ITMA Countdown – Focus Industry 4.0

On the occasion of a VDMA press conference themed "ITMA countdown" in Frankfurt, speakers from member companies Lindauer DORNIER, Herzog and Mahlo showed how Industry 4.0 solutions are going to impact the textile process chain and what technologies visitors can expect to see at ITMA 2019. The products examples of the respective companies made clear that Industry 4.0 is no end in itself but helps to improve production processes and results and supplements the range of services.

Organic start with an App

Dr. Janpeter Horn, CEO of Herzog, the leading company in braiding technology, introduced the company's latest Industry 4.0. product: An app-box with which the customer can easily access the data of Herzog and other machines, e.g. on a PLC (Programmable Logic Controller). The data can be visualised on dashboards created by the customer on terminals or others. The data can be processed, e.g. by creating key figures, alarms or analyses. Dr. Horn said: "Starting with Industry 4.0 does not necessarily mean to end up in a huge project and to employ software and consultant teams. We are offering an organic start into Industry 4.0 scenarios."

To realise this lean approach, the solution makes use of cloud technologies on the shop floor; open source technologies for inexpensive apps; no internet connection is necessary. The main advantage however is the "one-click" installation of apps which have been applicable only for smartphones and tablets.

Better production results with digital help

According to Rainer Mestermann, Managing Director of Mahlo, collecting and processing data for better production results is a basic idea of Industry 4.0. Mahlo develops and produces measurement and control equipment for the textile and nonwoven industry. A new platform from Mahlo realises the ideas of Industry 4.0 with digital technologies. In the digitization concept for all Mahlo products, the functionalities are grouped, optimized and standardized as "services". This results in modular hardware and software function blocks that can also be retrofitted. There are modules e.g. for the acquisition and processing of measured values, for control tasks or for the long-term archiving, data logging and analysis. One example is the control module in Mahlo's weft straighteners. The distortion control was revised and digitised. Optimised hardware and software resulted in a faster and more efficient controller. Mr. Mestermann explains: "Evaluations confirmed by customers prove that the control module regulates 20 percent faster and more precisely than before. Better straightening results reduce the production of second-choice goods and the need to pass the same fabric through the stenter several times."

An addition to personalized services

"Even in a 4.0 future, personal installation and maintenance support will remain an indispensable part of services but the portfolio will be supplemented by digital solutions," stated Peter D. Dornier, CEO of Lindauer DORNIER. The company is technology leader in weaving machines. At ITMA 2019, Lindauer DORNIER will present a new customer portal. The portal is based on state-of-the-art database technology and will provide an online shop with permanent availability for original parts for all product lines. Remote maintenance and networking of weaving machines – to improve run characteristics, for example – will also be possible in future via the new customer portal. The focus of this solution is on people: Its purpose is to make the job of machine operators and production planners easier.

Thomas Waldmann, M.D. of the VDMA.

Thomas Waldmann, Managing Director of the VDMA Textile Machinery Association, summarised: "The future success of the textile industry is more and more determined by Industry 4.0. As seen today, Industry 4.0 has many dimensions and possible fields of application. In Smart Services, Operations and Factory, key solutions are provided by the machinery industry. Today's presentations are just a few examples for innovative Industry 4.0 solutions. At ITMA in Barcelona, visitors will have the chance to see the whole range of I4.0 and other innovative solutions offered by VDMA member companies."

With regard to ITMA 2019, the VDMA published two interviews with experts from 16 member companies presenting their latest Industry 4.0 technologies.

Save the date: ITMA press conference of the VDMA Textile Machinery Association in Barcelona on 20 June 2019, 1:00 – 2:00 PM, Conference Room 1.2 in CC1.

The future of the textile industry is more and more determined by Industry 4.0. Industry 4.0 has many dimensions and possible fields of application. In three of them (Smart Services, Operations and Factory), key solutions are provided by the machinery industry. The other ones from smart textile products, marketing and sales, employees up to strategy and organization are specific know-how issues for textile mills.

At the ITMA 2019 in Barcelona, visitors will have the chance to see how Industry 4.0 solutions are impacting the textile process chain.

