

More than just routing

The digital transformation has taken off at speed. Whilst a few years ago Industry 4.0 was still just an idea not defined to its completion, that all too often was more of a vision than reality, nowadays it is assuming an ever bigger role in shaping production processes.

For many companies working in the wire, cable and tube industries, it has long been the perception that they can switch to the fast lane with Industry 4.0 and the accompanying digitalisation. The industries have long been able to do more than just routing...

The impetus for companies from the fourth industrial revolution will be considerable over coming years. The German Federal Ministry of Economics expects an additional growth to the economy of €153bn through Industry 4.0 by 2020. According to the Ministry, the planned annual investments in Industry 4.0 applications is to total €40bn by this time. And German companies have for a long time been in no doubt that the future will belong to the Smart Factory - 83% for instance will be seeing a high level of digitalisation of their value-added chains by 2020.

Enormous potential

For Germany as a location, the growth offers enormous potential. Around 15 million jobs depend directly and indirectly on the manufacturing industry. "With digitalisation of the industry, it will not only be value-add processes that will change, new business models and new perspectives for employees will also arise", explains the German Federal Ministry of Economics. Intelligent, digital production processes would offer large opportunities to small and medium-sized companies in particular.

Opportunities that should be seized upon. The transition to Smart Factory is affecting virtually all sectors – and the end is still a long



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way off. “Digitalisation and Industry 4.0 are key challenges for us, that will also bring about deep-rooted changes in the pipe and wire industries”, emphasises the SMS Group.

Intelligent technology

Making enormous data volumes useful – this maxim is also being realised by Leoni. “In LEONiQ, we have developed an intelligent cable technology that is capable of recording and analysing a wide range of parameters throughout any kind of cable system”, explains the company. This technology therefore makes it possible to draw conclusions about the condition of the overall system, and its control, and provides recommendations for future development cycles. “This new key technology will make energy and data streams more efficient, more reliable and more available”, explains Leoni. For the first time, not only the networked devices become intelligent – also the networking itself.

Even at an early stage in development, we use digital functional simulation to design cable solutions that best fit the respective application. If potential problems are identified in the development stage, a monitoring function can be integrated by means of sensor systems and electronics along the cable. “Various parameters, including temperature, density, mechanical stress and GPS location, are recorded continually, analysed in the Cloud using algorithms developed in-house, and then made available to customers in the form of a dashboard”, explains Leoni. This enables a series of smart services including early warning systems, active system control and pin-point recommendations for action. This effectively gives 100% transparency across all installed cable systems, anywhere in the world and for any application.

Digital smelting works

The SMS Group has also realised projects that show how networked systems, self-learning process models, intelligent

assistance systems, artificial intelligence and virtual reality are already “revolutionising and strengthening competitiveness of customers on the global market” in design, production and maintenance at steel and rolling mills. The digital smelting works is already reality.

Artificial intelligence is able to detect unknown correlations between different input parameters, and thereby to detect interference factors early on, explains SMS. “This means measures can be initiated and financial losses limited.” It was ascertained in one case for example that the strip temperatures on the coil occasionally, and suddenly, differed greatly from the setpoint value. “Given that such temperature deviations deteriorate the material properties of the coils, there was automatic cooling water adjustment of the water volume that reduced the difference between target and setpoint temperatures”. Nevertheless, the temperatures for the strips produced before meant these strips had to be devalued.

Together with the Jacobs University however, the SMS Group developed the X-Pact® Performance Enrichment Analysis – a method with artificial intelligence. With it, the unexpected correlation between a faulty work roll in a roll stand and the temperature differences in the cooling system could be verified precisely – indeed more clearly and effectively than with a standard analysis. “When the Performance Enrichment Analysis module is active, many potential fault scenarios can be monitored simultaneously.”

4.0-capable communication

Transfluid Maschinenbau too have had their eye on Industry 4.0 for some time. “In line with our customer base, we are converting our products gradually to 4.0-capable communication and are offering if requested by customers corresponding downstream software that is able to read and process parameters used in the

process”, says Benedikt Hümmler, Managing Director of Design/Production at the manufacturer of tube bending machines and tube machining solutions. With this and the corresponding hardware, the company is able to satisfy today’s perceptions of 4.0.

