

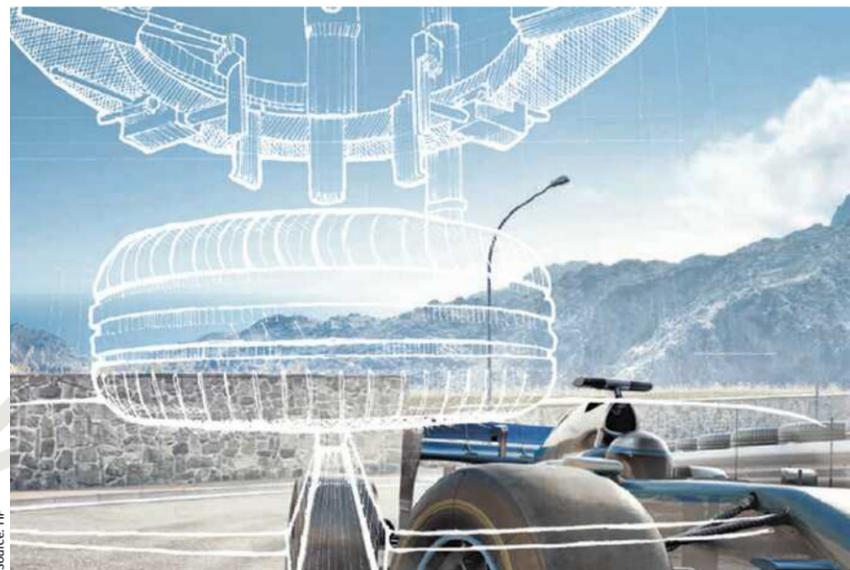
Robust under pressure

Major players upbeat, though headwinds stall last year's recovery, ERJ's Tire & Rubber Machinery Survey 2019 indicates

Given the market pressures that emerged during the year – international trade disputes, a cool-down in some tire markets and Brexit among them – the international tire & rubber machinery sector delivered quite a robust performance in 2018.

Figures from the 39 companies that completed the survey both this year and last year, show a sales total of \$4,077.2 million, just 0.8% lower than a year ago.

On the other hand, 2018 brought an abrupt halt to the previous year's bounce-back, when a similar like-for-like comparison in the survey recorded a 15.5% year-on-year increase in sales.



Sales for the 13 Chinese machinery makers that supplied figures for both surveys indicated a 12.3% year-on-year growth in combined turnover to \$1.09 billion. This compared to growth of 19.0% recorded in our survey last year.

Interestingly, though, data provided by the Chinese Rubber Machinery Association (CRMA) also estimated total sales of Chinese rubber machinery at \$1.40 billion in 2018, about 24% higher than a year ago.

Table toppers

There was a more settled look to the ranking by sales of the major tire & rubber machinery manufacturers after some jostling for top position over recent years.

HF Group emerged as clear leader, helped by 15.5% year-on-year growth in sales of tire & rubber machinery to \$462.3

million for 2018.

This helped put some clear water between HF and closest rival VMI, which grew sales by 1.8% to \$402.5 million.

At another major contender MESNAC sales of tire & rubber machinery grew by 6.0% to \$274.1 million, CRMA figures show – MESNAC itself reporting 1.0% year-on-year sales growth for the group as a whole, to \$402.5 million.

Another noteworthy performer was Tokyo-based Kobe Steel, which delivered growth of over 5% to \$206.0 million despite challenges in its most important market China (see below).

Business trends

Amid all the current woes besetting the global economy, business-confidence ratings among survey respondents matched those of last year, with plans for expansion, acquisition and/or plant-investments again running at high levels.

Asked to identify the fastest growing geographic market regions, there was a large degree of consistency between respondents'

Principal rubber machinery makers worldwide (sales in million US dollars)

