

fibers and filaments

the experts' magazine

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Geotextiles as asphalt inlays

To extend the utilization of roads

Asphalt is used for more than 70 percent of Federal highways and Autobahns. Therefore, it is completely understandable that consideration has – for many years now – been given to finding out how to extend the life of roads.



Digital solutions for future processes

Industrie 4.0

With innovative Industrie 4.0 solutions, the company is setting new standards with regards to customer benefits.



"We offer our customers innovative solutions that ensure they remain competitive."

Martin Rademacher
Head of Sales Oerlikon Neumag

Staple fiber production – the right solution for every need

More than 4 million tons of installed production capacity worldwide speak for themselves. Oerlikon Neumag staple fiber plants stand for highest product quality and absolute reliability.

- From 10 - 300 tons per day
- One-step or two-step technology
- Polypropylene, polyester, recycled polyester, polyamide and more
- Commodity or special applications
- Mono- or bicomponent fibers



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Editorial



Dear Customers, dear Readers,

The world is built on textiles. This is once again clearly demonstrated in the case of geotextiles. Although not at all apparent at first glance, textile fabrics frequently play a decisive role. These advanced materials have the most diverse properties that make them the ideal solutions for the most varied applications.

Geotextiles are fabrics and nonwovens deployed in civil engineering – ranging from road construction all the way through to stabilizing embankments, railroad tracks and weed-control nonwovens. The tasks of these high-tech, complex materials cover such applications as drainage, separating layers, reinforcements through to tension equalization products. The polymers deployed are usually made from polypropylene, polyester or polyamide, while the fundamental materials can be industrial filament yarns, tape or monofilament yarns, nonwovens or even carded nonwovens.

Each material has its justification, each manufacturing process its specific benefits. In the current edition of our magazine *Fibers & Filaments*, we would like to offer you brief insight into the possibilities for manufacturing geotextiles and illuminate their importance in modern road construction.

Although the main focus – with respect to *Techtextil* trade fair – is clearly on industrial applications, we have also prepared exciting contributions for manufacturers of textile yarns in the form of our new eAFK HQ 4-deck texturing machine and the VarioFil R+ recycling polyester POY system.

As a solutions provider, we also always put our machines and systems into an overall context. To this end, the topic of *Industrie 4.0* has been one of our focuses for many years now. And we have already made extremely good progress here with our Plant Operation Center (POC). Discover how you can network and optimize your production and hence always remain several steps ahead of your competitors.

This is all supplemented with comprehensive monitoring of our customers' investments. With our lifecycle management, our Customer Support division will look after you and your investment – from the commissioning phase all the way through to scrapping. Here, our specialists provide advice and support with a particular focus on system profitability and the best-possible performance of your production facilities. In a nutshell: operational excellence! A success factor of this process is our global service network. Just recently, we have significantly expanded the Vadodara, India, service station to support our customers with an even broader range of services.

I am thrilled to be once again presenting you with a diverse edition of *Fibers & Filaments* and hope you enjoy reading it.

With best regards,

Georg Stausberg
CEO Oerlikon Manmade Fibers Segment

Bengal Global Business Summit 2017 Ride the growth

India, and specifically the Bengal region, still harbors huge potential for the textiles industry. While the main focus of the manmade fiber sector currently lies – for example, with Silvassa in the Gujarat – above all on the west of India, a new ‘hub’ could soon develop in the east of the subcontinent around Kolkata. The establishment of an industrial infrastructure for the textile value added chain in Bengal and the proximity to the textile-processing nation of Bangladesh speak in favor of this development. International stakeholders – coming together at the Global Business Summit 2017 in Bengal – recently discussed what measures could help



B. Chatterjee, CEO of IVL Dhunseri Petrochem Industries Ltd. (left), and Meghna Mukherjee, Executive of West Bengal Civil Service (middle), met up with Oerlikon Barmag’s Klaus Kürten and Debrabata Ghosh.

promote the region. Klaus Kürten and Debabrata Ghosh were at the event



representing the Oerlikon Manmade Fibers segment. (aw)

SASA celebrates 50 years

SASA Polyester Sanayi A.S. celebrated its 50th anniversary in November last year. The Turkish company spent this memorable day with numerous guests.

Since being established back in 1966, SASA has made a name for itself as

one of the leading manufacturers of polyester staple fibers, filament yarn and special polyester-based polymers. Within the context of expanding its staple fiber capacities, the company has invested in several Oerlikon Neumag systems over the last two years. (che)

Those attending to congratulate SASA also included Oerlikon Neumag representatives: on behalf of the Manmade Fibers segment, Martin Rademacher, Head of Sales (3rd from the right) and Sales Director Max Hergenreder (2nd from the right) congratulated SASA Chairman of the Board Ibrahim Erdemoglu (3rd from the left).





From Melt to Yarn

Integration of the polycondensation trend at yarn manufacturers

The Manmade Fibers segment has registered huge interest in polycondensation systems over the past few months. There was a sharp rise in inquiries above all within the context of the India ITME 2016 in Mumbai (International Textile Machinery Exhibition), comments Sales Manager Sven Streiber: “We conducted very concrete discussions with numerous customers. The interest in integrating the upstream production processes is extremely noticeable among manmade fiber manufacturers. And the expanded production depth promises huge profits.”

A sensible corporate strategy, insists Michael Mächtigt, a process engineer and polycondensation expert at Oerlikon Barmag: “If manmade fiber manufacturers integrate the upstream melt production process, they are able to optimally influence the entire produc-

tion chain – from the raw material all the way through to the yarn and fibers. This enables the production of first-class yarn quality, which creates a clear competitive edge for our customers, as the market has shown us – particularly over the past few years – that it is becoming increasingly difficult to earn money with ‘standard yarn’. Those who want to be players in the long term must be able to offer high-quality yarns, fibers and specialty products.”

The Oerlikon Manmade Fibers segment is the world’s only manmade fiber systems supplier that has proven engineering competence ranging from the raw material all the way through to the finished product and also supplies polycondensation systems through its joint venture Oerlikon Barmag Huitong Engineering. (bey)



Integrating the upstream melt production process gives the manmade fiber manufacturer optimal influence on the entire production chain.

Events

International Conference on Nonwovens for High-Performance Applications 2017

March 7-8, 2017, Prague, Czech Republic
www.intnews.com/NHPA

PU Tech India

March 8-10, 2017, New Delhi, India
www.putechindia.com

Domotex Asia/Chinafloor 2017

March, 21-23, 2017, Shanghai, China
www.domotexasiachinafloor.com

Index 2017

April 4-7, 2017, Geneva, Switzerland
www.index17.org

Saigontex 2017

April 5-8, 2017, Ho Chi Minh City, Vietnam
www.vfabric.com/sgtextile

Technotex India

April 12-14, 2017, Mumbai, India
<http://technotexindia.in>

Techtextil 2017

May 9-12, 2017, Frankfurt, Germany
www.techtextil.com

Eurasian Geotextiles Symposium

June 7-8, 2017, Beijing, P.R. China
www.edana.org

Techtextil North America

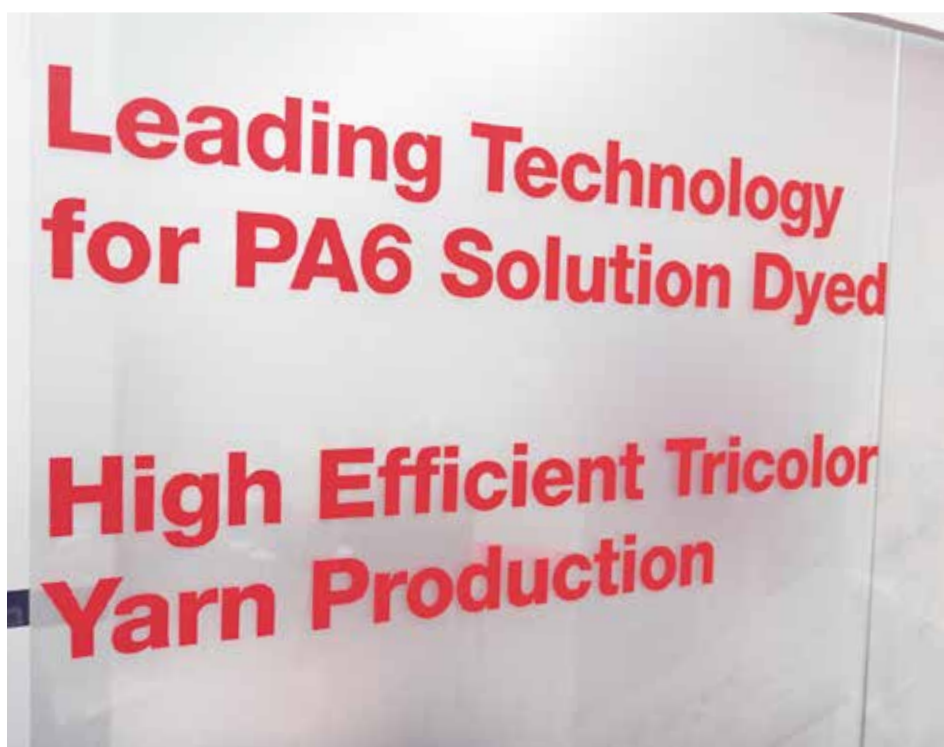
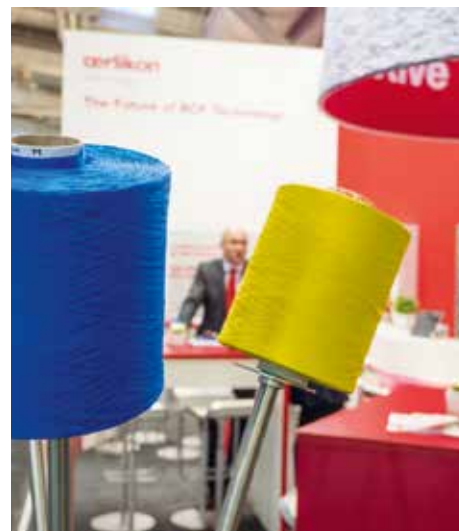
June 20-22, 2017, Chicago, USA
www.techtextilna.com

Oerlikon Neumag at Domotex 2017 Industrie 4.0 solutions for BCF yarn production

This year's booth at DOMOTEX once again reflected Oerlikon Neumag's latest innovations. New Industrie 4.0 solutions were also shown for the first time: With the presentation of the new 'IPC 4.0' (Intelligent Plant Control) customer services, Oerlikon also set new standards in the future of BCF yarn production.

"DOMOTEX is our main BCF event and marks the start of the New Year for us. After just coming back in December from the ITME in Mumbai, Hanover is basically a local exhibition for us where we can show off our products to a truly global audience. As usual we had a lot of talks with high-caliber decision-makers and visitors spent a lot of time at our booth with technicians and sales to get informed about our latest offerings. DOMOTEX is becoming less of a product showcase and more of an inspirational meeting place for the trends in the making," remarked Martin Rademacher, Head of Sales at Oerlikon Neumag.

During four busy days a total of 1,409 exhibitors from more than 60 countries showcased their latest innovations to a global audience at the Hanover Exhibition Center. Around 70% of visitors were from abroad, with the majority coming from EU countries. There was a considerable increase in visitors from the Near and Middle East as well as East and Central Asia. (rst)



Domotex is becoming an inspirational meeting place for trends.



