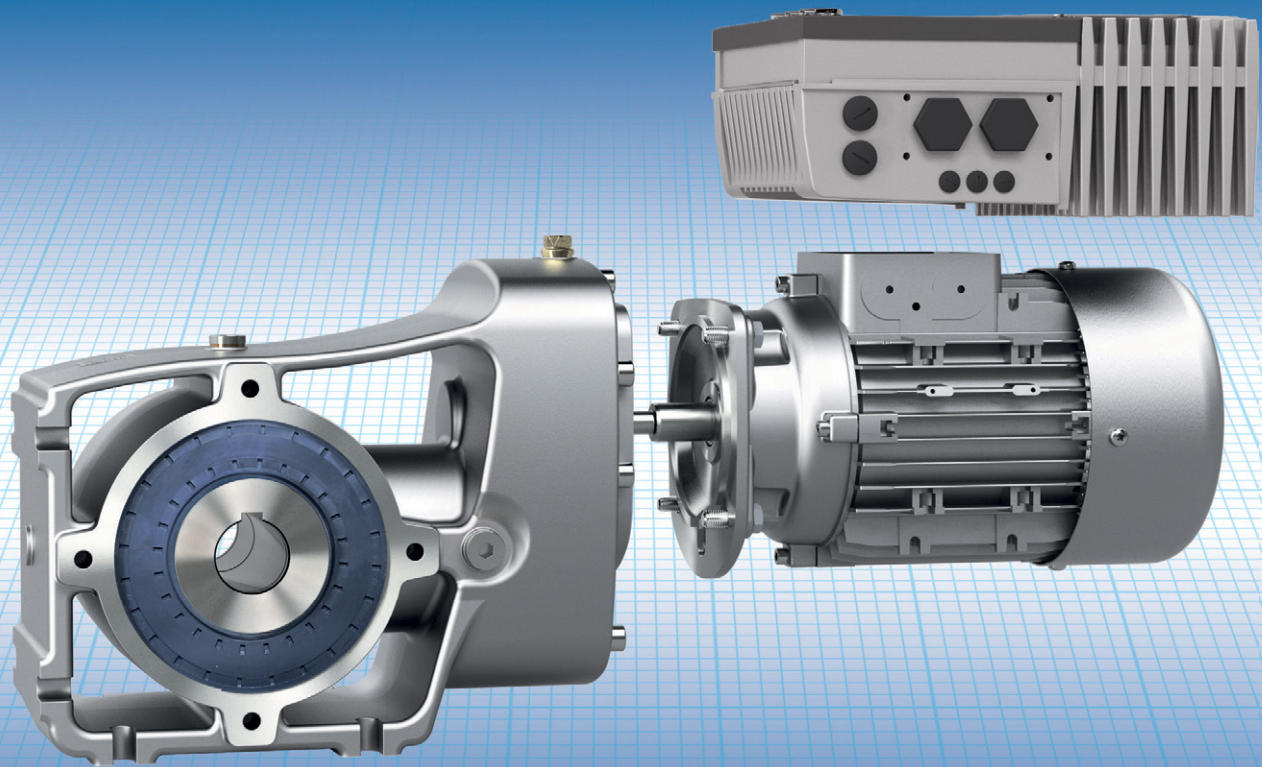
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Worldwide News

Deutsche Messe expands engagement in China

Beginning in 2016, Hannover Milano Fairs Shanghai, Deutsche Messe AG's subsidiary in China, and Sichuan Exhibition Co., organizer of the Western China International Fair, will jointly organize a trade fair for power transmission and fluid power, industrial automation, metalworking, and manufacturing IT. The new event, the Western China Industrial and Manufacturing Fair, will be integrated into the Western China International Fair at the Century City New International Convention & Exhibition Center in Chengdu. Deutsche Messe AG already organizes Asia's largest event for power transmission and fluid power, PTC ASIA in Shanghai, and will now offer the industry sector another platform in dynamically growing western China. With more than 4,000 exhibitors and 19,000 visitors, the Western China International Fair is the biggest and most important industrial fair in Southwest China. Its diverse exhibit program covers topics ranging from aviation, renewable energy and green production to electronic components, consumer electronics and logistics.

www.messe.de/home

Schaeffler honors its best suppliers

Schaeffler's 14 best suppliers were presented with the Schaeffler Supplier Award for their performance in 2013 during a special ceremony. The company has 73 manufacturing locations that receive production material from around 1,300 suppliers all over the globe. 80 suppliers from 22 countries who have been carrying out excellent work during the last few years were invited to Herzogenaurach by Schaeffler AG. The 14 best suppliers were chosen in a preliminary selection process. The awards went to companies from Germany, Japan, USA, Italy, Korea, Slovenia and China. The Schaeffler Supplier Awards for production materials are presented every two years – alternately with the "Premium Supplier Awards" as part of the purchasing cooperation with Continental AG.

www.schaeffler.com

Eaton's electrical sector announces new appointments to its EMEA leadership team



Power management company Eaton announced changes and new appointments to the Europe, Middle East & Africa (EMEA) leadership team of its Electrical Sector business. Enzo Strappazzon has been named Senior Vice President and General Manager of the newly-formed Industrial Control and Protection Division. Strappazzon will be responsible for driving the strategic growth of this new division which will include the Industrial Control and Automation Division and Eaton's Bussmann fuse business in EMEA.

Additionally, Mike Longman has been named Senior Vice President and General Manager of the newly-formed Power Quality and Electronics Division for EMEA. Longman will be responsible for driving the strategic growth of the business including completion of the integration of a number of legacy brands under the Bussmann banner, including Martek Power, Sefelec and Semelec. Lastly, Cyrille Brisson has been named Vice President of Marketing for EMEA with responsibility for driving segment orientated campaigns, brand building and demand generation strategies across all product, service and solution offerings for Eaton's Electrical Sector.

www.eaton.com

WIN EURASIA in march 2015

WIN
EURASIA

WIN Automation exhibition organized by Hannover Messe Bileşim brings sector professionals together in Tüyap Exhibition and Congress Centre on 19-22 March. Last year 795 companies from 23 countries presented their new products and built new business contacts at the exhibition. The show hosted 77,204 professionals from Turkey and abroad. The show for Automation, Electrotech, Hydraulic & Pneumatic and Materials Handling products and services plays an important role in increasing the trade volume of the sector. Alexander Kühnel, General Manager of Hannover Messe Bileşim, highlighted that these exhibitions are highly important for the machinery manufacturing sector to reach the 100 billion dollars target in the 2023's 500 billion dollars exportation goal and stated: "Especially in machinery sector, subjects such as research and development or innovation are at premium. The goal of today's rapidly growing industries is to increase productivity and minimize the expenses. In this sense, WIN Automation exhibition is an exhibition that will guide the sector's professionals."

www.win-fair.com/en

B&R opens new office in Manchester



In response to increasing levels of business in the North of England and Scotland, B&R is pleased to announce the opening of a new office in Manchester. Managed by area sales manager Andrew Norcliffe, the new B&R UK Northern office employs 3 application engineers, including a dedicated B&R technology trainer. Plans are already in the works to expand the team. "The highest levels of customer and application support are integral to our business model," said Norcliffe. "This factor, along with the growth in our business, has meant that the opening of a new office in the North of England was essential." B&R's Northern office serves customers in a wide range of fields such as renewable energy and the chemical industry, as well as in more established markets such as food and beverage, packaging and plastics. It is B&R's 3rd office in the United Kingdom, the others being headquarters in Peterborough and another office in Bristol.

www.br-automation.com

Steffen Haack new area manager for industrial applications at Rexroth



Steffen Haack has taken over management of the product area for industrial applications at Bosch Rexroth. The 48-year-old formerly held the task of chairman of the area board in the Bosch business area of Solar Energy and person responsible for sales and corporate development. The area of industrial applications contains products, software solutions and services for plant and machine construction and factory automation. Haack assumes this task from Karl Tragl, chairman of the area board of

Bosch Rexroth. Tragl is to increasingly maintain contact with large customers in future and drive development of the business on the international markets.

www.boschrexroth.com

Wagener leads supervisory board of Linde Hydraulics

Helmut Wagener will lead the supervisory board of Linde Hydraulics GmbH & Co. KG in future. The engineer was the chairman of the Hydraulics management of Bosch Rexroth AG until 2010. The previous chairman of the supervisory board, Jiang Kui, president of Shandong Heavy Industry Group, will remain a member of the controlling body of Linde Hydraulics. Jeffrey Y. Chen left the supervisory board. Linde Hydraulics, headquartered in Aschaffenburg (Germany) is a globally active developer and provider of modular drive systems from hydraulics, electrical engineering and electronics.

www.linde-hydraulics.com



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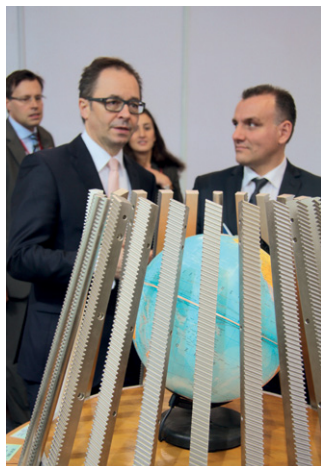
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India is waiting

In December 2014 the WIN India show opens its doors for the second time in New Delhi. After the success start the organizer expects now even more visitors and exhibitors. So come to India and find out the peculiarities of the Indian engineering.

Five industrial shows - one location - infinite opportunities. This is the slogan of WIN India - World of Industry, which will take place from 10 to 13 December in New Delhi. The trade show will be demonstrating complete range of products and services, from Hydraulics and Pneumatics to Electro-Mechanical Transmission, automation components to process and factory automation systems, materials handling

equipments to logistics infrastructure systems. Surface technology products to electroplating and surface engineering techniques. These shows will be special attractions for the industry. The powerful synergy of these concurrent events will attract the visitor traffic at the exhibitor booth ensuring significant ROI.

"WIN India is one of the leading shows for Motion, Drives and Automation in

India, it is fascinating to see new technologies at WIN India", was heard by many exhibitors. In 2013 more than 11,000 visitors, 200 industry delegations and 20 delegations of industrial associations arrived at the exhibition centre in order to receive extensive information about more than 400 new products from the fields of the shows "MDA India", "Industrial Automation India", "CeMat India" and "Surface

Technology India". In particular, the exhibitors were satisfied. Andreas Frey of HFB Wälzlager-Gehäusetechnik (Germany): "This year, we have definitely had more contacts and, in particular, more decision makers visited our stand". And the leaders of Festo thought: "We have had a successful show at WIN India 2013. We had visits of good number of decision

makers and potential customers with interesting projects. Needless to say, Festo SmartBird was the centre of attraction of the entire event."

In addition to two exhibition halls with a total exhibition area of more than 11,000 m², the WIN India event features 2014 again numerous conferences, seminars and live demonstrations, application

parcs, summits and awards thus offering visitors the opportunity to receive information and create networks. So WIN India delivers all you need for your business – meetings with important buyers, ample promotions, lively atmosphere & a smooth experience.

www.win-india.com

"A preview of Hannover Messe 2015"

In 2013 it was the first WIN India in its new shape and in New Delhi. Was it worth the change?

Yes, definitely. Change was in favor of the success, which we got for the last edition. We received huge response from the companies to participate, and moreover industrial visitors. WIN India 2013 witnessed, 85 % visitor footfalls increase from previous exhibition, which was a tremendous success rate for any exhibition. This resulted in 40 % of space re-booking for WIN India 2014 during the 4 days of the show itself.

What do you expect for the show in 2014?

WIN India 2014 will be a preview of Hannover Messe 2015. This event will be extensively covered by mainline media and trade journalists, and the show has already grown by 40 % and this edition will witness about 20,000 visitors and 5000+ products. It will be new to Indian market, and will be showcased by the exhibitors from 27 countries.

Why should the visitors come to New Delhi?

As always, it is an action packed event lined up for Indian Manufacturing sector. We have already introduced new concept, "Automation Application Park", which will showcase 4 automation solutions like High speed production line, Batch production assembly, cell using robots, Material Handling using SCARA Robot and MIS Gadget Application for controlling machines through mobile. We have many knowledgeable platforms, where industry's stalwarts will discuss on the latest trends and new technologies. And we have a special summit for Purchase Managers, International Purchase Managers' Summit, which will discuss issues; like how purchasing has moved from transactional to strategical.

What are actually the main topics in the Indian industry and the automation technologies?

Make in India campaign of new government, India will be the hub for manufacturing and to compete with global companies, Indian manufacturer needs latest manufacturing technologies. These automation technologies will be showcased in WIN India, which will help in manufacturing sector to upgrade their factories. The products and services showcased are needed to produce a product and deliver it on time to the customer without compromising in quality. This show is also helpful for the engineers who work in factories as they can upgrade their knowledge about new technologies available and can specify these products for its factories.

How can Indian companies help to develop the technologies of the future?

Exhibition is also a platform, where exhibitors and visitors interact and network with each other and such platforms are a budding ground for new ideas and innovations. These healthy networking sessions create new technologies and ideas to get evolved. We have visitors from production department of the manufacturing sectors, who come along with the consultants and system integrators, and discuss about future requirements for making products of global standards. WIN India will be an ideal platform to visit the show to see latest products and innovations to source for enabling them to manufacture great products to deliver in the global market place.



Mehul Shah, Managing Director, Hannover Milano Fairs India Pvt Ltd

India goes Hanover

India has been designated the official partner Country at Hannover Messe 2015 (13-17 April), putting this vast nation of more than 1.2 billion inhabitants squarely in the spotlight at the world's leading industrial exhibition.

"India is an emerging economic giant which is going to open up enormous sales potential for our German and international exhibitors at Hannover Messe," commented Marc Siemering, Vice President Hannover Messe, during the official signing of the Memorandum of Understanding. "At the same time we will be offering even more exhibitors from India access to new global markets. Ultimately all our exhibitors and visitors as well as the trade fair venue of Hannover will benefit equally from the participation of this attractive Partner Country."

There were three main reasons for the selection: India's fast-growing economy, the many years of good relations between German and Indian enterprises and the positive experience of having India as the Partner Country at Hannover Messe 2006.

Boasting an average annual growth rate of 10 percent over the last 10 years and with current growth running at around five percent, India is one of the world's fastest-growing economies. To stimulate growth the country is opening itself up to further foreign investment, having decided to modernize its infrastructure and industrial plant and equipment. According to Siemering, "India's participation as the Partner Country comes at exactly the right moment, as our exhibitors from Germany and across

the globe will encounter visitors from India who are in the market for state-of-the-art technology to strengthen their domestic economy."

With a trade volume of 16.1 billion euros, Germany is India's leading trading partner within the EU. The German trade surplus of approximately 3.4 billion euros (2012/13) reveals the high level of Indian demand for capital goods in particular – above all for machines, which constitute some 33 percent of Germany's total exports to India. Based on a survey commissioned by the German-Indian Chamber of Commerce, German enterprises are expecting a medium-term increase in exports to India thanks to the business-friendly policies of the country's newly elected government.

"Deutsche Messe is particularly well represented in India and will take advantage of our excellent relations in that nation to support India and help ensure its success as the Partner Country," stated Siemering. India's most recent participation as Partner Country at Hannover Messe 2006 inspired some 350 Indian exhibitors and 5,700 Indian attendees to make the trip to Hannover. Last year's event attracted the participation of 122 exhibitors and 2,400 visitors from India. "Having India as the Partner Country will allow us to greatly expand those figures," remarked Siemering, citing a further motivation for India's selection as the featured country.

www.hannovermesse.com





Interview with Marc Siemering



Onuora Ogbukagu, spokesperson of Hannover Messe, spoke to Marc Siemering, Vice President Hannover Messe, about the decision to feature India as partner country of next year's Hannover Messe. Siemering gives an overview over the three main reasons for choosing India as partner country. In addition, he states his impression of the current development of the Indian engineering sector and the political framework introduced by the new Indian government under Prime Minister Narendra Modi which was elected in May. Finally, Siemering provides a comprehensive preview of what the visitors can expect from the Indian participation at next year's Hannover Messe trade fair.



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News about the following markets:



“What do you expect from the Indian drives market in the next years?”

The electrical drives market is anticipated to witness a high double digit growth over the next six years. Government of India's initiative such as the perform-achieve-trade (PAT) scheme that allows industries to derive business benefits through the exchange of energy savings certificates will give a huge boost to the sales of electrical drives India. Introduction of programs that rates buildings based on their energy usage, will also drive the demand for AC drives. HVAC will be one of the growing segment for Low Voltage AC drives, while growth in building construction industry will see increasing demand for Low Voltage AC drives in elevators, cranes and hoists.



There has been low level of acceptance of the MV drives amongst the SME segment due to high cost but with increasing standardization, growing maturity in the MV drives technology and in the ease of operation, prices are expected to come down and thus the demand for MV drives is expected to increase in the coming years.

Metals is the biggest contributor to the DC drives market and will continue to use DC drives for specific applications. Steel, paper, sugar and cement industries have been using DC drives in more complex applications, where DC drives are easy to install and use, compared to AC drives. But the DC drives market is expected to gradually lose traditional users in the face of the superior AC drives technology.