Company	Sales 2018	Growth 2018-17	Sales 2017	Growth 2017-16	Sales 2016
HF Group ¹	462.3	+15.5%	400.2	+5.2%	422.1
VMI Group BV	402.5	+1.8%	395.5	+19.2%	331.9
Mesnac Co. Ltd ²	274.1	+6.0%	258.5	+58.4%	163.2
Mitsubishi Heavy Industries Ltd ³	210.0	+5.0%	200.0	0.0%	200.0
Kobe Steel Group ⁴	206.0	+5.1%	196.0	+2.1%	192.0
Dalian R & P Machinery Co. Ltd ²	152.6	+32.9%	114.8	+13.7%	101.0
LWB Steintl GmbH & Co. KG	148.4	+5.1%	141.3	+18.2%	119.5
Troester GmbH & Co. KG	141.5	+4.4%	135.6	+2.2%	132.7
Klößner DESMA Elastomertechnik GmbH ³	140.0	+6.0%	132.0	+13.2%	116.6
Safe-run Machinery Co. Ltd ²	131.9	-5.0%	138.2	+11.5%	124.0
Comerio Ercole ⁶	88.0	+4.6%	84.1	+7.1%	78.5
Tianjin Saixiang Technology Co. Ltd ²	81.1	+5.5%	76.9	+16.2%	66.2
Herbert Maschinenbau GmbH & Co. KG	80.5	+14.7%	70.2	+19.1%	66.4
Pelmar Engineering Ltd	80.5	+22.9%	65.5	+26.0%	52.0
Larsen & Toubro	75.0	+25.0%	60.0	+8.3%	55.0
Cimcorp ⁵	74.6	+1.0%	74.0	+30.0%	57.1
Uzer Makina VE Kalip Sanayi	71.3	+46.7%	48.6	+14.1%	42.6
Zeppelin Systems GmbH ⁷	70.0	5.0%	66.4	0.0%	66.4
REP International ⁸	69.0	+10.9%	62.2	+12.5%	55.3
Doublestar Mechanical Ltd ²	56.3	-44.6%	101.5	+25.8%	80.7
Rodolfo Comerio	55.7	+14.4%	48.7	+13.5%	42.9
Maplan ³	53.5	+5.0%	50.9	+2.2%	49.8
Guilin Rubber Machinery Factory ²	53.4	-18.2%	65.3	+1.6%	64.3
Sino-Rubber Machinery Co. Ltd ²	53.3	-33.6%	80.3	+1.0%	79.3
Guilin Rubber R & D Institute ²	51.6	-3.7%	53.6	+24.1%	43.2
Beijing Wanxiang Co. Ltd ²	45.9	-25.4%	61.5	+75.7%	35.0
Yiyang R & P Machinery Group Co. Ltd ²	45.5	-35.2%	70.1	-24.7%	93.1
Konstrukta-TireTech a.s.	33.3	+15.6%	28.8	n/a	n/a
Marangoni Meccanica Spa	32.2	-53.0%	68.0	+393%	17.3
French Oil Mill Machinery Co. ⁹	29.0	0.0%	29.0	16%	25.0
Sichuan Yaxi R&P Machinery Co. Ltd ²	23.5	-9.3%	21.5	+5.9%	20.3
Beijing Jingye Mechanical Equipment Co., Ltd ²	22.8	-14.3%	26.6	-27.3%	36.6
Wuxi Suanxiang R & P Machinery ²	22.1	+3.3%	21.4	+10.3%	19.4
4Jet Technologies GmbH	19.6	+2.1%	19.2	n/a	n/a
Calemard Spoolax	18.4	-9.4%	20.3	+34.4%	15.1
Z-Laser Optoelektronik GmbH	15.5	+11.5%	13.9	+25.2%	11.1
Gislotica ³	6.0	+5.0%	5.7	-13.6%	6.6
Carter Brothers	4.6	0.0%	4.6	n/a	n/a
Gillard Cutting	4.0	+14.3%	3.5	+9.4%	3.2
Sinoarp Tires Equipment Technology ²	n/a	n/a	40.4	+80.4%	22.4
Shaoxing Jingcheng R & P Machinery ²	n/a	n/a	n/a	n/a	15.1

All euro/dollar conversions €1 = \$1.15, based on average rate during 2018.

1: HF Group covers Harburg – Freudenberger AG, Farrel Ltd and Pomini Rubber & Plastic

2: Figures provided by Chinese Rubber Machinery Association (CRMA) using currency conversion \$1 = RMB6.75

3: ERJ estimate (see below)

4: Kobe Steel estimated for fiscal year to 31 March 2019

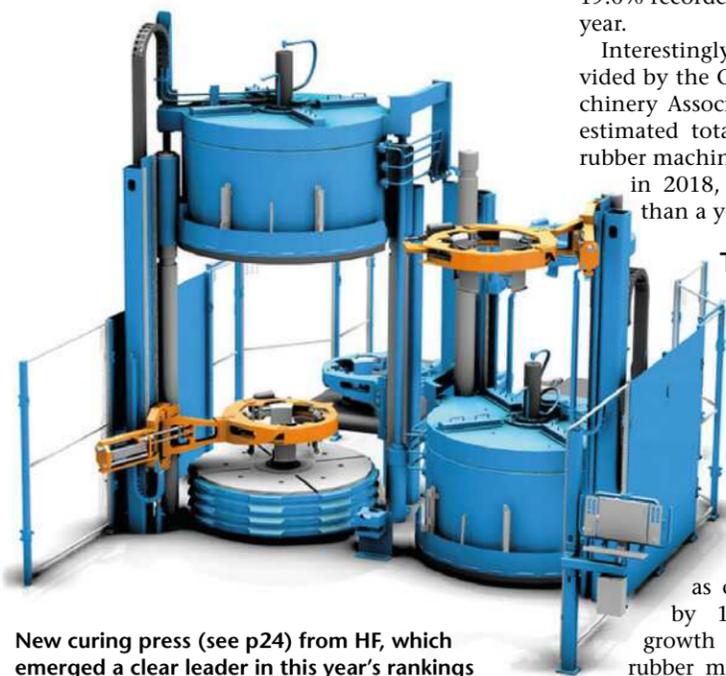
5: Estimate for Cimcorp tire industry division