Oerlikon Neumag's technology in demand Staple fiber business continues to boom

The trend of the last year continues for Oerlikon Neumag's staple fiber business: the demand for systems and components remains at a consistently high level.

Over the past two years, the company has sold in excess of 20 systems of various types. A specific trend cannot be identified here: the order books include both European and Asian, but also American, customers. The system capacities range from 10 to 225 metric tons per day, with the fiber types ranging from monofilament specialty fibers, bicomponent fibers all the way through to classical cotton-type fibers.

The component business focuses above all on Oerlikon Neumag crimpers and cutters. The extreme durability and reliability means low maintenance costs and minimum downtimes.

The excellent order situation underlines the fact that Oerlikon Neumag and its portfolio of single-stage and two-stage staple fiber systems with the corresponding components are superlatively positioned within the market and are able to perfectly cater to the requirements of customers. (che)

Oerlikon Neumag at the 'Index' in Geneva With FAUS towards efficient high-end production of meltblown nonwovens

Oerlikon Neumag will be presenting itself with its spunbonds, meltblown nonwovens and airlaid nonwovens technologies at the 'Index' in Geneva, taking place between April 4 and 7, 2017. The Edana 'Filtrex' conference will be taking place in parallel for the very first time.

prises various suction zones, which are multiply-segmented and can be custom-adjusted. This enables extremely flexible formation and hence increased product diversity.

The FAUS operating unit for automating meltblown systems ensures an

increase in both their productivity and reliability. FAUS comprises in default configuration five different modes of operation with a total of eight different programs, to secure future high-end production of meltblown nonwovens even more efficiently. (che)

The prime focus is on the Oerlikon Neumag spunbond technology, which is extremely convincing in terms of its efficiency: up to 30% lower conversion costs compared to conventional spunbond processes available on the market. This is made possible by energy savings totaling almost 20 percent in the spinning system alone, compared to traditional systems. Furthermore, raw material utilization has been optimized, with the consequence that 5 percent fewer raw materials are consumed for the comparable output quality using standard, European products.

For its meltblown products, Oerlikon Neumag will be premiering two further innovations: the multifunctional forming table for the Oerlikon Neumag systems is characterized by its considerably reduced footprint. It can be moved horizontally and vertically and com-



Oerlikon Neumag's spunbond technology convinces with up to 30% lower conversion costs.

Geotextiles as asphalt inlays

To extend the utilization of roads

The German road network is being used until it is worn out – and has been for many years now. There is a considerable underinvestment by local German communities, with the greatest investment needed for the road and transport infrastructure – and this despite rising expenditure in this area. For this reason, the motto of the next few years is: maintenance rather than new construction. Here, one option for extending the life of a road is to use geotextiles as asphalt inlays.

Around 95 percent of the local authority transport infrastructure comprises asphalt. And asphalt is used for more than 70 percent of Federal highways and Autobahns. Therefore, it is completely understandable that consideration has – for many years now – been given to finding out how to extend the life of roads.

The 'Additional technical terms of contract and guidelines for the structural upkeep of traffic areas – asphalt construction' (ZTV BEA-StB/Zusätzliche Technische Vertragsbedingungen und Richtlinien für die Bauliche Erhaltung von Verkehrsflächenbefestigungen – Asphaltbauweisen) name, in the event of an accumulation of individual cracks, two maintenance measures that can be carried out. On the one hand, maintenance – in other words, merely filling and covering the cracks – or repair – in other words, the use of an asphalt overlay. The durability of this procedure is however heavily dependent on the condition of the road surface. If this has cracks, there is the risk that these could once again come up through the newly-applied asphalt surface. To prevent this happening, asphalt inlays have often proven to be a reliable solution in practice. Because if the asphalt inlay has been selected and expertly fitted in accordance with its specific purpose, this method of construction can result in a lengthening of the repair intervals, an extending of the life of the road and a lowering of the maintenance costs, as cracks and gaps reappear considerably later. Here, the objective is to lengthen the repair



intervals and lower the maintenance costs and hence extend the life of the road. Asphalt inlays can be used both in partial areas and over the entire road surface.

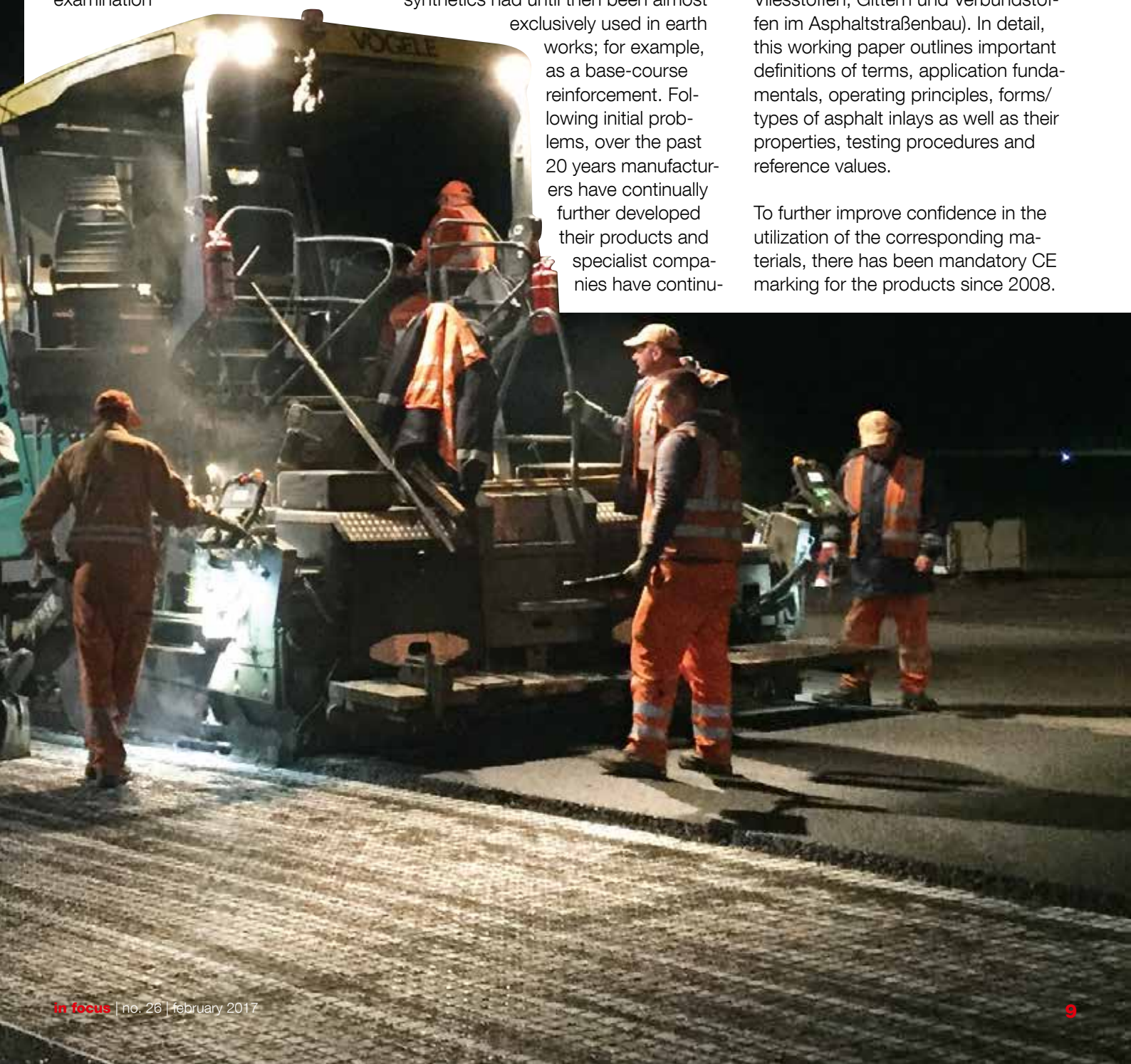
Here, it must be noted that asphalt reinforcement is in no way able to increase the existing load-bearing capacity of the road structure. In any case, there must always be an accurate examination

of the road condition and the cause of the damage to the road, because the cause of the damage is one of the decisive factors for selecting the appropriate procedures for maintaining the structure.

Geo-synthetics were first deployed as asphalt inlays in Germany as far back as the 1970s. At the time, this was a completely new application, as geo-synthetics had until then been almost exclusively used in earth works; for example, as a base-course reinforcement. Following initial problems, over the past 20 years manufacturers have continually further developed their products and specialist companies have continu-

ally refined their installation techniques. Information on the proper and professional installation of asphalt inlays can be found in Working paper 770 from the Road and Transportation Research Association (FGSV/Forschungsgesellschaft für Straßen- und Verkehrswesen): 'Working paper for the utilization of non-wovens, grids and compound materials in asphalt road construction' (Arbeitspapier für die Verwendung von Vliesstoffen, Gittern und Verbundstoffen im Asphaltstraßenbau). In detail, this working paper outlines important definitions of terms, application fundamentals, operating principles, forms/types of asphalt inlays as well as their properties, testing procedures and reference values.

To further improve confidence in the utilization of the corresponding materials, there has been mandatory CE marking for the products since 2008.



Areas of application

The functions of the product are outlined in the European DIN EN 15381:2008-11 standard – ‘Geotextiles and geotextile-related products – Characteristics required for use in pavements and asphalt overlays’. Basically, an asphalt inlay can – depending on its design – fulfill three tasks:

■ Reinforcing function

The stress on our infrastructure is constantly rising. For this reason, a functioning road network is absolutely indispensable. To keep this road network in good condition, any damage detected needs to be dealt with in good time using suitable construction maintenance measures. However, if a new asphalt overlay is applied to a cracked but still load-bearing road surface, for example, this will create preprogrammed weak points. Here, tensile stress will occur which soon comes up through the newly-applied layers of asphalt. If asphalt inlays are used, they will absorb this tensile stress, distributing it over a large surface and lowering the crack tip. This ensures the longer retention of the effective asphalt thicknesses compared to systems without asphalt inlays.

■ Tension-releasing function

Equally, distortions can occur as a result of movement in the substrate,

which can damage the road structure. This tension can be removed by installing a bituminous interlayer or SAMI (stress-absorbing membrane interlayer). A SAMI is predominantly used when building over concrete pavements, but also helps improve the bond between layers and helps ensure horizontal movement by lowering the tension and hence avoiding reflective cracking. And this function can also be provided by using suitable asphalt inlays.

■ Sealing function

Potholes occur above all on roads already damaged. Whenever – as the result of maintenance measures not being carried out – water is able to enter pre-damaged areas such as cracks, for instance. In winter, this water freezes, expands and breaks up the road surface. But frosty winter weather and the subsequent thaw and deicing salt used cannot damage an intact road surface. It is all about ensuring a closed asphalt layer. Here, asphalt inlays used as seals in the road surface can prevent water from entering the surface – for instance, in the case of brittle or cracked asphalt layers. The inlay prevents water entering the lower asphalt layers and hence creating more severe damage to the asphalt construction.

