



MIXING TOGETHER

MAGAZINE OF THE HF MIXING GROUP



MIXING know-how
➔ 10-13



MIXING applications
➔ 28-31

MIXING story

Quo Vadis, TRG?

➔ 04-09

2015



MIXING expertise
➔ 42-45

MIXING markets
Constantly on the move

Major developments in the field of continuous mixers.

➔ 32-33

MIXING events
IMS Seminar Topeka

Full house at the fourth international industrial conference in Kansas.

➔ 46-48

MEGATRENDS



Dr. Andreas Limper and Mark Meulbroek.

'It is difficult to make predictions, especially about the future.' Attributed to the physicist Niels Bohr, that quote held true once again in 2014.

Indeed, it was a year that offered ample proof that the course of worldwide events is unpredictable. And yet despite unexpected developments, whether political or general in nature, there are megatrends which remain constant. These clearly include an increasing level of urbanisation and the trend toward higher mobility. In the cover story 'MIXING story', we will take a look at the trends in the technical rubber goods sector which derive in turn from those megatrends.

Another major trend is globalisation, which is creating an ever more diverse society on a planet where distances seem to be continuously shrinking. The impressive effects of this trend are also evident at our company: people with different skin colours, religions and cultural backgrounds are working together to achieve the common objectives of the HF MIXING GROUP. In the 'MIXING people' section of this issue, we will personally introduce you to a few of our employees and also give examples of how we promote mutual understanding.

In order to anticipate the future demands of our customers better, representatives of our company have participated

in numerous professional conferences all around the world. One tendency continuously gaining strength in this regard is the increasing automation of plants – a trend known as 'Industry 4.0', which characterised industrial trade fairs again in 2014. Its impact on our company is explored in the section 'MIXING Highlights'.

Last but not least, efforts are under way to minimise the consumption of natural resources worldwide. Our continuous compounders make an important contribution here, because their specific energy consumption is especially low. We would like to present this aspect of our 'Continuous Mixers' to you, along with many other features, in the 'MIXING markets' section. As you can see, the HF MIXING GROUP is confronting the challenges of today!

We hope you find the reading enjoyable!

Dr. Andreas Limper

Mark Meulbroek

Managing Directors of the HF MIXING GROUP

CONTENTS

MIXING story Quo vadis, TRG? – Kaleidoscope of the industry	➔ 04–09
MIXING know-how Special applications	➔ 10–13
MIXING news	➔ 14–18
MIXING future What's driving the industry	➔ 19–21
MIXING locations New POMINI location in Rescaldina, Italy	➔ 22–23
MIXING highlights Automation and systems	➔ 24–27
MIXING applications Friction linings in application	➔ 28–31
MIXING markets Continuous mixing systems	➔ 32–33
MIXING 'on tour' Come along with us on a world tour	➔ 34–37
MIXING people The people behind the HF MIXING GROUP	➔ 38–41
MIXING expertise The performance characteristics of the HF MIXING GROUP	➔ 42–45
MIXING events Events, seminars and anniversaries	➔ 46–48
MIXING culture Culture, sponsoring and knowledge transfer	➔ 49–51

Quo vadis, technical rubber goods?

Since the discovery of technical rubber goods, many industries and products have been influenced by them. HF MIXING TOGETHER takes a closer look.

Rubber may not exactly be ‘the stuff that dreams are made of’. However, since its discovery, this material has inspired mankind and made very important contributions to industrial and technical progress. As early as 1600 BC, inhabitants of Central America and the Amazon were making use of the water-repelling properties of caoutchouc. They named it simply after the method of production – the ‘tears of the tree’ (composed of the Indian cao for tree and ochu for tears) and used it to make hoses, containers, torches and even articles of clothing. Of course, they did not know about the process of vulcanisation, but they were already able to convert the plastic latex into an elastic, rubber-like material through the addition of tree and vegetable saps.

A breakthrough came in 1839 when Charles Goodyear invented the vulcanisation process, this is the process of transforming the plastic caoutchouc into elastic rubber, that is still used today. This marked the birth of rubber: a material with permanent elastic properties, relatively high tensile strength and elongation, and resistance to ageing and the effects of weathering. Natural rubber is still produced on a grand scale today. The five biggest producing countries are Thailand, Indonesia, Malaysia, India and the People’s Republic of China. Sixty per cent of the world’s requirements, however, are covered today by petrochemically manufactured synthetic rubbers.

Reliable partner of the technical rubber goods industry

For 150 years now, the HF MIXING GROUP (HFMG) has been supporting the rubber processing industry with machinery for producing an extremely wide variety of compounds. Significant innovations such as the BANBURY® mixer, intermeshing rotor systems with fixed and variable axis spacing (VIC™) and tandem technology were developed by the companies of the HFMG. A large share of

industrial rubber production is used to manufacture tyres. It comes as no surprise, then, that the tyre manufacturers also represent a major customer segment of the HFMG. The group develops and produces machinery for automotive applications in the passenger car, heavy goods vehicle, off-road and bus segments along with machinery for tyre retreading.

Another very large customer segment is the technical rubber industry. The HFMG develops efficient, advanced solutions for this area – an activity which is both exciting and challenging. The customer companies of the TRG industry span an extremely broad range: they include major contract compounders who develop and produce practically all rubber and TPE blends. They serve a large number of sectors ranging from the automotive industry to the pharmaceutical industry. These compounds are used to produce seal profiles, conveyor belts, hoses, components for household appliances, footwear, and much more.

Most large compounders offer a broad product range for a variety of customer processes. This ranges from compact to foam rubber blends, black and coloured mixtures, pellets and strips of various widths, and some mixtures even have to be strained or calendered. They also have experience with a large number of polymer types, such as EPDM, SBR, NBR, HNBR, ACM, FKM, AEM, IIR, CR, CSM, CM, VMQ, ECO and NR/IR.

Along with large compounders, however, the technical rubber goods industry also includes highly specialised niche suppliers – who are likewise customers of the HF MIXING GROUP. They manufacture products such as special seals, cables, brake linings or products used in medical technology applications. As a rule, these rubber mixtures are designed to satisfy particularly demanding requirements regarding resistance to temperature or media, wear resistance, etc.



HEXPOL – Machine for tensile testing.

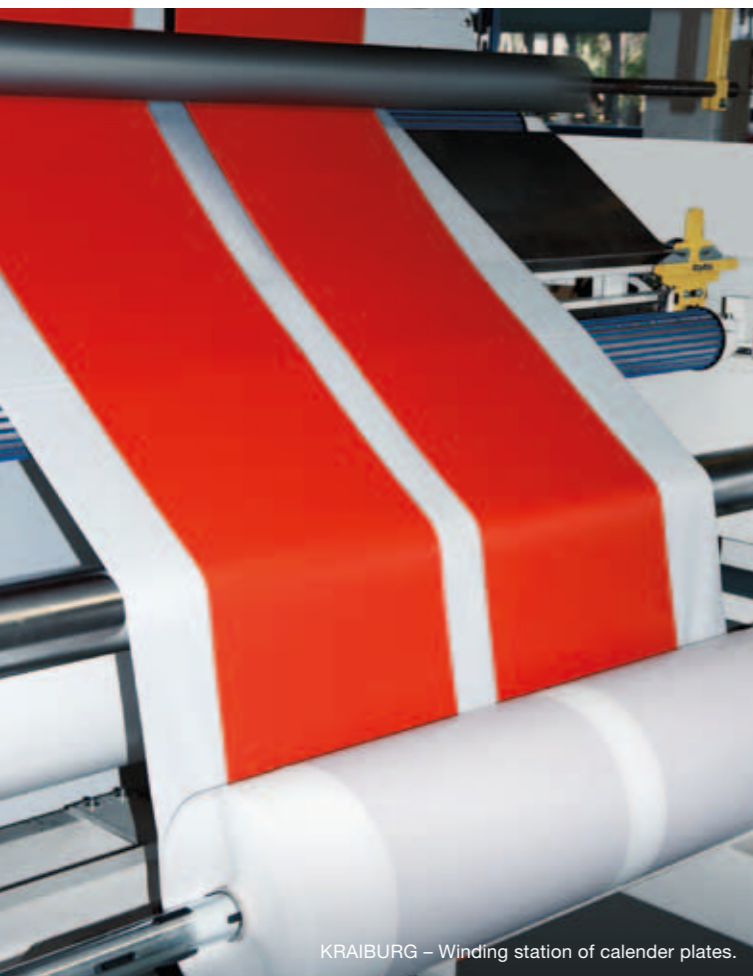


HEXPOL – Microscope for analysis of an extrusion streak.





KRAIBURG – Discharge rolling mill of the bright mixer line.



KRAIBURG – Winding station of calender plates.

Flexibility – the be-all and end-all in the mixing room

Regardless of the size and business activity of its customers, HFMG has always worked closely together with each business in order to understand and satisfy their requirements. Wanting to have a better understanding of its customers, the editorial staff of HF MIXING TOGETHER asked the managers of four different firms from the TRG industry to tell us which market trends are currently driving their business operations, what requirements they require at this time and in the future, and how they see the market developing. Based on the feedback from those surveyed, it soon became apparent that – as far as the mixing room is concerned – the most important criterion is flexibility.

Carsten Rüter, President Technology at HEXPOL Compounding, a leading group of companies in the development and manufacture of high-quality rubber compounds, TPE blends, and mixtures for roller coatings and special applications. Mr Rüter strongly emphasised: 'Requirements such as small lot sizes, complex recipes, variable mixing cycles, and new materials are all relevant. The most important one, however, is the flexibility that a modern mixing room must provide in terms of raw material handling, flexible process control, and ultimately the machinery. The key to a successful mixing room concept is high machine availability, which is guaranteed by a robust and low-maintenance installation with a long service life.'

Adding to this, Klaus Bressel, who is currently head of engineering for KRAIBURG GmbH, reinforces that flexibility is the criterion: 'For us as a specialised firm that also supplies small quantities, the greatest possible flexibility and efficiency of the TRG mixing room are decisive factors. The machinery must cover the broadest possible spectrum of batch sizes, supply quantities and forms while ensuring extremely high quality. This is the only way we can guarantee short delivery times and consistently meet our scheduling commitments with our customers.'

Automakers fuelling new growth

Whenever the topic of conversation turns to potential growth areas, the expression 'automotive industry' invariably comes up. Klaus Fassler, Operations Manager for the ContiTech AG affiliate PHOENIX Compounding Technology GmbH, explains it this way: 'Technical rubber goods manufacturers follow the innovations emerging from the growth requirements and technology demands of the automotive industry. The former reap time-delayed benefits from the latter's developments. The properties required of the products used, change at an extremely rapid pace. In particular, the demand for weight reduction necessitates and a reduction in the density of the compounds. Fibre

composites, silicones and thermoplastic compounds also have a promising future.'

Paul Hallas, Operations Director at SPC UK and SPC Jevsa, in Spain, also emphasises the importance of this branch of industry: 'In Great Britain, we are currently experiencing growth in the automotive industry, above all relative to new products for special applications in the high-end market of the automotive industry.'

E-mobility is still on the back burner

The opinions of the market players also converge with regard to whether e-mobility will have any effect on the TRG manufacturers, and if so, what those effects will be: 'Sure, e-mobility will cause changes in our industry, but we're talking about a timeframe of from 15 to 20 years. I think we'll be driving with internal combustion engines for a long time to come,' says Klaus Bressel von KRAIBURG with confidence. And Carsten Rüter adds: 'E-mobility will no doubt affect TRG products, but for now it is still the last link in the 'internal combustion engine – hybrid – battery' product development chain. Once e-mobility achieves full coverage, the need for products such as fuel lines and hydraulic hoses will be eliminated, whilst lightweight construction will become increasingly important. Highly filled – and therefore heavy – elastomer components will then come under scrutiny and have to be replaced by components made of new materials. Where this is all heading is not quite clear at the moment, but it is a focus of attention at HEXPOL Compounding. The TRG industry first needs to support the hybrid solutions of the drive concepts, and in that context the higher temperature stability of elastomer components is clearly of keen interest.'

Highly filled compounds are a reaction to price pressures

Whilst the other interview partners see no trend toward highly filled compounds in their segment, Carsten Rüter of HEXPOL and Klaus Fassler of PHOENIX do indeed see one, but take a critical view. Rüter, for example, emphasises: 'The development toward highly filled compounds is primarily the result of price pressure on the market. The resulting higher density is counterproductive for elastomer products from a cost perspective, however, and yields only a limited cost reduction for the processor. Accordingly, a balanced relationship of specific density and mixing costs plays the decisive factor in the final product costs.' For the same reasons, Klaus Fassler believes that the possibilities for highly filled compounds are limited. He generally sees clear development away from the 'mid-field' and toward simple and inexpensive compounds on the one hand and highly complex, expensive compounds on the other.'

Equipment in the mixing room

The mixing rooms of the firms we asked use classical mixing machinery for the most part: conveyor and weighing technology for all raw materials, continuous and discontinuous mixing aggregates, rolling mills, strainers and pelletising systems, automatic batch-off and strip packaging machines, refrigeration systems, modern laboratories and process monitoring systems. Opinions on the use of double-screw extruders vary. On the one hand the rolling mill is undoubtedly considered as the standard discharge aggregate, now and in the future, because it can cool the mixture down rapidly and efficiently and is the most versatile relative to the customers' strip width demands. On this point, all of the interview partners agree. However, for certain compounds to be produced in large volumes, the double-screw extruder is viewed in a very positive light and might replace the rolling mill, because it automates the mixtures and can therefore be operated unmanned. In the view of all who were asked, straining volume will continue to increase as a result of increasingly demanding quality requirements and is already well-established today at most suppliers. There does not appear to be any trend towards continuous mixing systems due to the fact that flexibility is considered the top priority.



PHOENIX – On the mixer platform.



PHOENIX – Operation of a twin-screw extruder.



Proximity to the customer is also expected of the machinery supplier

Regardless of their size, proximity to the customer is extremely important for all suppliers. The firms we asked all have international operations. In recent decades, they have followed their customers above all to Asia. Proximity to the customer is not only useful, but rather – with regard to the products and their properties and qualities – altogether essential in this industry. Paul Hallas of SPC insists: ‘We are a global company with a strong presence in Europe and Asia. Our manufacturing facilities are located near our customers, in a seven-to-ten-day delivery window, in order to ensure that the excellent quality of our products is not impaired.’