6: Comerio Ercole pre-final balance sheet figure

7: Zeppelin Systems rubber business estimate

8: REP International estimate

9: French Oil Mill Machinery figure based on estimated sales-range supplied (\$24-34m)



New curing press (see p24) from HF, which emerged a clear leader in this year's rankings

replies across our 2019 and 2018 surveys.

This metric usually throws up significant variations from year to year, but our 2019 study mostly indicated only minor changes – slight improvements in ratings for western Europe, central/eastern Europe, North America and China.

An exception, though, was India, which was identified as one of the strongest-growing market regions by 62% of respondents – up from 46% in last year's survey.

Survey ratings for the fastest growing industry-market sector, likewise, came in more-or-less unchanged this year, with

steady showings by the tire, automotive parts, general rubber goods and engineered products sectors.

Manufacturers' viewpoints

Feedback from leading machinery suppliers – both in interviews

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and written comments supplied for this year's survey – reflect different degrees of uncertainty and optimism about the current direction-of-travel of their markets.

For its part, Pelmar Engineering said the market “now increasingly requires upgrading of existing equipment as part of brownfield projects, simultaneously with greenfield projects, which we expect to subside in the coming years.”

In comments for the *ERJ* survey, Pelmar added that it also foresees “major closures of plants in China, and several new projects in North America and India.”



“Business is now going well especially in Europe and India. The [general] trend has been improving since early last year”

LUCA BONOLLO, MARANGONI MECCANICA

All of the above trends “will have an impact on rubber machinery production, sales and building,” the Israeli group further commented in its statement.

Pelmar went on to note in-

creased demand for specialised machinery and systems for improving working conditions and reducing emissions, as well as for automated weighing and feeding systems.

In its 2018 annual report, VMI parent group TKH noted higher earnings and profitability despite a “continued high proportion of engineering for clients among the top-five tire manufacturers.”



L&T's manufacturing facility at Kanchipuram, India



“The market looks good currently and for the next year in India”

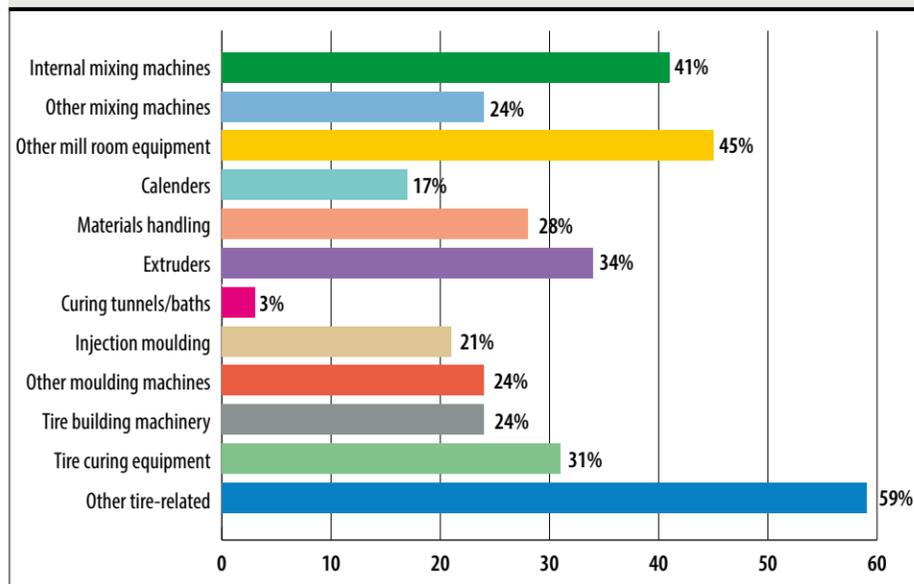
MK SURESH, LARSEN & TOUBRO

Indeed, the Dutch group added that the share of the top-five tire makers in VMI's order intake increased further last year.