Types of asphalt inlays

There are three types of asphalt inlays:

- Nonwovens
- Grids and grids with installation aids
- Grids with nonwovens

Non-wovens are saturated with a bitumen emulsion, then function as a ‘bitumen reservoir’. This creates a seal. Bitumen, a water-repellent mineral oil derivative binding agent, ensures that asphalt inlays made from nonwovens are excellent sealing layers. Furthermore, they have a tension-reducing effect. It is particularly important to adhere to the precise bonding agent dosage when installing non-wovens. Using too much bitumen harbors the risk of ‘bleeding’; in other words, the non-woven releases the bitumen again. Using too little bitumen runs the risk that the material bonds poorly with the asphalt or does not bond with it at all. In the case of non-wovens, it must be noted that they do not absorb tensile stress sufficiently.

In contrast, grids are excellently suited to absorbing tensile stress. Their reinforcing effect is aimed at absorbing this tension where it occurs and distributing it over a larger surface. This increases the tensile strength of the asphalt construction. Grids are made of grid structures comprising synthetic fibers – such as glass fibers or polypropylene – with different grid dimensions. The prerequisite here is expert installation of the asphalt inlays into the road construction to achieve an effective bond between layers and hence to enable the transfer of tension. Only in this case can the tensile stress be transferred from one material to the next.

With the compound materials, the ultimate aim is to double the effect by combining nonwovens and grids, as these can unite the sealing, tension-reducing and reinforcing properties of grids and nonwovens. Choosing the suitable asphalt inlay requires precise analysis of the road condition to ensure that the construction maintenance measures are tailored to the damage and the asphalt inlay appropriate for the respective construction sites can be chosen.

Using asphalt inlays is a cost-saving and economically-prudent alternative to conventional remedial construction.

Recycling

Asphalt has not been thrown away in Germany for more than 30 years now – it is recycled. Asphalt is a building material that is 100-percent recyclable. Around 14 million metric tons of asphalt is excavated in Germany each year, 84 percent of which is recycled into the same product, namely newly-mixed asphalt. The remaining 2.3 million metric tons are also used as a construction material. Extensive research has been conducted into the reutilization of such asphalts with the aim of continuing to exploit the ecological and economical advantages of asphalt, even in the case of asphalt inlays.

The result: there are no hindrances caused by existing asphalt inlays during milling work. And manufacturing an asphalt mix with the addition of asphalt granulate made from asphalt inlay residue using a mixing system. However, it is important here that the recyclability and the environmental compatibility verification are provided by the manufacturer. These ensure that the asphalt and asphalt inlay can be sustainably used and recycled.

Conclusion

Using asphalt inlays is a cost-saving and economically-prudent alternative to conventional remedial construction. However, it is essential that the road condition and the cause of the damage are accurately assessed using appropriate exploratory measures prior to using asphalt inlays. Only on the basis of this assessment can there be any conclusive decision regarding the installation of asphalt inlays. And top-quality installation is essential for ensuring optimum results. The longer lifespan of the maintained road and the lowering of the maintenance costs save money, while simultaneously reducing the use of natural resources, hence protecting the environment. And the use of recycled asphalt mix is completely unproblematic. (bhi)



Staple fibers and nonwovens

Invisible, but indispensable: geo-synthetics in ground works

The quality of nonwovens is determined by the stabilization, the application and the fiber quality. As a proven expert in spinning, Oerlikon Neumag beneficially deploys its many years of expertise here both for its spunbond and staple fiber technology. Hence, Oerlikon Neumag is able to offer solutions for processes and systems for manufacturing high-end spunbonds and fibers for carded nonwovens.

Since 2002, nonwovens have experienced a sharp rise, with six-percent annual growth with regards to its use in geotextiles. This above-average growth trend continues, as huge infrastructure programs are being implemented particularly in China and emerging countries, which require large volumes of geotextiles. Furthermore, many manufacturers are continually developing new, innovative applications in which nonwovens frequently replace classical materials. Here, nonwovens are often combined with other structures, such as geo-grids, bubble films or geomembranes to create so-called geo-synthetics, with the aim of being used as composites for fulfilling several functions at the same time. And nonwoven products are also already providing various functions here: including drainage, separation, reinforcement and penetration protection. They increase the load-bearing capacity of the substrate in road, path and railroad construction

and help secure dams and disposal sites. And, once installed, they are no longer visible!

Here, the diverse textile fabrics really showcase their special properties: geononwovens are voluminous and also very easily absorb tension. In road construction, this can considerably reduce the required mineral substructure, for example. In addition to further factors, the tenacity of the nonwovens is hugely important in such industrial applications. They need to be extremely tear-resistant and often simultaneously very extensible. Here, the materials should behave isotropically, i.e. in longitudinal and transversal direction show similar characteristics (MD/CD=1).

To achieve the greatest possible mechanical robustness and durability, the polymer raw materials used are either polypropylene (PP) or polyester (PET). PP is always used if the product has to be extremely durable – geotextiles frequently remain in the ground for more than 50 years and must still be able to provide their load-bearing function. Here, the chemical resistance and hydrolysis resistance of PP is more advantageous to those of PET. In contrast, PET is cheaper and is suitable for solutions requiring shorter lifetime tenacity in the ground or if the geononwovens are installed close to the ground surface; in other words, they are exposed to solar UV radiation over longer periods of time. Here, the UV resistance of PET is superior to that of PP.

However, the quality of the nonwovens is decisively determined by the targeted transformation of the polymers into fibers and filaments with the application-appropriate properties. And this is where Oerlikon Neumag brings decades of experience into the equation. More than 4.3 million metric tons of fibers per year are today manufactured across the globe using systems from





the Neumünster-based company. This spinning expertise has also been successfully transferred to spunbond technology. To this end, Oerlikon Neumag has progressive technologies both for the production of fibers for geotextile carded nonwovens and for the manufacture of geotextile spunbonds.

**Carded nonwovens:
high fiber quality in demand**

Carded nonwovens are made from staple fibers, whereby the card web is generally doubled and flattened using a cross-lapper before it is subsequently needed. The staple fibers used for geo-nonwovens can be manufactured on single-stage staple fiber systems, with which the spinning and subsequent drawing are carried out in an in-line process. The capacities of these 'small' special systems generally lie between 40 and 80 metric tons a day. Most fibers are manufactured in white, although the extruder technology deployed also permits fibers that are spun-dyed and/or include additives – such as a UV stabilizer – to cater to the corresponding target applications. The systems offer superlative flexibil-



Oerlikon Neumag has progressive technologies both for the production of fibers for geotextile carded nonwovens and for the manufacture of geotextile spunbonds.





ity in terms of raw materials (PP, PET, recycled PET, PA6) and provide the highest product quality along with total reliability. This is essential, as the fiber quality requirements are very high.

Critical fiber characteristics for geotextiles include high tenacities with simultaneously high elongation – not only in terms of the resulting controllable nonwoven quality, but also particularly in terms of the processability on carding and needling machines. In addition to these internal fiber characteristics, reliable further processing also requires excellent, even spin-finish application and the crimping of the fibers. The better the crimping and the spin-finish application are, the faster and more even opening of the fibers in the carding system is. Geo-nonwovens produc-



Spunbonds are progressively replacing classical carded nonwovens.

tion generally involves the use of fibers with a so-called 2D crimp, whereby the shape of the crimp is in 2 directions. The Oerlikon Neumag Baltic Crimper is excellently suited to this task, as it ensures homogeneous crimping and enables good opening of the fibers.

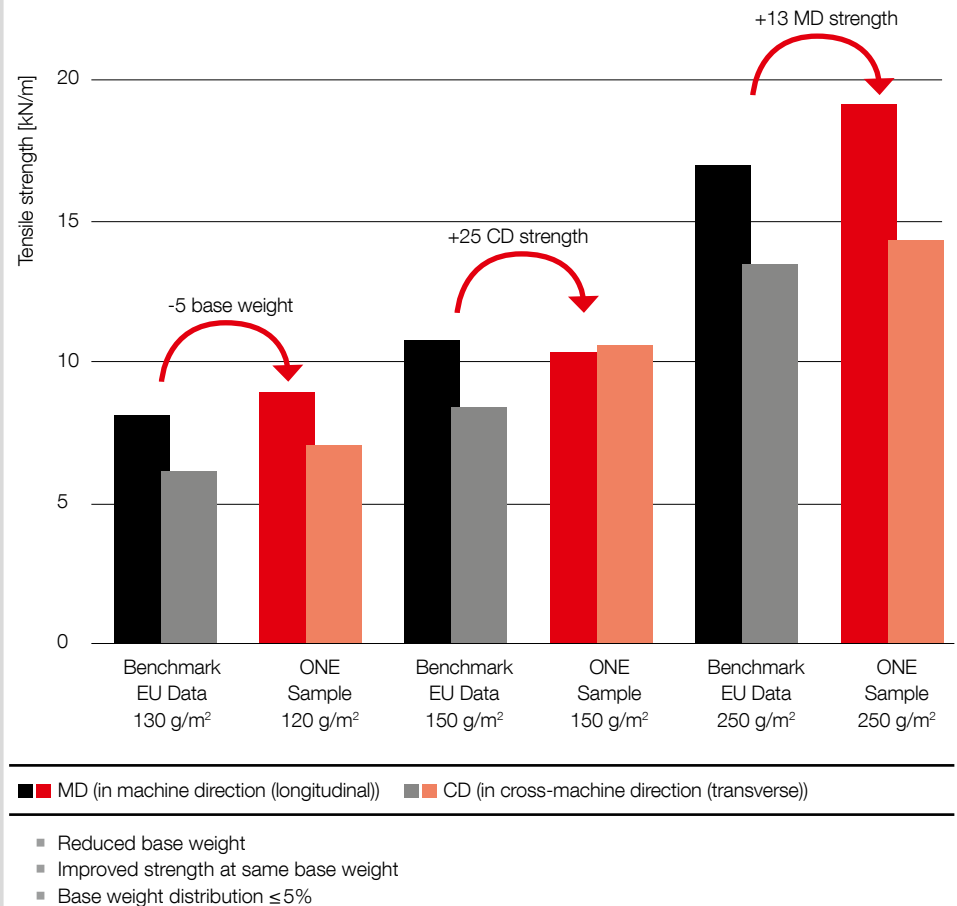
Spunbonds: high-tenacity with low material input

Spunbonds are on the rise in many industrial nonwovens applications, as the market is increasingly demanding more efficient processes and products; in other words, often the same or greater product requirements with lower raw material input. For this reason, spunbonds are – due to their technical and commercial benefits – progressively replacing classical carded nonwovens. And geotextile applications are on the rise.

To this end, the current generation of Oerlikon Neumag spunbond systems have – particularly in the case of polyester – been able to achieve excellent nonwoven tenacities with low raw material input. Compared to the predecessor generation, the energy consumption has also been reduced by approx. 20 to 30 percent. General benchmark comparisons with standard products in Europe have shown that higher nonwoven tenacities can be achieved at comparable base weights. Conversely, the required tenacities can be achieved with reduced base weights and thus with lower raw material input: in corresponding trials, it has been shown that this alone allows raw materials savings of more than five percent.