TRG suppliers also expect such proximity to the customer of the machinery manufacturers. Carsten Rüter explains: ‘For us it is important that a competent machinery manufacturer can provide worldwide service, but also that we have a central contact for strategic questions such as procurement of new equipment or basic modernisation projects for mixing operations.’ And Klaus Bressel adds: ‘Close collaboration with the machinery manufacturers is important to us, so that our specific requirements can be implemented. For us, factors such as short retooling times, easy cleaning, different batch sizes, and a high machine availability are important.’

And Paul Hallas would like a tailor-made life cycle programme for each and every machine, which can reliably predict its wear with reasonable accuracy. ‘I would like to know that I will be needing a new mixer body in five years, so that I am aware of any financial investment that may need to be made in the future on our part.’

Two megatrends: automation and energy efficiency

Automation has already been of interest to TRG suppliers for a long time now. Machine and automation are subject to an ever greater degree of networking. ‘For extreme flexibility in terms of raw materials and compound variety, this is also necessary,’ explains Carsten Rüter of HEXPOL. ‘Condition Monitoring and process monitoring are an absolute must!’ PHOENIX has been working for more than 20 years on the networking of machine and control system, as Klaus Fassler reports. ‘We have a comprehensive control room system which handles everything from order management to material requirements by shift, and from process and quality monitoring and machine control right through to warehouse administration. It is all displayed for the employees and process engineers. At PHOENIX, the paperless factory is a reality. Moreover, we have an integrated TPM system.’ Also at KRAIBURG and SPC, the degree of automation

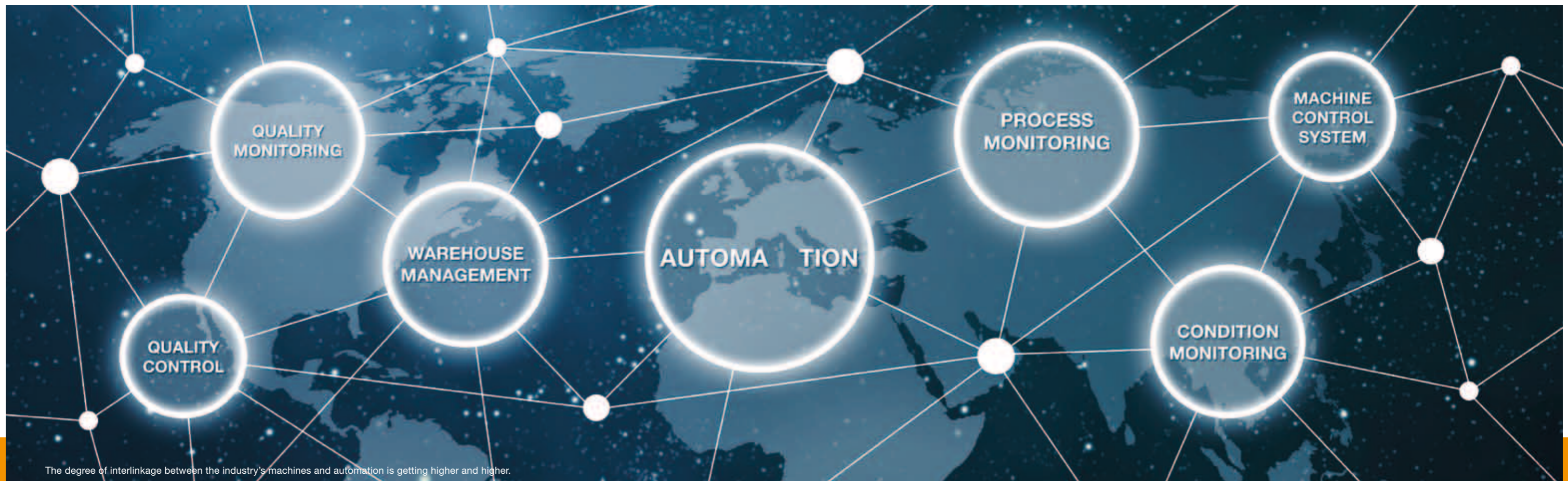
of machines has become an increasingly integral part of the business, as Klaus Bressel and Paul Hallas report. ‘This trend continues. For technologies that we do not cover, it is important for us that the machinery manufacturer takes over that service,’ says Bressel. ‘One example of this is remote access to the control system and automation. As a rule, our spare parts catalogues enable faster availability of spare parts, which is in our interest, of course.’ And Paul Hallas adds: ‘The networking of machines and control systems is of crucial importance. All of our quality controls are fully automated, in order to minimise the risks associated with human error. Our high-quality products are completely traceable thanks to precise and constant processes. High-quality calibration is of central importance here.’

The second major topic that TRG suppliers are currently working on, and will continue to work on, is energy efficiency. Carsten Rüter reports: ‘Energy efficiency is a top priority for us globally, and complete energy studies of our mixing rooms are in the works. From mixer and rolling mill drives to support installations to mixing room lighting, everything is being subjected to testing. Clear objectives for the reduction of CO2 emissions have been established at HEXPOL AB at the group level. Corresponding support from the various machinery and component suppliers would be desirable.’ The subject is also very important for KRAIBURG, as Klaus Bressel reports:

‘For two years now, we have had our own energy management system according to ISO 50001. From the manufacturers, we expect machinery with efficient drive technology and generally low consumption.’

PHOENIX Compounding established an energy team eight years ago. The team works on energy monitoring, low-consumption drive concepts, cogeneration, the use of heat exchangers, and other topics. This resulted in savings of more than one million euros just over the past five years! Klaus Fassler calls on machinery manufacturers: ‘They have to ensure that the new machines have energy-efficient drives. It would be a good thing if the customer could also purchase an energy monitoring system directly with the machine.’ Paul Hallas also welcomes the opportunity to work together with SPC’s machinery suppliers on new ways to improve energy efficiency. ‘I would be especially interested in innovations to recover energy, not only with regard to individual machines, but for the complete mixing room.’

HEXPOL Compounding, KRAIBURG, PHOENIX and SPC can – on behalf of all suppliers from the technical rubber goods industry – be certain that the HFMG has taken note of their requests and will address their demands with excellent solutions – just as they have done for the past 150 years.



The degree of interlinkage between the industry’s machines and automation is getting higher and higher.



WPC pellets.



Flax fibres.

Natural fibres for light-weight construction in the automotive industry

Together with ExxonMobil Chemical Europe and Ford, the HF MIXING GROUP is conducting research into suitable mixtures.

As elsewhere, the use of renewable raw materials as reinforcement fibres has been playing an ever increasing role in the automotive industry in the past several years. Modern cars now contain an average of five to seven kilogrammes of natural fibre materials. In German luxury cars, approximately 90% of interior furnishings are made of natural fibre-reinforced plastics (NFP), and in mid-range cars that figure is about 60%: applications include interior door trim, boot linings, spare wheel wells and covers, column trim, instrument panels, roof linings,

ventilation screens, parcel shelves, glove boxes, and seat shells and backs. However, NFP is also seeing increased usage in exterior components. The standard production underbody of the Mercedes A and B-Class, for example, is reinforced with abaca fibres by means of impact extrusion. Besides flow- and compression-moulded parts in particular, NFP-based components produced by injection moulding also provide a lot of potential worth exploiting.



Much of the potential of natural fibre-reinforced plastics remains to be tapped.

At Ford, researchers have been looking for ways to integrate natural materials into automotive construction ever since the company was established over a hundred years ago. Today, more than 300 components made of natural materials are already used in Ford vehicles – including, among others, the Fiesta, the Focus and the Mondeo. The natural materials are integrated primarily where they cannot be seen: in instrument panels, door trim or bumper systems, for example. ‘We are working intensively on the development of bio-based materials.

Fibre compounds are part of this sustainable development strategy,’ explains Maira Magnani, Research Engineer for Advanced Materials & Processes at Ford Research & Advanced Engineering Europe. ‘Applications are being studied in all areas – including the engine compartment, the vehicle interior, and exterior components. The main criterion for evaluating where and when it makes sense to substitute NFP for conventional materials is a positive ecological balance sheet. The substitution must not result in increased weight, for example.’

The advantages of NFP are obvious: unlike traditional plastic reinforcement materials such as glass fibres, natural fibre materials have up to 50% lower density, simultaneously reduce the CO2 footprint, and permit not only more material recycling but also 100% thermal disposal of the reinforced plastic. In so doing, they open up whole new opportunities for this type of lightweight construction material, particularly also in the field of electromobility.

The goals of the research and development departments of various automakers are perfectly clear. Natural fibre-reinforced materials are an extremely attractive alternative for injection moulding applications, if material characteristics can be achieved in the range of PP GF20, if unpleasant outgassing effects can be prevented (especially for interior applications), if weight and production costs are lower than those of the component being replaced and if, moreover, the entire manufacturing process is reliably reproducible on an industrial scale.

These automotive industry goals give rise to a whole range of challenges for the selection of suitable reinforcement fibres and matrix materials as well as for the development of the relevant formulations. One problem is that natural fibres are subject to quality fluctuations in response to ambient conditions, and this makes it difficult to maintain narrow tolerances with regard to quality and property profiles. Moreover, the maximum impact strengths that can be achieved are typically relatively low. Above all, the natural fibre conditioning process plays a decisive role in determining the material properties of the natural fibre-reinforced thermoplastics, and therefore ultimately the product characteristics of the component as well.

Challenges in natural fibre processing

The industrial processing of natural fibres, however, also poses new challenges for process and equipment engineering. The standard methods familiar from plastics processing operate continuously and therefore also require a continuous stream of dosable raw materials. Due to their low density and their surface structure, however, natural fibres are barely dosable with gravimetric systems. Maira Magnani of Ford also emphasises, 'Long term, natural fibre-reinforced plastics and biomaterials have potential for greater significance in vehicle manufacturing applications. But this largely depends on the advanced development of process techniques for large-scale series production applications.'

In order to solve this problem, a great deal of time and money has been invested into researching the relevant pre-treatment steps. Known processes primarily involve the short cutting, grinding or pelletising of fibres to in-

crease bulk density and flowability. From a technical and economic perspective, however, this is counterproductive, because it not only raises the compound's processing requirements and manufacturing costs, but also significantly reduces the natural fibres' reinforcing potential, especially when they are short-cut or ground. Other challenges in the conditioning of natural fibres include their temperature sensitivity and their high moisture content. 'One major challenge with fibre compounds lies in conditioning the natural fibres for further processing and in metering them precisely,' confirms Magnani.

Internal mixer technology makes process control more flexible

These challenges call for innovative compounder technology for the economic production of this type of lightweight construction material on an industrial scale. Internal mixer technology-based mixing room systems fully satisfy this property profile, especially since no pre-treatment steps are necessary. Nearly any form of addition of material into the internal mixer is possible.

An upstream weighing and metering system feeds the raw materials to be processed into the internal mixer. After completion of the mixing cycle, the finished mixture is then emptied into a discharge extruder. The discharge extruder transforms the batch mixing process into a continuous process and develops the pressure required to force the mixture through the perforated plate of an underwater pelletiser. After underwater pelletisation, the pellets are dried and cooled. They are then conveyed to storage silos, and finally packaged in a bagging unit, big-bag filler or octabin filling station for dispatch to the end consumer.

Another key advantage of internal mixer technology lies in the batch operation of the internal mixer and the associated high level of process flexibility. This can be seen in the mutually independent variable process parameters, such as mixing time, rotor speed, the point in time at which the raw materials to be mixed are added and the sequence in which they are added, the degree of filling and the temperature control of the equipment. Raw material metering and addition are also batch operations, i.e. all of the components used are automatically pre-weighed into portions and also automatically fed at the right point in time via a large feed hatch or other feeder openings into the mixer. That also makes it easy to change formulations.

Depending on their origin or type, the high moisture content of natural fibres naturally differs considerably. For that reason, in continuous mixing processes, the materials must be dried, which is energy- and cost-intensive.



This is another disadvantage that the interior mixer does not have, because the process is operated with partially filled material, and the material can be dried practically 'on-line' in the early phase of the mixing process by means of die ventilation.

Cooperation with ExxonMobil and Ford

The aforementioned goals from the research and development departments of various automakers represent a real challenge. In order to meet this, the HF MIXING GROUP is cooperating with ExxonMobil Chemical Europe Inc. and Ford. Based on the experience of these two cooperation partners and on the requirements of the automotive industry, test formulations were developed along with the relevant test plan.

For all formulations, the polypropylene homopolymer ExxonMobil PP1055E2 served as matrix material, with the adhesion promoter Exxelor™ PO1020 – a maleic anhydride-grafted homopolypropylene – also originating from ExxonMobil. In addition, depending on the formulation, up to 10% by weight of ExxonMobil PP1055E2 was replaced by Vistamaxx™ PBE 6202. Vistamaxx™ PBE 6202 is a propylene-based elastomer, the melting point of which is well below that of the polypropylene homopolymer. The HF MIXING GROUP anticipates that the addition of Vistamaxx™ PBE 6202 can improve the dispersion of the natural fibres, raise the impact strength of the compound, and lower its melting temperature. That latter improvement is primarily beneficial for gentle downstream processing in injection moulding operations and reduces the risk of unpleasant offgassing from the finished component as a result of thermal damage to the natural fibres during the injection moulding process.

Findings

Preliminary testing in the technical centre of the HF MIXING GROUP on a high-performance IM5E laboratory interior mixer with a total volume of 5.5 litres showed – based on initial visual assessment – that all material combinations produced homogeneous mixtures without forming fibre nests. After scaling up the process parameters on a high-performance IM45E production interior mixer with a total volume of 49 litres, tests also confirmed that fibre bales could be processed in large portions without pre-drying and without upstream cutting or grinding processes.

The finished compound was discharged from the interior mixer as melt and then granulated via a conical dual screw discharge extruder and downstream underwater pelletiser with no problems whatsoever, even where highly filled mixtures were involved. The effect of Vistamaxx™ on the result of the mixing and pelletising process was interesting. According to current findings, the point in time at which the Vistamaxx™ is added appears to play a decisive role. Excellent results were achieved when the material was added either shortly before the end of the fibre-drying step or only after its completion. The addition of Vistamaxx™ significantly enhanced pellet quality, especially in highly filled test compounds.