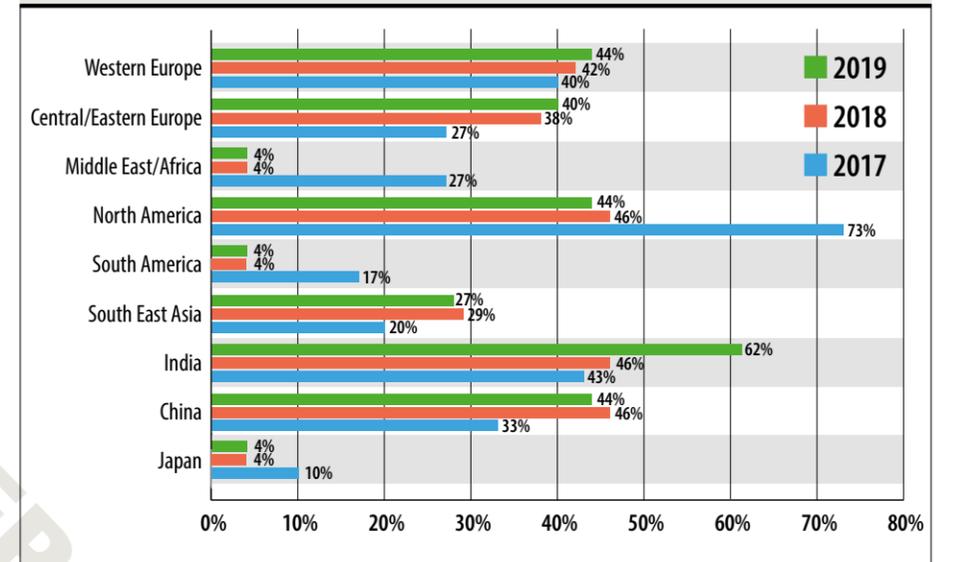
However, TKH reported order intake in China “at a low level and given the decline in capacity utilisation in the tire manufacturing industry in that country, we do not expect this situation to change in the coming year.”

At Marangoni Meccanica, new commercial director Luca Bonollo said “business is now going well especially in Europe and India.

2019 profile of types of machinery manufactured



Fastest growing region



The [general] trend has been improving since early last year and has remained strong.”

Looking forward, however, Bonollo expects some market contraction from the middle of this year – reflecting a decline in the tire market during the final quarter of 2018.

“It is a question of our customers' markets, which went down in the final quarter of 2018. So, I believe that investment for this year will go slightly down,” he explained to *ERJ*.

There remain, however, some high-growth markets for tire & rubber machinery suppliers.

“Overall business looks good currently and for the next year in India,” summarised M.K. Suresh, joint general manager & head, marketing, customer service & testing at Larsen & Toubro (L&T).

Overseas, L&T is not seeing new investments – except in the OTR segment – but expects a pick-up over the next two years, according to the machinery company manager.

“The Indian tire industry has been investing in a number of

greenfield and brownfield projects, catering to all the tire segments,” Suresh added in an interview at Tire Tech Expo 2019.

“We expect this growth and investment to pan out in the next financial year as well,” commented Suresh.

Much of the tire sector investment is being driven by India's fast-growing passenger car industry, which currently produces about 3.5 million cars per year.

“The recent quarter did see a bit

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→ Continued from page 21

of [a decline in] growth in the passenger car segment," noted Suresh. "Hopefully this is just a temporary phenomenon."

After some years of decline, he added that India's commercial vehicle market is delivering growth as high as 25% this year – albeit from a relatively low base.

There is also a lot of investment in new production of two-wheeler tires, for which India is the world's largest market at about 16 million units/year.

At Kobe Steel, consolidated sales of rubber machinery edged up to \$206 million in 2018, from \$196 million the previous year.

"Frankly we expected a bigger increase," said Naoaki Kimura, area general manager, Kobe Steel Group – noting, in particular, developments in the Chinese market.

Last year, he said, passenger car tire sales in China fell by 4.1% while truck/bus tire sales increased 5.1%. This resulted in an overall decline of 2.8% in that market.

"Demand for truck/bus tires related machines was okay, or above our expectations, but one year ago we expected more," the Kobe Steel manager told *ERJ*.

Kimura went on to note increased investment by some Japanese tire makers, Bridgestone and Yokohama in particular, in part to



“2018 started a little bit slow but at the end of the year the market went up very, very rapidly”

NICOLA FEDELE, RODOLFO COMERIO

strengthen their position in the Chinese OE market.