Six weeks prior to ITMA, Nicolai Strauch, press officer of the VDMA Textile Machinery Association, Germany, spoke to experts of VDMA member companies about their products and services with regard to digitization and Industry 4.0.◆

Dr. Soest, what is Trützschler's latest I4.0 innovation?

Dr. Soest: We have developed intelligent, self-optimizing machines and connect them through digital monitoring systems. The latest examples are cloud-based monitoring solutions which enable customers to literally steer and optimize their spinning mill anytime from anywhere in the world. This combination of complete, intelligent machinery solutions and digital support systems means a big step in automation and ensuring high quality.

Dr. Christof Soest, CTO, Trützschler.

What is the exact benefit for a spinning mill?

Dr. Soest: Customer benefits range from improved productivity and quality to fewer downtimes, machine failures and reduced scrap. One of our monitoring systems, for example, warns operators about potential issues or optimization needs. It also specifies where exactly they occur and advises what needs to be done. There is no need for time-consuming searches for the source of the issue. This saves a lot of time and money. By connecting all machines in a unified data set, we eliminate the information silos that made it difficult to steer production in the past. ◆

Let's go a step forward in the textile chain. Industry 4.0. is also an issue in fabric production. Mr. Kürig, at ITMA ASIA 2018 Karl Mayer launched its own digital brand, KM.ON. What is new in the associated digital solutions portfolio with regard to production?

Kürig: KM.ON's range of features has been extended considerably. A good example from Karl Mayer is a new digital tool that combines a PDA system with a ticket system to enable any disruptions in production to be managed efficiently. The relevant information can be input easily and quickly at the machine and forwarded to the appropriate location in real time. Any problems can be dealt with quickly, and the root cause can be tackled rapidly by displaying the relevant sequence.

Maximilian Kürig, Managing Director, KM.ON, a software start-up company of Karl Mayer with Antonia Gottschalk.

What does this tool mean for the machine operator? Is it an operator friendly technology?

Kürig: This system is very easy to operate, which means that this new development can be used immediately. ◆

Strauch: Let's stay in the spinning sector. Mr. Langius, company Neuenhauser specialises in the handling of yarn packages within the yarn spinning process. Are transportation systems also influenced by Industry 4.0?

Langius: Indeed, a good example is a new development for the automated handling of sliver cans.

Wilhelm Langius, Division Head, Neuenhauser.

AGV stands for Automatic Guided Vehicles, a technology that has been around for many years but has been fuelled recently by the introduction of Industry 4.0.

Neuenhauser saw with the recent advances in autonomous vehicles and navigation systems that an AGV is also a good solution for spinning mills. We thought it is a useful tool to automate the labour-intensive handling of sliver cans in a spinning plant. Within twelve months, our team developed a state-of-the-art transport system using a large fleet of intelligently controlled automated guided vehicles. The AGV will pick-up sliver cans which are filled with cotton sliver material and deliver them to the spinning frame where empty cans will be exchanged with full cans. The empty cans are then returned to the equipment which will refill the sliver cans with cotton sliver to repeat the cycle. Within a typical spinning mill, very large numbers of sliver cans are required to be moved each hour.

How do you make sure these vehicles find their way in a spinning mill?

Langius: The vehicles are equipped with the latest state-of-the-art safety sensors to ensure the vehicles operate safely alongside plant personnel who need to share the same floor space and aisles within the spinning mill. The plant personnel are also equipped with specialized sensors they wear on their safety vest, to inform the AGV where the operators are working and moving around within the manufacturing floor. With such a system both the AGVs and local plant personnel can work safely together within the same manufacturing area.◆

Integral parts in knitting, warp knitting and sewing are needles. Will needle handling also move to a digital level?

Schöller: Yes, indeed. Groz-Beckert has developed a quality and life cycle management system for needles. It organises each needle in a clearly structured process and documents them digitally, from arriving at the factory to leaving for recycling.

Eric Schöller, Managing Director, Groz-Beckert

How do customers benefit from this system?