The test material produced in the mixing trials at the HF MIXING GROUP's technical centre is currently undergoing further analyses at ExxonMobil. Once the analytical results have been verified and released for publication, we will present them in a follow-up article. The initial results are very promising.

MIXING news

Last year was an eventful one. Catch up on all the news and latest developments at the HF MIXING GROUP around the world.

Relocation of the BR1600 to Rochdale

➔ Farrel Ltd., Rochdale, UK

The new BR1600 BANBURY® mixer, which had originally been intended for the laboratory in Oxford, Connecticut, USA, has now been moved to the Tangential Business Unit in Rochdale, England. The relocation was undertaken in order to support the development and introduction of the ADVISE® Lab control system, and to satisfy increasing worldwide demand from our customers who want to use the BR1600 for testing and training purposes.

No sooner than it was installed in England, the mixer began to deliver impressive results. After successful completion of laboratory testing, for example, Brüggemann Chemicals, based in Heilbronn, Germany, placed an order for a BR1600, including consulting and on-site service. The mixer features two-wing standard rotors and a water-based three-zone temperature control system for independent control of the metal temperature of the rotors, sides and door top as well as a 40 hp (35 kW) variable frequency AC motor and drive.

For trials, demonstrations and further information, please contact mixing@hf-group.com or qhartley@farrel.com.

Management tandem at HF Qingdao

➔ Harburg-Freudenberger Machinery China, Qingdao, China

Since last year, Harburg-Freudenberger Machinery in China has been led by a management tandem: Shimin Wang and Xiaolin Ma both serve as Managing Directors and report in that capacity directly to the general management of the HF MIXING GROUP.

While the 43-year-old Shimin Wang takes care of the commercial affairs of HF Qingdao, Xiaolin 'Michael' Ma (45) is responsible for service, procurement and sales. Both are experienced managers: Ma worked for Bridgestone for eight years before joining HF (which was still Thyssen Krupp at the time) as a contractor in 2000. Wang

brings experience from leadership positions in one state-run company and two private businesses. Both managers are married and each is the father of one daughter.

HF Tire Tech Group Hamburg cooperates with HF NaJUS

➔ HF NaJUS, Dubnica, Slovakia

HF Tire Tech Group Hamburg, which is part of the HF Group, is outsourcing the production of extruders from Hamburg to Slovakia. In connection with that transfer, it is collaborating with HF NaJUS, which supplies parts, components and assemblies and which had already manufactured spare parts for HF Tire Tech Group Hamburg in the past. Having also gradually taken over responsibility for prototyping various products, it now manufactures

primary products as well – from production right through to final assembly. September marked the first complete production and assembly of a Quadruplex extrusion head together with the extruders.

The partnership is one of the reasons for building a new production hall at the HF NaJUS site in Dubnica. The new hall will also be used to assemble the HF Hamburg products. Five employees, including designers, manufacturing engineers and a project manager, are exclusively assigned to HF products. The machinery has also been relocated from Hamburg to Dubnica. Before the machines could be put into operation, large portions of the existing production space had to be reorganised. Daniel Prekop, Sales and Marketing Manager of HF NaJUS, sums up the effort this way: 'We had to implement a whole range of measures in order to make the cooperation possible, but they will pay off over the long term. This cooperation enables us to expand our product portfolio and also offer the assembly of these products.'

New production hall at HF NaJUS

➔ HF NaJUS, Dubnica, Slovakia

HF NaJUS, the newest addition to the HF MIXING GROUP, is a company with a long tradition of manufacturing components and specialised machinery. The history of the Slovakian company is as rich as the country itself. Accordingly, HF NaJUS has often had to adapt its business

activity to changing market conditions brought on by local political and economic developments. Under the umbrella of the HF MIXING GROUP, the company now intends to broaden its professional basis even further.

This is why large sums have been invested recently in the renovation of the building, in the machinery, in technical innovations and in the continuing education of the workforce. The latest investment was for the construction of a new production hall, which will satisfy the increased volume of incoming orders and create 60 to 70 new jobs. The cornerstone of the 4,000-square-metre hall was laid just last summer, and production began already in January 2015. About two thirds of the floor space is dedicated to assembly operations, and one third accommodates the new welding shop. The total investment volume was two million euros.

Retirement

➔ FARREL POMINI, Ansonia, Connecticut, USA

In July 2014, Frank Borzenski, Manager of Applications and Development at FARREL POMINI, left the company to begin his well-earned retirement. He worked for the company for 45 years. Borzenski started as an engineer in training, later worked in process engineering and in the laboratory. He was promoted to development manager in 1979. He continued as a consultant through 2014 where his extensive experience remained a tremendous asset.



Shimin Wang – Managing Director at HF Qingdao Machinery Co. Ltd.



Xiaolin Ma – Managing Director at HF Qingdao Machinery Co. Ltd.



4,000 square metres of space for the increased order volume: the new production hall of HF NaJUS.



First CP4000 Series II™ Compact Processor delivered

➔ FARREL POMINI, Ansonia, Connecticut, USA

In 2013, FARREL POMINI announced the enhancement of the CP Series II™ Compact Processor range with the development of a larger format CP4000. One year later, the first CP4000 was delivered to the Ravago Group in Italy.

The manufacture and delivery of the CP4000 marked the culmination of a major engineering undertaking. The new design combines the two most popular FARREL POMINI equipment models – the CP2000 and the 9UM with 300 mm extruder. It expands customers' options for the production of medium-to-large batches and is the result of 2,000 engineering hours, state-of-the-art 3D modelling techniques and joint efforts of several engineers and designers. New features include a production capacity that is 60% greater than the next size processor, a compact footprint and a unitized ancillary frame.

In terms of product quality and output, CP4000 correlates well with the CP550, which is available for demonstrations and testing in the laboratories in the USA and the UK. Scale-up ensures that what a customer experiences when running a lab trial is what they can expect on a larger scale on the CP4000.

FARREL and POMINI develop processor together

➔ FARREL POMINI, Ansonia, Connecticut, USA

At the FARREL POMINI Laboratory and Research & Development Center in Oxford, Connecticut, USA, Stefano Canegallo from POMINI and the R&D technicians from FARREL are working together on a solution for migrating POMINI LCM technology to the FARREL POMINI product range. With the development of a CPXL Compact Processor, they have achieved tremendous progress.

The CPXL Compact Processor features two-stage LCM technology rotors and its L/D ratio has been increased from 6:1 to a nominal 10:1.

The rotor design is complete and components have been built which make it possible to convert the CP550 in the Oxford laboratory to the CPXL format. A series of large-scale customer evaluations have been conducted allowing the customer to see the benefits of each technology.

Work continues on the adaptation of additional applications to take full advantage of the CPXL technology. The FARREL POMINI team is working hard to ensure that all customers have access to the best solutions.

New company building for FARREL POMINI

➔ FARREL POMINI, Ansonia, Connecticut, USA

FARREL POMINI is also erecting a new company building this year. Business Unit Director Paul Lloyd and Site Director Paul Zepp announced the news at a meeting of their 90 employees. The company will construct a modern, for-purpose building to house production, administration and their laboratory under one roof. Currently, the American colleagues are dispersed among three buildings.

Current plans are for a 5,500-square-metre building which will be ready for the employees to occupy by the end of 2015. The building will be in an industrial park in Ansonia, the town where production and administration are located now.

'This is an exciting time for FARREL POMINI and its employees,' explains Paul Zepp. 'The new building is a clear signal of the long-term commitment of our owners and the result of the hard work and success of all FARREL POMINI employees worldwide. While the rubber business was moved to other HF MIXING GROUP sites, we worked hard to make the business unit successful and to achieve significant growth. The new facility will not only be the perfect home for FARREL POMINI, it will provide an excellent setting for customer visits.'

Good prospects for the Tangential Business Unit

➔ Farrel Ltd., Rochdale, UK

2014 was another successful year for Farrel Limited in Rochdale: the Tangential Business Unit of the HF MIXING GROUP achieved a record turnover and managed to exceed the targeted minimum production quantity of mixers by 20 per cent. The market launch of the new BANBURY® BM700N was also very successful. With high performance ensured by super-cooled rotors, that mixer is a successful symbiosis of the GK650N (W&P) and the Farrel BM Series. A total of 60 mixers of the new N Series have been sold so far.

In addition, 2014 also saw the launch of the new IM1.5E and IM5E INTERMIX® laboratory mixers, which were developed and manufactured in Rochdale. The mixers are equipped with PES5 rotors and an ADVISE® Lab control system.

Preparations to relocate the manufacture of tangential rotors from Topeka and Freudenberg to the Tangential Business Unit in Rochdale are proceeding at high gear. For the transfer of the GK400N and GK255N mixers, two machines are currently under construction. Plans call for the launch of an independent drive system for the rotors of the tangential mixers in 2015.



The new building brings production, administration and laboratories together under one roof for the first time in the history of FARREL POMINI.

Peter Scholz Site Director & Executive Vice President in Topeka and Vice President Sales & Marketing North America

➔ HF Rubber Machinery, Topeka, Kansas, USA



Peter Scholz – Site Director & Executive Vice President in Topeka and Vice President Sales & Marketing North America.

Peter Scholz has led North American sales and marketing activities since 1 January 2015. The 45-year-old holds a degree in Business Administration and has worked for 20 years in a variety of sales functions for companies in the construction, automotive and machinery construction sectors, including eight years at HF Hamburg. In his previous position as head of sales for the Marine division at Mahle Industriefiltration, he led Key Account Management and built up an international sales team. For his new job, Scholz relocated to the USA together with his wife and two children.

One of his tasks there is to bundle and coordinate sales activities in order to be closer to the market and to intensify customer relationships. Scholz, whose passions include skiing and sailing, expresses confidence in the future: 'We have an excellent installed base and a growing market in North America, which form a solid basis for continued success and for the further expansion of our market position, both in the tyre industry and in technical rubber goods. I'm really excited about this great assignment and the opportunity to work with this outstanding team.'

Fitness centre in the new POMINI building

→ POMINI Rubber & Plastics, Rescaldina, Italy

The HF MIXING GROUP is doing something for the health of its employees: after the in-house fitness studio STARK opened at the Freudenberg site at the end of 2013, last year, the Italian colleagues from POMINI followed suit. Now the company's new building in Rescaldina also has a fitness centre. It has been operational for the past few months and is being used enthusiastically. Along with equipment for endurance training and for strengthening the cardiovascular



A rarity in Italy: the company's own fitness studio in the new building of POMINI Rubber & Plastics.

system as well as other systems for strength training and muscle building, employees also have access to a personal trainer twice per month.

Thanks to flexible working hours regulations, the employees can choose when they wish to make use of the offer. Some prefer to start their day with fitness training, others train during their lunch break, and still others look forward to physical exertion after work. 'In-house fitness studios and employee health programmes are not very widespread in Italy,' says Eleonora Mingrone, assistant in customer service at POMINI. 'So we were especially pleased about this offering. Personally, I now work out regularly during the midday break and have already noticed several benefits: my workout allows me to decompress and to free my mind completely right in the middle of my workday, so I can start my afternoon refreshed and reinvigorated. And then in the evening, I also have more energy for my family and friends. I used to spend a lot of money to go to a fitness studio. Not only was it costly, it was also time-consuming – and afterwards I was often tired. I'm really glad that we have the chance to take care of our fitness at our place of work now!'

Tangential BU invests in production

→ Farrel Ltd., Rochdale, UK

Major additional investments in the production facilities of the Tangential Business Unit in Rochdale were approved in 2014. Retooling times have been significantly reduced through optimised fixtures. In addition, the assembly area has been completely redesigned, resulting in improved provision and shorter transport paths.

FCM™ upgrade

→ FARREL POMINI, Ansonia, Connecticut, USA

As a result of the boom in the floor covering industry in 2014, the market for luxury vinyl tile has experienced rapid growth. In order to be a leading supplier in that market segment, FARREL POMINI redesigned the FCM™, the FARREL Continuous Mixer, with high torque and launched an additional model, the 7FCM.

This unique continuous mixer adds expanded capabilities to the original FCM™ technology platform. This ensures that it meets today's application requirements, while maintaining the machine's ability to open completely under hydraulic load, which is important for highly filled PVC applications such as this. By updating this machine, FARREL POMINI has been able to offer maximum flexibility to its PVC floor covering customers, which led to significant growth in turnover in 2014.

What's driving the industry

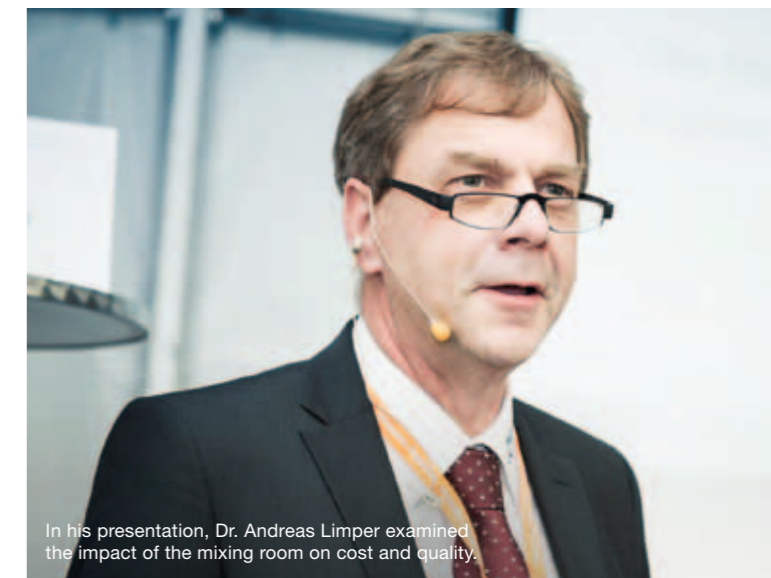
The MAPLAN Days of Technology and the German Rubber Society's annual congress treat topics, trends and tendencies in the technical rubber goods industry.

