

DEUTZ^{WORLD}

Edition 2 | 2018

The customer magazine of DEUTZ AG

HIGHLIGHT

„Get electrified“

Page 6

WORLDWIDE

Strong brand in China

Page 16



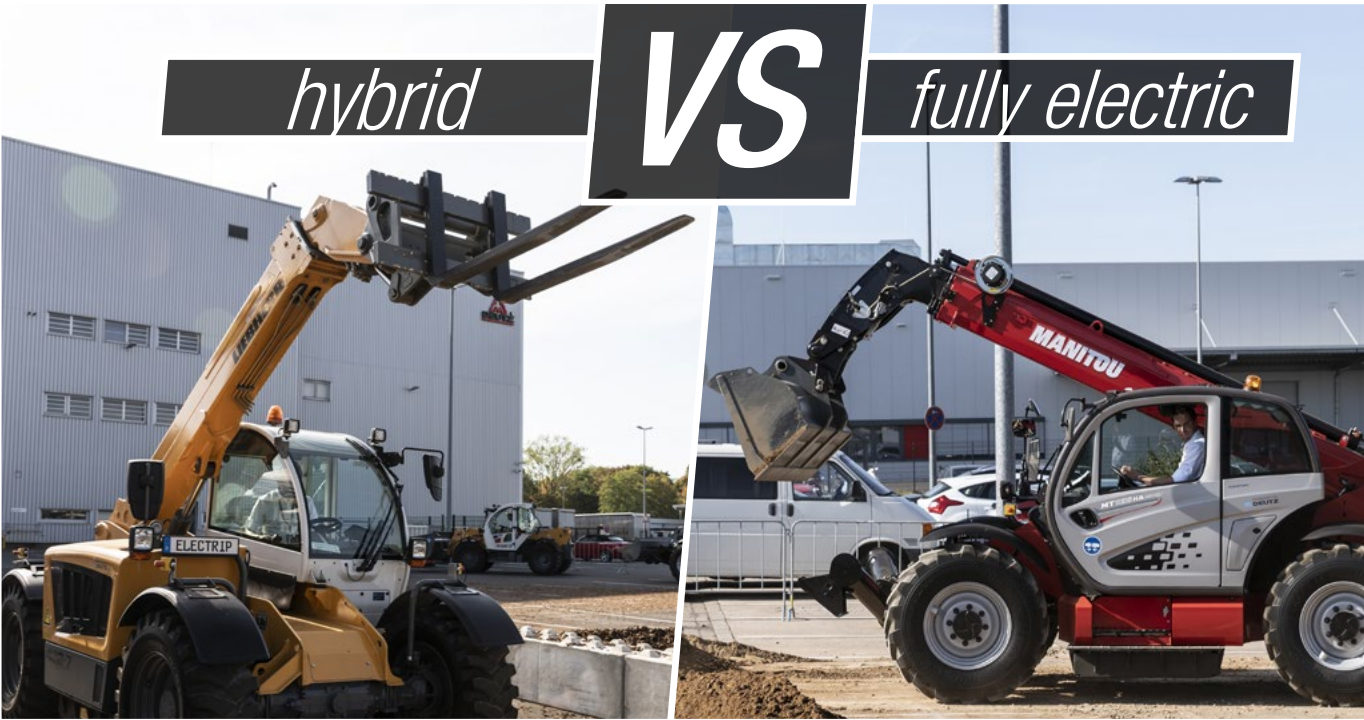
The new world of mobility

hybrid vs fully electric

Page 14

The engine company.





NEWS
Notifications and information regarding DEUTZ 4

HIGHLIGHT
„Get electrified“ DEUTZ ELECTRIP 6

Faster electrification with Scrum 9

Why even cows love electromobility expert round table 10



ENGINEERING
Green light for 9 to 18 litres 18

SERVICE
Great Service, Satisfied Customers 20

A conversation between partners 22

The right solution – always 23

QUALITY
The Power of Matter 24

CULTURE
A place with character 26

When a choir goes travelling ... 27



ELECTRIP Impressions 12

The new world of mobility hybrid vs. fully electric 14

WORLDWIDE
Strong brand in China DEUTZ sets the course for more growth in China 16

Convincing Performance In an interview: Michel Denis, CEO of Manitou Group 17



Note: Gender differentiation has not been applied in this document for reasons of improved legibility. The relevant terms apply for both genders in the sense of equal treatment.

IMPRINT

DEUTZWORLD, Edition 2/2018
Published by: DEUTZ AG
Ottostraße 1, 51149 Cologne
Person responsible:
Janina Decker, Public Relations

Director: Janina Decker
Phone: +49 (0)221 822 24 93
Fax: +49 (0)221 822 15 24 93
E-Mail: janina.decker@deutz.com

Editorial team: Janina Decker,
Michael Ziegler
Design: Diamond media GmbH,
Miria de Vogt

Printing: Druckerei Engelhardt
Picture credits: Janina Decker, DEUTZ AG, Foto Drathen, Andreas Möltgen, Nils Hendrik Müller, Stephan Pick Fotografie, shutterstock.com



DEUTZ is already
developing technologies for
tomorrow's needs – today.

Dr Frank Hiller,
Chief Executive Officer of DEUTZ AG

Dear readers,

The 'new world of mobility' is currently the hot topic. But what about drives and engines? Where is the trend going? For us as a supplier of innovative drive systems, one thing is clear: there isn't just one solution. Our customers and markets have different demands that are as unique in their particular configuration as any engine. That is why we have decided to offer solutions to meet all requirements – from traditional diesel to hybrid and all-electric drives.