For manufacturing needed spunbonds for geotextiles, Oerlikon Neumag offers the entire process – from the polymer granulate all the way through to the rolled product. The single-phase spunbond technology combines efficiency and productivity and thus offers a potential reduction of produc-

Oerlikon Neumag Spunbond Geotextiles Benchmark comparison and product setting opportunities



tion costs of up to 20 percent with low wastage and maximum nonwoven quality compared to conventional spunbond processes. Here, the production capacities range from 800 to 1,500 kg/h, depending on the product type and nonwoven weight. The unique Oerlikon Neumag spunbond technology enables extremely-high spinning speeds, which are required for producing high-tenacity

filaments. To this end, especially – but not exclusively – PET filament nonwovens that are extremely-strong and that have very low shrinkage can be manufactured. To set the isotropy, the spunbonds are transversally-drawn directly in-line following the needling. End products include geo-nonwovens with excellent properties and an outstanding price-performance ratio. (imm)

Efficient geotextile production

Geotextiles make up a large share of industrial fabrics manufactured from tapes and/or monofilaments. These fabrics are used as reinforcements for stabilizing embankments in road and dam construction, as separating fabrics for flooring layers, as filtration materials, drainage and agricultural textiles, to name just a few examples of important areas of application.

In agriculture, the applications range from weed control fabrics, insect and hail protection textiles all the way through to so-called 'fruit coloring' fabrics. Just like black heat storage films, the interaction between color and sunlight is exploited here: the white fabric reflects sunlight and ensures even coloring of the fruit.

The required properties of the fabric and the fundamental tape yarn are dependent on the respective application. To this end, high tenacities with low stretch (in other words, high modulus) are decisive for all reinforcement applications. If the remit is to create a fabric with optimum performance with the lowest possible use of material, then high tenacities with simultaneously high stretch are required. Monofilaments must be additionally used for filtration applications or if high running meter weights are required. The excellent UV resistance demanded for all applications is achieved by including additives in the raw material. Tape yarns for geo-

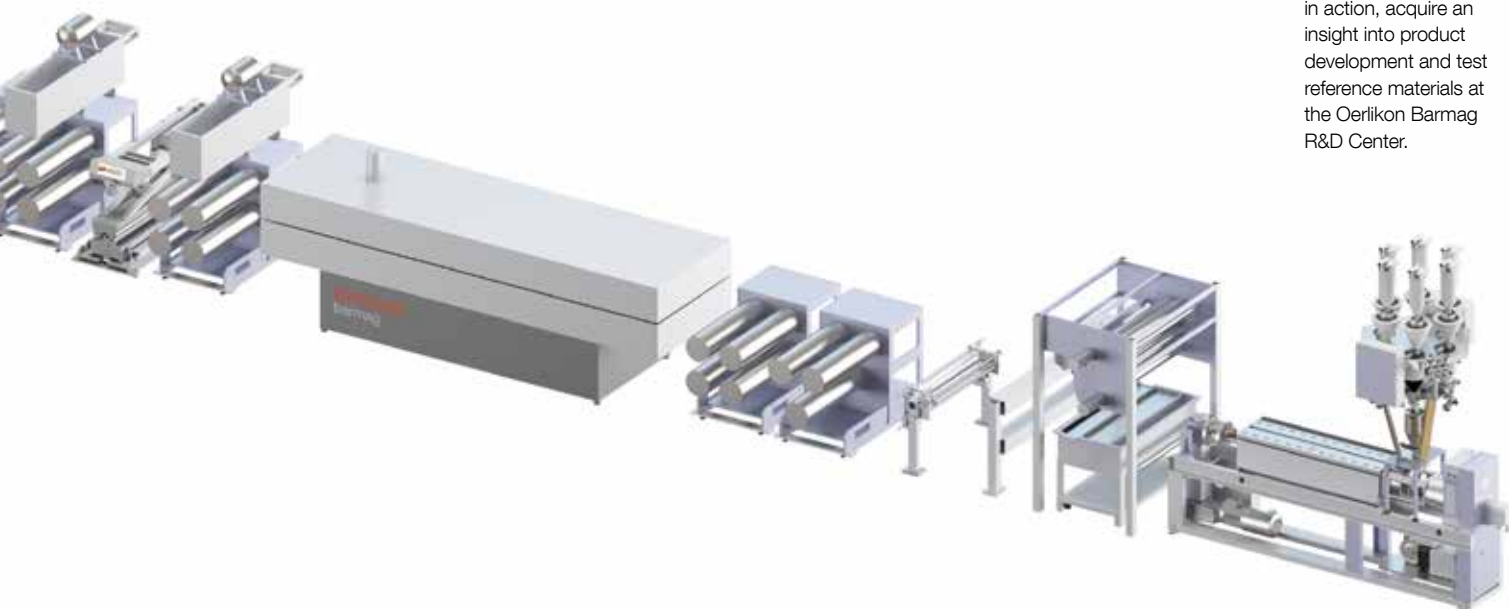


textile applications are normally manufactured in white or black (spun-dyed), while the fundamental material is generally polypropylene (PP) or HDPE.

The fabrics are predominantly made from smooth or fibrillated tapes with titers ranging from 500 to 10,000 dtex. In the case of light fabrics, the running meter weight lies between 70 and 200 g/m² and heavy fabrics range between 200 and 800 g/m². If the application requires the utilization of monofilaments, the fabrics can be manufactured using monofilaments for the warp and tapes for the weft or be made 100% from monofilaments.



with the EvoTape



Interested customers can watch the EvoTape in action, acquire an insight into product development and test reference materials at the Oerlikon Barmag R&D Center.

Diverse solutions for manufacturing tapes and monofilaments

Oerlikon Barmag extrusion systems have been guaranteeing the production of superlative-quality and high-performance tapes and monofilaments for geotextile fabrics for many years now. Depending on the requirement, both the EvoTape system and also conventional drawing processes are available for producing tapes. Furthermore, Oerlikon Barmag monofilament systems manufacture monofilaments with spinneret diameters adapted to the respective application. There are also combination systems – which can be easily converted when switching products – available for flexible customer requirements.

Faster, higher, smarter – with EvoTape

EvoTape plays out its advantages for all processes requiring high tenacities and medium to high stretch. The overall draw ratio in conjunction with the high speed (various geotextiles can be manufactured at speeds of up to 600 m/min) result in extremely high out-

puts of up to 800 kg/h. With this, the EvoTape is also a winner as a replacement investment: its extremely short return-on-investment (ROI) period and its low specific energy consumption makes investing in an EvoTape system to replace several old systems very interesting for producers.

Products with a high modulus (high tenacity with low stretch) can be extruded using the conventional drawing processes with the high product quality so familiar with Oerlikon Barmag systems.

All processes and product qualities relevant to manufacturing geotextiles can be carried out using an EvoTape system. The system specifications range from standard layouts all the way through to configurations specially tailored to the customer.

The huge range of specifications in terms of the width and thickness of the tapes, both fibrillated and non-fibrillated, demands a stable process with reliable technology. Tenacities of $>6.7\text{cN/}$

dtex ($>7.5\text{g/den}$) for non-fibrillated tapes and $\sim 6.0\text{cN/dtex}$ ($\sim 6.6\text{g/den}$) for fibrillated tapes are the benchmark for perfect product quality in geotextiles. The stretch properties are requirements-related and range from 5% for extremely high modulus to 25-30%. The drawing ratios lie between 1:5 and 1:15 for achieving the various properties. The result: only minimal tenacity losses during weaving, especially in the case of applications with low elongation.

Intelligent polymer handling in the extruder followed by the EvoTape extrusion process at comparatively low process temperatures and drawing ratios result in both high process stability and also generally low strain on the raw material. The products are wound using WinTape (up to 4,000dtex) or WinOro (up to 20,000dtex) winders. The automatic winders with identical package running lengths ensure superb efficiency and low wastage when manufacturing the warp beams for the weaving plant. (jwe)

Market opportunity geogrids

Low elongation, ultra-high tenacity, high modulus – industrial yarns offer superlative properties for the high-impact job of geotextiles. These cannot only be adapted to numerous requirements profiles using Oerlikon Barmag system concepts, the flexible systems concepts also enable a broad range of the most diverse industrial yarn products as well as high quality and efficiency with the lowest conversion costs.

Building with geotextiles is an economically-prudent and simultaneously cost-saving alternative to conventional construction methods: because these flexible fabrics have outstanding material properties, are particularly durable and can even be used for extremely-demanding projects. Geotextiles are meanwhile being successfully deployed in the most diverse functions in virtually every aspect of construction – from road building and civil engineering, horticulture and landscaping all the way through to structural engineering. And the demands made on the starting products are correspondingly diverse: these include separating, filtering, reinforcing, protecting and also sealing, among other things. This application diversity makes the market

for geotextiles attractive to producers – with annual growth rates of around 9 percent expected until 2020, according to forecasts by well-known market research institutes. This positive trend has also been confirmed by rising demand for industrial yarn systems at Oerlikon Barmag, which also relates to geotextiles and textile construction.

The primary quality requirement in this business is that the products are very durable in their respective areas of application. The yarn used for these must be highly-stable and creep-resistant and have product properties such as low elongation, ultra-high tenacity or high modulus. To fulfill these requirements in an application-appropriate manner, Oerlikon Barmag offers machine concepts perfectly suited to

manufacturing industrial yarns for geotextiles. The systems not only provide superlative product quality and efficiency with optimum conversion costs, they also offer the flexibility of being able to manufacture a large range of other industrial yarn products. This is aimed at enabling the greatest possible benefit all the way through to the further processor or end user.

To this end, part of the otherwise common downstream plying process, for example, can be dispensed with as a result of a potential maximum windable single yarn titer of up to 8,800 dtex.

Machine concepts: HT/LS and HMLS

The first choice for polyester geotextiles is the 8-end HT/LS (high-tenacity/low-shrinkage) machine concept, which is able to cover a titer range of up to 8 times 2,200 dtex – or up to 2 times 8,800 dtex for the single yarn titer through plying. With this, the draw unit configuration offers superlative yarn quality with the simultaneously highest level of productivity. In contrast, high-modulus and low-shrinkage yarn types for geotextiles can be manufactured using a 4-end HMLS system.



Must be able to resist a lot: Industrial yarns in geotextiles.

These two machine concepts are complemented by system configurations that – with a draw unit featuring six godet systems – are able to cover a broad range of products and hence also diverse end applications. To this end, not only can geotextiles be flexibly manufactured with excellent quality, so too can such products as mooring ropes, coated fabrics for tarpaulins and automotive products – all using the same machine concept.

Components: from 3LA filter through to the ACW IY winder

Decisive requirements for low conversion costs and excellent margins that can be achieved using an Oerlikon Barmag IDY system are not merely the product quality and system flexibility. The factors also include a coherent overall concept with a well-conceived selection of components tailored to the process requirements. The system concepts achieve their excellent productivity as a result of high production speeds: in the HMLS process, for example, speeds reach in excess of 6,000 m/min; with conventional 8-end processes, a total titer of up to 17,600 dtex per position can be achieved.

On the component side, the patented filter of the 3LA spin pack, for example, achieves a high degree of process reliability with outstanding service life as a result of its excellent filter properties. This also applies to the 6LA filter, which additionally enables a compact spinning system construction with a high number of threads. The optimum guidance of the melt in the SP8 spinning head and the high speed of the cross-flow quenching or EvoQuench radial quenching unit in the HMLS concept also lay the foundation stone for good yarn quality.