The technical rubber goods industry is walking a tightrope between strict legislative regulations and the no less demanding requirements of its customers. Core topics include ways to increase profitability and value generation along with the prognostication and deceleration of materials' ageing processes and their symptoms of fatigue. Visits to two major professional events showed that the industry is working on many good solutions.

On 4 and 5 June 2014, the elastomer machinery manufacturer MAPLAN drew some 330 visitors from the rubber and TPE sector to Ternitz in Lower Austria for its in-house trade fair 'Days of Technology'. Technical presentations, machinery exhibits and demonstrations in both the production facilities and the engineering centre, as well as information stands from partners provided the opportunity to network with colleagues and to learn about the latest technical developments. According to Wolfgang Meyer, CEO of MAPLAN, the in-house trade fair was held in a highly dynamic market phase: 'Numerous new projects serve both as proof of the processors' need to reinvest and the attractiveness of our offering.'

Comprehensive range of horizontal machines with automation

In the machinery hall and in the engineering centre, a number of different models of vertical and horizontal elastomer machines with clamping forces of 1,600 to 4,600 kN were on display. The visitors saw a updated spectrum of horizontal machines from 100 to 650 tonnes, represented by machinery ranging from simply equipped configurations to fully automated systems with end control modules as production cells. The automated systems shown were based on current customer projects. Examples from two-component technology, variometric approaches and the processing of solid silicone demonstrated the current state of technical feasibility in special applications. The exhibits gave the public insight into some of the ways available today to increase profitability and value creation: temperature control technology for energy conservation,



In his presentation, Dr. Andreas Limper examined the impact of the mixing room on cost and quality.

process optimisations and the realisable level of quality assurance with high output and low waste. For the experts from processing, particular emphasis was placed on clever automation solutions as well as mould making, real time service options, process aids and QS instruments. Application engineering consultation and information about rubber blends and materials in general attracted enthusiastic interest.

Broad network of partners from the field of elastomer technology

In all, some 24 partners from the rubber industry rounded out the programme with presentations and information stands. Professor Walter Friesenbichler from Leoben University of Mining informed visitors about shortening heating times in the vulcanisation process. According to Professor Friesenbichler, there are interesting potentials here for the full utilisation of shear and elongation warming. The understanding of the fluid dynamics and thermodynamic processes during the injection phase could be significantly improved through analytical trials. The



injection work as a primary parameter influencing the mass temperature and the possibility of shortening the heating time were documented within the framework of a dissertation. The extent to which the heating time can be shortened, according to Professor Friesenbichler, depends only on the injection work applied. Ulf Recht of the Institute for Plastics Processing (IKV) in Aachen, Germany, reported on the production of elastomer mouldings with superhydrophobic surfaces. This presentation also attracted close attention.

Quality and economy – the mixing room factor

In his presentation entitled ‘The mixing room – central element for high-quality, economical rubber processing,’ Andreas Limper of the HF MIXING GROUP addressed the significance of the mixing room in terms of cost and quality. Since quality fluctuations in the mixing room have far-reaching ramifications which can affect even the characteristics of the end product, deviations should be identified as early as possible.

Quality fluctuations in the mixing room can be due to a wide variety of causes. The quality of the raw materials used varies considerably on its own. In the carbon black, for example, the bead hardness or fines content can change significantly during transport and conveying. The polymer quality is also subject to fluctuations in viscosity and the degree of branching. It depends on the feeding method and on the temperature, as well.

In the process itself, variations in metering and weighing can cause deviations. Other factors such as kneader temperature, the point in time at which the polymer is added, mixer speed, and ram pressure have a further influence on quality. In this connection, Limper pointed out the importance of the seamless online monitoring of the process values and the machine data. The data of the mixing process should be used as an indicator for potential problems.

Furthermore, Limper showed the energy savings potential that the mixing room offers. In this way, a correctly designed motor, the hydraulic drive of the ram, temperature control units for mixer and discharge aggregate, and a ram stroke regulation system can save significant amounts of energy and therefore costs. For an INTERMIX® IM 320E model mixer, Limper showed the fascinated audience how he estimated an annual savings of 175,000 euros. Less wear and shorter mixing times are additional positive side effects of the optimisations listed above.

Second annual DKG congress

At the other major professional event, the annual congress of the German Rubber Society (DKG) from 23 to 24 June 2014 in Nuremberg, Germany, the 140 participants also had the chance to hear many interesting presentations from science, research and industry. There it soon became clear that the DKG’s mission to broaden and advance the latest findings concerning rubber and elastomers has lost none of its vitality. On the contrary, the applications and demands on these commonly used, crucial materials are becoming more and more complex.

Crack growth, fatigue and ageing processes

Research in the field of rubber continues to focus on ageing processes and the symptoms of fatigue. Stefan Robin of the German Institute of Rubber Technology (DIK) summarised the findings of various projects on crack growth and fatigue properties in peroxide and sulphur cross-linked elastomers. According to preliminary results, even small quantities of additive polymers lead to a significant improvement in the fatigue behaviour of EPDM. Experts anxiously await the final results.

In her presentation, Robin’s DIK colleague Stephanie Kautz examined the effect of cross-linkage and fillers on diffusion-based ageing processes. The basic problem in the prognosis of the ageing process – namely, that ageing happens slowly in actual practice – might be solved with new methods of predicting long-term behaviour.

The presentation by Christoph Naumann of the Chemnitz University of Technology also dealt with the question of realistic prediction of the service life of rubber. He reported on a model simulation for ageing which successfully correlated the changes in mechanical properties with chemical changes.

Challenges for polymer manufacturers

Industry had something to say at the DKG annual congress, too, of course. Representing the manufacturing sector, Thomas Früh of Lanxess Deutschland GmbH discussed the challenges currently facing polymer suppliers. Legislators are imposing ever stricter requirements on the manufacturers, for example. This – in combination with the demands of the customers – constitutes a serious challenge for the manufacturers. Against this background, it is hardly any wonder that the number of truly innovative new rubber products developed by the rubber industry has remained at a relatively moderate level in recent years. Especially in view of the fact that the development cycle of a new polymer typically ranges between seven and eight years. The industry has identified a number of long-term trends in material development, including lightweight construction, green mobility, functional integration, enhanced performance, energy-saving production, and recyclability. The only means of meeting these market demands in the polymer sector, according to Früh, is through the development of functionalities within the framework of intelligent system solutions. As examples in this context he cited tailor-made functionalised polymer chains or

cleavable X-bonds, i.e. special thermo-reversible cross-linkage sites.

Current practice in mixing machinery – systems engineering

The importance of intelligent system solutions was also underscored by Maik Rinker of the HF MIXING GROUP – albeit in a completely different context, namely on the machinery side of the rubber industry. Rinker explained that, in the face of new machinery directives, standards, conservation of resources, and cost savings, the procurement of mixing machines is an extremely complex undertaking, for which most customers nowadays lack both the resources and the technical expertise. A mixing system consists of a wide variety of individual machines or components that must be assembled into a single functioning unit. This is where systems engineering comes in: The machinery construction firm handles the complete conceptual design – from the selection of suitable mixers to the configuration of the upstream and downstream equipment machinery to the specification of an automation concept. The services include the detail engineering along with the project management and the construction site coordination. The machinery construction firm ensures that all customer-specific requirements are met and all technical details are taken into consideration along with the material flow and the safety and efficiency aspects. In this regard, the HF MIXING GROUP continues to transition from a machinery construction firm to a system supplier – a transformation which customers not only accept, but increasingly demand.



Maik Rinker at the annual congress of the German Rubber Society (DKG).



The 140 participants at the DKG’s annual congress also engaged in animated exchanges during the informal part of the meeting.



POMINI Rubber & Plastics' new headquarters is just as modern and open as the company itself.

Continuous growth

POMINI opens its new building in Rescaldina, Italy

Rescaldina – a location with a long history

In April 2013, POMINI Rubber & Plastics srl moved into its new office building in Rescaldina, Italy. This new site stands in stark contrast to the age of POMINI's historical roots in this region north of Milan, which go back to the end of the 19th century. Let's take a closer look at the company and at the history of POMINI Rubber & Plastics srl along with the origins of the INTERMIX® VIC and CONVEX™.

Rescaldina, the home of POMINI, is situated in Lombardy, in north-western Italy. The nearest major city is the business metropolis Milan – known the world over for fashion and football. A major trade fair destination, it will also host this year's EXPO 2015.

The municipality of Rescaldina, the name of which derives from the Latin word 'robur' (oak) and the Lombardic word 'scalta' (forest), has a population of 14,000. Due to

the growth of that figure over the centuries, however, not much remains today of the oak forest that gave the town its name. Rescaldina's history can be traced back to the first century of the Roman Empire. The oldest documented commercial product is alabaster, which was already in use in this region but in the time of the Etruscans. During the Middle Ages, monks from Chiaravalle Abbey began to turn the heavily forested area into farmland. This is where the town later developed. The oldest buildings still standing in Rescaldina date back to the fourteenth century. Many legends from the region survive to this day. One such legend is the story of a squire named Lupo da Limonta, who fled from a castle. That's why the municipal coat of arms of Rescaldina still features the image of a wolf jumping from a tower.

The roots of POMINI's production operations lie nearby in the town of Castellanza, where POMINI has been producing a broad range of machinery and equipment since the second industrial revolution. The company's founder,



The municipal coat of arms of Rescaldina, Italy.

Luigi Pomini, began in 1886 with the maintenance and repair of machines used to process cotton. The company soon employed nearly 100 people. The founder's sons, Ottorino and Egidio, expanded the company's field of activity and also sold their products beyond the borders of Italy for the first time. POMINI began with the production of high-performance gearboxes for the cotton industry. In 1950, the company was licensed by David Bridge and by FARREL and McNeil to manufacture machines for the rubber and plastics industry. The company experienced steady growth; in 1960, POMINI Spa employed more than 1,000 people. They worked in two factories in the town. Products for the rubber and plastics industry included batch mixers, continuous mixers, single-screw extruders with both hot feed and cold feed hoppers, pin-type extruders and presses for tyres. From 1960 to 1985, all products were manufactured under the brand name POMINI FARREL. In 1985, the Pomini family withdrew from the business and sold their shares to investors.

The following years proved very productive, and the company generated many new ideas and products. The VIC (Variable Intermeshing Clearance Mixer), the LCM (Long Continuous Mixer) and not least the TDE (Twin Dump Extruder) were developed and patented during that period.

In 2007, after nearly 20 years in the Techint Group Spa, POMINI's rubber and plastics division was acquired by Harburg-Freudenberger Maschinenbau GmbH. The TDE, POMINI's most successful product, was redesigned and since 2009, after a best-of-best optimisation process, it has become the CONVEX™ Extruder.

Both Rescaldina and Castellanza are situated near the world's first toll highway, today's A8 Motorway, which links Milan with Varese. It was inaugurated on 21 September 1924 by Italian King Victor Emmanuel III travelling in a Lancia Trikappa.

In the new office building in Rescaldina, the staff have been able to grow together as a group. The new offices are attractive and modern, thereby perfectly reflecting the philosophy and outlook of POMINI.

The new Italian-style building houses a canteen and a fitness centre – a further expression of the POMINI culture and the lifestyle of the employees. From this building, POMINI Rubber & Plastics srl will proceed to operate as the Business Unit for the CONVEX™ Business Unit in the HF MIXING GROUP.

From machinery manufacturer to systems suppliers

The HF MIXING GROUP adapts to the needs of its customers and supplies them not only with mixers but increasingly with complex mixing room systems as well.

Nothing is more constant than change. This expression from the ancient philosopher Heraclitus has not lost any relevance in modern times. On the contrary, the world seems to be changing faster and faster. Even the HF MIXING GROUP is constantly changing, sometimes in order to optimise internal procedures or to fulfil new legislative requirements, but usually in order to meet the changing demands and needs of its customers. Its transformation from being purely a manufacturer of mixers to being a supplier of complete mixing room systems also falls within this category.

This began some years ago: at first it was only a few technical rubber goods manufacturers who lacked either the know-how or the time and human resources to deal with the selection and purchase of all of the individual machines and components themselves, and therefore asked the HF MIXING GROUP for mixing room systems. Recently, some tyre manufacturers have followed this example. Unlike in the past, when most were self sufficient and equipped their mixing rooms with machines they purchased separately, today more and more of them leave the entire task to the machinery supplier.

‘Until recently only a few technical rubber goods customers requested this service, but today tyre manufacturers also rely on the full-service package from HF.’

‘One of the basic reasons for this lies in the growing complexity of the complete systems,’ explains Maik Rinker, Business Unit Director for Systems/Automation of the HF MIXING GROUP. ‘The engineering of the overall system is becoming more and more important. After all, the solution selected should remain technically viable for many years. Moreover, a wide variety of new standards and regulations must be observed, in order to obtain CE certification, for example. This is because the operator of the system is subsequently responsible for safety. Accordingly, he should be able to rely on the supply of CE-compliant machines and the documentation required in connection with complete systems. It is also necessary to arrange the complete system in such a way that it works as energy-efficiently as possible. Taken together,



Systems engineering and automation are inseparably interconnected.

these factors raise the level of complexity to a point where more and more customers prefer to leave the job to an expert. The primary reason, though, is surely the fact that the increased degree of automation has repeatedly led to interface problems between the individual components that would cause downtimes to occur often and sometimes for long periods of time, or would lead to prohibitively long and expensive commissioning phases. After all, a mixing room system consists of a wide variety of individual machines that must be assembled into a single functioning unit. In this respect, we can offer our customers the big advantage of working with many suppliers in accordance with standards specified by the HF MIXING GROUP.’

The full spectrum of mixing room equipment

The Board of Management of the HF MIXING GROUP recognised these market demands early, and strategically positioned the company. It launched the Systems/Automation Business Unit in which the systems expertise of the HF MIXING GROUP is pooled, developed and optimised. The business unit, which now has over 60 employees worldwide, handles the full spectrum of mixing room equipment for the customer, from the concept to the procurement process to commissioning. ‘On the

basis of the requirements specified by the customer, we first create a mixing room concept tailored to these requirements,’ explains Christoph Sanger, Head of Global Systems Technology. ‘We select the appropriate machinery on the basis of the respective application, the required throughput rate and the desired quality, and also handle the design of the upstream and downstream components such as the material feed system, rolling mill systems, twin-screw extruders, batch-off units, etc. In cases where we outsource the manufacture of those system components, we work in close cooperation with our suppliers. Even in this early project phase the automation specialists come into play and develop the appropriate automation concept.’