Baruah, Manasjyoti, Sales and Marketing, Kübler

India's population, 1.2 billion, is growing about 1.3 % each year since 2008. At the same time, India's per capita energy consumption is one third of the global average. 80,000 MW capacity addition is expected during 12th plan from 2012-2017. Super critical power plants are encouraged by the Indian Government due to higher efficiency, lesser emissions and optimum utilisation of natural resources. Therefore we see good chances to participate in this growth

with our drive technology for the power, oil and gas industry. Also we see a big potential for public transport. For example the number of passengers using the metro in Delhi on a daily basis is anticipated to double to four million by 2016. Recently the Korean company



Hyundai Rotem placed a major order with Voith for the extension of the metro in Delhi: until 2018 Voith will deliver among others automatic Scharfenberg couplers and gear units for 486 cars of RS 10 of Delhi Metro Rail Corporation (DMRC). All products will be manufactured in India at Voith location in Hyderabad.

Paladugu Srinu, Senior Manager Voith India

According to market indications, the machinery market in India, in general, is expected to grow slowly before 2016. In these years, however, Bosch Rexroth is expecting a reasonable market growth. Already the demand in Indian market for electrical drives and electro hydraulic drives is increasing. Many Indian OEMs across all industry segments are now developing more sophisticated machines, based on intelligent drives. This trend increases the average number of drives per machine. Especially, the machine manufacturers for food and packaging, printing as well as the automotive industry are seen in leading position in following these trends. Simultaneously, heavy industries are modernizing their equipment changing from analog to electro-hydraulic systems. Standard European drives often do not meet the Indian requirements. Bosch Rexroth in India, therefore, has invested in local R&D capacities to develop and manufacture locally product variants and system solutions suitable for the Indian market.



Dr. Karl Tragl, Chairman of the Executive Board at Bosch Rexroth AG, Germany





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MDA champions Industry 4.0



Manufacturers of power transmission and control technologies have an important part to play in bringing about the intelligent, self-optimizing and autonomous manufacturing processes of Industry 4.0. In 2015, the world's leading manufacturers will present their latest innovations for tomorrow's factories at the MDA show in Hannover, Germany.

"MDA is of great importance for the power transmission and control industry and so is generating immense interest. By providing multiple points of intersection and synergy with key industrial users, Hannover Messe offers this industry excellent opportunities for new leads and new business," said Marc Siemering, Deutsche Messe's Senior Vice-President responsible for Hannover Messe.

Exploit synergies

For example, in 2015, MDA exhibitors who make gearboxes for wind turbines will benefit enormously from the show's physical proximity to the Wind show in Hall 27, which features companies from all areas of the wind energy industry. Further synergies will stem from the MobiliTec show, which intersects with MDA in Hall 27 and is orga-

nized by the German Engineering Federation (VDMA) and Germany's Research-Association for Power Transmission Engineering (FVA). MobiliTec is dedicated to hybrid and electric powertrain technologies, mobile energy storage and alternative mobility technologies. These are all areas which use power transmission and control technology. MDA (13 to 17 April) will also share multiple points of synergy with the Industrial Automation show and with the ComVac show for compressed air and vacuum technology.

The premier showcase

Schaeffler AG has been exhibiting at MDA for many years. Its managing board member Robert Schullan explains the show's importance to his industry: "Global provid-

ers of power transmission technology value MDA as a powerful visitor magnet that brings them face-to-face with high numbers of existing and potential customers and partners from around the world. In this sense, MDA is the ideal platform for Germany's power transmission and drive technology industry to tap directly into the strong worldwide demand for its quality solutions." Robert Schullan also chairs the MDA Executive Committee and the Power Transmission Association within the German Engineering Federation (VDMA).

Schullan's views are echoed by Hartmut Rauen, who is the VDMA management board member in charge of power transmission and fluid power: "MDA is the premier showcase for exploring and addressing the all-important topics of resource-efficient production and high-performance, energy-efficient products. It is an opportunity for the German mechanical and plant engineering industry to showcase its credentials as a premium provider and innovation leader that enjoys worldwide demand. This is especially true of the industry's power transmission and control products, which play a key part in the smart, integrated factories of Industry 4.0."

www.hannovermesse.com

**Arno Reich, the
HANNOVER MESSE
Director in charge
of MDA, Industrial
Supply and Research
& Technology**



“Integrated Industry – Join the Network!” The message behind the lead theme for HANNOVER MESSE 2015 is that key Industry 4.0 challenges – e.g. achieving universal M2M communication standards and data security – can be mastered only through collective endeavor in networks. Whatever the future may hold, manufacturers of power transmission and control technologies will provide key components of tomorrow’s intelligent, self-optimizing and autonomous factories. Their power transmission, fluid power, motion control and drive solutions will facilitate integration across control and production processes and optimize productivity and energy efficiency. These will be on show at Motion, Drive & Automation in Hannover, Germany, from 13 to 17 April 2015. MDA is the world’s foremost innovation showcase for power transmission and control technology. Every two years, it gives an overview of the world market, thanks to the support of leading providers and industry associations. With about 1,100 exhibitors from all around the globe, MDA is one of the mainstays of HANNOVER MESSE.

Power transmission and control technology is a central building block of industry. MDA integrates this technology with allied disciplines and applications. It is one of a family of 10 closely interlinked trade shows at HANNOVER MESSE and is thus able to put its exhibitors in direct contact with customers from their most important user industries. MDA exhibitors are able to network directly with customers from the wind energy and alternative mobility industries at the Wind and MobiliTec shows in Hall 27.

MDA spans halls 19 to 25. The rather fluid thematic transition between it and the adjacent Industrial Automation show is reflected in actual physical overlaps between the two shows in halls 14 to 17. Leading providers of electric drive and linear motion technology participate at HANNOVER MESSE in order to take advantage of this crossover.

The key themes at MDA 2015 include intelligent factories and Industry 4.0, energy efficiency, sustainability, security, condition monitoring, total cost of ownership and lifecycle cost. These themes will feature at the exhibition stands and will be discussed in depth at the MDA Forum, organized by the German Engineering Federation (VDMA).

The manufacturing industry is becoming ever smarter and more connected as it moves into the IT-powered era of Industry 4.0. HANNOVER MESSE 2015 will feature an exciting lineup of power transmission and control products and solutions to help this transition along. It is a show you can’t afford to miss if you want to stay on top of the latest developments in Industry 4.0 and stay ahead of your international competitors.

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Worldwide News

Turkish Machinery participated at MDA North America

Turkish Machinery is pleased to have co-sponsored MDA North America 2014 in Chicago. Ferdi Murat Gül, Turkish Machinery's Board member responsible for the US market, said, "It was the place to be in September and Turkish Machinery fulfilled its goal of expanding awareness about the quality as well as the recent technological advances in their machinery sector." Turkish Machinery Group sponsored by the Machinery Exporters' Union exhibited its best technologies and solutions for attendees. The inaugural Motion, Drive and Automation – MDA North America trade show introduced attendees to a range of motion control topics and one of the highlights of the show was the Turkish Machinery group promoting its machinery sector. Turkish Machinery maintained a highly visible presence throughout the event. Their logos were spread throughout the fair including at all charging stations ensuring that Turkish Machinery reached its targeted audience and achieved its goal. Gül said that "the venue provided Turkish Machinery with numerous successful networking meetings and business interviews including several potentially profitable US partnership meetings." He went on, "We left the show very optimistic and with a positive impression of the enormous potential that exists for a US – Turkey machinery and machine tool industry collaboration." Turkey is now poised to enter the US market and ready to build an equally beneficial partnership.

www.turkishmachinery.org



Powerlink Technology Promotion Center opens at Chinese university

The Powerlink Tianjin Technology Promotion Center is the newest addition to the Fieldbus Control Technology Center of Tianjin University of Technology and Education. It will provide companies and research institutions in the Beijing region with Powerlink-based training, support and development services, as well as helping to facilitate the continued development and improvement of the technology. "Powerlink is



cutting-edge open source technology, which gives it particularly rich prospects for the future," says Lu Shengli, director of the Fieldbus Control Technology Engineering Center at the opening ceremony within the framework of the Powerlink Technology Exchange Conference. "We have decided to actively support the research and development of Powerlink because we believe it is taking the right approach for the future."

www.ethernet-powerlink.org

SKF invests in Brazil



SKF announced that it is investing around € 24 m in a factory at its existing SKF Campus in Cajamar, Brazil. The 6,600 m² facility, which will employ up to 150 people, will produce Kaydon slewing ring bearings for wind turbine manufacturers providing solutions to the Brazilian wind energy segment. Brazil is one of the world's fastest growing markets for wind energy, with predicted annual installation growth of between 2,000 MW to 3,000 MW per year. Tom Johnstone, SKF President and CEO says, "Kaydon's market leading position within renewable energy in North America, combined with SKF's global footprint and the investment in Brazil, creates one of the strongest portfolios and service offerings available today." SKF completed the acquisition of US-based Kaydon Corporation on 16 October 2013. Production at the new factory is scheduled to commence during the second half of 2015.

www.skf.com

UNTAPPED POTENTIAL IN INDO-GERMAN RELATIONS

A Business **Impulse** from Hannover

Commentaries about international collaboration, particularly when they come from economic development companies like hannoverimpuls, aim at success stories. So, let us indeed start with one, but to cut to the chase: Economic ties between the Western world and countries like India fall far short of fulfilling their potential. This is a tragedy!

Firstly, the success story. Next year's "Hannover Messe" will take place with India as a partner country. More than 250,000 visitors are expected to attend to promote their businesses. India, with a population of 1.2 billion, is expected to surpass China as the most populous country in the world but it also has the third highest GDP (PPP), succeeding only China and the United States. So, not only are we delighted to welcome the business-world to Hanover again. We will have a very strong and promising partner at our side!

"We do not understand each other well enough"

Nevertheless, there's a flip side of the coin. Why are economic ties between India and Germany still so backward? Normally, such a market would be a prime interest for European companies. Why is this not the case? – because we do not understand each other well enough. While Germany is focusing more and more on Industrie 4.0 or Big Data, Indian market is different. Why do Indian people need cars? – as a means of transportation. Western sales arguments focus on Bluetooth connections or safety systems. Why do many Indians need a phone? – to communicate via voice calling. Other features may be alright, but become excessive when they only add vulnerability to the core product. While we, in the Western industrialised world, value technical fripperies in a wide variety of products, demand in developing countries continues to rise for products that fulfil basic needs.

This philosophy, is condensed to "frugal engineering".

Many in Germany know Dacia Logan – a car, simple, efficient, cheap. It is produced without any robots or other bells and whistles. And, the model is steadily pushing into the global car market. It has been a rude awakening for carmakers like VW, Toyota, Suzuki, Chrysler. High-end carmakers developed countless high-end solutions and are now fearing a low-cost car? Why is a car, intended for nothing more than transporting people such a success? Because it's using its familiarity with the target countries. Dacia has simply tailored its product to meet demand.

Meeting the demand – why is it so difficult to follow such a simple rule? Because frugal engineering is a "moving target". The urge to sell the same product worldwide is overwhelming. It's easy: no additional workflows, a simple case of extending sales models. In addition, simplifying complex products can be a considerable challenge when all parts are already engineered to fit perfectly together. You cannot produce a simpler version of the Daimler E-Class.

In countries like India or China, demand for luxury products is high and growing. However, many people in these places do not need and cannot fully exploit the functions on such complex products. Even worse, complexity is a reason for failure. We are familiar with reports about unsatisfied customers in China publicly destroying Western cars.

This is precisely the reason why companies have to involve local partners. Frugal products cannot be produced and sold without help. A joint approach is the only way to approach such markets. Be aware: Consumers are likely to be as loyal to their products as they were in Germany after World War II. Someone who bought a Mercedes in the 1950's was likely to remain loyal to his very first car maker. And this has meant success for Daimler. This trend will repeat in India. If Western firms want to be successful, they should pay close attention



Peter Eisenschmidt, hannoverimpuls GmbH

to mentality and market conditions. If you are not first in you'll certainly never make it.

Sharing insights is precisely what "hannoverimpuls" and the State of Lower Saxony are doing at the "German-Indian Business Center" (GIBC). In this context, the hannoverimpuls company connects German businesses with Indian partners. First and foremost, it's about understanding. The challenges related to cultural differences must not be underestimated.

"Complexity is a reason for failure"

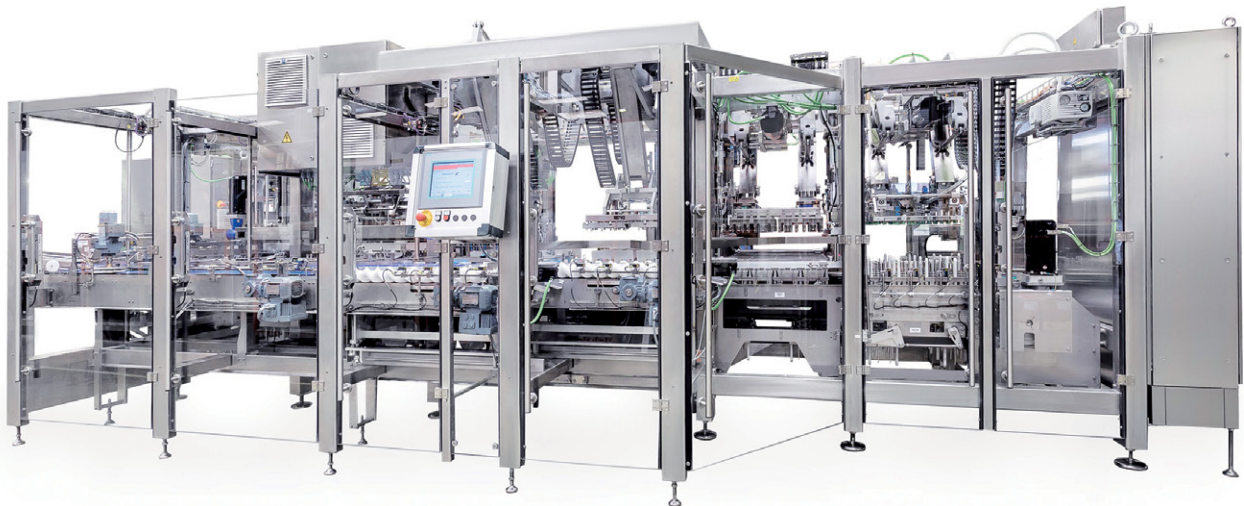
Hanover is one of the few locations in Germany with deep and long-lasting experience in Indo-German business relations. The GIBC has existed for eight years. One-sided thinking will not facilitate mutual learning. On the contrary, German business actors must understand: over-performance at a technical level is not needed. Moreover, the reliability of Indian partners is crucial for their German counterparts. This, and much more, is what we can gain from one another.

www.hannoverimpuls.de

Drive Technologies

Engineering, Design and Application of Drives and Controls

Servo gearheads assure precision and performance in packaging line



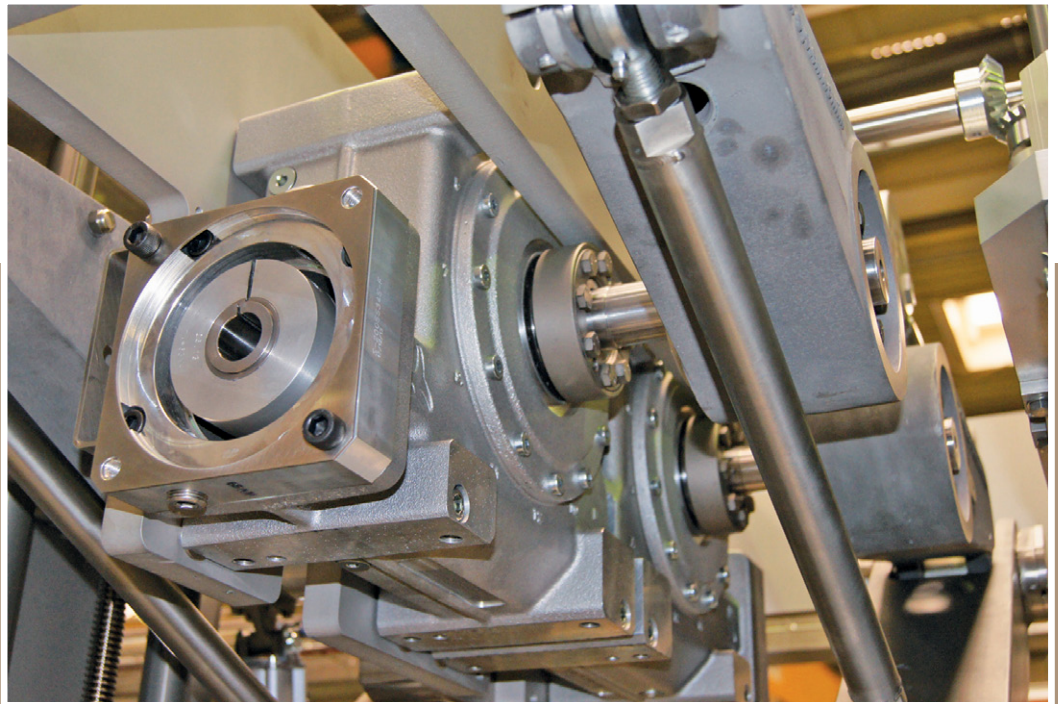
Peter Hempsch

Packaging machine manufacturer sema Systemtechnik has integrated more than a dozen worm, bevel and planetary gearheads built by Wittenstein alpha GmbH in a packaging line, comprised of a tray former and carton sleever, for its British end customer Yeo Valley. sema has trusted in the reliability and lifelong precision of these gearheads for many years, and cites them as compelling arguments to utilize the same Igersheim-made technology in other packaging machines.