The high energy efficiency of the SP8 spinning head and the EvoQuench quenching unit is also found in the HF godet concept. By means of four



or eight separately-controllable heating zones per godet in a system, the filament is subjected to precisely the amount of heat that it requires at this point. This is the main prerequisite for successfully manufacturing a yarn with the demanding properties of a geotextile. At the same time, high-frequency heaters are – in terms of efficiency and energy consumption – considerably superior to conventional 50-Hz heating technology.

The ACW IY winder – especially developed for the requirements of industrial yarns – is located at the end of the drawing process. Depending on the design, this component is available for speed ranges of up to 4,000 m/min or 7,000 m/min. Here, a single yarn titer can be wound with up to 8,800 dtex with optimum package build.

And finally the icing on the cake: POC and Variofil

The Plant Operation Center (POC) can further increase the efficiency of machine processes, error identification and products. This overriding higher-level process control system permits complete process control including recipe management.

And, last but not least, Oerlikon Barmag also offers systems that cater to both the described PET concepts and – equally competently – PA or PP products. To this end, the Variofil concept enables corresponding IDY stand-alone solutions, including such utilities as air-conditioning system and compressed air provision. A turn-key entire industrial yarn manufacturing plant can be provided within the context of an engineering project. (rei)

Texturing in a new dimension

eAFK HQ – The world's most productive DTY machine

During the ITMA Asia 2016 in Shanghai, Oerlikon Barmag introduced its latest DTY innovation, an extension of the eAFK automatic draw texturing machine family: the eAFK HQ. The world's most productive texturing machine with 576 positions simultaneously excels in terms of its extremely space-saving construction.

With this, customers are able to texture their products on a machine with the smallest space requirements per position within the DTY market. Moreover, they benefit from the up to 50% increase in productivity offered by the eAFK HQ compared to other texturing machines supplied by competitors.

Where it all started

Over the past few decades, machine lengths have grown from fewer than 216 to 288 and finally 384 positions. Today, the Oerlikon Barmag DTY machine portfolio offers manual or automatic machines with up to 16 sections or 384 positions for all cross-sections. With the aim of developing a machine concept that was more productive than the existing 4-deck machines, Oerlikon

Barmag concentrated on a new concept for the automatic eAFK machine family with the following objectives:

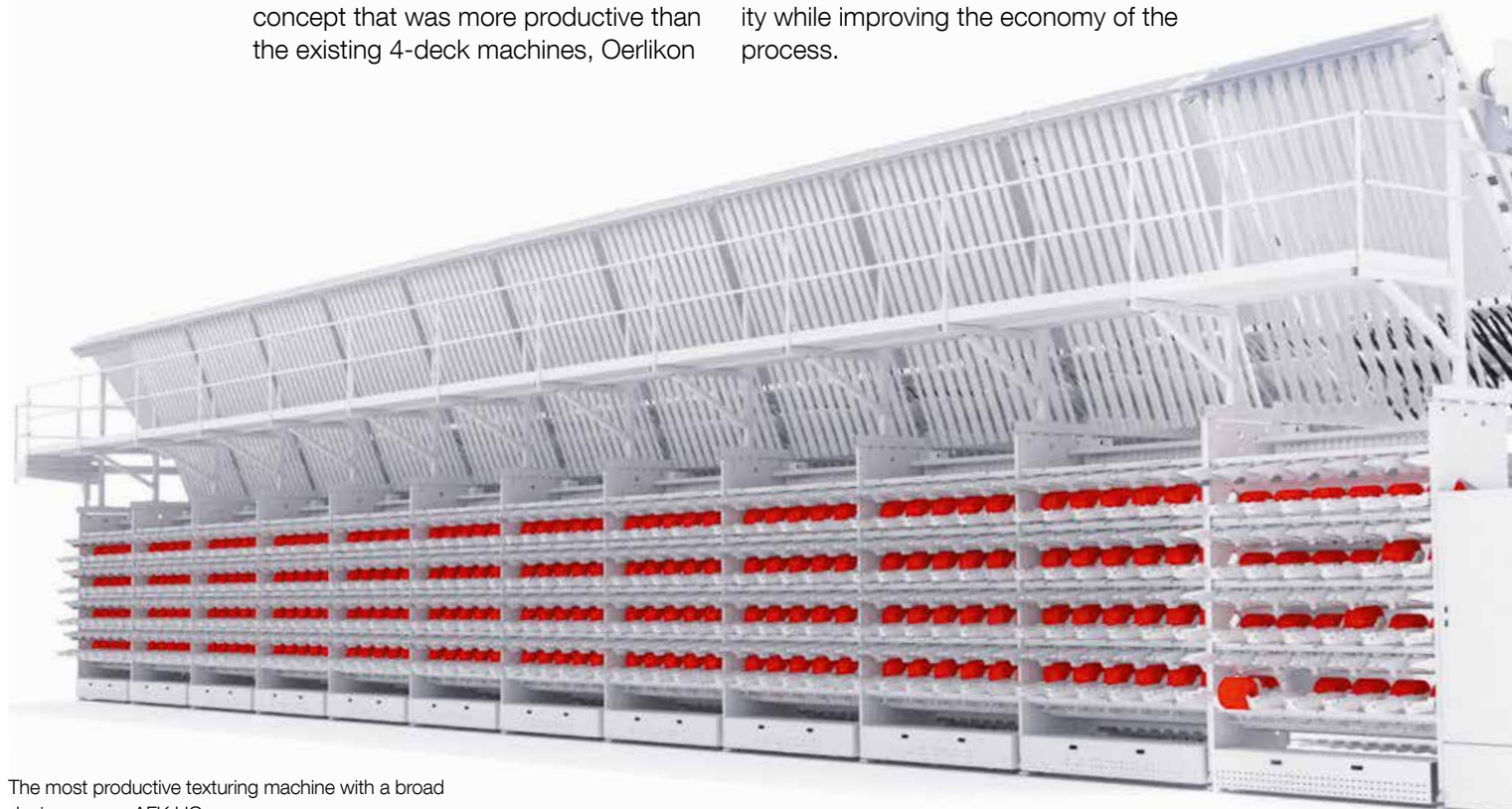
Increasing the yarn ends and yarn density per m² to

- Reducing the space requirements,
- Increasing output per m² and
- Improving energy efficiency.

with

- Operator-friendly design,
- Doffing efficiency up to 99%,
- Wide operational range and
- No compromise in terms of yarn quality and package formation.

The result of the development efforts is the eAFK HQ. HQ – short for 'High Quantity / High Quality', with up to 576 positions sports a 4-deck take-up solution to increase the throughput capacity while improving the economy of the process.



The most productive texturing machine with a broad denier range: eAFK HQ.

While adding a fourth deck, two positions have been added on each deck to further improve the yarn to m² ratio. In order to achieve an increase of yarn ends in the same given space, all single components in the yarn path prior to take-up have been addressed.

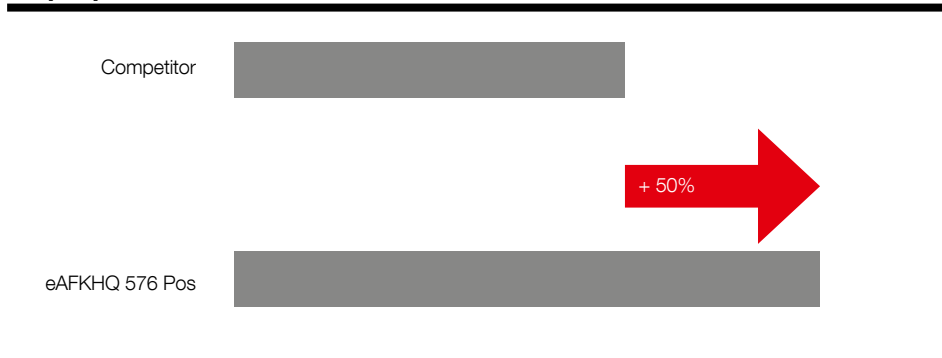
Machine concept

Concept-wise, the eAFK HQ comprises an Oerlikon Barmag multispindle texturing zone design, which from the start allows single-yarn treatment with single-driven friction aggregates. To allow the additional yarn ends to be further processed, the feed system, the string-up as well as the first and secondary heaters had to be redesigned in addition to the general changes applied to the take-up unit. Optimized yarn handling was the primary focus of the development.

The eAFK HQ in the standard cross section offers the customers a process window of 30 - 300 den at a maximum mechanical speed of 1200 m/min. The yarn ends per section have



Output per machine



■ Productivity

eAFK HQ: 50% higher productivity per machine than current state-of-the-art.

been increased from 24 to 48, with the expansion of take-up positions per deck from 4 to 6 while adding a 4th deck. All single components have been re-engineered with this space optimization in mind:

- The G1/G2/G2x godet feeds have been redesigned, decreasing the diameter to allow proper single-feed treatment.
- The pneumatic string-up device has been redesigned to accommodate 24 single yarn ends.
- The first heater has been redesigned to provide greater savings and with a higher number of yarn ends in mind, resulting in 10 - 15% energy savings potential compared to a conventional 2.0 m first heater. The new energy-saving secondary heater has been introduced, also with up to 10 - 15% energy savings compared to conventional secondary heaters.
- The eAFK HQ ATT is the next generation of the Advanced Take-Up solution. The new system further improves the package formation for conventional and dye packages.
- The individual automatic doffer ensures up to 99% doffing efficiency.
- The Jumbo Rotary Creel, included as standard, has been improved for

easier handling and loading for the higher number of POY bobbins.

Highest yarn density with up to 576 positions – a world record!

In comparison to its peers, the eAFK HQ has a m²-to-yarn-end ratio of 0.68 m² per yarn end in its most space saving design, which saves up to 15% of space at the same throughput per position in comparison to alternative machine concepts.

A production machine with 12 sections now offers a maximum of 576 positions. Each side has 288 positions equal to a complete machine of today's standard. Drastically reduced space requirements are combined with the highest energy-saving potential.

With the eAFK HQ, Oerlikon Barmag today already shows manufacturers how they can optimize the production processes of the future. (as)

OTIZ enters PA66 automotive market with Oerlikon Barmag technology

The Chinese industrial yarn manufacturer Oriental Industries (Suzhou) Ltd. (OTIZ) successfully commissioned its first polyamide 66 investment recently.

Here, the company put its faith in the Remscheid-based spinning systems constructor Oerlikon Barmag. “The PA 66 experience offered by Oerlikon Barmag was the decisive factor that influenced our investment decision. This gave us the necessary confidence to know that we can also be successful with a – for us – new process”, comments OTIZ President, Moji Wu. In the future, OTIZ will expand its portfolio to include industrial PA66 yarns with a titer range of between 270 and 1440 dtex. With this, the subsidiary of the Taiwan-based Far Eastern Group has now entered the PA66 automotive growth market.