Companies are also entering into cooperation to realise the large-scale project as comprehensively as possible. For example, Leoni and Relayr, specialist for industrial solutions in the Internet of Things (IoT), entered into a strategic partnership to increase production efficiency in the automotive industry. The objective is to marry intelligent cable and automation systems with IoT technologies. “Solutions created should enable automotive makers and suppliers to reduce unscheduled standstills of robot lines and to increase production efficiency, and so to improve Overall Equipment Effectiveness (OEE)”, explains Leoni.

Both companies are planning this year to realise initial test installations in automotive production, with the aim of offering their solutions to a broad customer base from 2020 onwards. HSB (Hartford Steam Boiler), as well as Relayr (part of the Munich Re Group) are also part of the partnership. Leoni: “This broadens the technological IoT portfolio of the amalgamation with the addition of financial services and risk management – that turn the business model for customers into a direct value-add from security and financial viewpoints.”

Intelligent remote maintenance

Schwarze-Robitec has delivered to a US customer working in the automotive sector a fully electric multi-radius tube bending machine with transport boost technology. According to the company, a NxG controller achieves time, displacement and speed optimisations of all CNC axes, accompanied by a reduction of production time of up to 35%. With the current development in mind, Schwarze-Robitec has also already prepared this tube

bending machine for future requirements in the context of Industry 4.0. “For example, the intelligent remote maintenance solution from the machine constructor is integrated into the gigantic machine”, stresses the company.

ThyssenKrupp is deploying networked value-added chains. For one of its hot-rolled strip plants, the company “has implemented an Industry 4.0 solution that extends far beyond the bounds of a single company”. The processes of the supplier, hot-rolled strip plant (as manufacturer) and customers are digitally networked here.

Influence of “just in time”

ThyssenKrupp: “From a distance of about 80 kilometres, the production of steel blocks (as the basic material for the hot-rolled strip) is controlled by steel manufacturer Hüttenwerke Krupp-Mannesmann. “So even for primary materials we are able to respond at short notice to the delivery requirements of customers”. Conversely, a customer has with this networked hot-rolled strip plant the ability to influence “just in time” hot-rolled strip production. “They can book their orders directly into the IT system at the plant, and then define themselves when their orders are processed”, explains the company. Also, up to shortly before the start of production, customers are able to make changes to material specifications, so changes to width and thickness for example.

ThyssenKrupp: “For production and logistics of the hot-rolled strip plant, it is a challenge that necessitates integration of commercial, administrative and technical data. So this process chain extends beyond the company boundaries. “It offers flexibility as well as other benefits for all involved. Because this enables space and costs for storing basic materials and products to be reduced, the capital previously ring-fenced for this is released for more productive purposes.”

Need to catch up

Industry 4.0 is on the minds of industry sectors – but more intensively in some countries than others. “For many Central and Eastern European businesses, there is no longer any way round the digitalisation and intelligent networking of production processes”, stresses GTAI (Germany Trade & Invest). If they are looking to participate in cross-border production networks and supply chains in the future too, they must continue to force the pace of deployment.

Russia is one of the countries with a great need to catch up. The Russian government has therefore started various high-tech initiatives. According to GTAI for example, coming years will see the creation of 10 high-tech IT companies, new industrial platforms established and about 120,000 IT specialists trained every year.

So digitalisation is also gaining significance in Russia too. A necessary step considering the Russian economy is four to five years behind the US according to Germany Trade & Invest. Companies should therefore invest in the best available technologies and Industry 4.0 solutions. This could mean productivity increasing by 30% by 2035. According to consultancy firm McKinsey, the digital economy is currently contributing only about 4% to the Russian GDP. If the industry enjoys dynamic growth however, as it is expected to, its contribution towards the GDP in 2021 could climb to 4.7%.

The path to success

This offers software vendors the opportunity to assist Russian companies with attractive orders. Some have already taken up this chance. For example, software developer SAP is operating, with Russian steel producer Nowolipezker Metallurgisches Kombinat (NLMK), an innovations lab in which digital solutions for mining and the metal industry are developed.

So across the world, providers of intelligent digitalisation solutions are driving forward the conversion from production industry to Smart Factory. Despite the distinct advancement of Industry 4.0, it is still not possible to fully foresee the opportunities arising in the future for the wire, cable and tube industries. All are on the way. But only it will also be the path to success.

Innovative technologies will be presented at wire and Tube from 30 March to 3 April 2020 at Düsseldorf Fairgrounds. More information under www.wire-tradefair.com and www.Tube-tradefair.com. Please also visit our new metalflow portal under www.metalflow-alliance.com and learn more about our international metalflow portfolio.

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