Author: Peter Hempsch, MBA,
Manager Technical Sales Office North,
Wittenstein alpha GmbH,
Bad Pyrmont, Germany

Wolfgang Beckmann, Manager Packaging Solution Design at sema, is particularly admiring of the V-Drive⁺ series of servo worm gearheads with food grade lubrication: "Throughout my fifteen years in the engineering profession, this gearhead type has consistently proved to be absolutely dependable. The special gearing technology also convinces me with its high efficiency, superior performance data compared to similar gearheads from other manufacturers, high overload protection and very low operating noise." The reliable, high-precision gearheads manufactured by Wittenstein alpha are sema's solution of choice for other servo applications too - beyond the carton sleever for Yeo Valley. "It's a big advantage, both for us as the machine builder and for our end customers, if the complete gearhead technology can be sourced from a single supplier - not simply for one machine but for our entire range of

01 About a dozen servo worm gearheads in the V-Drive⁺ series are installed in the carton sleever's various freely programmable robot units



packaging machinery", says Beckmann when prompted to name the benefits for application consulting, purchasing and customer service.

Specialist for packaging solutions

Sema Systemtechnik – at home in Hüllhorst, twenty miles north of Bielefeld in North-Rhine Westphalia (Germany) – is a leading manufacturer of special-purpose machines for straightening, inspection and automation systems. "sema first entered the market for packaging solutions about four years ago", Beckmann reports. "We develop and distribute systems for packaging, transporting, palletizing, erecting and re-packing primary packaged products in cups, jars, cans or dishes. Our tray formers, top loaders, case packers, re-packers and carton sleeves are in great demand in the dairy and food processing industries." As far as the technology is concerned, the strategy pursued by sema contrasts with that of many other packaging suppliers. Its machines are designed strictly according to 'clean' principles, with a whole series of features to facilitate optimal foam and pressure jet cleaning with no residues. "Wittenstein alpha made appropriate modifications to the gearheads – for example the seals – to ensure that they fit in perfectly with our

clean design concept", Beckmann continues. sema explored several new avenues when the basic idea for the new machine design was conceived, but at the same time insisted on a few key criteria, such as the use of Wittenstein alpha gearheads. "The decision was made even easier by the fact that the company enjoys an excellent reputation with our end customers. Yeo Valley is no exception here: as market leader, they produce more than two thousand tons of yoghurt and other dairy products a week," Beckmann comments. sema's packaging solutions accordingly have to combine power and reliability: the carton sleever for Yeo Valley is rated for a throughput of 34,000 cups per hour, twenty-four hours a day and seven days a week. Beckmann: "The machines and all their components have to deliver uncompromising performance, precision and availability."

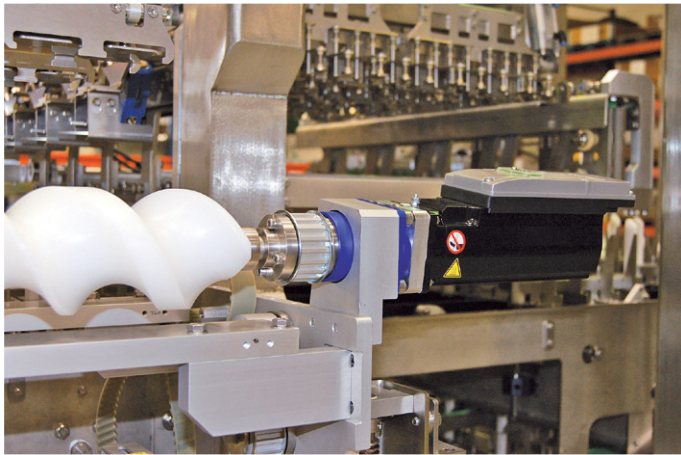
Carton sleever with a cycle time of 3.4 seconds

The carton sleever designed for Yeo Valley's dairy portfolio is loaded in three different ways: the cups are fed to it on a conveyor belt while the blank sleeves stored in lateral magazines are automatically removed and preformed and the trays are supplied by the upstream sema tray former already folded.

A special separating system makes sure the trays are accurately positioned and spaced before the sleeved products are placed in them. At the same time, screw conveyors on the opposite side of the machine separate and position the cups precisely in four lines. Dual-axis robot modules each remove four double cups and insert them into the blank sleeves, which are cycled into the machine in four lanes. The sleeves are then glued to the flaps with hot melt adhesive in the downstream sealer – a process that calls for similarly precise handling. Finally, sixteen containers per cycle, each with 2x2 stacked cups, are placed in four pre-positioned trays by another robot module and conveyed to the next step. Beckmann is visibly proud of the machine's performance: "The carton sleever delivers up to 17,000 single-layer multi-packs an hour in this way with a cycle time of 3.4 seconds."

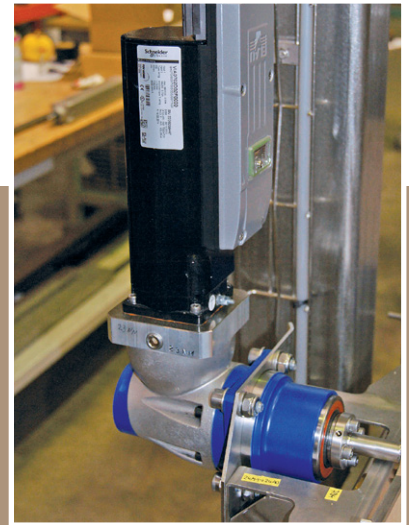
Lifelong positioning precision

All in all, about a dozen servo worm gearheads in the V-Drive⁺ series are installed in the carton sleever's various freely programmable robot units. When dynamic positioning is called for, the high precision they allow – both at the machine's main drive and while feeding the sleeves,



02 Generation 3 LPB+ low-backlash planetary gearheads help position the sealed cups exactly on screw conveyors

03 The LPBK+ right-angle gearheads make sure the trays are accurately positioned



gripping the cups, gluing the sleeves or placing the containers in the trays – is quite awesome. The gearhead design unites an enveloping worm wheel with a cylindrical worm shaft. “This combination guarantees high transmittable torques. It’s suitable for varying loads and speeds, and the large tooth contact surfaces mean mechanical wear is reduced to a minimum,” explains Karl Schmitt, Product Manager at Wittenstein alpha in Igersheim (Germany). The special tooth geometry of the V-Drive+ gear-

heads assures the constant, lifelong accuracy that is vital in high-precision servo applications such as this. “In contrast to the majority of our competitors, we chose a geometry with hollow-flank teeth because when the torque is selected based on T2Servo values, the increase in torsional backlash that is normally accepted over time is virtually zero, resulting in constant, high positioning accuracy”, Schmitt adds. Another advantage of the V-Drive+ gearheads’ special tooth geometry is their higher efficiency due to the improved build-up of the required oil film in the lines of contact between the worm wheel and the worm shaft. At the same time, the optimized lubrication of the hollow-flank teeth means there is no stick-slip effect. Schmitt sheds light on the technical issues involved: “This tendency to slip back is extremely undesirable and leads to uncontrolled motions; it can often be observed with other tooth geometries if an oil film has not yet built up between the gearing parts, in other words at high gear ratios and low speeds”.

positions the blanks is driven by means of a timing belt. Right-angle gearheads in the HG+ hypoid series ensure maximum precision and repeatability when the blanks are removed from the stack. In another application realized by the Yeo Valley machine, Generation 3 LPB+ low-backlash planetary gearheads help position the sealed cups exactly on screw conveyors – and control the grippers precisely when the trays are stacked in the robot modules.

Innovative, technically reliable and economical – these are the hallmarks of the Wittenstein alpha gearheads installed in sema Systemtechnik’s packaging machines. The lifelong precision of these worm, bevel and planetary gearheads is fundamental to the high availability of the secondary and tertiary packaging lines. It comes as no surprise that machine manufacturers like sema and end customers like Yeo Valley trust in gearhead solutions built by Wittenstein alpha.

www.wittenstein-alpha.com



04 Wolfgang Beckmann (centre), Karl Schmitt (left) and Peter Hemsch (right)

Powerful solutions

In addition to the servo worm gearheads in the V-Drive+ series that have proved effective both at the main drive and in the robot modules, sema also uses high-precision right-angle and planetary gearheads for a number of functions. The innovative magazine solution for carton blanks is just one example. “It allows the machine operator to place new stacks into the magazine without a climbing aid”, Wolfgang Beckmann remarks. The mechanism that receives and



About

Company name: Wittenstein alpha

Headquarters: Igersheim, Germany

Turnover: 254 million Euro

Employees: 1,900 worldwide

Products: Low-backlash planetary gearheads, Servo-right-angle gearheads, Linear systems, Mechatronic system solutions, Stage and lifting technology, sensors

Product News

New roller bearings for large gears



NSK presents two new series of large gears for industrial gears, which differ from the previously available series with a clearly increased service life. The bearings use a special material that leads to considerably improved resistance against different types of breakouts ("flaking") in combination with a special heat treatment. Thus, the manufacturer offers a counter-measure for a damage pattern that occurs, among

others, in the large roller bearings used, e.g., in wind turbines. The resistance of the new roller bearings against "White Structure Flaking" has been increased by a factor of seven. While the service life increases by a factor of two under common conditions, it can be increased up to three-fold if the lubricants are strongly contaminated.

www.nsk.com

Universal speed control with Danfoss VLT Automation Drive

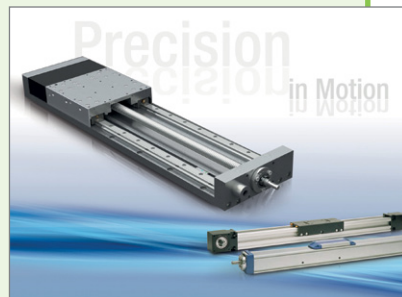
Many countries worldwide have established statutory efficiency classes for electric motors. More and more innovative technologies for three-phase motors, including induction, permanent-magnet and synchronous reluctance motors, claim to achieve the highest energy efficiency. The VLT Automation Drive by Danfoss is the first VLT platform that is able to operate all of these motor types efficiently using adapted algorithms. For users, it is therefore advantageous to be able to operate all motor types with just one type of frequency converter, because this distinctly reduces the previously described extra effort and expense. In principle, nearly all motors can be operated with programmed curves that specify the required voltage for every speed or frequency (voltage versus frequency characteristics). However, the theoretical efficiency of each motor technology can only be achieved in practice with control algorithms specifically adapted to the individual technologies, as otherwise it is not possible to optimize operation for every operating point with variable load. The frequency converter makes commissioning easy with additional functions such as automatic motor adaptation, which measures the motor characteristics and optimizes the motor parameters accordingly. This way the motor always operates at the highest possible efficiency, allowing users to reduce energy consumption and cut costs.

www.danfoss.com



Linear technology by Rodriguez: suitable for harsh applications

The linear technology offered by Rodriguez ranges from simple roundrail via profile rails to cross roller guides, including entire linear systems, which combine the guide and drive in a single unit. In this way, the company offers a suitable solution for almost all motions required. For example, a ball-screw drive with a toothed belt drive and sliding guide is used in an orbital saw. The linear unit feeds the saw to the semi-finished product (tubes with a length up to 8,000 mm) with a feed precision of ± 0.3 mm. The semi-finished offcuts are then returned via the linear guide. Due to the large output length of the semi-finished products, a long stroke had to be created. For this specific linear unit, it reaches 12,000 mm. The resulting long travel lengths allow large saw lengths without changing grip. The belt drive of these units consists of a plastic toothed belt with steel cord inserts. It runs between two belt pulleys, one at each end of the profile. A belt pulley is connected to the motor and the other is



mounted onto a tensioning station. The belt can be re-tensioned, whereas the load remains on the carriage. The prism sliding guides used are self-aligning.

According to the manufacturer, all linear units manufactured by Rodriguez stand out thanks to their low noise emission, low overall weight, compact structural dimensions and durability. Sealing via a magnetic stainless steel cover strip with a self-clamping feature also allows applications under harsh operating and ambient conditions. For demanding applications, the company also supplies corrosion-resistant and chemical-resistant finishes.

www.rodriguez.de



Heavy-duty work for industrial gear units in the Alps

In an extremely demanding construction project in the Swiss Alps, at an altitude of around 1,700 m and almost 600 m inside the mountain, large chambers have been being excavated to form the new expanded underground center of a pumped storage hydroelectric power station. With an extreme incline of 45 degrees and a height difference of approximately 180 m, conveyor systems in a sub-station transported 500 tons of excavated material per hour, around the clock, using conveyor belts that were driven by industrial gear units.

The expansion project "Linthal 2015" is Switzerland's largest hydroelectric undertaking. The overall output of the existing power plants will be increased from 480 MW to 1,480 MW. A new underground pumping station will pump water from a reservoir at an altitude of 1,860 m above sea level into a reservoir lake about 600 m higher up. The pumped storage power station will use this elevation difference to produce hydroelectric power on demand. The builder is Kraftwerke Linth-Limmern AG, a member of Axpo Holding AG.

The power requirements of a national electricity grid are subject to large fluctuations over the course of a single day. Power consumption is at a minimum at night and typically peaks at midday and in the evening. In Switzerland, electric power is mainly supplied by nuclear and river-based hydroelectric power stations. Biomass and conventional thermal power stations also make a contribution. In contrast to nuclear and river-based plants, pumped storage hydroelectric power stations can rapidly respond to changes in demand. The opti-

mum interplay between these various types of power generation technologies ensures that a reliable and economic power supply is maintained around the clock.

Pumped storage stations meet peak demand

Unlike regular hydropower plants, pumped storage stations cannot just generate energy at peak times; they can also convert excess power, which is available during periods of low demand, into valuable peak-time energy. The demand for peak energy is continuously increasing throughout the entire European grid network. An important reason for this is the massive development of wind energy plants in the coastal regions of the European Union. This factor results in an increase in the so-called stochastic energy, which depends on random wind conditions and therefore cannot be reliably planned. Excess wind power generated in off-peak times can be used to pump water back into the reservoirs of pumped storage power stations. If there is no wind during the day, pumped storage power stations can then cover the power defi-

cit. A further reason for the increasing demand for peak energy is the opening of the electricity market. As consumers can purchase power from any supplier in a free market, power distribution networks must increasingly be regulated by system services, which ensure a reliable supply.

While regular hydropower plants have only an upstream reservoir, pumped storage plants have an additional lower reservoir. Power is generated when water flows from the upper reservoir into the pressure system. The water drives turbines, which in turn power the motor generator. The electrical power which is produced there is fed into the grid. After leaving the turbine, the water flows into the lower reservoir. At peak times, water can be pumped back from the reservoir into the higher altitude lake using excess power from the grid in order to generate hydroelectric power again at a later time. Thus, pumped storage power stations can store energy in the form of water in reservoirs. Pumped storage is a well-established method of compensating fluctuating supply and demand in the grid network in an eco-friendly and economic manner.

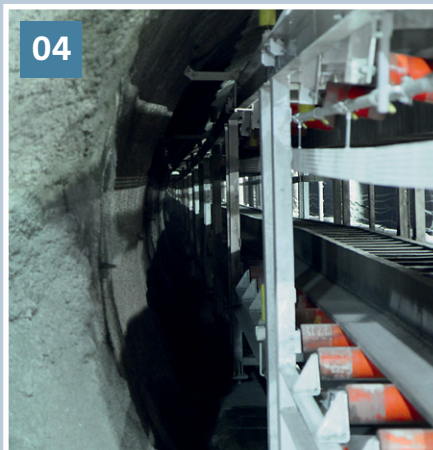
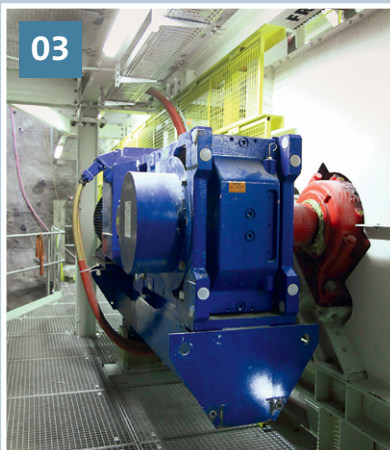
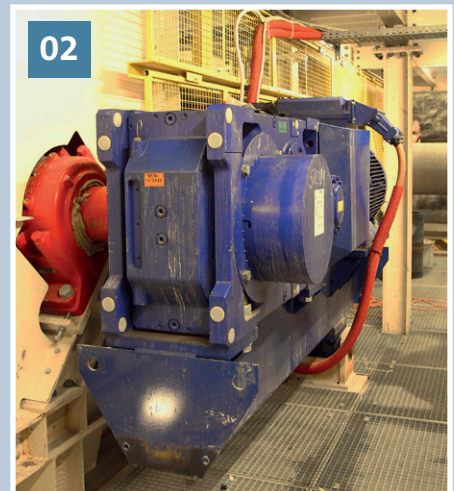
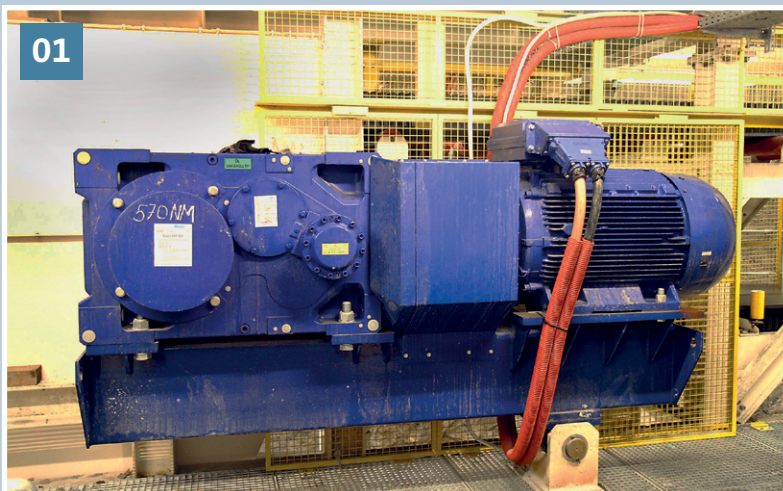
The scope of the "Linthal 2015" project included excavation and construction work for the underground central station of the pumped storage power station and the tunnel system for the water that provides the power. Construction of a new heavy-weight dam for the higher lake will increase its storage volume from the present 9 to 25 million m³. The existing compensating reservoir is also being expanded. Construction work has been carried out at different altitudes and for the most part inside the mountain. The compensation reservoir is the lowest point at an altitude of about 800 m. The Limmernboden reservoir with a capacity of 92 million m³ is located one thousand meters further up. At an altitude of about 1,700 m and some 600 m into mountain, the heart of this gigantic expansion project has been created: huge excavated chambers house four groups of machinery for the new 1,000 MW pumped storage plant. The underground station consists of a 150 m long, 30 m wide machinery chamber with a maximum height of 53 m and a separate transformer vault which is about 130 m long, 20 m wide,

and 25 m high. This central station creates the link between the two lakes via a system of upper and lower water delivery tunnels, parallel pressure shafts, and other service tunnels.