The new systems supplied by Oerlikon Barmag cater to three different segments: low denier industrial yarn (LDI), medium denier industrial yarn (MDI) and high denier industrial yarn (HDI). An 8-end system has been supplied for the up to 1440 dtex HDI yarn range for the very first time. With the considerably higher output per position, the company – founded in 2005 – now has a tremendous competitive edge. “For us, it was important to secure a long-term partner for this innovative technology, a partner who also has tried-and-tested experience in the downstream processes”, explains Regional Sales Director Oliver Lemke.

The yarn products are deployed in airbags, luggage, parachutes and sports apparel (LDI), landscaping and geotextiles (MDI) and also in tires (HDI). As a fully-integrated industrial yarn

specialist, OTIZ is involved along the entire process chain: from polyester chips, spinning, twisting, weaving all the way through to dipping. Its main products include polyester chips, polyester industrial filament, polyamide 66 industrial yarn, tire cord and fabric reinforcements for rubber & plastic products. The company’s clientèle includes well-known automobile sector suppliers across the globe. (bey)



OTIZ' main products are automotive yarns such as tire cord, airbag or seatbelt yarn.

Sinowin focuses on airbag yarns

Ten positions of the new Flex 6 concept for manufacturing polyamide 66 industrial yarns were recently commissioned at Sinowin Chemical Fiber Co., Ltd.

The benefits of the new machine concept include components that are optimized to the respective application, which considerably reduce the required space compared to conventional solutions and its optimized energy consumption. Oerlikon Barmag Sales Director Oliver Lemke: “With its new godet configuration, the Flex 6 concept promises an unparalleled price-performance ratio for the production of high-end yarns. Sinowin is therefore the first industrial yarn manufacturer in China to deploy our new technology.”

Sinowin is completely committed to creating value for its customers. Here, quality and innovative technologies are absolutely essential, confirms General Manager Sheng Jian Wang: “We are striving to become a leading ‘Made in China’ enterprise in the chemical fiber industry. For this, we require state-of-the-art technologies that manufacture quality products. Oerlikon Barmag has an excellent reputation – above all for the PA66 industrial yarn process. To this end, there was no other partner for us.”

Sinowin Chemical Fiber Co., Ltd. is an industrial yarn manufacturer that entered the Chinese market in 2015: the still young company has specialized in airbag yarns manufactured using Oerlikon Barmag polyamide 66 low denier industrial yarn (LDI) and medium denier industrial yarn (MDI) systems. Sinowin’s program also includes sewing yarns, yarns for luggage, sails and tarpaulins. (bey)



Sinowin's General Manager Sheng Jian Wang sets high value on quality: the company supplies mainly airbag yarns.



Increased demand for industrial yarns systems

Technical applications offering interesting margins

Last year, Oerlikon Barmag secured an above-average number of industrial yarns projects. The general trend was once again confirmed within the context of the ITMA Asia + CITME in October 2016.

This shows the sustainable success of the comprehensive range of innovative process solutions offered for the entire industrial yarns product program. With its global network, Oerlikon Barmag is positioning itself as a leading partner and a solutions provider of efficient 'from-melt-to-yarn' production processes.

The new systems that will be commissioned over this year are primarily focused on the Asian region; however, manufacturing industrial yarns is also interesting for producers



Airbags, safety belts, tire cord, geotextiles, safety ropes, conveyor belts – Oerlikon Barmag industrial yarn systems manufacture filament yarns for the most diverse applications.

in Europe due to the comparably high margins and specialized areas of application. "We are experiencing huge demand for industrial yarn systems. Customers are asking for products that offer an interesting margin, such as specialties and industrial yarns, for example", comments Oliver Lemke, Regional Sales Director at Oerlikon Barmag.

Stefan Becker, Senior Expert Research and Development, adds: "What has, for example, been very well received by our customers is that our current machine concepts for industrial fine-titer nylon yarns allow us to offer configurations that are specifically tailored to the product requirements of the end application of these yarns, such as tents, tarpaulins, parachutes, etc. Here, the focus of the machine design is both on the product quality of the yarns in typical titer ranges of between 20 and 70 den and on production efficiency and, above all, on the optimization of the conversion costs."

The vast majority of the additional output of polyester and polyamide yarns will be deployed in the automotive sector (airbags, safety belts, tire cord). A further application area focuses on the broad spectrum of geotextiles and products for textile construction. And the continuing trend towards polyester yarns as a substitute for polyamide – prevalent among many product categories such as airbags, for example – is being confirmed by our projects. This is above all due to the constantly improving properties of polyester with simultaneously considerably lower raw material costs. Despite all this, the market for industrial yarns continues to diversify and develop very much in line with the specific end applications. Here, the rising demand for so-called high-performance tires is resulting in both increased demand for PET HMLS yarns and in the greater output of PA66 yarns for use in cap ply.

Oerlikon Barmag offers flexible and product quality-oriented machine concepts that efficiently cover these requirements with excellent conversion costs for all product categories. To this end, systems for manufacturing yarns for PET and PA airbags, tires and safety belts are successfully operating in the automotive sector, while there are also systems being used for textile applications such as upholstery and carpets. With this, the yarn production for all automotive sector applications can be covered by Oerlikon Barmag solutions. (bey)

VarioFil R+

From PET bottles to yarn

18 months following its market launch, Oerlikon Barmag's VarioFil R+ is successfully manufacturing products at a home textile manufacturer in Central Asia. The company is producing recycled polyester using the compact system predominantly for the in-house downstream process.

The VarioFil R+ is the world's first POY spinning line which uses recycled bottle flakes as feedstock for dope-dyed textile POY. The line provides several technological features such as a special extrusion system for bottle flake materials, the latest metering and blending technology for dope-dyeing and an advanced 2-step melt filtration. The result is a high quality dope-dyed POY. The turnkey machine comprises 4 spinning positions, each equipped with an Oerlikon Barmag 10-end WINGS POY winder.

**Bottle flakes instead of rPET chips:
VarioFil R+ reduces the spinning process by one step**
PET has become the primary material for beverage packaging – billions of PET bottles are used worldwide each year. This huge quantity of PET bottles, usually disposed of as

waste after initial use, is a perfect source of raw material for the sustainable production of synthetic fibers. Furthermore, the reutilization of resources and raw materials, along with energy saving production processes, are becoming increasingly popular. The VarioFil R+ concept combines all these trends. It uses PET bottle flakes as a raw material, which avoids the additional pelletizing of bottle flakes into rPET chips. This leads to a significant advantage in terms of investment and energy costs. It also provides the latest technology for dope-dyeing, which is the most resource-saving dyeing process. Hence, the development of VarioFil R+ underlines the trend of increasing demand for textiles made from yarns which have a 'sustainable background'. It also provides the possibility for recycling companies to sell high-quality yarns instead of bottle flakes, therefore generating added value. (kos)



VarioFil R+ is the world's first POY spinning line which uses recycled bottle flakes to manufacture dope dyed textile yarn.

Talking to Necat Altın, Managing Director of Korteks

“R&D is the most important tool you can use to get ahead of the competition”

Turkey – as a ‘powerhouse’ of the European textiles industry – is home to several outstanding international textiles companies. These include Korteks, a member of the Zorlu Group and headquartered in Bursa, the largest fully-integrated filament yarn manufacturer within the extended European region.

For just under three decades, the Turkish benchmark enterprise has been producing quality yarns for the local and international polyester markets. Fibers and Filaments had the opportunity to talk to Necat Altın, the Managing Director of Korteks.

» **Mr. Altın**, Korteks invested in the entire textile value-added chain from the very outset. What are the reasons for this and where do you see the advantages of integration

We at Korteks look to the future confidently as the largest fully-integrated polyester yarn manufacturer in Europe and the Middle East. Producing about 2,500 different kinds of yarn, Korteks has the ability to efficiently and quickly supply 2,240 customers located all over Turkey with the superior-quality yarns that they need in their weaving, knitting and many other processes. Besides serving its home markets, Korteks also ships goods to more than sixty countries on five continents, among them Germany, UK, Italy, Spain, USA, Canada, Iran, Egypt, Algeria, Brazil, Mexico, and South Africa.

We are perfectly confident when we say that Korteks today is way ahead of, and far superior to, any other European manufacturer from the standpoint of the technology and also its full integration that it uses in all of the business lines in which it is active.

» **Mr. Altın**, you produce polyester yarns for virtually all applications. How do you secure your standards of quality here?

Korteks-manufactured products are used to produce everything from home textiles (curtains, comforters, carpets, towels, etc.) to garments (dress suits, ties, scarves, underwear, etc.) and are suitable for applications ranging from the automotive industry (door panels,

ceilings, upholstery, parcel shelves, sun visors, etc.) to outdoor applications (awnings, tarpaulins, garden furniture, deck-chairs, umbrellas, etc.). Moreover, the company’s knowledge and experience mean it can easily respond to customers’ changing needs and expectations.

It gives me pride to say that our production processes have been awarded many different internationally-recognized certifications such as ISO 9001, ISO 10002, ISO 14001 and TS 16949. I should also point out that all our production processes are subject to online monitoring, which means that any lapse in them can be corrected almost instantaneously.

In fully-equipped, high-tech laboratories, Korteks-manufactured yarns are subjected to a battery of tests before being shipped to customers. The ability to combine technology with innovation and to use both to achieve and maintain an advanced level of customer satisfaction is just one of the things that distinguishes us from our competitors.

» **Mr. Altın**, polyester yarns are the main focus of your company...



Necat Altın heads the largest fully integrated polyester yarn manufacturer in Europe and the Middle East.

Yes, today Korteks Yarn has 335,000 m² of production facilities whose daily polymer production capacities amount to 580 tons of polymer, 400 tons of pre-oriented yarn, and 120 tons of fully-drawn yarn. In addition to these, the company turns out 350 tons a day of textured yarns and 25 tons a day of twisted, fancy, and elastic polyester yarns.

Its tight-spot, knit-de-knit (KDK) torque-free, special-effect, fancy twisted and elastic yarns in more than 100 dope-dyed color options are intended for use in various applications. The company's branded products – such as DRY TOUCH® – with their advanced functional features and Korteks' standard POY, FDY, conventional textured yarns, air-jet textured, improved textured yarns (ITY), monofilament, twisted yarns provide a product range whose diversity caters to virtually all the sector's requirements.

» **Mr. Altın**, talking about branding and niche products...

Our DRY TOUCH® fabric is made from high-tech functional channel cross-sectioned yarns that are produced at the Korteks AS yarn factory employing



“We are perfectly confident when we say that Korteks today is way ahead of, and far superior to, any other European manufacturer from the standpoint of the technology...”

special techniques. DRY TOUCH®, a genuine high-performance moisture management fabric that is also natural-looking and soft to the touch, provides perfect moisture absorption, breathability and improved cover. TAC yarns are used to produce high performance fabrics that enable improved functionality. Korteks has also been focusing on automotive textile and carpet yarns. With its high quality, over 100 standards, an almost infinite number of customized colors, flexibility and short dispatch times, Korteks' automotive yarn programs are hugely successful.

It is a similar story when it comes to carpet yarns. As the use of PES yarns is continually growing within carpet manufacturing, KORTEKS is gaining a competitive edge here with its polymer-dyed colors, high quality and the expertise and capabilities of its in-house chemical & textile laboratories.

» **Mr. Altın**, the textiles markets have always been dynamic. How do you see their development in the future?