The HF team begins with the detail engineering as soon as the mixing room system is approved by the customer. This includes things such as the planning of the material flow in the mixing room, the system layout, the foundation plans including a proposal for the structural steelwork as well as the calculation of the static and dynamic loads of the machinery and components. The relevant parameters for the coolant, compressed air and energy requirements for the layout of the building and the technical infrastructure are also determined in this phase. The routing of the cables and media lines as well as the material flow and storage are also planned. And one more important thing: all of the (mechanical and electrical) interfaces are defined.



A wide variety of components must be connected to one another in a mixing system: the material weighing and dosing system, the mixer with all of its auxiliary equipment and the downstream equipment, to name just a few of the basic elements. A large number of interfaces must be taken into consideration as early as in the concept phase when joining these individual elements. This involves interfaces for the supply of the fillers, plasticisers, rubber and small-scale components for the auxiliary equipment such as hydraulics, tempering, lubrication or drive train, for the downstream equipment as well as the transfer chute, the feed belts or the warehouse. The building and the supply of electricity, coolant and compressed air as well as the safety features must also be intelligently connected via interfaces.

Eliminating interface problems

The HF MIXING GROUP offers a fully integrated mixing room automation system for this with ADVISE®. 'ADVISE® eliminates interface problems even before they can occur – interface problems that could otherwise result from using several different control systems from various suppliers in the mixing room,' explains Hans Martin Monyer, Head of the HF Automation product segment. 'All machine and device control systems as well as process control systems and operating stations, from material acceptance to the interim storage of premixes and final mixes, are intelligently interconnected with one another by means of standardised interfaces. The uniform user interfaces at all workstations also provide the transparency required in such complex systems, prevent operating errors and thereby increase efficiency in the mixing room.'

As a complete solution, ADVISE® offers enormous advantages for the mixing room operator – and not just in the long term: 'If the customer connects individual control systems together into a line then, in addition to the interface problems, there are often functional overlaps as well, which lead to additional procurement costs overall,' says Monyer. 'The costs for spare parts are also reduced with a standardised total system such as ADVISE® because uniform components are installed in all parts of the control system.' In addition to the cost benefit, uniform automation also offers the customer further benefits: when using control systems from different suppliers it not uncommon to have trouble determining clear responsibility in case of malfunction. As a result, the customer may have to struggle with ambiguous responsibilities over the entire service life of the system. A total solution using ADVISE® also guarantees a high-quality and uniform technical

documentation of all control systems in the mixing room. 'I have actually seen some customers using systems for which there were four circuit diagrams drawn completely differently,' says Monyer. 'Over the years, things like that make work harder for the maintenance personnel and repeatedly interfere with fast fault correction.'

Energy savings through optimally designed drives

The greatest potential for energy savings in the mixing room lies in the optimal design of the mixer drives. In the past, drives were designed generously according to the mixer size and rotor geometry. 'More than a few companies would use the proverbial cannon to kill a mosquito,' says Monyer, descriptively explaining the lack of focus on efficiency in earlier times. The HF Drive Design Tool developed by his department prevents oversizing and its associated wasting of energy by enabling engineers to precisely determine the power requirements for the use, the mixer size and the rotor geometry and to design the drive appropriately. 'Against the backdrop of the fact that only a one-digit percentage of the total life cycle costs for a mixer drive go to procurement costs but the largest portion



goes to energy costs, enormous savings can be generated through an optimally designed drive!' It is therefore no wonder that the HF MIXING GROUP has sold more drives in the last five years thanks to the Drive Design Tool than in the entire 15 years before it.

A full-service package for the customer

In addition to the concept and engineering, HF MIXING GROUP also handles the entire project management for a system project: starting with the selection and coordination of the suppliers, and ranging from scheduling, order placement, change management, inspection of suppliers, in-house commissioning and acceptance, all the way to transport to the customer and assistance in obtaining CE certification. 'In doing so, we also carry out the entire construction site coordination from the determination of the required installation material to the resource planning for the installation all the way to the coordination of the commissioning,' says Christoph Sängler. 'In addition, our colleagues also support the customer in the test phase and with the start-up and optimisation of the system. The training courses that we offer are also very important. We use these to ensure that customers get the optimal benefits from our products.' Customers thereby receive a full-service package that significantly reduces the pressure on their schedules and personnel. Because the HF MIXING GROUP takes the responsibility for the entire project, it stands to reason that this would incur high costs. However, this is not the case: in terms

of the total costs of a system project – i.e. the costs for machinery, automation, installation and commissioning – only a share of approximately ten per cent goes to the system project services of the HF MIXING GROUP.

Good prospects for system technology

The advantages of system technology for the customer are so impressive that even large-scale customers who have their own in-house machinery know-how are now taking advantage of this offer.

'The importance of system technology will continue to grow,' says Business Unit Director Maik Rinker with confidence. 'Ever-faster processes and improved line management with regard to preventative maintenance, recipe management and production planning are required. In addition to a lot of know-how, all of this also requires an increasing degree of automation. Energy efficiency will also play a greater role. New drive concepts and energy-optimised auxiliary equipment will therefore become even more important in the future. We perform research and development in all of these areas and have the entire system under control. I am therefore very confident about the future of our system technology and automation.'



Friction linings – the mix is the key

The quality of friction lining blends is the decisive factor for the safety of their many different applications.

They can be found in all kinds of vehicles. They are used in escalators, washing machines, wind turbines and closed-dye forging presses – as well as in many other industrial machines and those of everyday life. We're talking about brake linings. Wherever they are used, they represent a vital component of safety, meaning that their quality is a non-negotiable. And this quality depends directly on the friction material formulations and the mixing process used to produce them. From a technical point of view, the preparation of friction lining mixtures is very challenging. The challenges in these applications include the wide variety of raw materials used, and, dependent on a particular formula, the ratio between the filler and polymer shares, which is typical of friction lining material formulations.

Numerous requirements

'Friction linings must have a highly stable friction coefficient and temperature resistance, must be moisture-repellent and exhibit low noise characteristics and high mechanical strength. They should offer extremely long service life and keep brake disk wear to a minimum. Moreover, they should prevent smoke generation and – for some years now – they also need to be environmentally friendly,' says Dirk Herkrath, CEO of Becorit, in listing the requirements of friction linings. The German company Becorit GmbH, a subsidiary of the US-based Wabtec Corporation, is one of the major suppliers of brake linings. At their site in Recklinghausen, Germany, they produce disk brake linings and plastic brake shoes for rail cars and special brake linings for mining and industrial applications.





E-mobility is already the state-of-the-art in rail transportation.

Overall, the application spectrum of friction linings can be divided into three major areas, with the largest share being used in automotive applications such as brake linings and cladding or clutch linings for passenger cars and lorries. Then is a much smaller railway market. Brake linings for disk brakes and brake shoes for wheel brakes form the main share of this segment. Due to differences in sizes and specifications, they require a range of different material properties. The third segment in the market concerns industrial applications. This segment includes brake linings, clutch linings, sliding elements, friction belts, rollers and bands, disks and dampers for a large variety of machines.

Francesco Laureri, Technical Director of ITT Friction, one of the world's largest suppliers of brake and friction linings for the automotive industry, sums up the essential criteria in today's automotive environment this way: 'Customer-specific requirements relative to consistently high quality and extremely low wear have become tremendously demanding in recent years. In addition, our sector now places a higher and higher value on comfort considerations, such as on low-noise operation. And environmental aspects are also gaining daily in importance. In 2014, for example, ITT took yet another ecologically minded step by introducing copper-free linings in original equipment components.'

The different applications require different mixtures. Most automotive applications use two-stage mixtures. In this type of mixture, a 'wet' pre-mix is added to the 'dry' mixture in a second step. The difference between the 'wet'

and 'dry' mixtures is due to the type of binder used. The material specifications require a combination of flexibility and stiffness, good performance and comfort with minimal wear. Most of the 'wet' blends are used in the railway segment and in industry. One essential requirement for the friction material in the railway sector is pliability, so that it can conform to large track or brake disk geometries. Because the brake components used in trains have a three to five times larger braking surface than those used in cars.

Different production processes

For the production of 'wet' mixtures, three different processes have become most prevalent. The first is that which is used primarily in automobile production. Here wet mixtures are used either as a finished mixture for the brake linings or as masterbatches for yarn impregnation in clutch surfaces. The mixing systems used here consist of an interior mixer with a downstream rolling mill mixer and subsequent pelletisation.

The second method is that used for railway brake linings and industrial wear parts. As a general rule, the material here has a high rubber content and can be pressed into various shapes at room temperature, without prior melting or use of a binder compound. This type of production allows for a high share of filler to be present in the mixture. A production line comprises an interior mixer with pelletisation. The most common example of an application for this process is the manufacture of pelletised friction lining mixtures which can be moulded by hot or cold compression. The production must be carried out in special interior mixers whose mixing chambers are protected against excessive wear. The advantage of this method is its extremely short compression and moulding times. The stiffness of the material must be high enough to ensure that the geometries moulded from the press do not flow while curing. It is nonetheless also possible to use hot presses for moulding.

The third method is the manufacture of pelletised mixtures for rolling mill mixers: this method uses an interior mixer coupled with a pelletiser unit and subsequent calender machine to form the resulting mixture into a skin for stamping. Typical applications are the production of pelletised friction material mixtures with high rubber content. In the course of further production, pellets are formed, cut in rollers and dried, and finally stamped into different shapes. To prevent cracks and damage to the surface of the material after rolling, the formulation must not contain any highly filled materials. The mixture must be very pliable and have a low viscosity, so that it can be processed into thin rolls in a one operation.

The advantages of interior mixer technology

The mixers used in the production of friction lining mixtures have to satisfy many requirements: they must be able to process high fibre quantities and low rubber quantities without solvents. At the same time, they must also feature high wear protection against abrasion and be capable of high throughput. That's why the interior mixer is often the machine of choice.

Interior mixers offer many advantages in the production of friction lining mixtures. They enable the composition and production of highly filled mixtures in short processing times. In addition, only interior mixers can condition the



INTERMIX® E Series

mixture for cold pressing. This allows for cost-effective production of parts in high quantities and short, fixed cycles. And the quality of the mixtures is also very good.

Due to its cooling capacity, the model IM 135E interior mixer from the HF MIXING GROUP is the machine for mixing friction lining materials. Its PES5 rotors with intermeshing rotor geometry ensure that all of the mixing components are distributed homogeneously and that the mixture has an extremely high degree of dispersion. Moreover, the rotor design and the optimised cooling characteristics of all of the machinery components that come in contact with the mixing goods also make it possible to process heat-sensitive materials efficiently. As a result of these properties, the INTERMIX® 135E has established itself in the friction linings industry.

Dirk Herkrath of Becorit maintains: 'The main advantage of an interior mixer is the ability to process rubber bales without solvents. Today especially, everyone is trying to eliminate the use of any solvents which could be problematic for the environment or safety.' The only disadvantages he sees are the relatively high mixing costs due to smaller batch sizes, along with increased energy requirement of the mixing process.

Herkrath's assessment of the future of his industry reflects a nuanced view: 'It will indeed be possible to achieve growth in low-noise goods transport and in the metro segment as well as on the Chinese market in general, which continues to be a growth market. It will be exciting to see how the development of e-mobility will affect our industry. Conventional brake systems which are associated with the friction materials will always be indispensable. E-mobility is already the state-of-the-art in railway traffic. But modern trains, in particular, also use electric braking for reasons of energy storage. For this reason, friction lining consumption might decline in the future.'

We also see a high degree of automation as one of the major success factors in the future for our growth in China and North America. 'Our industry is subject to high price pressure. But since nobody wants to compromise on the quality of the friction linings, the manufacturers have to look at other aspects, such as automation. We're well on our way there, because the degree of automation at ITT is already very high. The number of robots now exceeds the number of employees (whose qualification is growing continuously).' With regard to automation, however, Laureri still also sees an obligation on the part of the machinery suppliers: 'A seamless process monitoring and online support system for all machines is extremely important to us.'

Always on the move

The continuous mixer market.

The continuous mixer market is constantly in motion. Since the formation of FARREL POMINI and the Continuous Mixer Business Unit in 2011, several dramatic developments have transformed the market. These include, for example, the revitalisation of the US petrochemical industry fuelled by plummeting feedstock prices as a result of intensive shale gas production through fracking. Above all, however, worldwide growth in the demand for luxury vinyl tiles has led to a shift in the market. PVC flooring customers in Europe, Asia and the US are investing heavily in expansion projects in this sector and stimulating tremendous levels of growth in otherwise mature markets.

New machines to meet new challenges

Specialising in plastics industry applications, the Continuous Mixer Business Unit reacted to this development with, among other things, the addition of the 7FCM-High Torque (7' 175mm) to the range to complement the 9FCM-High Torque. Like all continuous mixers of the FCM-HT machines, the 7FCM-High Torque is particularly well suited for processing the newer highly filled, temperature-sensitive products. The automatic and rapid opening feature which facilitates cleaning, clearly adds value in the customer's eyes.

Market demand for polymers and growth in FARREL POMINI's key markets of masterbatch and PVC were slightly lower than market forecasts. When our masterbatch customers in this segment pushed for increased production rates and better ROI, the business unit responded by developing the CP4000 Compact Processor. That new

processor can raise the maximum nominal output of a CP machine by more than 50% over the previous maximum of 2,500 kg, which is the rated capacity of the CP2500.

Expansion of sales to new countries pays off

The continuous mixer and CP Series II™ Compact Processor product lines have already been very well established for many years now in highly filled polyolefin & styrenic masterbatches and PVC applications. FARREL POMINI's drive into new geographic markets and further applications has seen new machine sales growth in the region of 20–25% annually. 2013 even saw the highest number of CP unit sales since 1986. So the focus on expanding the geographic reach of our sales channels and on increasing our activities in developing markets in Asia, Russia and South America has paid off. 'We've forged new, growing relationships there with customers previously unaware of the capabilities and benefits of the continuous mixer product,' reports Paul Lloyd, director of the Continuous Mixer Business Unit. 'And at the same time, those new markets also brought our developers into contact with interesting new types of fillers and minerals.'