The excavation work for the two chambers has recently been completed. The work proceeded rapidly in an intensive 24/7, 3-shift operation. The chambers were excavated from top to bottom. Every day, about 800 m³ of rock were removed – in total 2,445,000 m³ from both chambers.

Drive systems for conveyors

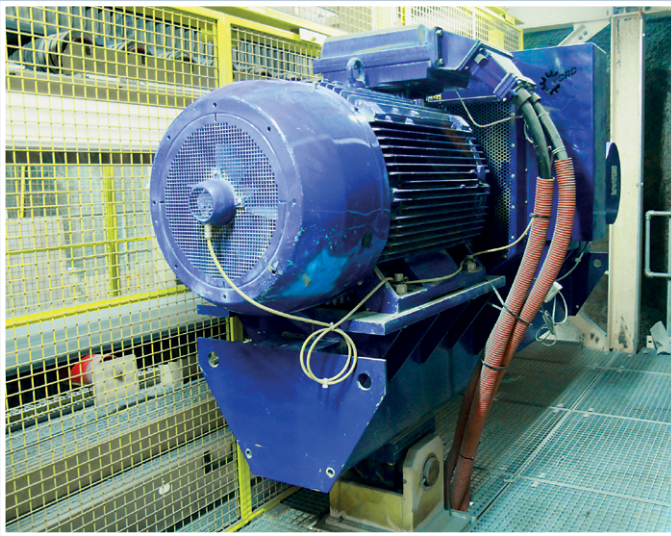
The conveyor system used for the "Linthal 2015" construction project was driven by industrial gear units from Nord Drivesystems. Two "S-conveyors" each transported 500 tons of material per hour over a distance of about 260 m with an extreme incline of 45 degrees and a height difference of around 180 m. The excavated material was conveyed down to a crushing plant. This conveyor belt was driven by a Nord industrial gear unit with brake control, which also generated electricity. On a second conveyor



01 and 02 A Nord SK 12407 geared motor was used to drive the lower conveyor belt

03 Nord manufactures modular industrial gear units for output torques up to more than 242,000 Nm with a one-piece UNICASE housing

04 The upper conveyor belt moved downwards and the lower conveyor belt moved upwards



05 Nord SK 12407 industrial geared motor with brake function and energy recovery (upper conveyor belt)

belt, the crushed material was transported up to the gravel plant, where it was stored or used as construction aggregate for the dams or for construction concrete. Over a total of three years, these conveyors transported approximately one million tons of material. Located right and left of this conveyor system and connected by a common shaft, two Nord industrial gear units generated a belt speed of 2.2 m/s. With a protection class of IP55, these industrial gear units each have a drive power of 250 kW.

The industrial gear units for this massive construction project were developed based on the tried-and-tested Unicase design: the one-piece housing block integrates all bearing seats. Unicase housings are manufactured on state-of-the-art CNC machines in a single setting. The concept features high precision, rigidity, and strength with no joints between the output side and the gearcase which are subject to radial forces or torque. What is more, the overlapping bearing offset allows for more compact gearcases and larger roller bearings that guarantee a long operating life. Industrial gear units can be right or left mounted.

Customer-oriented drive solutions

The supplier of this complete drive solution was Getriebebau Nord AG, Switzerland – a member of the Nord Drivesystems Group. The drive specialists from Arnegg near St. Gallen place much value on customer orientation and proximity. Guido Eigenmann, Manager of Getriebebau Nord AG, Switzerland, says: “We sell customer benefits – not just products. We offer a

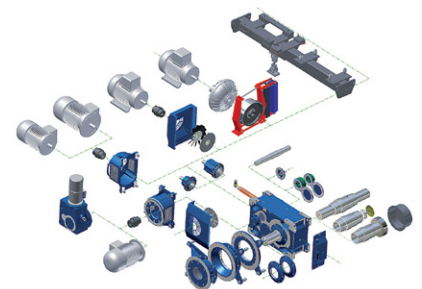
comprehensive service package and provide maintenance training, so that the customer knows what to look out for. It is particularly important for us to supply complete systems which are highly efficient and economical. Many users require not just drive components, but rather complete and functioning system solutions. We tailor our drive solutions to each individual application.” Nord Drivesystems was commissioned by the plant constructor Marti Technik AG. Founded in 2002, the international technology company is one of the many subsidiaries of the Swiss Marti Holding AG. Marti Technik AG is a provider of individual tailor-made solutions focusing on underground construction work.

After the completion of the conveying tasks, the Nord industrial gear units were disassembled by Marti Technik AG, and are now awaiting their next assignment. Ernst Kuster, head of maintenance and responsible for the conveyor systems at Marti Technik, says: “In compliance with the instruction manual, we changed the oil once, but that was the only maintenance measure we had to take over the course of three years. The Nord gear units performed brilliantly. Nord Drivesystems has cooperated with us very well. All of our requirements were catered for. The short delivery time is also remarkable – it only took about ten weeks from ordering to delivery of the built-to-order drives. All in all we are very satisfied – a very good cost-benefit ratio, excellent advice and support, and on-schedule delivery.”

www.nord.com

Industrial gear unit in a UNICASE housing

Currently available in eight sizes in Unicase housings, Nord Drivesystem's powerful industrial gear units cover smaller frames for torques from 25,000 Nm to large models up to 242,000 Nm. In this series, a single standard housing per frame size spans the entire transmission range. A highly flexible and modular concept provides countless options for straightforward and fast configuration for individual models. If required, Nord assembles complete drive trains for users, including swing bases with gear units and motors as well as options such as drum brakes, fluid clutches, fans, and auxiliary drives. Even the largest industrial gear units are manufactured to Nord's one-piece Unicase concept: all bearing seats and sealing surfaces are machined in a single stage on state-of-the-art CNC machining centers. The benefits include extremely high reliability and exceptional sealing with safe handling of even the largest torques; combined with high axial and radial load bearing, quiet running, low maintenance and an exceptionally long operating life.



About

Company name: Nord Drivesystems

Headquarters: Bargteheide, Germany

Turnover: approx. € 450 m (Nord-Group)

Employees: more than 3000 worldwide

Products: Geared motors, industrial gear units, motors, frequency inverters, motor starters

Nanotec introduces programmable motor controller

The company Nanotec Electronic GmbH & Co. KG has developed a controller specifically for the open loop control of stepper motors sized Nema 17 to Nema 34, which can be parameterized and programmed via USB. The C5 controller is especially suited to simple applications that do not require an encoder but rather high dynamic performance and smooth running, such as CNC dental milling machines.

It can be operated via clock-direction mode or through specification of the speed or position via the analog input. It also supports sequence programs that are directly executed in the motor controller.

Programs developed in NanoJ, based on C++ run as machine code in the controller and are synchronized via a real-time operating system in 1-ms cycles with digital inputs and outputs, including the instructions received via the field bus.

www.nanotec.de



Frequency converter with intuitive operating concept

The frequency converters Movi4R-U by SEW-Eurodrive meet the basic needs to drive technology. The manufacturer deliberately focuses on the most important functions of a converter, i.e. the simple speed control of asynchronous motors. The protection type



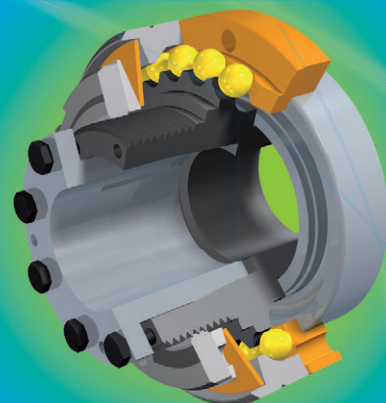
IP54 permits assembly outside of a control cabinet, e.g. close to the application for control of conveyor belts. The product series covers the performance range of 0.25 to 1.1 kW (3 x AC 400 V) or 0.25 to 0.55 kW (1/3 x AC 230 V). The operating button permits the setting of any device parameter via two menu levels; an LED shows the device status and informs about the cause of the error in case of interference. An operating card permits the user to handle commissioning and error diagnosis without external help or any additional product documentation.

www.sew-eurodrive.com

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The airbag for your machine



"In our high quality filling and packaging systems, we only integrate components that offer very high quality and reliability. Therefore, for overload protection, we have been relying exclusively on EAS[®] torque limiters by mayr[®] Antriebstechnik for several years."

Markus Kröger
Franz Tölke GmbH, Sondermaschinenbau.



Backlash-free torque limiters for reliable protection against overload damage

Chr. Mayr GmbH + Co. KG, Eichenstraße 1, D-87665 Mauerstetten,
Tel. no. 08341/804-0, Fax no. 08341/804 421, E-Mail: info@mayr.com

www.mayr.com



Kinematic functions support production of tobacco packaging in China

The Chinese tobacco industry is changing rapidly. Small brands are being consolidated into larger brands and individual production volumes are increasing. This creates a need for new manufacturing processes that provide significantly higher levels of productivity. When it comes to automation, the Swiss company Pantec GS Systems relies on system solutions from B&R.

The state-owned China National Tobacco Co. is the largest manufacturer of cigarettes and cigars in China. At the same time, it is responsible for marketing, production and sales of all tobacco products in the country. Recent decades have seen the start of a process of modernization and consolidation in the industry with the aim of halving the number of factories producing tobacco products within a few years. “This means that much more efficient production

processes are needed,” explains Peter Frei, CEO of Pantec GS Systems. “In addition, the range of brands is being reduced to a select few, which substantially increases the production volume for those that remain.”

New packaging machines

There is a demand for machines that can cope with high production rates while at the same time applying trademark protections

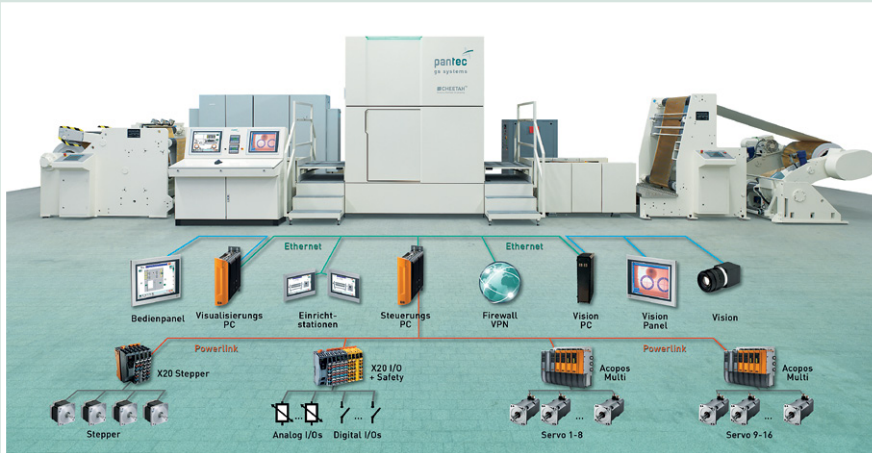
to the packaging. This includes finishing with hot foil embossing and the application of holograms, a requirement that has previously limited efficiency since it relied on sheet-fed printing. “Not only does this mean manually feeding sheets into the packaging machines – already highly inefficient – it also means large portions of the sheets go unused, resulting in more waste and, ultimately, increased costs,” says Frei.

Tight schedule

And so the Chinese tobacco goods producers approached Pantec GS Systems, which has long been recognized as a specialist in efficient and high-quality finishing processes for packaging. In just seven months, four new machines from the e-pack 850 Cheetah F series were to be sent to China. “This schedule was particularly tight and repre-



01 Machine module for the efficient application of holograms and hot foil embossing on packaging



02 B&R industrial PCs from the Automation PC 510 series and ACOPOSmulti drives guarantee high processing speeds for hot foil embossing and hologram application



03 Manfred Kindle: "As a complete solution provider, B&R supplied us with a fully integrated automation system."

sented a significant challenge for the entire automation team," explains Frei. The existing technology was adapted for the tobacco market using the newly-designed Cheetah foil embossing system. In addition, an offline "e-pack" system was developed to move and control the web. This permits reel-fed foil embossing and pack finishing with web speeds of up to 120 m/min.

Structured development

Automation for the system was supplied by the Liechtenstein-based affiliate, Pantec Automation. This allowed the team to prove the strengths of the Pantec Phoenix Project Accelerator toolset. Using targeted requirement engineering, professional project management and standardized, modularized software development, the project was kept streamlined, transparent and quantifiable at all times. "Our customers were amazed when the machine went into operation in China after just a few months, complete with the extensive range of functions they had requested. The development methodology really paid off quickly," says Frei.

Complete solution from a single source

What Pantec GS systems was looking for was a complete, one-stop solution for the automation system. "The Cheetah F is very complex. This is why we wanted to be certain that the individual components

worked together perfectly and that our requirements for robustness, reliability and long-term availability were met," says Manfred Kindle, project manager at Pantec Automation, describing the design requirements. In choosing a hardware platform, we opted for components we could trust. B&R supplied the real-time PLC, bus system, drives and servo motors, an integrated safety solution and even a comprehensive development and diagnostics system.

High-performance industrial PCs from B&R's Automation PC 810 series and ACOPOSmulti drive systems are used. The B&R X20 system provides more than 150 decentralized I/O channels, connected in real-time via the Powerlink bus.

A total of 26 axes are controlled, six of which featuring safety functions. "We were able to perfectly adapt the movement profiles of the drives to our requirements. As a result, the embossing process runs reliably even at high web speeds without any deterioration in quality," says Kindle, highlighting the benefits of the kinematic functions provided by the ACOPOSmulti drive system.

Service is key

The implemented diagnostics system is both comprehensive and transparent right down to the last terminal connection. "With remote maintenance features and worldwide support provided by Pantec Automation, we're able to intervene quickly," says

Frei. "This is a decisive factor for our Chinese customers."

Success – with perspective

"Goldroc Printing in China is very impressed with the significantly higher performance of our machines. This news has spread quickly throughout the industry and opened more doors for us," says Frei. For him it's clear: the decision by the Chinese tobacco industry to use Pantec GS Systems technology to apply packaging holograms is just the beginning. He also has his sights set on packaging for chocolate. "Hot foil embossing and holograms are important marketing tools for high-end products. They help strengthen product branding with a unique design, as well as protecting the brand with added security features."

www.br-automation.com



About

Company name: B&R
Headquarters: Eggelsberg, Austria
Turnover: € 475 m (2013)
Employees: approx. 2,530 worldwide
Products: Industrial PCs, control systems, motion control, networks and fieldbus modules, IO systems, safety technology

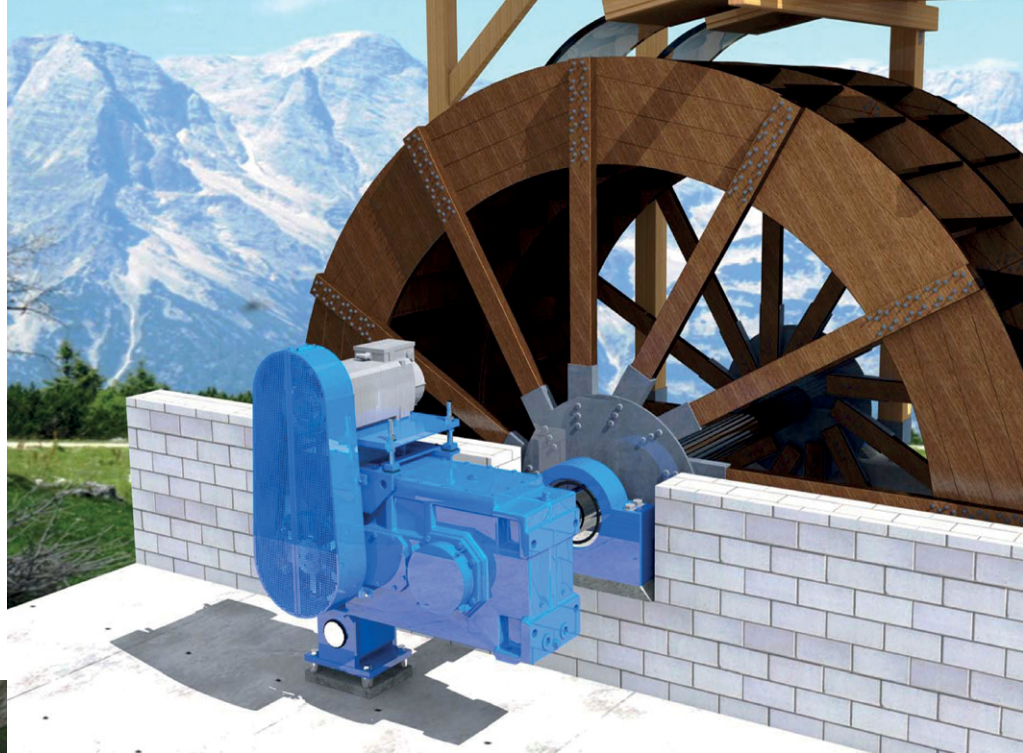
Drive system supports power generation in Tyrolean mountain hut

Clarahütte, a mountain hut located 2,000 meters above sea level in the Tyrolean Alps and owned by the German Alpine Association, will be generating its own hydropower in future using integrated drive technology from Siemens Industry.