Annual production at Uzer Makina has increased from 60-70 presses in 2017 to 150 presses in 2018, reported marketing & business development engineer

Mehmet Akın Kılıç.

"This year, we are fully booked and we are taking orders for 2020," he informed *ERJ*. "The market is still growing with the big players now investing."

For example, Kılıç said Indian tire makers "are investing a lot and looking to build new plants to increase capacity."

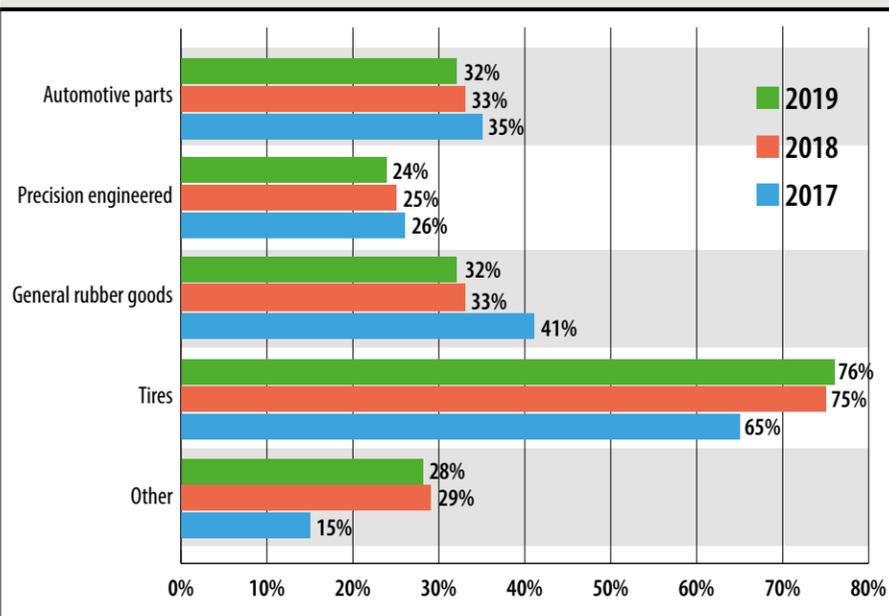
"Other customers are also investing, probably due to the Chinese situation and tariffs. I think tire makers are trying to expand capacity in other areas, including Europe."

Uzer Makina, he added, is also following major new tire plant projects in Serbia, Saudi Arabia and Algeria.

Nicola Fedele, international sales and marketing manager at Rodolfo Comerio gave an upbeat assessment for the rubber machinery side of the business – the company also supplies the PVC and flooring industries.

"2018 started a little bit slow but at the end of the year the market went up very, very rapidly," said Fedele. "Then, also at the beginning of 2019 we finalised many contracts."

Fastest growing industry market sector



Regarding the Chinese market, he said that at the start of 2018, tire makers there were not ready to buy new machines as they had already invested heavily in previous years.

"But now doors are opening, and we finalised projects at the start of this year in China as well as in India and Europe," said the Rodolfo Comerio manager.

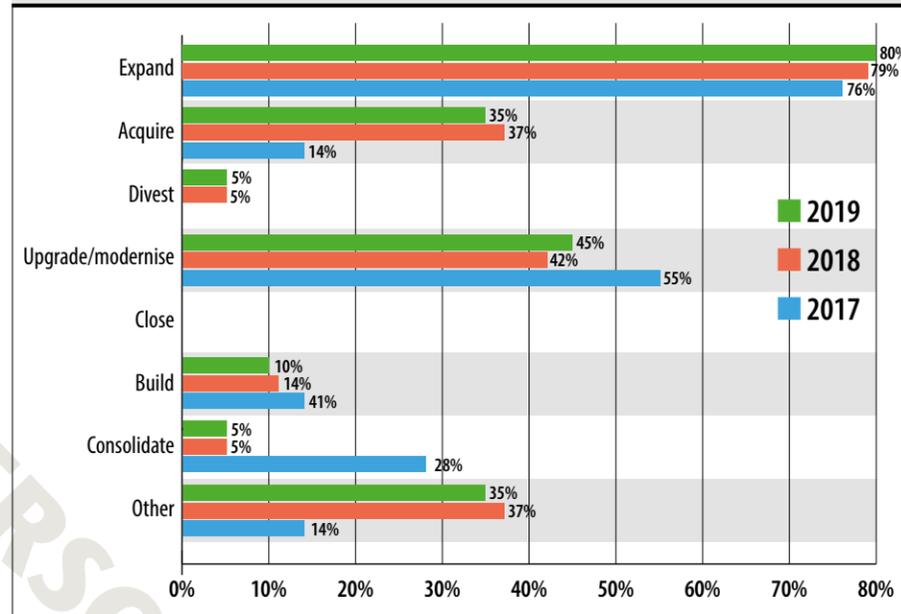
"My prediction is that 2019 will be a [strong] year for Rodolfo," concluded Fedele, pointing in particular to demand for the company's newly patented, high-accuracy calendering technology.