Schöller: This quality management system makes it possible to efficiently conduct audits and, as part of the digitalization process, provides a complete overview of KPIs (Key Performance Indicators) with the option of implementing predictive maintenance measures. Customers also benefit from the ability to improve machine utilization and identify weak points in production. The use of the system reduces needle consumption at factories by up to 10 percent. Downtime during needle changes also decreases by 50 percent on average. Moreover, the risk of contractual penalties due to non-compliance with brand owner specifications goes to zero. The use of the system also eliminates the need to store used needles for documentation purposes; the needles can be sent for recycling right away – a decisive benefit in the sense of sustainability.◆

Mr. Lukas, Andritz Küsters specializes in technologies for the nonwovens industry. Which steps have been taken recently to address the topic I4.0?

Lukas: Andritz has pooled its relevant expertise under a new technology brand that covers smart sensors, big data analytics and augmented reality.

Andreas Lukas, Managing Director, Andritz Küsters.

Augmented reality is a good topic that has not been mentioned so far. What are the advantages of this technology?

Lukas: Portrayal of important information where operations are taking place and always with respect to the product or object are compelling arguments in favor of using Augmented Reality. Other benefits for customers include conventional operating manuals are converted into digital instructions, virtual tools can be displayed in the real work environment, and users can perform difficult work sequences with a lower error rate.◆

Gentlemen, in the daily press I get sometimes the impression that I4.0 / digitization is an end in itself. Mr. Pieper, in textile finishing, energy consumption plays a crucial role. Can I4.0-solutions help to reduce energy costs?

Pieper: Brückner has developed an intelligent machine assistance system that monitors the settings of the entire system in the background. Deviations from default values are immediately signaled to the machine operator and stored in the production history logbook. A new simulation tool helps the machine operator to get the highest possible productivity and/or energy savings out of the system. Maintenance and spare part suggestions are displayed preventively after a certain interval. Upcoming maintenance tasks are comprehensively visualized for the maintenance department and can even be retrieved from mobile devices.

Axel Pieper, CEO, Brückner Trockentechnik.

How can a finishing company realize savings potentials with this solution?

Pieper: During production, a production assistance system helps the operator to decide which parameters need to be adjusted to make the system even more energy-efficient and productive. Optimized recipes can be stored for future processes and are therefore very easy to reproduce. At the customer's request, we can also connect his system to a higher-level control station system. This allows recipe data to be researched in a central data base and to be shared with other users. This new intelligent assistance system in combination with the simulation tool allows productivity increases of up to 40%. Energy consumption can be reduced by up to 30% with these systems.◆

Mr. Hannes, tell us something about the portfolio of Sedo-Treepoint.

Hannes: We are known for smart factory integration and offer integrated textile management systems along the textile production chain, such as spinning, weaving, knitting, dyeing, finishing, printing and inspection. For all departments, PPS, routing of orders (track and trace) or energy management is available. Existing ERP systems are integrated as well, so double entry of existing information is avoided.

Andreas Hannes, Marketing Manager, Sedo Treepoint.

What can we expect from your company at ITMA?

Hannes: We will introduce a new series of our dyehouse controllers. The new series is specially designed for Industry 4.0. The open connectivity on production and machine level improves the M2M-communication. Important information for the production floor is displayed wherever required.◆

Let's stay in the finishing process. Mr. Mestermann, company Mahlo develops and produces measurement and control equipment for the textile and nonwoven industry. A basic idea of Industry 4.0 is collecting and processing data for better production results. How is Mahlo addressing this issue?

Mestermann: A new platform from Mahlo realizes these ideas of industry 4.0 with digital technologies. In the digitization concept for all Mahlo products, the functionalities are grouped, optimized and standardized as "services". This results in modular hardware and software function blocks that can also be retrofitted. There are modules e.g. for the acquisition and processing of measured values, for control tasks or for the long-term archiving, data logging and analysis.

Why should manufacturers and finishers of textile fabrics invest in your solutions?