Situated close to the Umball Falls in Hohe Tauern National Park in Austria and surrounded by several three thousand meter-high peaks is Clarahütte, run by the German Alpine Association (DAV). This mountain hut is a popular starting point for tours of the glacier and demanding mountain hikes.

The hut was due a general refurbishment, partly as a result of damage caused by an avalanche in 2012. The project is executed by the Essen section of the German Alpine Club, mostly as volunteer work. As part of the renovation project, the DAV decided not



Instead of a petrol generator, in future, a mill wheel and the nearby river Isel will be the sources of power for the Clarahütte



only to modernize the hut itself, but to also invest in a mill wheel power plant to make it self-sufficient with green energy. Instead of a petrol generator, in future the nearby river Isel will be the source of power for the hut. For the mill wheel to turn hydropower into electrical energy requires highly efficient technology. This was supplied by Siemens in the form of an integrated drive system comprising a Simotics M synchronous motor acting as a generator, and a Flender SIG gear unit. The components were provided on site by the Siemens Solution Partner Softwerk GmbH.

These compact and rugged drive components interact ideally to create a reliable, high-powered drive train, supplying Clarahütte with its own independent source of energy. This will allow the operators to take care of the many mountain climbers and hikers it hosts every year without impacting on the delicate Alpine ecosystem with added carbon emissions. The refurbished mountain hut is due to open its doors to visitors in the summer of 2014.

Photographs: DAV/EWLW

www.siemens.com/ids



About

Company name: Siemens Industry Sector

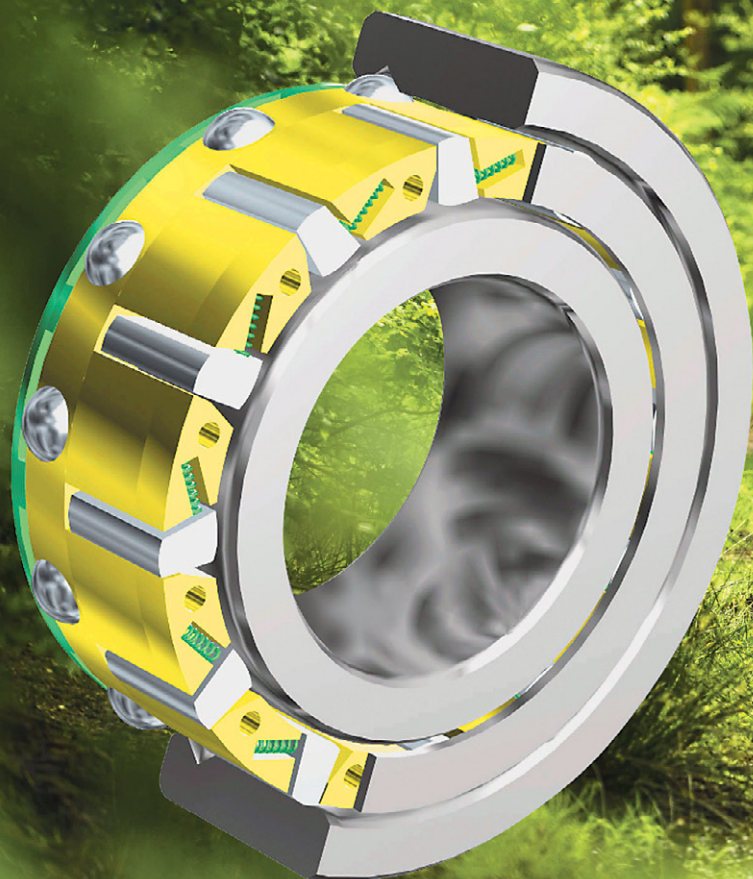
Sector: Industry, Drive Technologies

Headquarters: Nuremberg, Germany

Divisions: Industry automation, drive technologies and customer services, business unit metals technologies

Employees: more than 100,000

Products: Automation technologies



Clutch helps all terrain wheelchair manufacturer along the road to success

While standard wheelchairs are an essential tool for many people with disabilities, they are still extremely limited in terms of the terrain that they can handle. This is why Tim Morgan has invented the Mountain Trike. Operating in such harsh conditions can put a strain on the components and at times sourcing parts that could withstand this tough environment proved a challenge.

There is great desire amongst many wheelchair users to go out and enjoy the countryside. However, activities as simple as family trips in the park or ambling along country paths can be difficult or even impossible in a regular wheelchair due to the uneven ground, steep terrain and mud. While some traditional wheelchair designs are available with chunky, “off-road” tyres, they still require the user to push the wheels to move the

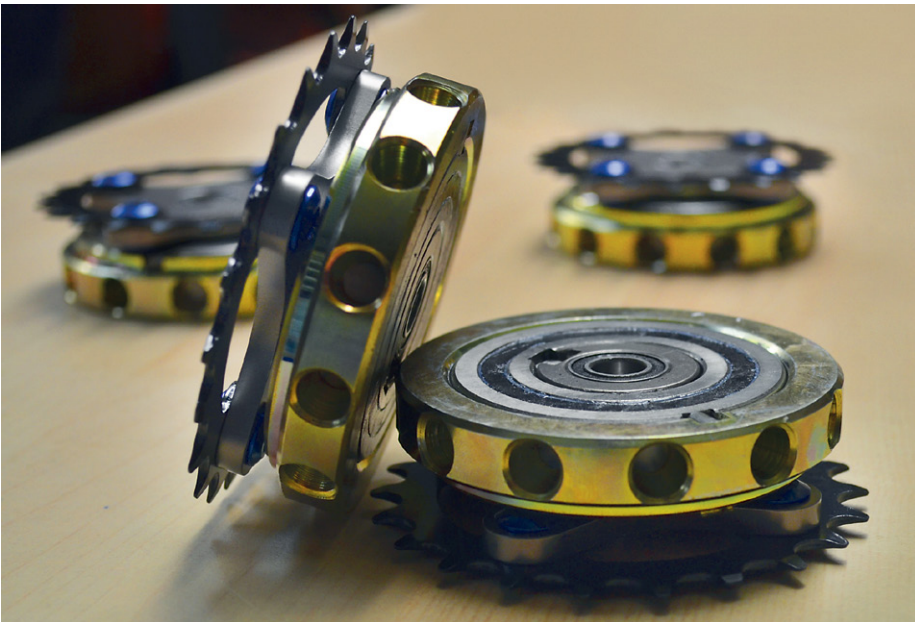
chair forward, which results in muddy slippery hands and poor transmission of drive.

The Mountain Trike is the only manual wheelchair on the market that has been designed specifically for all terrain use, combined with everyday practicality. It uses a unique lever drive system that allows the user to power, steer and brake the Trike using two levers which are positioned in front of them. The levers are connected to the wheels using similar

technology to that found on a mountain bike and power each wheel independently. A third wheel at the back stabilises the chair and can be steered using a joystick mechanism attached to one of the levers.

From total failure...

Rather than a standard bike free wheel, the Mountain Trike's designer, Tim Morgan, chose to specify an overrunning clutch to transmit the kinetic energy from the levers to the wheels. Tim explains his reasoning behind the specification: “When the wheels are spinning freely on a mountain bike, without drive from the pedals, the freewheel clicks during the rotation. The Mountain Trike is intended for use during family walks and other lifestyle activities so I wanted to make sure it would run silently. I also found that bike freewheels have a



01 Stieber Clutch helps Mountain Trike, an off-road wheelchair manufacturer, improve reliability

small amount of free travel before it engages. Because the levers are quite long, this translated to several inches of free travel with each push, which was quite jarring for the user and resulted in less efficiency overall. Using an overrunning clutch eliminates both of these issues."

While the initial overrunning clutches, specified on early test models, performed as desired short term, it became apparent that over long term use their durability was not up to the standard required for the Trike. Poor seals meant that mud and contaminants could creep inside, which caused seizing, while the poorly machined internal components led to slipping and, eventually, total failure due to the regular shock loading caused by disengaging and engaging the drive train with every push.

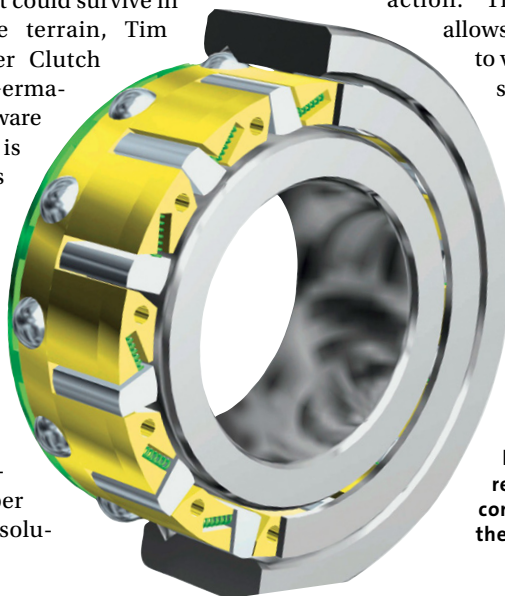
... to safe solution

Aware that he needed to source an alternative component that could survive in the most extreme terrain, Tim approached Stieber Clutch from Heidelberg, Germany. "I was already aware that Stieber Clutch is well known for its quality and reliability in tough industrial applications, so when we began to have problems with the original bought in components I approached the company to see if Stieber was able to offer a solu-

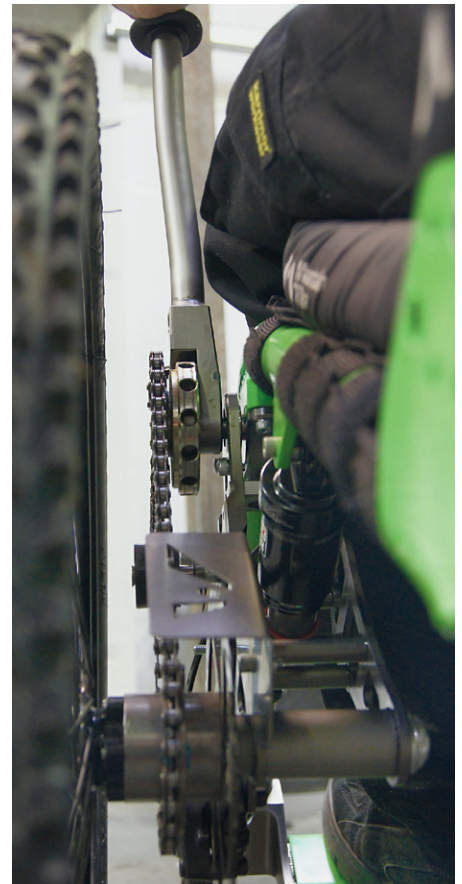
tion. I was supplied with the CSK PP overrunning clutch for testing and the superiority of the component was immediately apparent. The seals were clearly far better protected and the movement was much smoother."

Stieber Formsprag overrunning clutches offer a number of unique design features which ensure that they are longer lasting and more reliable than other components on the market. The sprags are manufactured using the company's patented "Formchrome" process which diffuses chromium carbide into the working surface of the sprag, increasing its surface hardness substantially to deliver excellent wear protection. They are also precision machined to ensure that each sprag is almost identical to the next to prevent uneven rolling movement.

The sprag retainer assembly also features a free action design that permits each sprag to have free and independent action. This independence allows each sprag to adapt to variations in annular space (eccentricities) so that when the clutch is engaged, the load



03 Stieber Formsprag overrunning clutches offer a number of unique design features which ensure that they are longer lasting and more reliable than other components on the market



02 Mountain Trike's designer, Tim Morgan, chose to specify an overrunning clutch to transmit the kinetic energy from the levers to the wheels

is proportionally shared among all sprags, eliminating the possibility of clutch damage resulting from the entire load being absorbed by just a few sprags. In operation, springs energise the sprags into position for instantaneous engagement with no backlash.

Tim continues: "During the testing process it was clear that the Stieber clutch offered far more in terms of reliable performance and they are now specified as standard on all Mountain Trikes. Since they have been installed we have had no reported failures, even from some of our more adventurous customers."

www.stieber.de
www.mountaintrike.com



About

Company name: Stieber GmbH
Parent company: Altra Industrial motion group
Headquarters: Heidelberg, Germany
Employees: 140
Products: Overrunning clutches with a torque capacity from less than 1 Nm all the way to 1,700,000 Nm



Belts as alternative drives for machine tools

Sasha Kolouch, Hans Offermanns

For a long time, it was believed that linear motors and direct drives provided the answer to the need for higher machine tool productivity, and that belt drives were on the decline. However, thanks to new materials, belt drives may once again be the number one choice.

When using belt drives for machine tools, the user is presented with a range of options, depending on the application. For speeds of up to approximately 60 m/s, elastomer v-belts or multi-ribbed belts are sufficient. Beyond 60 m/s, Polyflex polyurethane v-belts are the best option, especially in the form of banded belts. The key properties of these belt drives are the low specific weight of the belts, their high power density compared to other types of belt, and their quiet operation, even in high-dynamic applications.

Alongside the construction of the belts and the materials used, this is achieved using a special wedge angle of 60°, which enables the drive to reach circumferential speeds of up to 100 m/s. This special wedge angle requires the use of customized pulleys. Standard v-belt pulleys have an angle of 34° to 38°, depending on their diameter. However, producing belt pulleys with a special flank angle is usually not a problem for machine tool manufacturers.

Synchronous belts

If the application in question involves a positioning drive which runs at high speed, several thousands of revolutions per minute and since friction drives are not suitable for this purpose, the solution lies with synchronous belts. Increasingly, synchronous belt drives are being used instead of simple transmissions and chains, which are not designed for higher

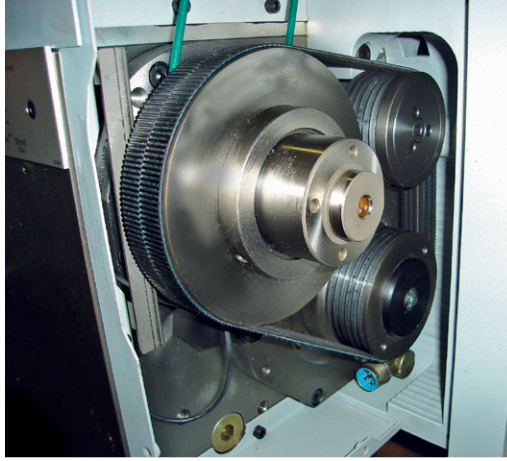
speeds, are loud and require frequent maintenance.

When selecting the right synchronous belt design for high-speed applications, the following three principles should be taken into account:

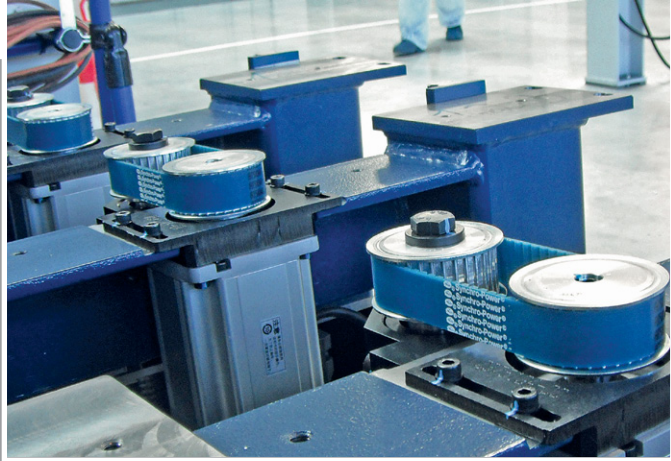
- Select a suitable tooth pitch and a suitable tooth profile in line with the power to be transmitted and the speed produced. Too small a tooth pitch will entail an increase in the construction space required as well as higher noise levels. Pitches that are too high, on the other hand, will necessitate a larger belt pulley diameter, and will also result in high noise levels. The best solution is a belt drive with the highest power density and the lowest possible tooth pitch at the same time. For high-speed drives and drive powers up to 100 kW, belts with 8mm pitch and GT-profile are normally used. For very compact belt drives, a 5 mm pitch with an extremely rigid carbon tensile member is recommended. Small

Author: Sasha Kolouch works in the Eastern Europe Regional Sales Department at Gates.

Hans Offermanns is an Applications Engineer at Gates.



01 Composite belts in a grinding machine drive



02 Oil-resistant polyurethane synchronous belts

itches of 2 and 3 mm are used for low-power applications which involve high-precision positioning, measurement and machining or engraving.

- Select a belt drive with a minimal width in order to reduce noise levels as much as possible. The use of several split belts on one belt pulley with separating discs has proven particularly effective. The width of the 8 mm pitch belts used in drives with speeds of approximately $10,000 \text{ min}^{-1}$ fall between 12 and 30 mm.

- Set the correct preload. This is important because, in the case of high-speed synchronous belt drives, the preload influences service life, heat generation, noise levels and the reliability of the components. The preload also has a significant impact on the stiffness of the system. It is important to consider the effect of preload on drive dimensions early in the planning of a belt drive. The preload of the belts decreases at first due to post-installation run-in behavior, but then remains constant after run-in for the rest of the service life of the machine if the correct belts have been selected.