Things may be slowing down in some markets but are picking up in several others, Paul Kapper, sales director, RJS Corp. said in an interview, also at Tire Tech Expo.

"So, there are some markets for example south east Asia and India, that are still very active," he noted. "And we have projects in the US, which we are working on right now."

And while, he said, recent trade disputes had impacted business

Future plans



in China, companies there are mostly expanding elsewhere in south east Asia countries including Vietnam and Thailand.

On the other hand, Kapper said: "I keep hearing that Europe

is slowing. There is a lot of uncertainty."

Asked about technology trends, the RJS executive said "what everyone is looking for now is automation and robotics."



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Innovation on demand

Machinery manufacturers discuss their latest advances in technology and the changing demands of the tire industry. **Patrick Raleigh** reports

As might be expected in the emerging era of Industry 4.0, tire & rubber equipment manufacturers are reporting increasing demand for enhanced automation, data-acquisition and connectivity features on their machines.

But there is also a continuing push for engineering-led innovations that increase the accuracy, efficiency, functionality and reliability of calenders, mixers, presses and tire-building machines.

The latter trend is evident in HF Tire Technology's new 'Curemaster' presses for truck tires, which respond to tire-maker demands for enhanced flexibility, precision and cost-savings.

"We have taken the traditional mechanical design for a curing press and shifted it to a hydraulic concept," said Kevin Rolfe, vice president sales, HF TireTech Group.

The Curemaster is configured to provide larger diameter capabilities within the space required by a traditional press design, Rolfe said in an interview with *ERJ*.

In terms of flexibility, conventional presses typically have double cavities that can only cure the same tire in the same mould in those cavities, added Stefan Bahlke, lead engineer, HF TireTech Group.

"Our new machine is independ-



Marangoni is focused on automation and machine customisation

ent from the left cavity to the right cavity. So you can cure totally different products in the two cavities," Bahlke stated.

Such flexibility is needed, said Rolfe, as the 'tickets' are getting smaller in tire factories, in line with orders from their customers.

The design, he added, also responds to an increase in the variety of tires now being required by the market.

For his part, Bahlke noted that – unlike with traditional machines – if a problem arises in one press

you can do stop it for maintenance while the other is still running; so you don't lose 100% of production.

Cycle time is 30% faster due to the mechanical movements used to load and unload the tires, the HF officials further claimed. The Curemaster, they added, consumes a third less energy than a traditional machine.

"Unlike the old mechanical presses which tilt backwards, consuming a lot of energy, here there is a curing chamber sitting on the machine with the mould inside," Rolfe explained.

Further energy-savings are achieved as the mould is enclosed in an insulating chamber, as opposed to the open designs of conventional mechanical machines.

Bahlke went on to highlight the problem of bending on traditional double-cavity machine with a connecting beam – over time, causing both wear and non-uniformity.

"With the new design, the pressure is applied all around so you get complete uniformity and minimised wear," said the HF lead engineer.

Consistency is becoming a big issue with truck tires, for example, getting bigger and sidewalls getting thinner, according to Rolfe.

"Tires are changing, and they will change even more if you look at trends such as e-mobility. This machine gives the flexibility to react to that," concluded Rolfe.

Hybrid technology

Kobe Steel Ltd, meanwhile, is reporting market-inroads for a hybrid mixing technology, which combines the features of tangential and intermeshing mixing.

This is based on the Japanese company's 5THR rotor, which is designed to significantly improve quality and productivity in the mixing of silica-rich tire compounds.

"Customers worldwide have finished evaluations and are moving to the commercial stage," Yasuhiro Kameda, mixing process engineer at the Tokyo-based company told *ERJ*.

"Finally, we have started to get good orders for this rotor technology," he said. "It took time, but since last year, we have become confident in [market demand for] the 5THR rotor."

Target customers include companies operating tangential mixers in their factories, added Naoaki Kimura, area general manager, Kobe Steel Group, speaking in the same interview.

"As a solution to improve silica mixing in tangential mixers, we propose our rotor," said Kimura. "Tire majors have given certificates to 5THR, so this is already a solution, including for existing factories."

Also on the engineering front, Rodolfo Comerio is reporting growing demand for its patented 'sliding friction-free' system and 'GAP system' technologies, which it claims deliver the highest available accuracy in the market.