Mestermann: Our new platform makes it easier for customers to use data in a meaningful manner to optimize their processes. Networking of Mahlo devices with each other and with other systems ensures consistent data exchange and enables the bundling of

Rainer Mestermann, Managing Director, Mahlo.

information as a basis for process improvement. Higher machine availability through remote maintenance via better product quality by adaptive control or flexible data analysis as the basis for better decisions provide immediate monetary benefits.

Can you quantify the benefits, please?

Mestermann: One example is the control module in our weft straighteners. Together with a renowned university, the distortion control was revised and digitized. Optimized hardware and software resulted in a faster and more efficient controller. Evaluations confirmed by customers prove that the control module regulates 20% faster and more precisely than before. Better straightening results reduce the production of second-choice goods and the need to pass the same fabric through the stenter several times.

Gentlemen, thank you very much for this discussion. More than 200 VDMA member companies will exhibit at ITMA end of June. We are eagerly looking forward to a fantastic and successful ITMA in Barcelona.

With more than 3,200 members based in Germany and other EU-/EFTA-countries, VDMA is the largest network organization for mechanical engineering in Europe. VDMA was founded in November 1892 and is the most important voice for the mechanical engineering industry today. It represents the issues of the mechanical and plant engineering sector. VDMA has representative offices in Berlin and Brussels as well as liaison offices in important foreign markets and successfully accompanies its members in global markets. Expertise and support concern e.g. law, taxes, markets, economy, energy, environment, research, production, standardization, technology policy, management competences, benchmarks, training. In total, approximately 500 VDMA employees work for the members worldwide. The textile machinery part of VDMA represents some of the leading textile machine companies worldwide. ◆

Mr. Adler, what can your customers expect 'digitally' from Oerlikon?

Adler: I would say the digital refinement of our machines and production systems for manufacturing yarns, fibers, nonwovens along the textile value chain. We want to further optimize the efficiency of the systems and the quality of the end products with digital solutions. For this, we are deploying the know-how of our newly-integrated partner AC-Automation – which specializes in large-scale systems automation, transport, packaging and warehouse logistics and end product automated quality control. We combine this with our process competencies and digital data handling using our Plant Operation Center (POC). This has created Industry 4.0 solutions for our customers – with integrated storage and

Jochen Adler, CTO, Oerlikon Manmade Fibers.

communication capabilities, wireless sensors, embedded actuators and intelligent software systems. In turn, this allows us to build bridges between data and material flows and between the virtual and real worlds.

What aspects of all this can visitors already see at the ITMA in Barcelona?

Adler: At our trade fair stand we will be offering our visitors a digital experience that allows them to intensely discover and understand our machines, systems, components and services. Here, we will be deploying playful solutions to present the topic of artificial intelligence. We will be taking our 360-degree and augmented-reality applications as well as our virtual showroom with us, to allow visitors to experience complex systems live in 3D. The 'digital factory' is already in part becoming a reality in conjunction with our machine exhibits.◆

Mr. Müller-Probandt, company Dienes specialises in machine components for the manmade fiber production as well as textile special applications. One focus are pilot installations for research. How is Industry 4.0 touching this application?

Müller-Probandt: One key product in our portfolio is a modular spinning system which allows customised solutions, starting from thread run studies to complete pilot installations.

Each unit has its own PLC (Programmable Logic Controller), which allows to run DIENES units in foreign lines or to integrate foreign units in a DIENES line. The units can be operated with an interface directly or over the ethernet from an upper control system.

Steffen Müller-Probandt, Managing Partner, Dienes Apparatebau.

What are the advantages for customers e.g. research institutes or R&D departments?

Müller-Probandt: Our modular system includes a line overview, which rearranges itself almost automatically for different operation modes in alternative machine sequences. The detailed process representation allows the customer to monitor directly the effect for all changes of parameters.

If a good yarn could be realized it is possible to backtrack the journey of this yarn through the process.

The parameters can be modified with mobile devices, like a pad or a mobile phone. All these functionalities allow the research institutes and industry to reduce the cost of investments and to operate fast and flexibly in the development of new products, which additionally save costs and time. ◆

Let's move forward in the textile chain. Ms. Dilo, how can Industry 4.0 help customers in the nonwovens industry to increase efficiency and so to decrease costs?