In recent years, the polyester yarn market has changed in two ways. Firstly, there has been the change and



“I can also say that establishing successful collaborations through proper communication is one of the most important things you have to learn.”

transformation of the technology. Masterbatch technologies, functional products, automotive and technical textiles along with bi-component products are all the

result of developments in technology. Secondly, there has been the change and the diversification of the players within the market. We can cite the rising dominance of the Far Eastern players within the European market as an example. Over the coming years, we forecast that the demand in technical and automotive textiles, medical textiles with nanotechnology, e-textiles and masterbatch-based value-added products will increase. We also see environmentally-friendly production methods and recycled polyester yarn production as the most important topics within the industry.

» **Mr. Altın**, how well do you believe Korteks is positioned for the future in these volatile markets?

We are aware of the fact that it is not possible for a company to survive without the ability to transform scientific and technological discoveries into economical and social advantages. And the only way to do this is through research and development. R&D is the most important tool you can use to get ahead of the competition. We know

that energy sources are not limitless. In recent years, we have seen that consumers are becoming increasingly aware of the efficient use of energy. In line with this trend, we will continue to develop polyester yarns that provide light and sound insulation and will augment new production methods to decrease our consumption of energy and power. At Korteks, we have grown as a result of the right strategy; believing in innovation and relying on the quality of our products.

We live in an age in which technology and innovation, rapid thinking, research, and easy access to information are improving and having an idea that will make a difference makes a huge contribution towards being successful. I can also say that establishing successful collaborations through proper communication is one of the most important things you have to learn. The focal point of all these innovative ventures lies in the trust we have placed in our machinery and equipment. Oerlikon Barmag will undoubtedly be our most important partner in terms of new investments and modernization projects. We believe we have become stronger by replacing our existing machines with the very latest technology, new, state-of-the-art Oerlikon Barmag e-AFK machines – our most recent investment in 2016.

Thank you for speaking to us, Mr. Altın. (wa)



Techtextil and Texprocess in Frankfurt

Advanced materials for the manmade fiber industry

The Techtextil in Frankfurt, Germany, is the leading international trade fair for technical textiles and nonwovens, showing the full range of potential uses of textile technologies. Under the motto 'Connecting the Future', international exhibitors will present their textile innovations to trade visitors between May 9 and 12, 2017. Oerlikon's Manmade Fibers segment will be presenting its insights into the future of the sector in Hall 3, Stand B06.

Oerlikon Barmag and Oerlikon Neumag offer numerous technologies for manufacturing and processing industrial yarns, fibers and nonwovens. These form the basis for almost all technical textiles within growth markets such as electronics, energy, food, functional wear, infrastructure and transportation.

Automobile tires, safety belts, airbags, geotextiles, roofing membranes, mooring ropes for drilling platforms, conveyor belts, sails and fishing nets

– all these are manufactured using industrial yarns, fibers and nonwovens. Even this selection of applications showcases the diversity of what is possible in potentially the most exciting area within the textile sector.

Industrie 4.0 solutions

Using augmented reality solutions with Microsoft HoloLens for 'predictive maintenance' concepts and virtual 360-degree tours through spinning plants, visitors to the Techtextil will be offered everything

Oerlikon partners with Microsoft HoloLens in offering Industrie 4.0 solutions for its customers.



Living in Space

More exhibitors and a trip to Mars: visitors to and exhibitors at the Techtextil can look forward to a completely new trade fair experience. The highlight of this year's Techtextil is the special 'Living in Space' event in collaboration with the European Space Agency (ESA) and the Deutsches Zentrum für Luft- und Raumfahrt (DLR/ German Aerospace Center).

that state-of-the-art technology makes possible today. Linked to future-oriented service and automation solutions, Oerlikon wants to prepare its customers for the future of manmade fiber production. The fact that this will ultimately result in improved yarn quality goes without saying for the market leader, along with offering environmentally-compatible and sustainable production processes. Here, the segment will be presenting its e-save initiative for the 13th year in succession and showcasing new recycling solutions – 'From shredded PET to value added'.

Techtextil Symposium

An interesting addition to the trade fair is the Techtextil Symposium. This year, it has been expanded in terms of its concept and is split into seven blocks, each with seven presentations. For the first time, there will be a collaboration with the Dornbirn MFC Man-made Fibers Congress, with the event being held at the 'Saal Europa' venue in Hall 4.0. (aw)

Digital solutions for future processes

The Oerlikon Manmade Fibers segment technology is all about cost-efficient and high-quality manmade fiber production. With innovative Industrie 4.0 solutions, the company is setting new standards with regards to customer benefits.

With the Plant Operation Center (POC), for example, manufacturers can maintain a holistic overview of manmade fiber system production – from the polycondensation, the spinning system all the way through to texturing and the downstream further processes. With this, processes can be optimized, production optimally planned and the product quality improved. To this end, the concept is already supporting the rising need for greater flexibility in production processes. The digital future is now!

Global competition within the manmade fiber industry and the changing expectations of consumers with regards to fashion detailing are today increasingly presenting yarn manufac-

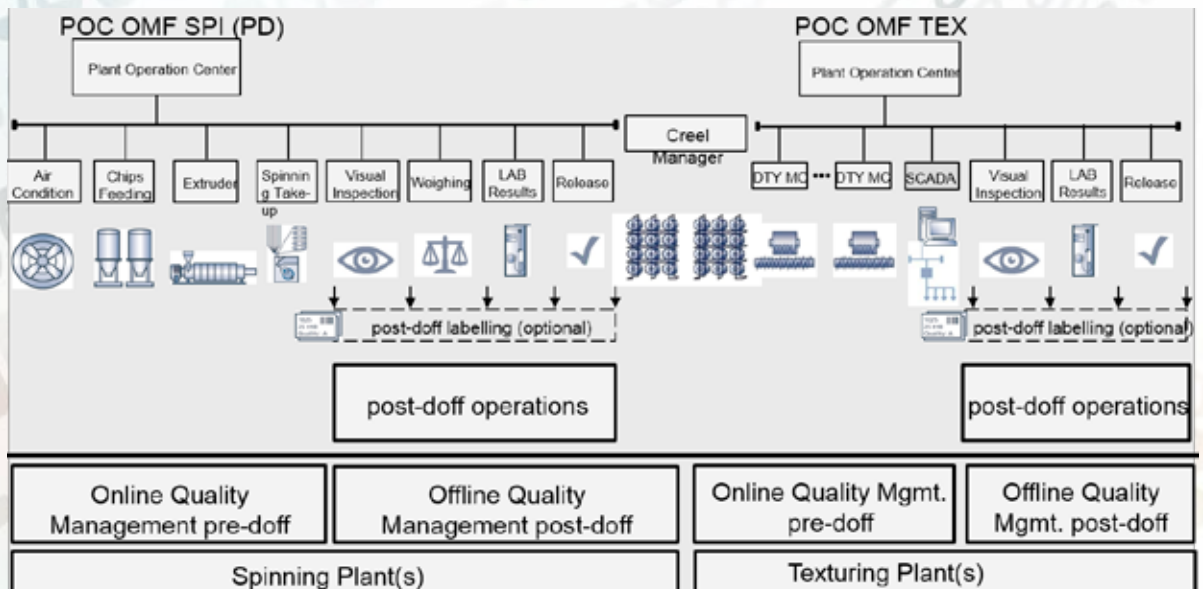
turers with challenges. Special production runs, such as spun-dyed products and special yarn cross-sections, must be flexibly, quickly and efficiently manufactured in small batches; here, the production of standard products must not suffer. Optimum planning of product switch-overs must ensure there is no risk of waste, quality errors or over- and under-production.

Modular system maintains workflow overview

Here, the modular structure of the POC system guarantees customer success. With its more than 20 modules – for example, for quality control, maintenance and production planning and recipe management – the workflow management system can be optimally tailored to customer requirements. More than 250 successfully implemented POC-equipped installations speak for themselves.

The primary focus is on the traceability of all process data in real time and the potential direct reaction to deviations in machine efficiency or product quality. Here, not only can data from the in-

Total Quality Management (TQM) – solution 'filament'



house laboratory be directly integrated, but so can – with the corresponding link – the data from the downstream processes such as texturing, for example. Equally, the POC is able to monitor auxiliary systems such as air-conditioning, compressed air provision and the entire polycondensation system (CP).

In detail: POC modules

Here, the modular structure permits yarn manufacturers to adapt their 'own' Plant Operation Center precisely to their requirements.

As a total concept, the POC assumes a major share of the functions provided by a manufacturing execution system (MES), including the link to superordinate ERP systems and to corresponding interfaces for automation systems, such as package handling and storage in the spinning system. To this end, the control of automation systems within the spinning process is part of the concept.

Each individual module provides concrete potential production cost savings.

1. Production planning

Production orders are optimally prepared and integrated into the production process, hence ensuring transparent production. With this, the over- and under-producing are avoided – even in the case of small batches.

2. Recipe management

Machine settings optimized to the respective product are stored in the recipe management system and transferred to the production system error-free when switching products. As a result, the product quality is guaranteed even in the event of frequent product switch-overs.

3. Quality control

The integration of data measured in the laboratory helps ensure high product quality. In addition to 100-percent traceability for each individual product

What does the POC do?

- Transparency throughout the entire production process and also for corresponding expansion measures over several plants throughout the world.
- Reliable real-time data analysis
- Fast identification of error sources
- Supports fast decision-making and the speedy implementation of the necessary process adjustments
- Optimum utilization of existing personnel and reduced downtimes
- Avoidance of incorrect process settings

unit (package) throughout the entire manufacturing process, a so-called cyber-physical system also provides fast identification of, and reaction to, potential quality deviations.

When integrating further processing procedures such as texturing, functions like the creel management system can be used to very efficiently optimize product quality.

4. Efficiency monitoring

The statistics module continually monitors the production efficiency of individual products or entire machines and plants. In this way, production process malfunctions that can result in lower yields or high waste rates, for example, are identified early on and can be alleviated quickly.

5. Alarms and maintenance planning

As a result of managing the alarms and the maintenance planning tailored to the production process, the POC system supports the customer in minimizing downtimes and unplanned interruptions and hence also production waste. At the same time, personnel deployment and system utilization are optimized. Malfunctions in the plant are transparently displayed using monitors or mobile devices, allowing for swift

alleviation and for optimum planning of necessary maintenance during the production process according to specialist staff availability. In parallel, shift planning is supported in keeping with actual staff requirements.

6. Performance monitoring

For fast real-time monitoring of production plant efficiency, the data can be displayed according to key performance indicators on the customer network and also on mobile devices. As a result, the management is able to check on the system at any time – even outside the plant.



However, if unplanned machine downtimes or process problems nevertheless occur, Oerlikon Manmade Fibers Customer Service experts can use the remote support function to log into the system directly and provide the system operator with swift support.