The technology ensures that in the shifting of the specialist calender rolls, which laminate the rubber with fabric and steel layers, there is no friction in the positioning.

"We are at an accuracy of ± 1 microns," said international sales and marketing manager Nicole Fedele. "This is the best in the market, because of the new technology concept in the frame of the calender and the bearing [module]."

According to Fedele, Rodolfo supplied four machines with the new technology last year and has already supplied three orders in 2019.



Kobe Steel officials reported progress with commercial application for the company's 5THR hybrid mixing rotor

The attraction for tire makers, he said, is that with higher accuracy they save money in terms of rubber consumption, reduced scrap and efficient use of materials.

Moreover, all tire industry customers want to reduce the thickness of the materials to have lighter tires, the Rodolfo manager pointed out.

"With a standard calender, of course, you can reduce the thickness, but you get stability issues with the fabric and on the steel. With our technology the process is completely stable," he claimed.

Automation levels

Recent developments at Marangoni Meccanica have included an automated, first-stage tire-building machinery offering different levels of automation to deal with demanding cycle-time and process specifications.

According to Marangoni, end users can achieve "fine-grained control of the process, without compromising on the complexity of the tire designs that can be manufactured."

An automatic finger ply-down and bead setting with pneumatic or mechatronic controls, means "even the most complex designs can be realised," the company has stated.

"The key point for us is to have machines where the quality of the tires is not depending on the operator," said Luca Bonollo, newly appointed commercial director of Marangoni Meccanica SpA.

"We offer machines where the key point is quality because the rest, like speed and flexibility, must come [as standard]," he added. "So machines that are well automated to eliminate human error."

Customers also come to Marangoni for tailor-made machines, continued Bonollo: "So we provide a machine lay-out that is compliant with the specifications of our customers, rather than them having to adapt their processes to our machine."

"For us it is much more than just a question of integration. We really customise our machines to fit the needs of our customers in terms of tooling, in terms of drums... [etc]."

Flexibility is "very important" in the agriculture and OTR tire sectors served by Marangoni, continued the commercial director.

"We can cover a very wide range of tires, from 20" to 32" without any tooling changes," he said. "It

“All tire industry customers want to reduce the thickness of the materials to have lighter tires”

NICOLE FEDELE, RODOLFO COMERIO

is a question of software, recipe and the machine, which can adapt the process at the press of a button. This is something that is really requested by customers."

For M.K. Suresh, joint general manager & head, marketing, customer service & testing, Larsen & Toubro Ltd (L&T), tire makers are concentrating particularly on reducing cycle time and increasing product variety.

The resulting increase in mould-change frequency is a big challenge

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HF's Stefan Bahlke (l) and Kevin Rolfe at Tire Tech Expo 2019

→ Continued from page 25

because any mould-change time is non-value-added time, he told *ERJ*.

"We are working to provide a reliable solution for quick mould-change both for the mechanical and hydraulic curing press to cut downtime."

Reducing customers' investment costs is another focus for L&T, which has developed a compact, floor-mounted curing press for PCR tires. The deck-height is short, and it can be mounted on the floor instead of a pit, which helps reduce capex, explained Suresh.

"Another area, which is still in an early stage for us is machine compliance for Industry 4.0. This is a focus area for us and we are working closely with our customers and suppliers on this front," said the L&T manager.

Likewise, Riccardo Comerio, CEO of calender manufacturer Comerio Ercole highlighted demand "not just to supply a machine but also to provide a 360-degree service for engineering to machinery supply."

The 200-employee Italian company, he said, is already leveraging Industry 4.0 technology to deliver improvements in productivity and process reliability for customers.

"For example, very recently we opened a new department for remote support and maintenance of our machinery around the world," said Comerio.

With a staff of six people, the department means Comerio is now in a position to provide 24/7 support including predictive maintenance capabilities to tire plants anywhere in the world.

"One of our main markets, for example, is China, which is eight hours ahead of Italy, so we have to work 24 hours to support companies there," said the CEO.

"This service is very much ap-



PCR floor-mounted hydraulic press from L&T

preciated by customers: the possibility to be on their site when they need our presence," the CEO commented.

Tire companies, he added, are becoming increasingly open to remote support services: "At the beginning it was a little bit closed as a new concept but it is now happening more and more."

"Remote control is quite easy via the internet but to do it properly is not easy and has required a big investment to deliver complete control also on the customer side."

Trends towards Industry 4.0 and digital manufacturing in the tire manufacturing sector are also a focus for tire press and mould manufacturer Uzer Makina.

The Turkish company is collaborating with Finesline around applying an RFID mould management system for new moulds," said Mehmet Akın Kılıç, marketing & business development engineer.