Dilo: Our new operator system assists the operators through intelligent sensors and automatized modes allowing a reduction of workforce at nonwoven lines. At a line restart, the newly formed web may wrap around rollers in the card and crosslapper. The new starting mode automatically prefills the line and forms a stable start nonwoven, minimizing the risk of wrappings.

Rebekka Dilo, Assistant to the Management, Oskar Dilo Maschinenfabrik.

What is the effect of this?

Dilo: As a result, the line starts smoothly with minimal manual intervention. Moreover, an energy-saving technology helps to decrease costs at the fibers transport, one of the main energy consumers in needling lines. Instead of operating the ventilators for the fiber-air transport at maximum frequency, the system controls the ventilator speed according to the actual throughput and also gives warnings before blockages can occur. The technology therefore targets ecosensitive nonwoven producers, who also want to increase their line availability.

This targets especially producers working with fiber blends and several bale openers respectively.◆

Dr. Horn, Herzog is producing braiding machines. What is your latest I4.0 product and what is your approach?

Dr. Horn: An additional module for Herzog machines, an app-box, with which Industry 4.0 scenarios can be realised without employing software teams or starting big Industry 4.0 projects. This technology is an app-based one. Apps can be downloaded and installed easily.

Dr. Horn, Herzog.

How do customers benefit from this?

Dr. Horn: The customer can easily access the data of Herzog machines, e.g. on a PLC (Programmable Logic Controller). The data can be visualised on dashboards created by the customer on terminals or others. The data can be processed, e.g. by creating key figures, alarms or analyzation. Alarms and information could be transferred by e-mail, messengers. Furthermore, the data can be linked to order from pps systems or transferred to the machines – if the customer decides to go this way.

Can you quantify the benefit?

Dr. Horn: No formation of software teams outside machines. New applications could be created easily. No additional software.

What is really new at this solution?

Dr. Horn: It is the result of a three-year research project. Various innovations have been implemented: The use of cloud technologies on the shop floor; open source technologies for inexpensive apps; no internet connection is necessary. The main advantage however is the "one-click" installation of apps which have been applicable only for smartphones and tablets. The apps are installed in a so-called box outside the machines.◆

Mr. Ott, your company Halo electronics from Austria develops Enterprise-Resource-Planning (ERP) systems for the textile industry. Please, tell us more about your company.

Ott: We provide custom-tailored IT solutions, that offer textile industry customers the perfect level of data transparency - from fibre to finished product. Direct communication between man and machine not only enables this consistently transparent presentation of all relevant data, but also gives employees flexible and, most importantly, mobile access to it. All important information is available on the handheld device while "on the go".

How is the usability of your solution? Can you quantify the benefits of the product?

Ott: The intuitive software relies on language-independent icons instead of text and can therefore be used without training in any work environment. The resulting cost savings are clear. The seamless implementation of the software in all relevant production processes up to the point of delivery enables complete consistency and transparency of the data collection, which simplifies optimisation processes and gives management vital decision-making information. For example, the use of our software enables time savings of 45% for the storage and retrieval of products in the warehouse.◆

The last steps in the textile chain is finishing. Mr. Heinrichs, what will Monforts present at ITMA?

Heinrichs: Thanks to a support app for communication and an app for operating Monforts systems, Monforts machines now feature a "digital twin" that will be presented to the textile industry for the first time ever at ITMA in Barcelona. With the help of advanced sensor technology, all technical data are mapped in the cloud virtually and in real time. The data in the cloud indicate the current state of the system with its respective specifications and can map the entire production process, enabling targeted analysis and controlled planning and production: Insights harnessed from data analyses can be used to optimise the actual production process.

Klaus Heinrichs, Vice President, Monforts Textilmaschinen

What is new about your solution / technology?