Therefore, drives with synchronous belts can be expected to require no maintenance for the entire duration of their service life, which can last tens of thousands of operating hours depending on dimensioning and wear to the belt pulleys.

The operating mode of machine tools is usually complex. Roughing operations are

performed at low speeds, e.g. 200 min^{-1} , and high-speed processing at $10,000 \text{ min}^{-1}$. Under such complicated conditions, it is advisable to design the belt drive with the help of suitable calculation software. Programs such as Gates Design Flex Pro can be downloaded online free of charge.

Polyurethane synchronous belts

For slow-running drives with speeds, ranging from a few revolutions per minute to $1,000 \text{ min}^{-1}$ and the high torques resulting from this, belt pitches of 14 mm provide the best solution. Spindles or tables can be rotated using endless belts, usually with a carbon tensile member which provides the correct level of stiffness.

For the purpose of automatically changing tools and work pieces, open-ended synchronous belts or flat belts made of elastomer or polyurethane are used, and are clamped in place using clamping plates. Depending on the mass of the object to be moved, belt drives are also used where acceleration and deceleration rates are up to 60 m/s^2 .

In the case of high-speed belt drives, proper balancing of the belt pulleys must be ensured. Unbalanced belt pulleys cause vibrations, and in the case of cast iron pulleys this entails a risk of collapse at high speeds. Dynamic balancing of belt pulleys should only be performed on the shaft onto which they will ultimately be installed. Users have often encountered

problems in the past due to ex warehouse belt pulley balancing.

To ensure that the belt drives reliably and sustainably perform their function, they must be resistant to ambient conditions. Belts in machine tools often come into contact with aggressive liquids, or at the very least oil vapors. For such applications, HSN/HNBR elastomer belts or polyurethane belts are most suitable. Although polyurethane v-belts are resistant to aggressive ambient conditions, if oil enters the grooves of the v-belt pulley, there is a risk of slippage.

The compact construction of machine tools results in poor heat dissipation. For temperatures of up to 100°C , polychloroprene belts are the best option, and for temperatures of up to 130°C , HSN/HNBR belts, special polyurethane belt models and standard Quad-Power III belts made of an EPDM compound are most suitable.

www.gates.com/europe/industrial



About

Company name: Gates Europe

Headquarters: Erembodegem, Belgium

Employees: 14,000 worldwide

Products: industrial belts, sprockets, sheaves, tensioners, industrial hose, couplings, industrial hydraulic equipment

Robust, precise, and powerful: bearing solutions for agricultural machinery

Dipl.-Ing. Peter Pospiech

Agricultural engineering spans a broad range of machinery, systems, and equipment: from cultivation machines and tractors, tedders and balers, to huge harvest equipment items such as choppers, combine harvesters, and root-crop harvesters. But no matter how different these machines might be, the operating conditions are always harsh this also applies for the bearings in use.

Author: *Dipl.-Ing. Peter Pospiech is freelance editor at PPM News Service Pospiech Maritim in Rhauderfehn*



The biggest challenges are both the sand and dust that are hardest on the bearing seal and the moisture that affects the bearings. It is here that the designer has to overcome big challenges. In addition to plant residue, this type of machinery also has to



01 Four-point contact ball bearing for seed disks with high tilting rigidity

handle sap from the plants that attacks seals with its acidic properties. Once the seal is damaged, the penetrating contamination destroys the bearing in a short time. Constant vibrations and jarring shocks make for constant strain in all seasons and weather conditions.

Similarly, cultivation machines that prepare the field for planting seeds also require extremely robust bearing supports. An example of these are plow disks, whose slanted position results in not only radial forces, but also shear forces and side loads. The bearing types used have to transfer just these kinds of external load combinations. In addition, the high levels of precision required for efficient sowing must not be underestimated.

Early involvement with innovations

Under the brand names of INA and FAG, Schaeffler produces standard bearings for

agricultural machinery, perfected through customer-specific solutions. These include components for cultivating and sowing machines, for tractor engines, transmissions, and chassis, as well as harvesters.

Their primary customers are OEMs around the world. For this reason, the experts at Schaeffler get involved early on in new machinery developments and can therefore react to related demands, coming up with the right solutions and allowing them to influence the products. Field service engineers on site regularly communicate with the customer, in this way guaranteeing early involvement even with innovations.

Global support

Schaeffler specialists have the necessary system understanding at their fingertips to integrate a component or a module into an overall system. This may involve a catalog product or a solution especially developed



FAG tapered roller bearings for hauler transmissions

for the customer. "In order to offer the best technical solution, our engineers need to understand the system and the demands placed on it in agricultural engineering. Only in this way can we obtain the best possible success for our customers in the drive train or the cultivating equipment. We are getting more and more involved in the field of mechatronics – our expertise in the area of sensors is just the beginning. Field service engineers and the Schaeffler Technology Centers located across the globe are the first on-site contact persons for the customer. Industry-specific application technology, e.g. the engineering hubs for agricultural engineering in India, America, and Europe, is interconnected around the world through the Global Technology Network. Schaeffler's expert knowledge is therefore available on a global scale in cooperation with the central R&D areas. In this way, we can make our product, application, and service expertise optimally useful to our customers," says Eduard Beresch,

manager application engineering agricultural engineering off highway.

Four-point contact bearing for seed disks

Depending on its width, a sowing machine has over 100 seed disk bearings installed inside. It is unthinkable to have to relubricate these bearings during harvest season. Nevertheless, the environment is and continues to be a challenge: Fine, abrasive particles of dust, aggressive acidic silage sap, stony and heavy loam soils – a standard bearing will not hold up here. Instead, a special bearing solution with a particularly effective sealing concept is required. Schaeffler has developed its own compact INA four-point contact bearing for such seed disks.

The four-point contact ball bearing for seed disks stands out with four advantages: It has a high tilting rigidity and load-carrying capacity, operating almost without backlash. These advantages are mainly due

to the polished ground steel raceways of the outer and inner ring that absorb the operating forces and torques without difficulty. In addition, the bearing has an optimized sealing concept that ensures the constant operation of the bearing position with the maximum amount of grease.

Bearings for pressure wheels in sowing machines

INA bearings are also used for pressure wheels in sowing machines: Double row angular contact ball bearings with integrated pins reduce the number of components for the customer. This simplifies and abridges the assembly process. The efficient and watertight radial shaft seal with its spring preload is already integrated in the bearing, allowing the pressure wheel to function reliably during operation. Other pluses: Due to the integrated seal, with a preloaded spring ensuring the sealing action even when worn, the bearing holds up much lon-



02 Flange bearing unit for plow disks

ger than alternative design solutions, even under harsh conditions. For the customer, this means no downtimes for repairs or premature wheel changes. Thanks to lifetime lubrication, the bearing unit is also maintenance free.

Flange Bearing Unit for Plow Disks

The solid flange bearing unit for plow disks is a system solution with a high load-bearing capacity and tilting rigidity that only needs to be bolted to the machine frame and the plow disk. The large pin diameter is ideal for extremely high loads. The internal assembly thread makes for a compact design and prevents the thread from seizing up due to contamination.

A plow disk can be changed out on site within a very short time. Thanks to the split inner rings of the double row angular contact ball bearing, a larger number of rolling elements can bear the load than with conventional angular contact ball bearings. In conjunction with the large contact angle, the necessary operating forces and torques can be absorbed safely and reliably. The rolling elements are guided by special plastic cages.

Tapered roller bearings in tractor transmissions

Thanks to their innovative inner design, FAG tapered roller bearings in X-life quality are an example of an efficient bearing type for providing pinion shaft bearing support in tractor transmissions that is especially suitable for extreme load demands. Specially processed raceway and roller surfaces, along with optimized contact geometry between the rolling element end face and the inner ring rib, have managed to reduce friction in the bearing by up to 50 %.

At low speeds when starting up or during field operation, the improved surfaces enable an elastohydrodynamic lubricating film to be formed more rapidly, which cuts down on wear and heat generation. The above-mentioned design characteristics not only save on fuel, but also slow down lubricant aging. The improved rolling contact surfaces and the use of high-quality materials increase the dynamic load-carrying capacity by up to 20 %. This makes it possible to extend the operating life by 70 %. By building smaller transmissions while maintaining or even increasing performance capacity, considerable advantages with regard to cost and competitiveness can result.

Re-engineered contact geometry between the roller and raceway, called profiling, counteracts harmful edge pressure and plastification in the rolling contact caused by impact loads or major shaft tilting under full loads (such as when tilling), preventing premature bearing, and thus machine, failure. Consequently, FAG X-life tapered roller bearings increase transmission efficiency, longevity, and reliability in mobile work machines, thereby making a significant contribution to lowering life-cycle costs.

Systematic Bearing Design

"The Bearinx rolling bearing calculation program developed by Schaeffler allows for the

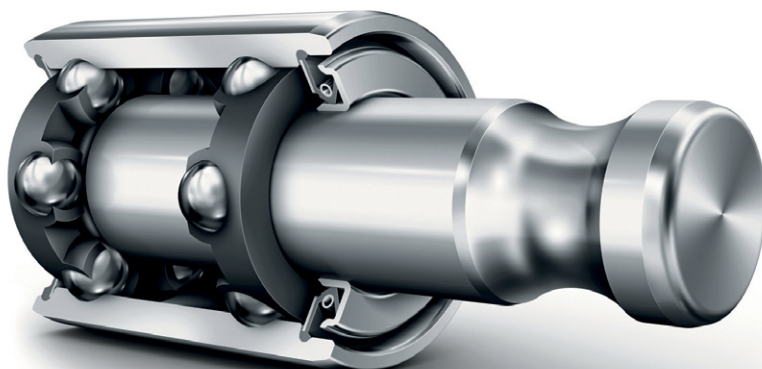
detailed analysis and load-appropriate design of the individual bearing positions in the particular application concerned," says Beresch. Even complex designs and load situations are perfectly represented. The program makes it possible to precisely portray, calculate, and document the loads affecting each bearing position. Automated changes to the bearing parameters of position/type and installation size enable performance reserves to be identified. In this way, customers receive the optimum and most cost-effective solution for their application.

The Fitting Lubricant for the Ideal Operating Life

Later in the application's life cycle, lubrication maintenance is added to the aspects of high-quality design and production-related properties. Beresch states in this regard: "The rolling bearing greases developed by Schaeffler under the brand name Arcanol provide very good conditions for favorable bearing running performance as well as for long operating life and high operational safety and reliability. The application range of Arcanol greases is calculated using modern test methods and test systems under a wide range of operating conditions and with all types of rolling bearings. Arcanol rolling bearing greases have better properties in all areas than normal greases do."

Each machine has a maintenance plan ex works for all lubrication points that indicates after how many hours of operation, in what quantity, and with which grease relubrication is necessary. For this, selecting the right lubricant and maintenance interval is decisive for reliable and ongoing bearing function. The end customer or machine operator can procure 100 %-tested and approved Schaeffler lubricant greases from distribution companies and authorized sales partners around the world.

www.schaeffler.com



03 Angular contact ball bearings with an integrated shaft for pressure wheels



About

Company name: Schaeffler Technologies

Brands: INA, LuK and FAG

Headquarters: Herzogenaurach, Germany

Turnover: € 11,2 bn (2013)

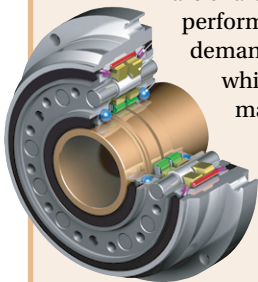
Employees: over 79,000 worldwide

Products: Rolling bearing and plain bearing solutions, linear and direct drive technology, as well as high-precision products for the automotive industry

Product News

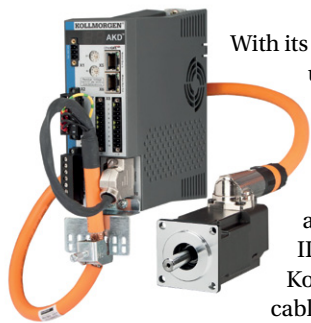
Play-free high-precision gears for demanding environments

The play-free high-precision gears of Sumitomo (SHI) Cyclo Drive Germany GmbH from the Fine Cyclo series are characterized by reliability and high performance. They are designed for demanding product environments in which low-maintenance components make a contribution to short down-times. With the largest play-free high-precision gear from the Fine Cyclo series, the F4CFS-UA 115, SHI specifically targets manufacturers of robots, positioners and handling systems. The gear is designed to be as resilient as possible to load cycles. Areas of use include positioning tasks (point to point) and track applications, such as pallet changers, bending heads, swivel changers, disc magazines, chain magazines and swivel tables. One typical application is used in the palletising robot to absorb high tipping torques and axial loads.



www.sumitomodrive.com

The SDF3 digital resolver by Kollmorgen requires fewer connecting wires



With its SDF3, Kollmorgen has halved the usual number of connecting wires required for its digital resolvers from four to two. They are sufficient to supply the digital resolver with current, implement communication, and simultaneously transfer the motor ID and temperature data. As a result, Kollmorgen has implemented single-cable connection technology with an eight-pole standard motor cable – three phases, one PE, two for the brakes and two for the feedback system. Thanks to its high noise immunity, data can be transferred safely via a cable without any EMC issues. Resolvers are used in more than half of all servo applications. In addition, the further development of the feedback system reduces the variety for connection technology. Motors with the digital resolver SDF3 and drives with Multiturn or a Hiperface DSL encoder can be connected with a single cable type. In this way, existing feedback systems in machines can be easily replaced even at a later date, without having to completely reinstall all of the cabling. Moreover, there is no risk of confusion, since only one type is used.

www.kollmorgen.com

Vogel Antriebstechnik converts production line to ground circular arc teeth

The spiral bevel gearboxes, servo spiral bevel gearboxes and bevel helical gearboxes by Vogel Antriebstechnik now have improved quality standards. Conversion to the modern production method of ground circular arc teeth brings numerous advantages for both machine builders and plant operators. In addition to the reliable and reproducible manufacturing quality, the main reason for the experts converting to the new process is the increase in productivity. This is achieved by a further reduction in concentricity faults, improvement of the surface of the tooth flanks with defined wear pattern as well as enlarged tooth widths and improved material strength. All these factors contribute to speeding up processing times considerably. For customers, this means faster deliveries and



even better delivery dependability. The method of circular arc teeth according to Klingelnberg increases load capacity by an average of 7%, whereby the value varies depending on gearbox size. Running noise and heat development are both lower in the new process. The greater toothing quality and precision allows small backlash values to be set easily: backlash can be reduced to 2 arcmin. The optimized toothing geometry produces lower specific gliding between the tooth flanks. In combination with the improved surface quality, this increases the efficiency of the toothing components to 99 % and of the complete gearbox to 97 %. In connection with the use of high-grade synthetic oils, durable and low-maintenance precision gearboxes are created.

www.vogel-antriebe.de

Modified gear motors by Siemens simplify assembly

With its rugged gear motors Sidoor MDG 180 and Sidoor MDG 400, Siemens Industry offers two modified motors for door control in industrial machines. The new drive units are characterized by



an improved hold of the drive belts. Moreover, a new pluggable cable system with a new polarized plug timer combines the feedback cable and voltage line in just one cable, therefore simplifying the pre-assembly of an industrial machine, as well as assembly. In combination with the automatic door control Sidoor ATD410W, the gear motors Sidoor MDG 180 and Sidoor MDG 400 with IP56 rating allow simple regulation of door parameters and, as a consequence, driving performance.

www.siemens.de/sidoor

Product News

LVD Sercos III: high performance low voltage servo drive by Servotronic

Servotronic introduces the LVD Sercos III, a compact, high-power and intelligent servo drive for low voltage 15-48 VDC bus servo motion applications. The drive is ideal for driving small low voltage brushless, stepper or brushed DC motors. In the case of stepper motors, the control is done via a closed loop commutation with no step loss. This sophisticated stepper control delivers a servo-like performance at the low cost of a stepper solution. The



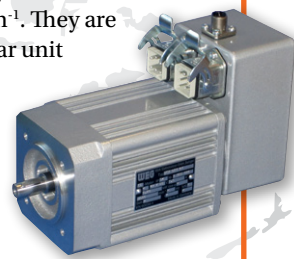
LVD fully supports Sercos III to provide high performance, fast multi-axis control at a competitive price. The drive is about the size of a smart-phone, and weighs 250 g. With 12 Arms peak current and a switching frequency of up to 100 KHz, the LVD is one of the most powerful low voltage drives in the industry.

The drive's high PWM switching frequency, combined with the field oriented control (DQ) and space-vector modulation, enables operation of low inductance motors while minimizing current ripple and eliminating acoustic noise. Separate logic and bus power supplies allow safe motor power-off while maintaining the drive state, and a fast restart.

www.servotronic.com

WEG extends its offering with products by Württembergische Elektromotoren

WEG added Württembergische Elektromotoren's (Balingen, Germany) products to its portfolio. The product line includes the UEX series: electronically commutated (EC) compact motors with attached four-quadrant electronic controllers, and extends WEG's offering. These compact EC motors with CANopen interface cover the power range from 60 to 250 kW and run at speeds up to 3,000 min⁻¹. They are available in versions with an attached gear unit (UEXG 3.3 TH and UEXG 513 TH) or as



bare motors (UEX 3.3 TH and UEX 513 TH), with IP54 protection rating. The series is designed as standard for a supply voltage of 24 V DC or 42 V DC and can be operated from a power supply. With the electronic controller mounted directly on the motor, installation at the user site has been simplified. The standard operating mode is speed control, but the compact drives can also be used for torque control or positioning tasks. Hall commutation sensors are used for motor speed control. The electronic controller and the motor communicate with each other over the CAN interface, while communication with the drive is possible via the CAN bus or digital inputs. The compact motors have several monitoring circuits: temperature monitoring to protect the winding and the electronics, speed monitoring, and overvoltage/undervoltage monitoring.

www.wegelectricmotors.co.uk

Metal bellows-cardan shaft with CFRP intermediate tube by R+W

The company R+W Antriebselemente has expanded its product portfolio with a metal bellows-cardan shaft with an intermediate tube made of CFRP (ZAL model). Due to its very low mass moment of inertia, the zero backlash cardan shaft is particularly suitable for very high speeds. Thanks to a special support for the metal bellows, an intermediate bearing for the shaft is no longer required and distances up to six meters can be bridged. The intermediate axis has split clamping hubs on both sides,



which allow radial and easy assembly.