FARREL POMINI also enjoyed success in the traditional markets in North America and Europe. Despite economic challenges, key customers there have continued to invest in their capabilities and capacity. One of the essential factors in this connection has been the business unit's continuous work with material selection and manufacturing methods to improve the longevity of the equipment.

Investments and new developments in all areas

FARREL POMINI has invested heavily in its Research and Development programme, establishing a new laboratory in Connecticut, USA and developing the European demonstration laboratory in the UK. Both facilities are utilised extensively by customers and potential customers to test new formulations or create new products. The use of those laboratories often represents a more cost-effective and focused way for them to carry out their development work. Conversely, FARREL POMINI's developers also regularly spend much of their time working on process applications at the customers' facilities in order to better understand their needs and develop the most effective solutions.

It was also through close proximity to customers that the business unit discovered the need to undertake several modifications to the control interface. In response to the general trend toward simplicity and the need for new language options in the new markets, FARREL POMINI's developers created a new, intuitive, symbol-oriented control system, which can be installed on all machines. All machines have also been equipped with an interface which

allows remote access and diagnostics. 'This interface now enables us to view machine, operator or process parameters and to provide instant remote support worldwide – no matter where the mixer is installed,' says Paul Lloyd, who is clearly pleased about this advancement.

Customers' service requirements have changed

New technological possibilities are not the only reason that customers' service requirements have changed in recent years:

many companies are focusing on their core competences and outsourcing traditional in-house activities. The Continuous Mixer Business Unit has adapted in response to this trend by dedicating more resources to project management, installation and maintenance services, in order to provide adequate customer support. It has also developed a strategic spares programme which enables customers to minimise their spare parts stocks. In this way, customers can take capital previously tied up in spare parts inventory and invest it in their production equipment.

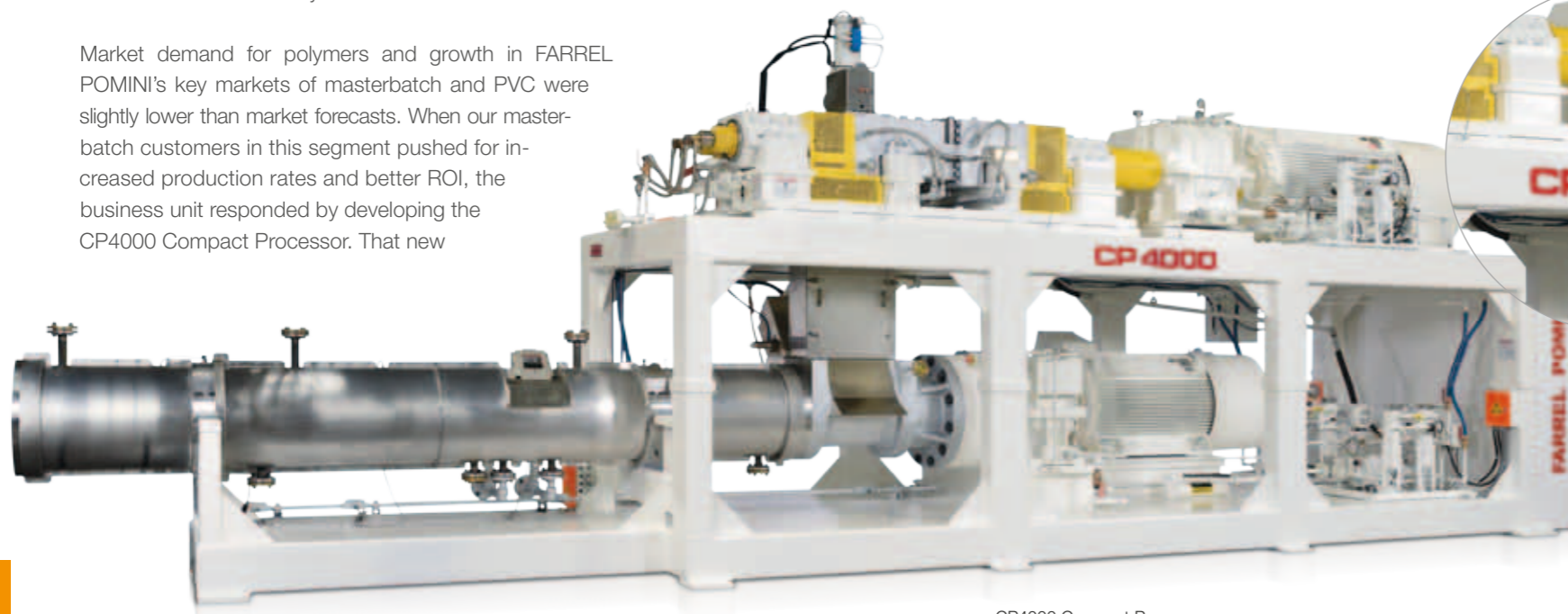
In 2015, FARREL POMINI will make further investments: the company is building a new facility in Connecticut, USA, which will bring research and development, engineering and production all under one roof for the first time. The new facility will not only make production operations more efficient, but also enhance communication and training capabilities.

Outlook

'Predicting future developments in the continuous mixer market isn't easy,' says Lloyd. 'It is clear, however, that certain factors will become increasingly important in the future. One of these is energy efficiency. Compounding equipment has so far been exempt from European energy labelling, however, this is certain to come. In the long term, I expect to see global regulations in this area.' His business unit is well-prepared for this – after all, FARREL POMINI continuous mixers are considerably more energy-efficient than those of the competitors. Nevertheless, Lloyd's development staff is already taking further steps to improve energy efficiency.

Lloyd is also convinced that the use of biopolymers will continue to increase in the future, even if only for environmental protection reasons. That assumption is borne out by the growing number of customers who are conducting trials and undertaking product developments in this area. Fortunately for FARREL POMINI, the continuous mixer is the ideal machine for processing generally temperature-sensitive biopolymers.

'The need for flexibility will also continue to grow. Companies that can adapt their production rapidly and cost-efficiently to changes, both large and small, will have a significant competitive advantage,' says Lloyd. 'Whatever the future may hold, we at FARREL POMINI will continue to rise to the challenge and provide optimal support to our customers to help them achieve their objectives.'



CP4000 Compact Processor



A review of 2014

14. International Car Symposium

➔ 28–29 January
RuhrCongress Bochum, Germany

Interplastica

➔ 28–31 January
Moscow, Russia

Tire Technology Expo 2014

➔ 11–13 February
Exhibition Centre Cologne, Germany

27th IKV International Colloquium Plastics Technology

➔ 19–20 March
Aachen, Germany

Plasticos Mexico

➔ 25–28 March
Guadalajara, Mexico

Chinaplas 2014

➔ 23–26 April
Shanghai, China

MAPLAN Days of Technology

➔ 4–5 June
Ternitz, Austria

Argenplas

➔ 16–19 June
Buenos Aires, Argentina

ITEC Show

➔ 9–11 September
Akron, USA

Plastimagen

➔ 18–21 November
Mexico City, Mexico

MIXING 'on tour'

Worldwide trade fairs and events are important dates on the calendar, also for the HF MIXING GROUP. Here is an overview of industry gatherings with our participation in 2014 and 2015.

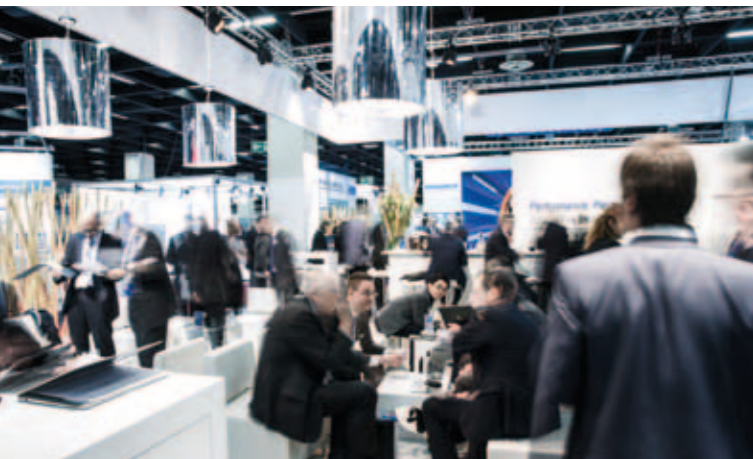
Tire Technology Expo 2014

➔ 11–13 February 2014, Cologne, Germany

The HF MIXING GROUP attended the Tire Technology Expo 2014 in Cologne, Germany, sharing a stand with their colleagues from Hamburg under the HF Group banner. The trade fair, which has been held annually for the past 15 years, is considered the world's leading event for tyre design and manufacturing. As in years past, our company once again invited visitors to the 'Bauwerk Köln' event facility for an 'HF meet and greet' on the first night

of the 2014 edition of the exhibition. Some 150 customers enjoyed flying food, an artistic performance by the magician Thimon von Berlepsh, and live music by Jelphy Trio. Some customers and colleagues also indulged in lively table football battles. HF took the opportunity to officially bid farewell to Riccardo Curti, the former director of the Twin-Screw Discharge Extruder business unit, and to present Otto Huth as his successor. Norbert Behrendt, retiring from the company as Hamburg's director of the Curing Press business unit, was also recognised for his service. The entertaining evening was an excellent kickoff to a successful trade fair.





Interplastica Moscow 2014

➔ 28–31 January, Moscow, Russia

Omya & FARREL POMINI hosted a joint seminar at Interplastica Moscow. Omya presented 'The benefits of processing with calcium carbonate (CaCO₃)' and FARREL POMINI spoke about 'The advantages of processing on the Compact Processor'.

The Omya presentation concentrated on the economic and technical benefits of using calcium carbonate in polyolefin applications. Calcium carbonate is one of the most important mineral fillers in the polymer industry. It improves stiffness, impact resistance and tear strength. Calcium carbonate reduces the cost of compounding, improves performance and results in lower production costs.

The FARREL POMINI presentation examined in detail the advantages of the CP Series II™ Compact Processor as a high-productivity compounder especially designed for high-quality dispersion of highly filled, highly pigmented materials. It includes an independently controlled, continuous mixer and extruder system. The compact processor is able to process highly abrasive materials outperforming other processors. It is designed to integrate various elements such as infeed and pelletising systems, making it suitable for so many different applications in very diverse industries such as wire & cable and flooring.

Interplastica Moscow draws more than 700 exhibitors from over 28 countries and some 20,000 visitors every year.

Chinaplas 2014

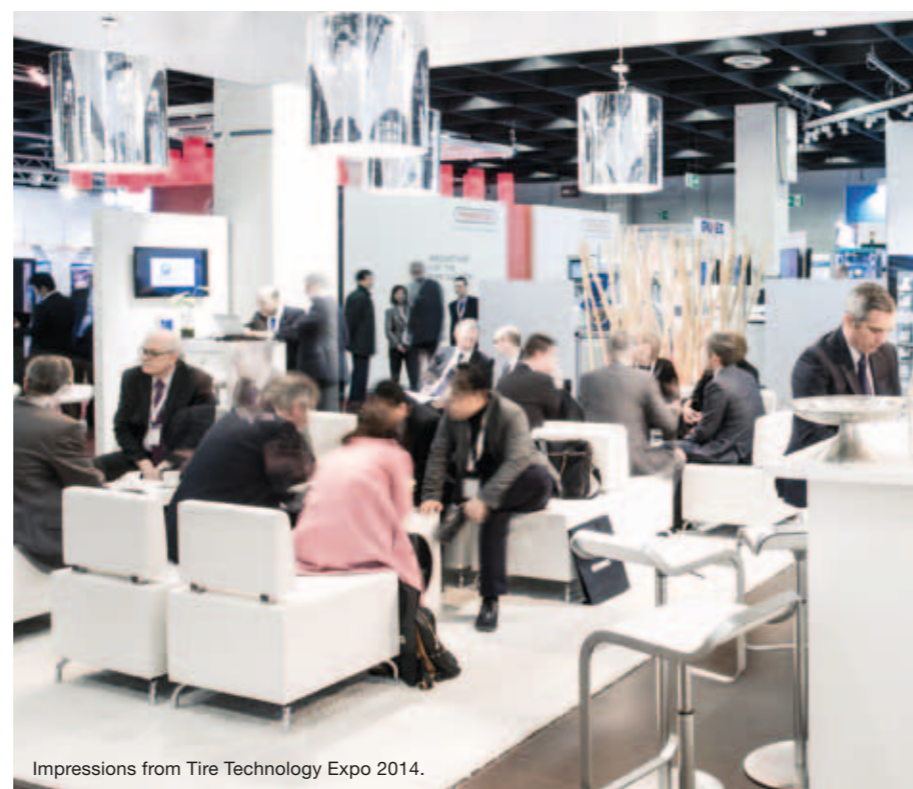
➔ 23–26 April, Shanghai, China

FARREL POMINI participated in Chinaplas 2014 in Shanghai, China. Chinaplas is the largest trade fair for

the plastics industry in Asia. This edition marked the 28th time the event has been held. The exhibition takes place annually, in contrast to the world's biggest plastics trade fair, 'K' in Düsseldorf, Germany, and the third biggest trade fair, NPE in Orlando, Florida (USA), both of which are only held once every three years. More than 3,000 companies exhibited their products and services in 17 halls at Chinaplas 2014. The number of visitors increased by 14.4% over the previous year's figure to 130,370. Of the visitors, 28% came from outside China. In 2015, the event will return to where it was held in 2013, Guangzhou.

FARREL POMINI was part of the US pavilion, where their rotor technology for continuous mixing processes was on display. The CP rotors, including the latest technology, 6:1 L/D are designed for extremely high-quality dispersion of highly filled, highly pigmented compounds while maintaining processing temperature of heat-sensitive materials. The trade fair stand presented a pellet display with a range of recipes that can be mixed on FARREL POMINI machines. In addition, the CP Series II™ Compact Processor product video was featured.