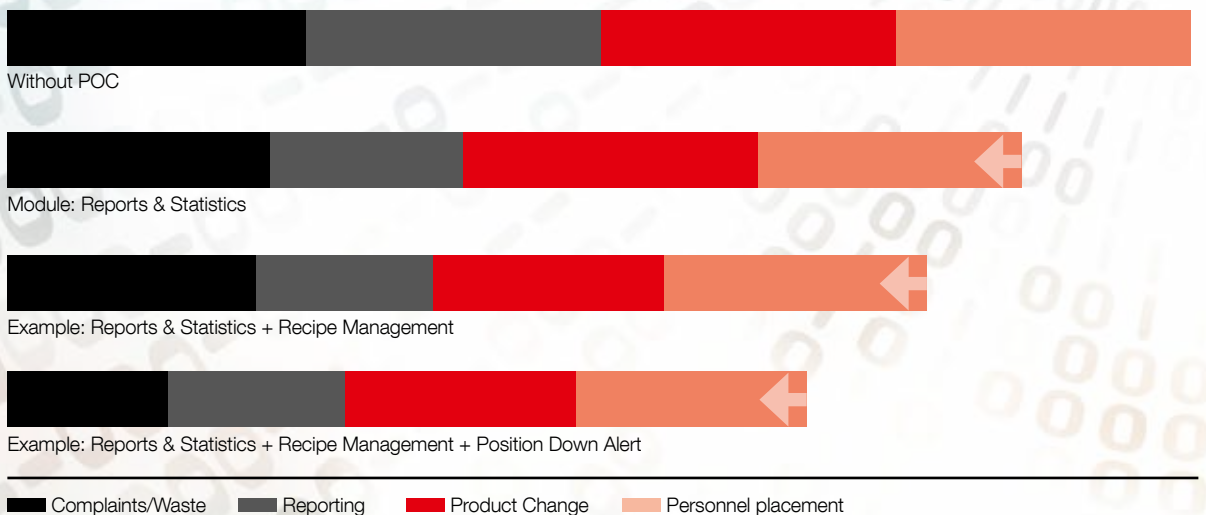
Digitalized production can improve efficiency and quality and make a considerable contribution towards competitive production even in the case of flexible, small batches.

Upgrading existing systems using a POC

A POC system is not only a process monitoring option for new systems.

Connecting existing manmade fiber systems to a POC system is usually unproblematic. For this reason, increases in quality and efficiency and hence also in competitiveness can be achieved even in the case of older systems.

Cost advantages using POC



The digital monitoring of as many areas as possible within a production process ensures optimum product quality and performance control and can therefore also help achieve optimum cost efficiency for customers.

All figures are based on own investigation and / or market information without guarantee



With its augmented reality solutions Oerlikon prepares its customers for the future of man-made fiber production.

Comprehensive support using the myOerlikon customer portal

However, digitalization does not end with the production system itself. And – with its ‘myOerlikon’ (www.myoerlikon.com) Web platform, Oerlikon Manmade Fibers supplies a cutting-edge solution for maintenance, spare parts provision and customer support. Here, the platform should not be viewed as a simple Web shop, but more as a customer-oriented global information and support platform. To this end, the complete documentation – including all operating instructions, plans and parts lists for the OMF machines installed at the customer sites, spare parts product selection from 3D catalogs and drawings, along with product images in the article overview – is among the most important features.

All customers have the possibility of tracking all quotation, order and transport route documents online and

are therefore always up-to-date with regards to the order status. Furthermore, training videos, instructions and product presentations can be provided. Practically as a bonus, customers can of course also purchase original tested Oerlikon spare parts whose function and process performance are monitored using Oerlikon Manmade Fibers systems.

Entering the future of Industrie 4.0 with Oerlikon Manmade Fibers

Oerlikon Manmade Fibers provided an insight into potential future Industrie 4.0 solutions at last year’s trade fairs, the ITMA Asia in Shanghai and the India ITME in Mumbai. Linked to future-oriented service and automation solutions, Oerlikon prepares its customers for the future of manmade fiber production. And it goes without saying that the end results are always improved yarn quality and production efficiency. (rei)

Customer Service focuses on operational excellence

Best processes for lasting

For Oerlikon Manmade Fibers, efficiency in all operations is not merely a technological aim, it is also a service offering for all customers which can be generally named as 'Operational Excellence'. It is all about the customized analysis, consultation and optimization of operational and production processes. Because only those who always manufacture their products in an efficient and cost-cutting manner, those who secure their quality, do not waste any resources and correspondingly train and motivate their staff will continue to retain their competitive edge in the long term.

Companies are unique – just like people. Special features extend right down to the very last detail, such as in the case of machine settings and work processes. Do these special processes really all work together smoothly and drive the same large engine? Is each link in the chain optimally tailored to its specific task, allowing it to join forces with the others to provide the best-possible commercial results?



success

Operational excellence looks into precisely these questions – down to the very last detail, if desired. “Superlative performance is the result of the interaction of numerous factors. Our service specialists know these influencing factors and have all the necessary instruments for increasing performance, developing future-proof systems concepts and tapping into savings potentials”, states Dr Wolfgang Ernst, Head of Service Sales.

The starting point for the service offerings is always a requirements-appropriate analysis of the business and processes. For this, the Oerlikon Manmade Fibers service experts visit the plant and take a very close look at the various tasks and processes – from systems management and servicing, housekeeping and contingency plans all the way through to quality and safety standards and employee training.



“The success of our customers is the benchmark of our performance.”



Oerlikon's engineers optimize systems and processes to guarantee excellent yarn quality at best possible cost-benefit ratio.

Customized solutions are drafted, presented and implemented as required on the basis of this analysis. Some time later, the results are examined and an analysis conducted as to whether the optimizations fulfill expectations.

Huge arsenal of competencies

“We know that this process demands a huge amount of faith. For this reason, we strive towards partnership-based collaboration – what we call ‘Partnering for Performance’. Here, we always orient ourselves on the wishes and requirements of the customer and present the steps we plan to implement as transparently as possible. And, finally, we return this trust to the customer – in the form of the resulting highest-possible operational excellence”, emphasizes Dr Ernst. To achieve this, the service experts draw on the huge arsenal of competencies and measures of a global original equipment manufacturer (OEM) and technology leader that has had expertise in machines and the markets for decades. These include concepts such as e-save for improving technical energy efficiency or life cycle management for extending the life and performance of a machine by means of upgrades, modernization and proven original parts. To this end, a process upgrade can improve throughput in production or the yarn properties or open a new process window for other products; modernization can help make existing technology future-proof again with minimal investment.

However, it is frequently not just about optimizing the technology, but also upgrading the work processes and structures. Delays in the supply chain can have an impact on production, for example. Identifying these and organizing the individual steps better can increase productivity. Such topics in particular also depend on well-trained employees, as they contribute decisively towards reducing downtimes, waste and costs as well as keeping

system performance and production quality high. For this reason, it is essential that the staff is on board and correspondingly qualified when implementing optimization processes. Here, Oerlikon Manmade Fibers also offers training programs that are tailored to the requirements and the equipment of the respective customer.

“Operational excellence can require the most diverse measures. However, we – as a global full-service provider – have a unique portfolio of services to ensure processes are raised to the very highest standards. The success of our customers is the benchmark of our performance. This is our understanding of 'Partnering for Performance'”, summarizes Dr Ernst. (tho)

Operational excellence requires a closer look.



Performance check: significant savings

The performance check is a special Oerlikon Manmade Fibers Customer Services offering and is oriented on the principles of operational excellence. This analysis instrument provides deep insight into the operational performance of a customer along with important recommendations for targeted optimization of processes, quality and efficiency. The service package comprises the following measures:

- Plant analysis over several days with machine check (electrics, mechanics and environment) and process check (operation, maintenance, repair), interviews with operators, servicing staff and plant managers and analysis of troubleshooting sequences.

- Processing of the data accumulated and documentation of recommendations according to customer-specific aims and requirements.
- Presentation of results and discussion of the options for action.

One top textiles manufacturer was able to optimize its working processes on the basis of a performance check. Savings of up to 50 percent were achieved with regard to waste and the time required in the clearing process alone. Another textiles manufacturer will save a significant six-digit sum in euros within two years and for each further year due to the optimization realized as a result of a performance check.

State-of-the-art service station focuses on innovation and sustainability

We are prepared for the

Oerlikon's Manmade Fibers segment has been present in India for more than three decades now and both Oerlikon Barmag and Oerlikon Neumag have been proud technology partners of the tremendous growth witnessed by the Indian manmade fiber industry. As part of our continued commitment to serving our customers in the optimum manner, we have unveiled our new state-of-the-art service station at Makarpura G.I.D.C., at Vadodara in Gujarat.

Like the older service station, which was also located in Vadodara, our new set-up is ideally situated to cater to our customers, most of whom are located in the state of Gujarat or its vicinity. The new service station was inaugurated on February 9, 2017 by the CEO of Oerlikon Manmade Fibers, Georg Stausberg, in the presence of our customers, vendors and partners. A total of round about 50 customers attended the event and it is a matter of privilege for us that the new service station is viewed by our customers as integral to their success as well.

The service station is situated on a plot area of 8,230 square meters, and we have utilized about 3,185 square meters for the current built-up unit, which contains a comprehensive mechanical and electronics workshop. In keeping with our commitment to sustainability, we have built a sewage treatment plant (STP) to treat domestic sewage and will be using the treated STP water for gardening, etc. Similarly, we have installed solar panels on the terrace, as well as a storm drainage network for rainwater discharge with a connected recharge well to enable water table recharge during monsoons. We have applied for IGBC Gold Rating certification and are confident of getting the same for the 'green' service station.

The Vadodara service station is part of our Global Service Network, providing 24/7 hotline support to customers. Enhanced facilities at this new service station include more storage space for customers, panel assembly operations and a well-equipped training center. At the inauguration ceremony, Georg Stausberg rightly pointed out the future-oriented approach that was adhered to while building this service station: there is tremendous scope for expansion in keeping with the growth of the Indian market, and adaptability to future customer services based on "Internet of Things and cloud technology".

"The growth dynamics of the Indian market resulted in the decision of the Barmag management to open the first service station in Baroda in 1995 and to provide professional services for our customers".

He further mentioned the importance of India for the Manmade Fiber segment: "We are looking back at an almost 60-year history of close cooperation with Indian partners, which started in 1959 with the first delivery of Barmag take up equipment to an Indian customer." Starting from that date, the OMF customer base has been constantly increasing and – since 1984 – Barmag has been represented with its own entity in India. "The growth dynamics of the Indian market resulted in the decision of the Barmag management to open the first service station in Baroda in 1995 and to provide professional services for our customers". Since then, thousands of mechanical and electrical components have been serviced by the Oerlikon Barmag



engineers and countless customer technicians have been trained by them. "Today, we are proud to have close personal relations to all of our Indian customers, which help us to acquire a better market understanding and to remain a reliable partner even in a challenging and fast-changing environment. With the inauguration of our new service station, we have



future



Whilst delivering the welcome speech, Bhanu Patel, Managing Director of Oerlikon Textile India, was unequivocal about Oerlikon Textile India Limited's commitment to being the preferred technology partner of the Indian man-made fiber industry by being best-in-class among after-sales service providers for customers. Another highlight of the event was the speech by Prashant Agarwal, co-founder and

Managing Director of the renowned consultancy 'Wazir Advisors' on 'Poly-ester Industry in 2025', which offered a keen insight into the future of the man-made fiber industry in India. (rk)

taken an important next step towards continuing the close cooperation with our Indian partners."



Was inaugurated with a festive ceremony: the new service station in Vadodara, India.



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