The model series is available graded according to torque in seven different series from 10 to 800 Nm.

Depending on the series, a bore diameter from 5 to 72 mm can be achieved. Thanks to the metal bellows, which are made of highly flexible stainless steel, the intermediate axis can also compensate for axial, lateral and angular shaft misalignments.

www.rw-kupplungen.de

Rolled ball gear drives for miniature applications



For positioning tasks in miniature applications, Hiwin recommends the small ball-gear drives with cylindrical single nut from the RSIT-series: the

models with diameters of 8, 10 and 12 mm, as well as a pitch of 2.5 or 4 mm, are suitable, among others, for pick and place tasks in automation technology. Where standard requirements are set to the accuracy, the rolled ball-bearing drives offer alternative or ground designs: three accuracy classes with a maximum deviation of 0.023, 0.052 or 0.21 mm per 300 mm path are available. If higher repeat accuracies are needed, the manufacturer will deliver the ball gear drives in a design with reduced axial play. Due to the screw-in angle, the cylindrical individual nuts can be easily integrated into the construction.

www.hiwin.com

Hydraulics & Pneumatics

Fluid Power technology magazine

Grand opening of Argo-Hytos in Yangzhou

On October 25, 2014, Argo-Hytos celebrated the grand opening of the manufacturing plant in Yangzhou, China. On an area of 2,500 square meters hydraulic components and systems are manufactured and assembled.

At two o'clock in the afternoon, Christian H. Kienzle, CEO of Argo-Hytos, his daughters, Nicola and Christine Kienzle, and Mr. Chen Xi, district manager of the Guangling region, welcomed the guests, cut the ceremonial red ribbon and wished the new facility success and growth. Afterwards, the 200 guests were asked into the beautifully decorated production plant, where more surprises awaited.

Mr. Li Li, chairman of the CHPSA (China Hydraulics Pneumatics & Seals Association), Mr. Chen Xi, district manager of the Guangling region, and Mr. Rauen from the German engineering association VDMA (Verband Deutscher Maschinen- und Anlagenbau) offered their warmest congratulations. Between speeches, the guests were treated to traditional Chinese music and dance performances.

Afterwards, Andreas Briegel, new managing director of Argo-Hytos Yangzhou, opened the Bavarian-style buffet. An amazing fireworks display that lasted almost thirty minutes – an opening present by the indus-



trial park GIP – marked the grand finale of the ceremony.

The opening of the Yangzhou branch clearly demonstrates the commitment of Argo-Hytos to China as an industrial powerhouse. On an area of 2,500 square meters hydraulic components and systems are manufactured and assembled. Approximately 60 people will be employed at Argo-Hytos Yangzhou by the end of the year. Other sales offices of Argo-Hytos in China are located in Shanghai, Beijing, Shenzhen, Xiamen and Hong Kong.

www.argo-hytos.com

New challenges

Andreas Briegel, new General Manager Argo-Hytos China, about his new role.





Economical and Energy-Efficient: Miniaturized Pilot Valve Technology

Theo Paulus

Compact size, energy efficiency, and intelligent control: When it comes to miniaturization in pneumatics, pilot valve technology plays a central role in terms of performance data and economy.

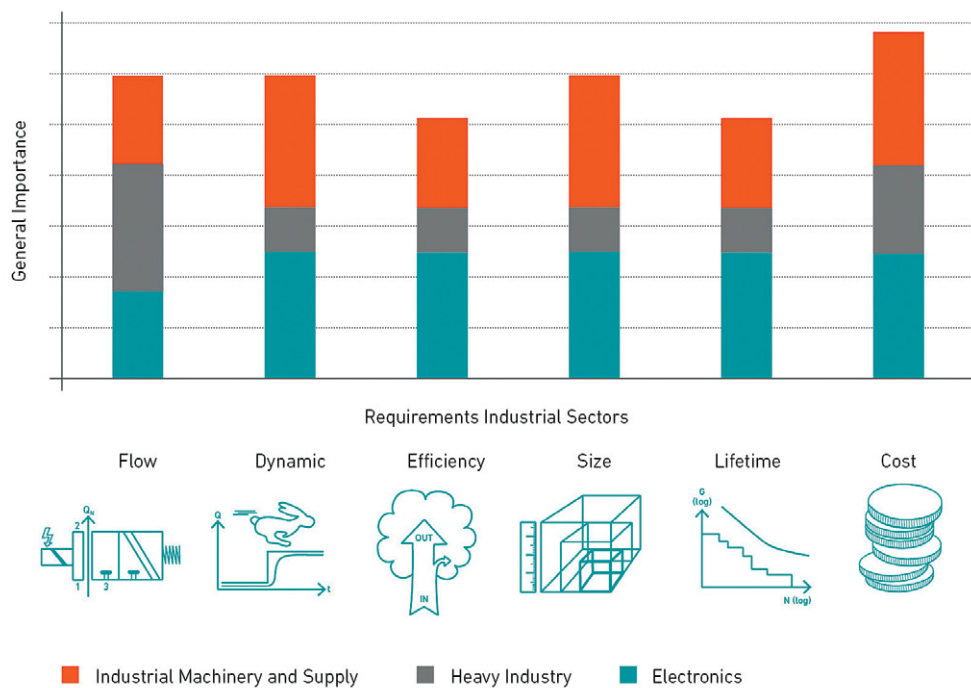
Author: Theo Paulus, Vice President Product Area Standard Pneumatics at Aventics in Laatzen, Germany

There is movement in the pneumatics industry, not least because of an ever-increasing discussion related to energy efficiency. Conventional pneumatics can offer substantial savings through the use of intelligent system designs. Valve technology miniaturization is another decisive step towards energy-efficient pneumatics. New developments, such as the Aventics AV series valve generation in sizes AV03 and AV05, offer impressive potentials for savings. While developing the required pilot valve technology, the company made a series of basic decisions that will shape pneumatics over the long term.

These decisions were based on industry user demands. Six factors are key for engineers when developing a pneumatic system:

- Flow rate,
- Dynamics,
- Efficiency,
- Size,
- Service life and
- Costs.

Engineers change their focus, depending on whether the products are to be used in the electronics industry, heavy industry, or general machine construction and automation technology. In heavy industry, the flow rate, i.e. the output, is critical, whereas electronic applications place a high emphasis on dynamics, efficiency, and component size. In the broad field of general machine construction, the large number of different applications leads to a mostly balanced properties profile. However, energy efficiency is also gaining in importance in more and more applications.

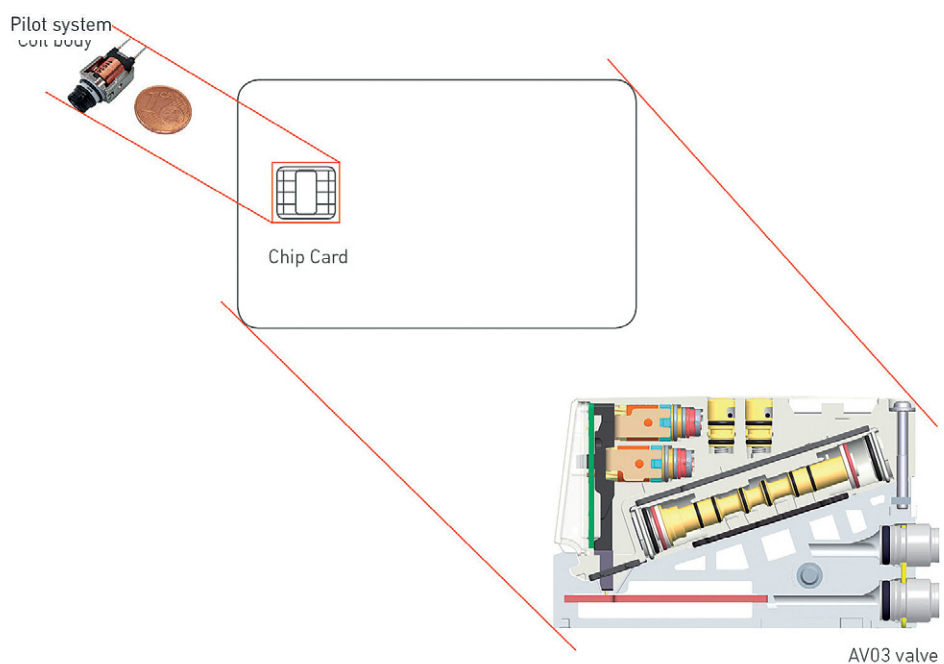


01 Factors that are decisive for designers when laying out pneumatic systems

Procurement costs for pneumatics are a significant factor for all applications. This is also reflected in the experiences of pneumatics manufacturers. The right pneumatics is, above all, cost-optimized, compact, and energy-efficient, whilst being highly dynamic.

On trend: Distributed systems with valves as small as a credit card

Another market trend: Users are relying more and more on a distributed arrangement of pneumatics. This approach supports concepts for modularization in machine construction, because tubing and cabling can be greatly reduced, leading to minimized air consumption. The more compact and light the pneumatic valves are,



02 Sizes in comparison with a credit card

the closer they can be positioned to the actuator. Here, Aventics is setting new standards with its AV valve generation: In contrast to conventional valves, the diagonal design halves the required space. The AV03 valves are as small as a credit card. At the same time, the use of high-performance plastics reduces the weight by around 50 %.

The compact design also has an effect on the pilot valve technology. Compact pneumatic valve systems have special electro-pneumatic pilot valves that convert the output signals from electric controls into pneumatic control signals for the main valves. Miniaturization in industrial pneumatics creates new challenges for pilot valve technology to provide the same switching times and performance in a considerably smaller space.

Other actuator principles are inefficient

During the development of the new valve generation, engineers at Aventics quickly decided to exploit the potential of conventional electromagnetic converters even further. After thorough testing, they discarded the idea of developing new actuator principles. The main reason: Alternative technologies, such as Piezo valves with boosters, increase manufacturing costs to a level that the market cannot support.

The six basic requirements for flow rate, dynamics, efficiency, size, service life, and

costs had top priority when drawing up the specifications for the AV series and downsizing the electromagnetic converters to just a few cubic millimeters. To stick with the credit card comparison, the aim was to achieve dimensions for the AV03 that would be just above the size of a chip on a credit card.

Ball with hard seal

In the new AV series valve generation, Aventics uses a pilot valve cartridge with electromagnetic actuator in a U-bracket design. The pneumatic control unit has a cartridge design and is easy to integrate in a main valve.

The pneumatic control unit of the valve cartridge has a dramatically different design compared to other common market solutions. Whereas conventional pilot valves use elastomer discs to softly seal against ring-shaped seats, the Aventics valve cartridge has a hard seat. The control element is a metal ball that seals in an injection-molded, cone-shaped plastic seat.

The valve cartridge consists of less than 15 individual components. The separate miniature components, such as the seal seat for the air supply or the pressure piece for force transmission are made of plastic and have a size of only around 10 mm³. This also places high demands on the component tolerances and precision in the production process. In order to achieve fast switching times, it is not enough to simply reduce the size and mass. In fact, tribological factors come into play to reduce friction as well. Aventics can fall back on decades of experience in the use of optimized slide bearing systems in pneumatics that are based on both high-performance plastics and metals. During the production of the valve cartridges, various laser welding processes are used for metals and plastics, as well as thermal processes.

Flow rate improved by 40 %

Thanks to its special shape, the pilot valve can be easily integrated in the main valve and enables an optimized design for the pneumatic channel guiding. Engineers reduced energy-guzzling swirling by improving geometries and providing flatter angles for the supply and exhaust channels. In comparison with common valves, this increases the flow rate by around 40 %. The practical result: the valve system operates at a working pressure that is 15 % lower than before thanks to a smaller pressure drop.

Current reduction during the holding phase

The reduction in size also has an effect on the actuator. Reducing the available winding space in the solenoid leads to a corresponding decrease in magnetomotive force. This lowers the force potential, which results in a less efficient ratio of friction to useful force. As a result, engineers have to draw up a more sophisticated design during configuration. Besides a reduction in force potential at a specified performance level, a reduction in size also leads to a less-favorable thermal situation due to smaller surfaces for heat transfer.

Aventics is counteracting these issues with an intelligent control strategy. As the electromagnetic actuator only has a high need for current during the pull-in phase, the current can be greatly reduced during the holding phase. This enables considerably lower solenoid power dissipation, particularly for long duty cycles, and improves the thermal situation.

Since it makes sense to use the described control strategy directly on each valve, only minimalist electronic circuits are possible, due to space and cost restraints. However, the power dissipation in the electronics themselves is the decisive assessment criterion, as this portion reduces the useful output and has a negative influence on the thermal balance. Here, the new AV series valve generation offers an intelligent solution that also takes the energetic aspects of market demands into account.

Conclusion

Miniaturization of conventional pilot valve technology fulfils the demands of modern pneumatics: it efficiently provides the required output and long service life at market-driven prices. This will ensure that pneumatics still has an important role to play in industrial applications of the future.

Photographs: Aventics GmbH

www.aventics.com

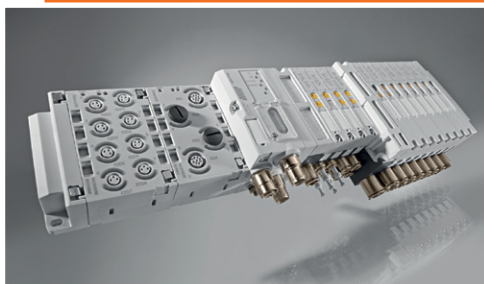


About

Company name: Aventics
established: 2014 (formerly Bosch Rexroth Pneumatics)
Turnover: € 400 m
Employees: : 2,100 globally
Products: industrial pneumatics, marine industry, tooth chains, commercial vehicles

New valve generations by Aventics

Aventics shows the potential for further development of conventional electromagnetic converters in the new AV series valve generation in the sizes AV03 with a nominal flow of 300 NI/min and AV05 with a nominal flow of 700 NI/min. Here, the electromagnetic converter has been reduced to a few cubic millimeters while maintaining high flow rates of 300 and 700 NI/min.



WE KEEP YOU AHEAD OF THE COMPETITION



Julian Massler (21)
Bronze medal at the
Junior European Championships 2011
Sponsored by ARGO-HYTOS



Fluid power technology for success

Innovations and intelligent system solutions combined with flexibility and productivity – ARGO HYTOS sets new standards in all areas of fluid power technology.

We support young talents in sailing on their road to success. This is also the way our customers experience us: As an active partner – for more than 65 years.



Safe hydraulics thanks to high-precision tube connection technology



Harald Pott

High efficiency, varying temperature conditions and frequent load changes – hydraulic systems in stationary and mobile machinery are constantly subjected to stresses. Corrosion-resistant, high-precision tube connection technology is vital to ensure maximum long term functionality.

Small components with big system features. Secure and reliable processes in the creation of hydraulic tube connections are crucial for reliable and economical operation of modern production machinery, across all industries. The desire to achieve better energy-efficiency is a central issue here – but as machine efficiencies increase, the loads acting on the hydraulics and pneumatics. In order to ensure that plant and machinery such as plastics injection moulding machines and huge mining excavators will operate reliably in tough conditions, coupling components meeting leak-tightness requirements and offering durable corrosion protection are required. This means that users not only have to choose suitable, system-compatible coupling components but must also focus their

attention on correct, professional assembly and choice of a competent supplier. Voss Fluid GmbH manufactures tube coupling systems and is a system partner of machinery manufacturers all around the world. The company's product portfolio includes tube couplings for stationary and mobile hydraulic systems, cutting-ring and flared screw couplings, tube-forming systems, flange couplings, valves and accessories.

“Superficial” quality with professional depth

The surface finish of tube couplings is one of the main quality requirements. This is the prerequisite for long-lasting corrosion protection and highly functional and therefore economical components. Here, Voss Fluid

Author: Dr.-Ing. Harald Pott is technical director at VOSS Fluid GmbH in Wipperfurth

uses its proprietary, durable and lasting Voss coat zinc-nickel finish for all tube couplings. This coating meets all requirements of the EU directive on end-of-life motor vehicles, which has prohibited the use of surface coatings containing hexavalent chromium compounds since 2007. In cooperation with independent research institutes and universities such as the Aalen University of Applied Sciences, a corrosion protection system which, compared with similar base materials, is ten times better than conventional zinc coatings has been developed. As opposed to pure zinc surfaces, zinc-nickel does not corrode to produce noticeable white rust, but only forms a light grey discoloration. Nickel release by this coating is 50 times lower than the limit values specified in EC Regulation 1907/2006 for articles intended to come into direct and prolonged contact with the skin. In direct comparison, a Voss coat surface achieves a limit value 2230 times lower than a 2-euro coin. The hard-nickel content of this coating makes the surface not only environmentally safe, but also more resistant to wear under the mechanical stresses which the hydraulic couplings are exposed to during transportation, assembly and everyday use. Voss coat consists of a zinc-nickel base coat which is subsequently passivated before being sealed. These three layers prevent the base material from corroding and thus sustainably improve the quality of the coupling components. The zinc-nickel finish achieves the best corrosion resistance class K5, according to VDMA standard sheet 24576. This class applies to a

optimum assembly torques. This has led to distinctly lower torques than those required with other zinc-nickel coatings. Depending on the coupling part a lubricant and partial internal coating is used in some applications, e. g. for union nuts.