Some 120 customers and potential customer visited the FARREL POMINI stand where many productive meetings were held. FARREL POMINI's Area Sales Engineer Fraser Bruce also gave a seminar for the trade fair visitors on the topic 'Flame retardants on the FARREL POMINI Compact Processor'. He presented the advantages and properties of the Compact Processor for processing flame retardant compounds.



Impressions from Tire Technology Expo 2014.

The success of the exhibition encouraged FARREL POMINI to reserve a significantly larger stand at Chinaplas 2015 in Guangzhou, where the company will exhibit a CP550 Compact Processor.

Exhibitions 2015 – FARREL POMINI

Arabplast – Hall 4C, Stand 162

➔ 10–13 January
Dubai, United Arab Emirates

Interplastica – Hall FO Stand E45

➔ 27–30 January
Moscow, Russia

PlastIndia – Hall 11, Stand B05

➔ 5–10 February
Gandhinagar, Gujarat, India

NPE – West Hall, Stand 6444

➔ 23–27 March
Orlando, USA

AMI Conference – Hall 9.2, Stand P01

➔ 12–13 May
Denver, USA

Chinaplas 2015 – Hall 9.2, Stand P01

➔ 20–23 May
Guangzhou, China

Exhibitions 2015 – HF MIXING GROUP

8th India Rubber Expo and Tyre Show 2015 –

Hall 7, Stand 7H.9
➔ 15–17 January
Pragati Maidan, New Delhi, India

Tire Technology Expo – Hall 11.1, Stand 2050

➔ 10–12 February
Cologne, Germany

PLAST 2015 – Hall 11, Stand B71

➔ 5–9 May
Milan, Italy

ACHEMA – Hall 5.1, Stand C27

➔ 15–19 June
Frankfurt, Germany

DKT + IRC (German and International Rubber

Conference) – Hall 12, Stand 12–315

➔ 29 June – 2 July
Nuremberg, Germany

DIK/DKG Seminar

(Production of rubber blends)

➔ 6–7 May
Freudenberg, Germany – Hotel Zur Altstadt & the Technical Center of the HF MIXING GROUP
For registration and additional information visit www.dikautschuk.de



Collective WoMen power: the trade fair team on the HF stand.

The people behind the HF MIXING GROUP

Our company has many personalities.
We introduce you to some of them here.

Bob McNabb – Sales Manager North America

Bob McNabb is practically an institution in our business. The 52-year-old American has been working in machinery construction for the rubber industry since 1988. He started out in production, but switched to sales just two years later. Ever since, the Pennsylvania-born father of two grown children has rarely remained at one location for long. 'There's no way to sell our mixing machines effectively without intensive travel,' explains McNabb. 'As sales manager for North America, I support customers from San Francisco to Montreal and from Anchorage

to Miami. One of my tasks is also new customer acquisition, of course. So I obviously don't spend much time at home.' His wife understands, though – after all, she's been married to him for 30 years now.

Bob McNabb supports his customers from his smartphone and laptop. The passionate Harley rider has no need for a permanent office at the HF site in Topeka, Kansas. For many key accounts and individual customers, he is the direct contact. When he lands an order, he is also responsible for the project management. 'I'm still thrilled about every order we sign. Not only because of my personal sense of accomplishment in my work, but above all because I know that the orders protect jobs in the factories. That means a lot to me,' emphasises McNabb. Along with his sales function, he is also involved in the HF team for systems.

In addition, the eloquent American enjoys making presentations, especially to groups. It goes without saying that 'passion' is a very important aspect of his work: 'That's what drives us to give our best and to be as good as we can. Passion is what drives us to be better than the others, better than our competitors.' In order to reinforce the passion of the HF MIXING GROUP's workforce, McNabb would like to see even more intensive intra-group exchange along with further employee development and training. 'Such programmes can help us build team spirit, so everyone feels like part of the Group.'

As a veteran in the industry, McNabb believes that merging the different companies under the umbrella of the HF MIXING GROUP is a strategically valuable step: 'The fusion of former competitors was a great idea. It gave us the opportunity to realise synergies in all areas – in sales, in engineering, in procurement and in production.'



Bob McNabb –
Sales Manager North America.





Daniel Prekop –
Head of Sales and Marketing, HF NaJUS.

Daniel Prekop – Head of Sales and Marketing, HF NaJUS

He's still young, but his career has gone from strength to strength. We're talking about Daniel Prekop, the 27-year-old head of sales and marketing at HF NaJUS in Slovakia. When he earned his Masters in Business Administration at the University of Bratislava in May 2012, he knew exactly what he wanted. The young manager describes his expectations at the time this way: 'My idea was to work for a large international company in a dynamic business environment, to always be in contact with the customers and to have the chance to improve my skills continuously.' To which he adds: 'And all of those wishes have been fulfilled at HF NaJUS!'

The communicative young professional started out in the procurement department at the newest addition to HF MIXING GROUP in October 2012. There he concentrated on the procurement of key raw materials and on active collaboration, above all with foreign suppliers. After two years he was promoted to department manager, and has been responsible for sales and marketing since July 2014. 'What I like most about my current assignment is that I get to know all of the companies and commercial processes

of the HF MIXING GROUP. Because commerce was my focus during my university studies, I'm particularly interested in everything connected with that.'

Today his work is comprised of two parts: sales and marketing. 'My main task in sales is communication with the customers. On the one hand, the internal customers of the HF MIXING GROUP, and on the other, the external customers. In this context, I work very closely with our sales engineers. It is also very important to look for new potential customers and to watch the competition. My main task in marketing is to strengthen the public image of HF NaJUS, for example through the new website, brochures, etc. HF NaJUS should be perceived as a strong market player that is still in the development stage and is now part of a large corporation with worldwide operations.'

Since the amalgamation in 2012, Daniel Prekop sees advantages for both companies: 'The technological expertise and industrial experience of Harburg-Freudenberger together with their access to the worldwide markets and customers have been combined with an established company, which was not only able to manufacture high-quality products under economically attractive conditions but also had very good relationships with local contractors. At the employee level, the fusion brought new opportunities with regard to additional training and state-of-the-art technologies and processes.'

Passionately enthusiastic about sports – he participates in practically every kind of sport, from ice hockey to football and tennis to inline skating – Prekop has many ideas how to further strengthen team spirit within the HF MIXING GROUP: 'One of the ways to achieve it might be more joint events for the employees from the same departments within the Group, regardless of where they work or their position. We could also start programmes to get employees more motivated – by regularly selecting the HF MIXING GROUP's 'Employee of the Month' or the 'Department of the Month', for example. I'm convinced that both sides – employer and employee – benefit when people enjoy doing their jobs. In my view, that's the decisive factor in the success of a company.'

Quentin Hartley – Process Engineering Manager for HF MIXING GROUP, based out of Farrel UK, Rochdale, England

Quentin Hartley joined the HF MIXING GROUP in 2012 and was already promoted to Global Process Engineering Manager in the following year. He started his career in 1985 as a laboratory technician for Francis Shaw and Co/Manchester Limited – the original manufacturer of the interconnected mixer INTERMIX®. There he gained valu-



Quentin Hartley –
Process Engineering Manager, Farrel, Rochdale, England.

able experience mixing many problematic compounds on interconnected mixers for customers who wanted to improve their processes. 'While creating new mixer lines for the customers and initiating new processes in their factories, the work was not only richly varied, but it also gave me lots of invaluable experience,' says Hartley.

After 10 years at Francis Shaw, Quentin Hartley left the company and worked for a large compounder in the USA. That company used both interconnected and tangential mixers. In his role as production manager, Hartley was able to study the benefits of both technologies intensively. His responsibilities included, among other things, the construction of two works in North America, for which he specified the mixer technologies along with the upstream and downstream equipment. 'My work for a large compounder with a broad customer base enabled me to become familiar with manufacturing processes for small and large companies – from tyres to technical rubber goods to special compounds. Every day brought more new experiences,' recalls Hartley.

Once again after 10 years, he returned to Great Britain, where he worked in the recycling of high-quality fluoroelastomeric materials – a business that continues to grow with increasing environmental awareness.

His work for the HF MIXING GROUP – leading a small, multi-national team of process engineers with special expertise – once again brought with it a whole series of challenges. His experience with various technologies for different applications enables him to learn more and more, to acquire new process know-how, and to maintain his passion for the polymer industry. 'I don't think there's another company anywhere that even comes close to offering such a large variety of expertise in such a large number of manufacturing industries as the HF MIXING GROUP does – and I'm proud to be a part of its sustained success.'

What makes us who we are

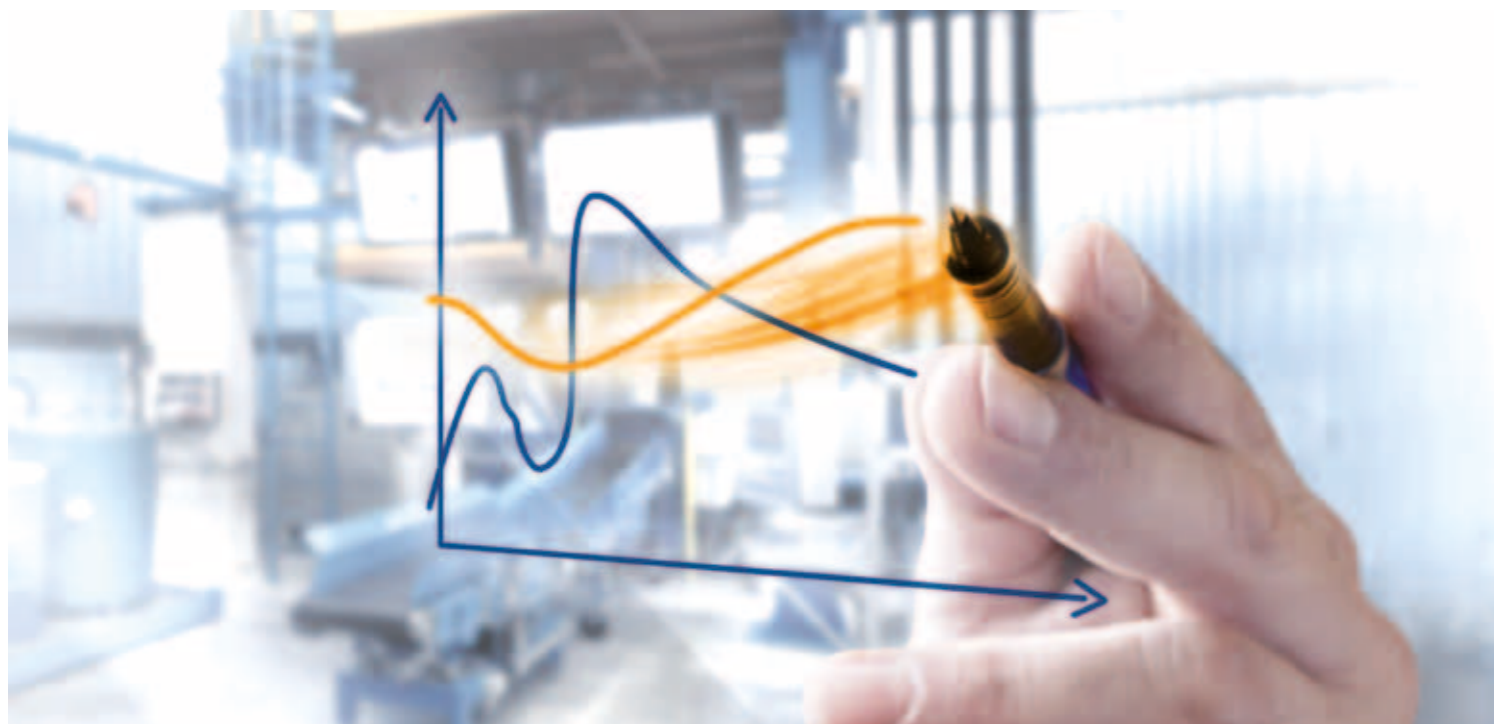
Every company exhibits specific traits and performance characteristics which are decisive factors in their success. At HF MIXING GROUP, those key elements comprise five unmistakable features.

A brand is a powerful symbol for a system of values. It offers employees, customers and suppliers a dependable basis for joint action. We provide our products and services to our customers with passion and in accordance with our values of reliability, ambition and sustainability. Moreover, the HF MIXING GROUP brand stands for a high degree of far-reaching technical and process engineering expertise gained over the course of 150 years, our corporate philosophy reflects our long-term vision and sustainability, plus conscious emphasis on close collaborations with our customers.

And what does this really mean, in very concrete terms, for us and for our customers? Last year we examined this question and defined five activities which are notable characteristic of the HF MIXING GROUP. Along with the unique technical selling points of the machinery we develop and build, our success also derives from the following competences:



View our expertise-videos on www.hf-mixinggroup.com/en/group/our-expertise



Process

The HF MIXING GROUP looks back on a long history of machinery construction for tyre manufacturers and the technical rubber goods industry as well as for a range of special applications. Our skill set encompasses a correspondingly broad spectrum. Our large, highly qualified, internationally staffed team has wide-ranging process engineering expertise and comprehensive know-how in the field of automation.

tangential and one interconnected – with laboratory rolling mills, two complete interconnected and tangential production lines with variable discharge aggregates, and state-of-the-art weighing and testing equipment.

We began operating our own Technical Center at the Freudenberg site in 1998. In 2011, it was redesigned and expanded to become the most modern of its kind in the industry. It features two laboratory kneaders – one

In this fully equipped mixing room, we enable our customers to test our machines under real conditions and to consult with our process experts. The perfect process is our shared goal and the cornerstone for the future. Through cooperation with various universities, the latest developments from the field of systems engineering, and our international engineering team, our Technical Center is uniquely positioned to keep pace with the times.



Solution

The HF MIXING GROUP delivers impressive results through its high degree of overall technical competence. With over 150 years of experience, we are the pillar of mechanical engineering expertise for the rubber processing industry. Our broad manufacturing and product knowledge together with our passionate innovative drive makes us an ideal partner for all companies in the sector – from small niche manufacturers to major automotive suppliers. And in this same context, we have an exceptionally high level of expertise – specific to each market – in control systems and systems engineering. Together with our customers, we develop concepts ranging from the design of individual machines to the configuration of complete mixing rooms. Our Engineering department works out all the details together with each customer in order to achieve the best possible

customised solution. We are the only manufacturer worldwide that can fully cover this portfolio.