Heinrichs: The status overview in real-time improves machine availability while minimising downtime considerably. Potential sources of error can be anticipated and eliminated. The digital twin provides information on individual wear parts of a system, such as converters or gears, for example. In the future operators will be able to see how long a wearing part will last and when it has to be maintained or replaced ahead of time. Direct access to the integrated Monforts webshop allows users to order wearing and spare parts at the press of the button when they are needed, virtually preventing machine downtime. On request, Monforts can monitor machine availability and proactively approach customers if action is required. Data is only ever called from the cloud provided customers have agreed, requiring their consent in the interest of data security.

What advantages does this offer for your clients?

Heinrichs: With the support app, the customer can contact Monforts service virtually 24 hours a day or at an arranged time via smartphone or tablet. Support is given right on site via a video connection. The Monforts service specialist can point out individual system parts on the customer's smartphone using a mouse cursor and assist users in troubleshooting or operating the machine on site. Documents, such as machine documentation, can also be shown in real-time on the smartphone. Data can be used to analyse a system's energy requirements. For example, machine operation can be optimised for production to go into full operation when electricity costs are at their lowest.◆

Let's stay in the finishing process. Mr. Stillger, the company Thies specializes in dyeing technology. What is your latest I4.0 product?

Jochen Stillger, Head of Sales, Thies.

Stillger: For the ITMA 2019 we offer a new version of our maintenance system, which, among others, was extended by the condition monitoring module. It is an automated planning, execution and monitoring software for inspection, service and routine maintenance, which not only facilitates the procurement of spare parts, but also provides the corresponding technical documentation digitally. At the same time, we are laying the foundation for future machine-specific and customized machine-based learning from the history data.

In addition, a new controller generation will be offered together with one of our control suppliers, which will be open for I4.0 applications and at the same time can be connected to the corresponding MES (Manufacturing Execution System).

What specific benefit does a customer get from your solution / technology?

Stillger: Optimization of production processes and production safety through completely transparent planning, implementation and monitoring tools. In the medium term, a significant reduction in process and maintenance time is achieved. There will be a reduction in the failure rate and the time to fix failures. All in all, a reduction in maintenance costs due to a purposefully controlled spare parts inventory and a prioritized and more efficient maintenance is expected.

Can you prove this with some factsand figures?

Stillger: Customers will achieve higher machine efficiency through intelligent maintenance. Depending on the individual situation in the dye house, optimization of the processes may reduce the costs by 20 to 50%. Successful energy management (managing energy allocation) can lead to an additional 7% to 10% reduction in costs.

The VDMA supports the mechanical and plant engineering industry in the development of OPC / UA Companion Specifications. OPC / UA is an open interface standard that defines the mechanisms of cooperation in the industrial environment. What advantages does OPC / UA provide with regard to your solution / technology?

Stillger: The OPC / UA interface enables standardized data transfer. A significant improvement in data quality is achieved. The new technology introduces customer-specific and system-specific monitoring of the functioning of the machine. Smarter sensors are used for process monitoring. Forward-looking history data are collected for the configuration of self-optimizing AI processes.◆

Mr. Kemnitzer, Baumüller is a well-known manufacturer of intelligent drive and automation systems as well as software for numerous branches, including textile machinery. One focus is simulation software. What's actually new?

Leonhard Kemnitzer, Head of Marketing, Baumüller Nürnberg.

Kemnitzer: Many simulation tools graphically depict machines and systems as 3D simulations. These standard tools focus on the behavior of the machines under optimal conditions. Our simulation software starts one step ahead. In the first step, the drives and the mechanical parts are selected for the respective application task in order to then verify the motion profiles of the machine.

What advantage does the software offer?

Kemnitzer: Our software is very user-friendly. With classical simulation tools a large number of different parameters has to be entered. The advantage of our tool is the great simplification of the models without losing their accuracy. Application engineers can work with ready-made models that are just as accurate from the calculation cycles as they are in other simulation tools. Due to the complete integration in the operating software, the models are automatically parameterized and changes can be carried out very quickly. The result of the simulation process is a parameter set which can be used in the real application. This saves much time in the engineering process and reduces the time to market.

Thank you very much for this Industry 4.0 journey along the textile chain plus supplier. More than 200 VDMA member companies will exhibit at ITMA end of June. We are eagerly looking forward to a fantastic and successful ITMA in Barcelona.

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