A competitive edge: in-house electroplating

A key factor in achieving such high-quality coatings of tube couplings is Voss Fluid's in-house electroplating plant, meeting high technological standards as well as conforming to currently valid environmental protection regulations for mixed residential/commercial areas. It is one of Europe's most modern plants and is optimally designed for the various internal coating process stages – a degree of specialisation that would have been impossible with an outsourcing arrangement. In comparison to conventional electroplating, this process has been optimised with regard to component damage prevention, layer distribution, visual appearance and coefficients of friction – ensuring qualitative reproducibility of the 6,600 different articles which form the basis for an even greater product spectrum. Mass, size and geometry are just some of the programme parameters – 12 on average – that are stored in the production control system for each individual article. These data are important requirements for achieving perfect coating of the different coupling parts every time. The electroplating current, the length of time the item remains in the bath



Dr.-Ing. Harald Pott: *“VOSS Fluid GmbH lays the foundation to success with its consulting competence and applications know-how.”*

surface protection effect which has been proved to prevent red rust development for at least 720 hours and white rust development for at least 360 hours. Under laboratory conditions, a salt-spray test of unassembled parts in accordance with DIN EN ISO 9927 even showed that these resisted corrosion for more than 2,000 hours. A real-life-conditions test using random samples of products from mass production after handling and assembly showed that the base material had not corroded even after 1,000 hours. The coefficients of friction of mating parts of cutting-ring couplings have been continually improved in further development and production processes in order to achieve

and the handling processes are specifically and clearly defined for every article.

The racks and baskets used to move the coupling parts through the plant are a proprietary development. Larger coupling parts weighing up to 2.5 kg and easily-damaged external threads are put on the racks manually in order to prevent potential damage during the coating process. In the preparation process, the items are cleaned ultra sonically to remove contamination or residues from holes and hollow sections. Smaller components are placed in drums for the coating process.

These are filled incrementally via a conveyor belt in order to keep the dropping height to



01 Larger coupling parts with weights of up to 2.5 kg and easily-damaged external threads are put on the racks manually in order to prevent potential damage during the coating process



02 Smaller parts with internal threads are placed in drums for the coating process



03 The inhouse electroplating plant is one of Europe's most modern plants and is specially designed for the various internal coating process stages – a degree of specialisation that would have been impossible with outsourcing



04 Compared to conventional processes, VOSS Fluid has optimised its electro-plating process with regard to component damage prevention, layer distribution, visual appearance and coefficient of friction

a minimum and prevent process-related damage. A considerably shortened coating process time is also gentler to the material. To be economical with resources during production, the entire electroplating process is monitored and controlled by on-line analysis systems. Automatic dosing pumps ensure that only the right amount of chemicals needed for the specific product treatment are added to the baths. This keeps bath concentrations stable and within specified process limits. The bath contents are kept constantly in motion in order to distribute the chemicals evenly. After electroplating, the coating thickness and the nickel addition rate of every production batch are checked. As has been proven, the articles are in this way given an even Voss coat surface finish and are durably protected against corrosion. Since 2013, an experimental electroplating plant has also been in operation, where the entire electroplating process is modelled in miniature, allowing simulation of production parameter changes in a resource-saving manner. Apart from the further development of Voss coat, this plant is also used to optimise internal processes in terms of efficiency and sustainability. Users therefore benefit from a

future-proof surface coating and customised system solutions.

Quality from A to Z

The quality of the products, the accuracy of their dimensions and process reliability depend not only on the electroplating process. Ensuring high product standards, starts with the choice of materials, which are only purchased from audited supplier partners. For instance, the incoming-goods inspection determines the material composition by spectral analysis, optical profile projector, contour measuring device or a surface roughness measuring device is used to determine the product geometry. This department also tests material hardness and the properties of the elastomers used for example for the seals. Another special inspection on suitability for machining is carried out on all articles in order to ensure constant high product quality. Each production lot is monitored by statistical process control (SPC) – both during machining operations and electroplating. Machine tool wear is continuously monitored during machining processes.

Process reliability of hydraulic systems in mobile and stationary machinery depends on choosing the tube connection technology which is most suitable for the respective application, its corrosion resistance, correct assembly and installation. Voss Fluid GmbH lays the foundation to success with its consulting competence and applications know-how. This results in machinery with a long service life and economical hydraulic systems that can be assembled using reliable processes.

Photographs: Voss Fluid GmbH

www.voss-fluid.com



About

Company name: Voss Fluid
Established: 1931
Headquarters: Wipperfurth, Germany
Turnover: € 106 m (2013)
Employees: 400
Products: tube couplings, valves, flanges, ...

Product News

Cooling system for an energy-saving motor concept

Bosch Rexroth has developed a smart cooling for diesel electrical locomotives with multi-motor drive system. The energy-efficient solution has been developed in coordination with a large manufacturer of rail-bound vehicles. To meet the EU exhaust standard Stage IIIB, the customer of Bosch Rexroth replaced the large diesel engines common in long-distance locomotives by four smaller models from large-series production. The individual diesel engines switch on and off on demand. For this, the cooling system had to include a higher energy density. The ventilation drives based on sensor data must also provide demand-oriented cooling output at all times. The cooling system developed by Bosch Rexroth works with a combination of hydrostatic and electrical ventilator drives and an adjusted control. The latter is based on Rexroth solutions for mobile work machines and has been adjusted to railways technology. Sensors record the temperatures of motor and generator cooling water, charging air and hydraulic oil to determine the required cooling output. Integrated additional functions adjust the ventilator speed to demand. Cooling of the flow inverter is achieved by additional electrical ventilation drives.

www.boschrexroth.com

Hydraulic cylinder simplifies machine construction

Parker Hannifin presents new hydraulic cylinders with perfect position recording, which increase the productivity of applications while also minimizing the cost of installation and maintenance. The Intellinder cylinders are robust solutions for all initial equipper applications that require precise recording of the piston rod position of the hydraulic cylinder. Typical applications for the new technology include vehicles and devices of the construction industry, as well as agriculture and forestry. The Intellinder supports functions such as electronic dampening, load monitoring and automatic load holding and positioning devices. The hydraulic cylinders are available with piston rod diameters of 25 to 127 mm and without limitation of the piston size. Stroke lengths up to 2.4 m are available by default, larger ones on request. The sensor is integrated into the cylinder head to read a pattern applied to a piston rod with a resolution of 0.03 mm. Then the signal is processed by the sensor electronics and transmitted to the control system via a CAN bus. The connection of Intellinder with a control, e.g. vehicle automation system IQAN, permits initial equippers to implement a complete drive and control system for mobile applications.



www.parker.com

New electrohydraulic linear drive

Parker Hannifin has developed an electrohydraulic linear drive with the Compact EHA. Because of its high performance, density, speed and longevity, it is perfect for narrow installation spaces, mobile applications and remote activation. Introduction of the Compact EHA of the second generation offers expanded assembly options and the possibility of a manual release function, which gives the constructor more freedom and the user more safety. The Compact EHA is a self-enclosed doubly-acting actuator that works with stroke speeds of up to 84 mm/s, making it a robust and maintenance-free alternative for conventional hydraulic, electromechanical and pneumatic systems in all military and industrial applications, aviation and aerospace, marine and construction. The design of the Compact EHA integrates all components in a stable and compact monoblock housing of anodized aluminum. The new linear drive can be used at operating temperatures between -34 and +65 °C.



www.parker.com

2/2- and 3/2-directional valves with different assembly options

SMC Pneumatik has optimized the mechanically actuated 2/2- and 3/2-directional valves of the VM 100/200 series. The series, with its new white housing, is constructed lightly for cost-saving operation and needs only a small installation space. The series is flexible due to its new installation options – now four in total: assembly with attachment element, assembly at the bottom, lateral assembly and control panel installation. It also offers two line connection options (side and bottom) and a wide range of actuation elements (mechanical and manual), which can be easily exchanged. Pushbuttons and dial switches are available in four colors to simplify visual control and make it easier to tell apart the functions of the individual compressed air lines. A pressure display also permits simple verification of maintenance. Since the assembly dimensions are the same, the new VM 100/200 series can be swapped with the predecessor model.



www.smc.eu

Intelligent drive system for Laotian hydro power plant

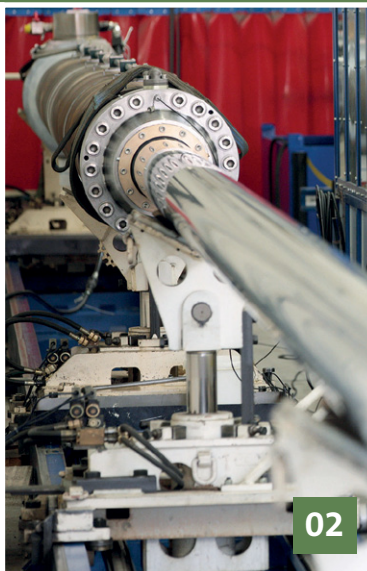




61 cylinders, 27 power units, four mechanical ship arrest systems and the shipping lock system control unit – with this delivery for the construction of the hydroelectric power plant Xayaburi in Laos the companies Montanhydraulik Germany and Montanhydraulik India were commissioned. The first delivery was inspected and shipped in late summer this year.



01



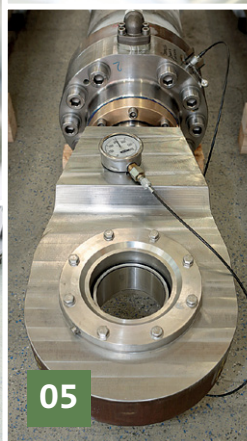
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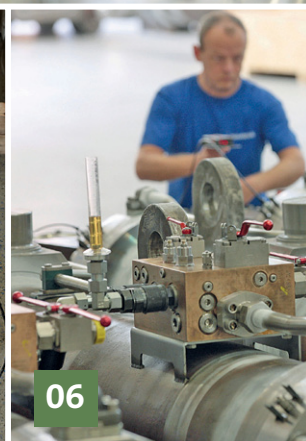
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04



05



06



Montanhydraulik Germany scope of delivery:

- 61 cylinders for dam and ship lock gates, including
- 14 pull cylinders for the radial spillway gates
 - Piston diameter: 620 mm
 - Rod diameter: 280 mm
 - Stroke: 13,000 mm
- 8 pull cylinders for the radial bottom outlet gates
 - Piston diameter: 450 mm
 - Rod diameter: 240 mm
 - Stroke: 14,500 mm
- 4 differential cylinders for the flap valves on the spillway radial gates
 - Piston diameter: 420 mm
 - Rod diameter: 250 mm
 - Stroke: 1,800 mm
- 4 mechanical ship arrestor units – in cooperation with DSD NOELL



Montanhydraulik India scope of delivery:

- 27 hydraulic units
- Control system including associated electronics for the ship lock system
- Provision of the team for the installation and initial operation of the drive technology, consisting of the cylinders and power units

A delegation of seven consisting of customers and advisers spent a whole week testing the first 26 hydraulic cylinders and six cardanic bearings at the Gelsenkirchen factory in Germany. From measuring the installation-relevant dimensions and testing the pressure of all cylinders, through to the surface tests for the piston rods, the dam specialists from Thailand, Malaysia, the United Kingdom, Austria and Switzerland inspected the products made by Montanhydraulik. Following the initial tests, it soon became clear: the quality fully lived up to expectations. All that was left was the painting and seaworthy package.

Shipping from Germany to Laos took four to six weeks. The associated power units and control panels were supplied from Chennai by Montanhydraulik India in time for the subsequent assembly. The employees from the Indian site are now on location with a team to perform the installation in the dam, including all piping, and to put the system into service.

Modern hydro power plant at the Mekong

Alongside the hydro power plant, the Xaya-buri dam also features a parallel lock for shipping. All of the hydraulic drive technology used for the movable gates in both systems is provided by Montanhydraulik Germany and India consisting of cylinders, power units and the corresponding control unit. The scope of delivery for the shipping lock also includes ship arrestor units: in an emergency, these use wire rope strung ahead of incoming shipping as a braking mechanism. Developed in collaboration with DSD Noell, a hydromechanical engineering equipment specialist and long-standing Montanhydraulik business partner, an "intelligent drive and control system" in the ship arrestor units ensures that the arrestor line is held suspended at a predefined height above the waterline for the duration of lock operations.

01 Ashok Rao, Managing Director at Montanhydraulik India (right), at the first review at the construction site for the Xayaburi hydro power plant in September 2013

02 The surfaces of the cylinders are tested thoroughly

03 The installation-relevant dimensions are discussed and verified together

04 The cylinders are suspended from the concrete superstructure using the gimbal mounts that were designed by Montanhydraulik

05 The pressure testing for the cylinders goes smoothly

06 The last tests also confirm the quality of delivery



About

Company name: Montanhydraulik GmbH

Headquarters: Holzwickede, Germany

Turnover: approx. € 250 mio. (2013)

Employees: approx. 1,100 (2014)

Products: Telescopic and synchronised hydraulic cylinders, rotary actuators, counterbalance valves, and the design and fabrication of complete electric drive systems

Cylinders for dam and lock gates

The scope of delivery for the cylinders includes generously dimensioned spillway gate pull cylinders, designed to be earthquake-proof in line with specific customer requirements. All cylinders are also equipped with gimbal mounts, with which cylinders are suspended from the concrete superstructure. Angular sensors are deployed to determine placement: The sensors' electrical signal is processed by the control units supplied by Montanhydraulik India. In addition to an integrated position measuring system, the hydraulic cylinders for the lockage also have sensors fitted to ensure the necessary redundancy.

Fish stocks and earthquake resistance

To ensure the fish stocks, five pumps are used, the smallest of which has a flow rate of 80,000 l/s. To provide evidence of the system's earthquake resistance, the project requires a significant amount of work in advance. The following figures show just how extensive the overall construction of the structure is: 5,000 people from almost 20 countries are currently working on the construction site. To keep on schedule, 6,000 tons of concrete are cast each day. The cement required for this is transported to the construction site each day in 130 lorries. The necessary water is taken from a specially created reservoir. The British company

Whessoe, a client of Montanhydraulik, created a special factory facility measuring 6,000 m² in order to manufacture the lock gates. Three state-of-the-art CNC-controlled milling machines with a working length of 15 m were specially purchased for this project.

Electricity for Laos and Thailand

With an estimated completion date of 2019, the hydroelectric power plant will produce a total output of 7,406 GWh annually. The electricity generated by hydroelectric power will be used by 1 million households in Laos and 3 million in neighbouring Thailand. Up to now, a large proportion of the population has had to get by without electricity. In actual fact, electricity generation using hydroelectric power is among the most important industries in the country and comprises 20 % of the total exports. Other energy resources are only available insufficiently or not at all, which is why the People's Republic primarily uses renewable energy from hydroelectric power. The nominal performance of the power station is 1,285 MW. It is generated by seven 175 MW Kaplan turbines and one 60 MW Kaplan turbine generator.

Photographs: Montanhydraulik GmbH

www.montanhydraulik.com

Technical data Xayaburi dam:

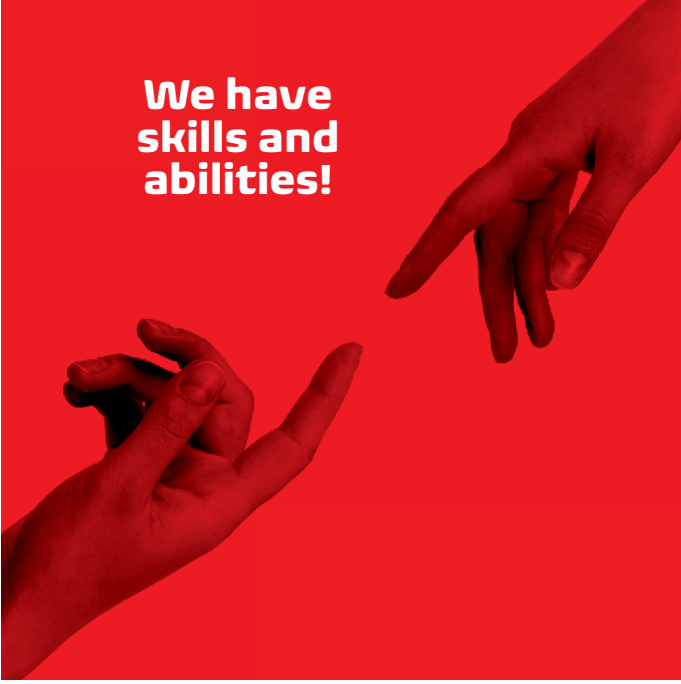
- Power plant type: hydro power plant
- Height: 32.6 m
- Width: 820 m
- Reservoir capacity: 225 million m³
- Costs: approx. 3.5 billion US dollars
- Start of operation: anticipated for 2019
- Rated output: 1,285 MW
- Turbines: 7 × 175 MW Kaplan turbines, 1 × 60 MW Kaplan turbine generator
- Power generation: 7,406 GWh/year
- Overflow versions: 7 sector gates, 4 bottom outlet openings

Photographs: google maps



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