In order to maintain our competence in all areas, we place a high value on the training and continuing education of our employees. An independent instructor has been hired to give special attention to our trainees, who also have the option to pursue dual university studies with us. For the advanced training of our employees as well as of our customers, we use our Technical Center. We also work closely together with the relevant faculty chairs and research institutes, and emphasise the importance of networked development within our international group. In so doing, we want to ensure that we will also continue to be able to offer our customers the best possible solutions in the future.



Direct +

Close collaboration with our customers lies at the very heart of our corporate philosophy. Direct contact between our employees and our customers is extremely important to us. Keeping commitments, ensuring short reaction times, and maintaining availability in all time zones – we see these as vital to our relationship with the customer. For direct and optimal communication, it is important to us that our sales staff have an extremely broad technical

knowledge of applications. That's why we believe that, on the technical level and also on the commercial level, we can create an optimal and personal link with the customer. And that's what 'one face to the customer' means to us. It's all about transparency!



Comfort +

We act in accordance with our corporate values of passion, reliability, ambition and sustainability, but our actions are not bound by immutable principles. We aim to solve our customers' problems – with a pragmatic and uncomplicated approach. Our flat organisation structure helps. Even the boss pitches in! With our worldwide network of local sites and service stations, we are always able to react rapidly in whichever time zone while taking cultural

circumstances into account. That's what customer focus means to us, and that translates to maximum convenience for our customers. Our decentralised organisation enables optimum workflow, and our company's unbureaucratic, solution-oriented structures permit us to act rapidly and effectively in the interest of our customers.



Safe +

Our entire activity is designed for sustainability and therefore for the long term. A healthy relationship to a continuously satisfied customer is more important to us than generating short-term profits. To that end, we invest a great deal, and we do so on a regular basis: in our personnel, in our research and development, and in our production equipment. Those investments pay off with a stable workforce, a high degree of innovation, and our successful overall performance. We believe that sustainability also includes an obligation to provide service and spare parts to our customers throughout the service life of

the machinery we supply. That maximises our customers' ability to plan for the future reliably.

To our way of thinking, security and sustainability are important factors that relate not only to our products and services. Our stable shareholder structure is also a source of security, as are the checks and balances built into our organisational hierarchy. Healthy, motivated and well-qualified employees are no less important to us. We recognise that employee health programmes are an investment in the future, and one of the ways we encourage this is through the company's own in-house fitness studios.

Events, seminars and anniversaries

Highlights of 2014 and plans for 2015.

International Mixing Seminar in Topeka

➔ September 2014, Topeka, Kansas, USA

On 23–24 September 2014, the HF MIXING GROUP hosted the fourth edition of its International Mixing Seminar (IMS) at the Capitol Plaza Hotel in Topeka, Kansas. The interest in the IMS has grown each time it has been held, and this time the event was even more crowded than in 2011. A total of 185 visitors from Europe, Canada, Mexico and the USA accepted the invitation. The lively interest underscores the fact that HF Rubber Machinery has successfully established the IMS as a professional gathering for the mixing industry.

During the two-day event, participants were treated to a large number of interesting professional presentations.

Jim Degan of the Lord Corporation, for example, gave an outlook for the global rubber goods industry. A report on new aspects from the fields of quality, environment, health and safety was presented by Zoran Hristov of Airboss Custom Mixing. Bob McNabb, HF Sales Manager for North America, and Christian Tittensor, Sales Manager North and South America for Zeppelin Systems, concentrated on integrated mixing room systems in their joint presentation. Ian Wilson, Director of the HF Tangential Mixers Business Unit, presented the BM700N BANBURY® mixer, which will be launched on the market in September.

After Andreas Limper informed the participants of the latest developments in downstream technology, the first day's programme transitioned to the social part of the

event: a German Oktoberfest – complete with traditional roast chicken, roast ham hocks, 1-litre mugs of beer, and pretzels – which was thoroughly enjoyed by all of the participants.

The second day of the event began with guided tours of the HF Rubber Machinery production facilities before shuttle buses brought visitors back to the conference. Dustin McKissen of ARPM started the next series of talks with a presentation on the different factors for influencing rubber products. Kim Bahner of HF explained how to install mixers from the ground up, and Ralf Baeuerlein of MonTech presented material testing machinery for rubber. Before the visitors left for their lunch break, HF Site Manager Paul White gave an interesting talk on outdoor installation and maintenance. The afternoon session featured Ed Juline (SASCO), Quentin Hartley, Joel Harper (both of HF) and Florian Lemke (RWTH Aachen) with likewise very worthwhile information about anti-tack, energy savings, control systems and automation.

'The seminar was once again very well-received,' says Paul White with satisfaction. 'Together with our partners, we were able to convey a huge bundle of expertise to the participants. For my own part, I participated in a great many interesting discussions, and I think that the same was true for most of the visitors.'

Mixing Technology Seminar in Teheran

➔ September 2014, Teheran, Iran

On 3 September 2014, the HF MIXING GROUP and RIERCO (Rubber Industries Engineering and Research Company) hosted a rubber technology seminar in Teheran, Iran. The purpose of the seminar was to inform the Iranian tyre companies about the latest requirements of the international tyre industry relative to compounding. The current status of the mixing and extruder technology of the HF MIXING GROUP was also presented. The presentations were made by Dr. Harald Keuter, Otto Huth and Andrea Delmoro. Many technicians and mixing experts from all Iranian tyre companies attended the seminar and showed their interest in the latest developments in the mixing sector.

Annual football tournament once again well received

➔ June 2014, Freudenberg, Germany

Over the weekend of 27–29 June 2014, colleagues from England, Italy and Slovakia travelled to Freudenberg once again for the annual HFMG football tournament. On Friday, the programme first called for an excursion to Bigge Reservoir with a visit to Atta Cave followed by a dinner.



Festive evening at the IMS in Topeka, Kansas, USA.



Experts from all of the Iranian tyre manufacturers visited the Rubber Technology Seminar in Teheran.



The teams of the HF MIXING GROUP in-house soccer tournament.

Saturday was dedicated entirely to football: after a series of hard-fought matches on the Friesenhagen sports field, Farrel UK ultimately emerged victorious. The local team from Freudenberg took second place, and HF NaJUS came in third, whilst the colleagues from POMINI had to settle for fourth place. Thanks to the great entertainment programme which included bull riding, cow milking, a

spiked helmet race and a barbeque party, everyone had a great time off the football pitch.

On Sunday, colleagues from Italy, England and Slovakia were also joined by some of the Freudenberg employees on a tour of Cologne and Düsseldorf.

OUTLOOK 2016

Hundredth anniversary of the BANBURY® mixer

→ Farrel Ltd., Rochdale, UK

The Tangential Business Unit in Rochdale is looking forward to a very special event in 2016: the BANBURY® mixer will be 100 years old!

In 1916, Fernley H. Banbury commercialised his mixer and thereby revolutionised the mixing industry. The development occurred just as the automotive industry was gaining momentum. Just one year after the market launch, Goodyear purchased a BANBURY® mixer in order to be able to satisfy the increasing demand for rubber tyres. That sale helped the BANBURY® mixer to become the standard in the mixing industry.

We intend to mark this jubilee anniversary with a fitting celebration, to which we would like to invite our current and former customers and employees. The exact date has yet to be scheduled. But if you would like to participate in the festivities, you can already add your name to the list by sending your name to: sallatt@farrel.com



Culture, sponsoring and knowledge transfer

The HF MIXING GROUP demonstrates its commitment in all three domains.

FARREL POMINI sponsors and donates

FARREL POMINI demonstrated its commitment to its hometown last year as primary sponsor of the celebration commemorating the 125th anniversary of the City of Ansonia. FARREL had already settled in the area before the City of Ansonia was established. The festivities included a culinary festival, a classic car show as well as a traditional baseball game played according to 19th century rules and customs. The event concluded with a concert and fireworks display.

Various charity organisations based in Ansonia benefited from the generosity of FARREL POMINI. The Employee Community Service Fund of the FARREL Corporation donated 9,000 dollars to a hospice, a homeless shelter and 'Meals on Wheels'. The donations are fully funded by FARREL POMINI employees.

The 'Drehmoment Freudenberg' – racing laps for a good cause

Today one in ten students leaves school without any formal qualification. The Siegerland district YMCA refused to accept that status quo, and so, seven years ago, they created the Pack's* programme, which helps young people make the transition from school to the working world. In 2009, the first work-study camp for students from 14 to 25 years of age was held. Out of that experience, the first five so-called 'coaching relationships' were established: volunteer employees support the adolescents and young adults take their first steps in their professional lives.

The programme is financed essentially through donations, which is why the YMCA organises events several times per year to activate sponsors. One of those events was the 'Drehmoment Freudenberg', a sponsor rally around the Freudenberg town hall. Participants could travel by

means of anything with wheels. In addition, every participant needed a sponsor who, for each lap, donated a certain sum toward the good cause. Accordingly, a total of 164 groups and individuals made 3,075 laps that day, resulting in a successful donation drive that netted 14,000 euros.

The HF MIXING GROUP was also quick to respond, of course, and showed its colours for the young people of the



HF sponsored the Speeding Scientists Siegen with their s3-13e-electric race car 'Marla'.





The assembly hall was quickly converted into a concert hall.



region where its headquarters are located. It presented itself, along with 15 other companies located in Freudenberg, as a company that provides training, and served as sponsor for the Speeding Scientists Siegen, who competed in their s3-13e electric race car 'Marla'.

* Loosely translated, Pack's is German for 'Let's seize the opportunity'.

Life goes on – unforgettable concert of Esther Bejarano and the Microphone Mafia

The HF MIXING GROUP, together with the local cultural association KulturFlecken Silberstern, served up an extraordinary cultural highlight at the company's headquarters on Asdorfer Street in Freudenberg: a concert by Esther Bejarano and the Microphone Mafia entitled 'La Vita Continua' ("Life goes on"). The assembly hall was converted into a concert hall in short order just for the event.

Now 88 years old, the artist survived the Auschwitz concentration camp as a member of the girls orchestra and became an artist for peace and a crusader against fascism and racism. She still appears on stage and has

created a unique musical project together with her family and with the German-Turkish-Italian rap group 'Microphone Mafia'. A melting pot spanning three generations who fuse their cultural, human, musical and personal perspectives and thoughts, and present their view of life to the listeners and spectators in the audience. A life that's worth fighting for!

During the event, Esther spoke of her experiences under Nazi persecution and of her time as a Jewish slave labourer. The powerful effect of her words together with the music entranced everyone present. The entire evening was an unforgettable experience, with inspirational music and rich subject matter for reflection.

In January 2015, Esther Bejarano and five other survivors of the Auschwitz concentration camp were received by Pope Francis in a private audience to mark the 70th anniversary of the liberation of the camp.

Knowledge Transfer Partnership

As already reported in the previous issue of HF MIXING TOGETHER, Farrel Limited Rochdale is participating in the Knowledge Transfer Partnership (KTP), which has

been created to promote knowledge transfer between universities, research institutions and companies in the UK. Since 1 September 2014, José Perdomo has been serving in the role of the KTP employee. The 28-year-old engineering student from the Canary Islands holds a degree in Industrial Engineering from the University of Las Palmas de Gran Canaria and will soon complete his doctorate in Bulk Solids Handling Technology at the Wolfson Centre of the University of Greenwich.

'At the present time, I am becoming familiar with the details of the research project, nearly finished with the literature research, and working on the test benches in Production,' says José. 'My goal is to make an exhaustive determination of the operating conditions necessary for preventing leaks at high operating temperatures and for minimising friction and wear in dust compression seals with optimal lubricant film thickness.'

Tough Mudder® 2014 – HF Team tests its mettle on unfamiliar terrain

18 km, 750 m of climbing, 23 obstacles, mud, electric current, and faces beaming with pride at the finish line – that was the Tough Mudder® NRW, which was held in early September 2014 on the grounds of Herdringen Castle in Arnsberg. And five supermen from the HF MIXING GROUP were competing to put their mettle to the test! Our 'HF Supermen', who were in two teams, braved the hardest obstacle course of their lives to date.

Typical obstacles included the 4-metre-high 'Berlin Walls', which cannot be scaled without the help of other team members, and the 18-metre-long 'Cage Crawl', where the participants have to pull themselves along on their back through water with just 15 cm of space to breathe. In order to reach the finish line, our supermen even had to fight their way through a curtain of electrified wires dubbed 'Electroshock Therapy'. After two-and-a-half and nearly three hours, respectively, the two HF teams crossed the finish line, exhausted but happy.

Tough Mudder® is a worldwide series of 16 to 18-kilometre-long obstacle courses. Ideally suited for testing your power and endurance – and no less well-suited for putting strength of will and team spirit to the test. Tough Mudder® is no typical cross-country or off-road race. With its extremely innovative courses and more than a million enthusiastic participants, Tough Mudder® is the world's leading obstacle course series.



The five 'tough guys' from HF who took part in the 'Tough Mudder®'.

IMPRINT

Publisher

HF MIXING GROUP
Harburg-Freudenberger Maschinenbau GmbH
Asdorfer Strasse 60
57258 Freudenberg | Germany

Phone: +49 2734 491-0
Fax: +49 2734 491-150
mixing@hf-group.com
www.hf-mixinggroup.com

A member of the Possehl Group
www.possehl.com

Editorial, design, composition

Welke Consulting Group
No liability will be assumed for errors and misprints.

Responsible for content at HF MIXING GROUP

Dr Harald Keuter, Melanie Jahn

Images

Cover: Fotolia
Page: 3 shutterstock
Page 8–9: Fotolia
Page 28–29: Fotolia
Page 30: Fotolia
Page 39: Fotolia
Page 42: Fotolia
Page 44: Fotolia

Printing

Krüger Medienhaus KG, Hachenburg
Germany

Print run

5,850 copies

Distribution

Available to customers, employees, partners
and interested parties of HF MIXING GROUP,
free of charge.

We are looking forward to your feedback regarding our MIXING TOGETHER magazine.
Please contact Melanie Jahn from Freudenberg, Germany, at mixing@hf-group.com.

Many thanks for your interest!

www.hf-mixinggroup.com

Scan the QR code for further information.