Tire moulds normally have eight or more segments, so you put a tag on each segment as well as a chip

for the container, Kılıç explained to *ERJ*.

"Using an RFID scanner you can scan the segments to ensure they are the correct ones, if the sequence is right, if the segments belong to a particular container etc."

"This is often a big problem because if the segments are incorrect you end up with a lot of scrap tires."

The RFID system includes a mould-location option that can help find containers in the warehouse within seconds, Kılıç saying: "The technology reduces time wasted searching for segments and containers."

Also, he said, it provides information, for example, about how many times you have used the mould so that maintenance is done before it becomes unusable.

In another high-tech move, Uzer Makina has shelved plans to start in-house production of cast tire moulds, opting instead to move into 3D printing technology.

"We saw that this technology is growing so fast and decided not to push the casting so much."

Uzer Makina has yet to buy any 3D machines, but Kılıç said it will "probably invest this year and adapt it into our technology for winter tires."

On the engineering front, Uzer Makina is developing a compact floating column type press for truck tire production that as it easy to maintain and use, and less heavy than conventionally used designs. "This is a another goal for 2019," said the company engineer.



“ We have opened a new department for remote support and maintenance of our machinery around the world ”

RICCARDO COMERIO, COMERIO ERCOLE

Rubber machinery companies

Listing of tire & rubber machinery companies and their operations around the world, based on information supplied for the *ERJ* Machinery Survey 2019

4Jet Technologies GmxbH

Base: Alsdorf, Germany
Company status: Private
People: 130, incl 50 in rubber machinery
Sales: \$19.6m
Supplies: Laser systems for cleaning curing moulds, Laser systems for marking rubber goods
Plant: Alsdorf, Germany

Andrew Isaacs Machinery International Ltd

Base: Borehamwood, UK
Company status: Private
People: 5, incl 3 in rubber machinery
Sales: \$1.2m
Supplies: Has operation in Manchester and has acquired a warehouse for machinery storage. Able to refurbish and overhaul machinery to customer requirements.

Calemard Spoolex

Base: Roche la Moliere, France
Company status: Private
People: 70, all in rubber machinery
Sales: \$18.4m
Supplies: Materials handling equipment. Also: In-line and off-line converting cells, slitter-rewinders, spooling lines and doctor m/cs
Plant 1 Roche la Moliere, France / Converting equipment
Plant 2 St Martin du Mont, France / Robot and automation

Carter Bros (Rochdale) Ltd

Base: Manchester, UK
Company status: Private
People: 50
Sales: \$4.6m
Supplies: Internal mixing machines both intermeshing and tangential mixers, laboratory mixers, 1.5 & 5 litres and production mixers from 17.5 litres up to 620 litres. Also: Specialist facilities for the welding of Stellite and crack-free hard welds.
Plant: Manchester, UK

Cimcorp Oy

Base: Ulvila, Finland
Company status: Private
People: 400, incl 250 in rubber machinery
Sales: \$74.6m
Supplies: Fully automated material handling solutions with total material flow control
Plant 1 Ulvila, Finland / Automation systems
Plant 2 Grimsby, ON, Canada / Automation systems
Plant 3 Norcross, GA, USA / Sales and service

Comerio Ercole

Base: Busto Arsizio, VA, Italy
Company status: Private
People: 250, incl 180 in rubber machinery
Sales: \$88.0m
Supplies: Internal mixing machines; Other mixing machines; Other mill room equipment; Calenders. Also: Automatic

wind up machines; Cutting machines.
Plant 1 Busto Arsizio, Italy: Calendering equipment
Plant 2 Solbiate Olona, Italy: Calendering systems
Plant 3 Maslianico Como, Italy: Mixing equipment
Plant 4 Marnate, Italy: Plastics extrusion
Plant 5 Castellanza, Italy: Automation and Industry 4.0

Engel Austria GmbH

Base: Schwertberg, Austria
Company status: Private
People: 6,600 (group)
Sales: \$1.74 billion (group – 2017/18)
Supplies: Injection moulding machines
Plant 1 Schwertberg, Austria: injection moulding machines
Plant 2 Pyungtaek-City, Korea: Injection moulding machines

French Oil Mill Machinery Co.

Base: Piqua, Ohio, USA
Company status: Private
People: 75, incl 68 in rubber machinery
Sales: \$24-34m
Supplies: Internal mixing machines; Extruders; Injection moulding machines; Other moulding machines. Also: De-watering and drying mechanical screw presses.
Plant 1 Piqua, Ohio – manufacturing and innovation centre
Plant 2 Shanghai, China

→ Continued on page 28

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