To illustrate to our customers, financial and press representatives how we aim to accomplish this task, we went to the ELECTRIP event week, where we were able to demonstrate the progress of our E-DEUTZ strategy live with the first fully electric telehandler prototypes. We were able to equip two units with one hybrid and one all-electric drive for Manitou, as the first E-DEUTZ project partner, thereby proving that we deliver what we promise: DEUTZ is already developing technologies for tomorrow's needs – today.

I hope you enjoy reading this issue!

Yours truly,

Dr Frank Hiller, CEO

Dalian
DEUTZ sells stake in joint venture DDE

DEUTZ AG announced on 3 July 2018 that it intends to fully withdraw from the DEUTZ Dalian joint venture with First Automotive Works (FAW) in China. DEUTZ AG has now sold its 50 per cent stake in the company to the joint venture partner FAW following approval from the Supervisory Board and agreement on the necessary contracts. The parties have agreed not to disclose any commercial details. The transaction is subject to approval by the Chinese authorities.

Despite ending the long-running joint venture, DEUTZ and FAW will continue to collaborate on a basis of a customer-supplier relationship, and DEUTZ can still procure engines for off-highway applications from FAW upon request. To this end, the two

companies have reached an agreement to explore further possibilities for collaboration in future. The withdrawal from the DEUTZ Dalian joint venture is not expected to significantly impact on earnings this year.

“This step allows us to realign our Chinese activities. We are now reorganising our presence in China in order to generate stronger growth and be even more successful there. Talks on new alliances with major local partners in the construction equipment and agricultural machinery industries have already reached an advanced stage,” says Chairman of the DEUTZ Board of Management, Dr Frank Hiller. The Company plans to publish further details in the current year.



Dr Frank Hiller (DEUTZ AG) and Hu Hanjie (FAW Jiefang).

Cologne
40 New Trainees at DEUTZ

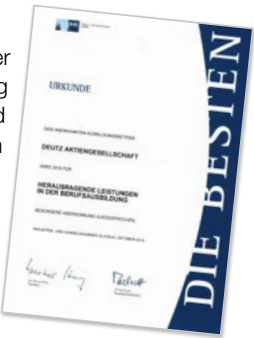
In September 2018, a new group of trainees started their career at DEUTZ AG. The company welcomed 30 young women and men at their site in Cologne. ‘I wish you all the best for this special day and your future training programme!’ said Dr Andreas Strecker, Chief Financial Officer and Director of Human Resources, Purchasing and Information Services, who welcomed the young people as part of an introductory session. During the onboarding days, designed by trainees in the second year of apprenticeship, the newcomers are prepared for their training and become acquainted with the various work areas and divisions. The company also welcomed new trainees at the DEUTZ locations in Ulm and Herschbach. In Ulm, eight young men and women started their training; in the components facility Herschbach two young people are learning their technical trade. For the first time, starting this year, DEUTZ also offers training as an IT specialist. DEUTZ is expanding its training portfolio in the digital sector with this new programme, which focuses on systems integration and application development.



DEUTZ Board member Dr Andreas Strecker (7th from the right) welcomes the new group of trainees

Cologne
DEUTZ apprentice is the best in North Rhine-Westphalia

Only a few weeks after the DEUTZ training centre won an award for its excellence from Cologne’s Chamber of Industry and Commerce (IHK), DEUTZ apprentice Tobias Bürger was honoured at the 2018 IHK awards ceremony for his outstanding results in the final production mechanic exam. The 21-year-old scored 92 out of a possible 100 points, making him the best apprentice in his profession in North Rhine-Westphalia. He received the award in the presence of state premier Armin Laschet, who attended the event as the guest of honour. “It is a great honour for us that our apprentice has achieved the highest score in the state and that we can therefore count ourselves among the best in North Rhine-Westphalia. We are very proud of the achievements of our apprentices and our training centre,” said Dr Andreas Strecker, member of the Board of Management for finance, human resources, purchasing and information services. This is the sixth year in succession that the DEUTZ training centre has been awarded at the awards ceremony.



Milan
New DEUTZ Service Centre in Milan

Over the past year DEUTZ AG acquired its long-time Italian dealer IML Motori, based in Lomagna, so that it can further strengthen its sales and service network in Italy with the newly formed DEUTZ Italy. With the construction of a new service centre in Milan, this strategy has now been once again reinforced. Covering an area of approximately 1,000 square metres, the new service centre includes a workshop as well as a warehouse. The workshop also has an extensive range of equipment at its disposal, including an engine test bench, a sandblasting machine, and several mobile service vans. The warehouse maintains an inventory of about 3,500 spare parts. Qualified in-house technicians support customers with all engine-related questions. This enables DEUTZ to offer its customers the best possible service and thus further strengthens the internationally established reputation of DEUTZ Service.

21 %

With a share of 309.2 million euros, the service industry accounted for 21% of total revenue in financial year 2017.

Cervasca
An excellent cooperation

On the occasion of the 20-year cooperation with DEUTZ and the delivery of the 40,000th DEUTZ engine in October, Amilcare Merlo, company founder and owner of Merlo, was honoured with a special award. The award was presented by DEUTZ board member Michael Wellenzohn as part of the DEUTZ choir’s itinerary in Italy, which subsequently presented the staff of Merlo with a special concert. Founded in Italy in 1911, Merlo S.p.A. mainly manufactures construction machinery and is one of the largest Italian companies of its kind with more than 48,000 telescopic handlers in operation worldwide.



Personnel

Leslie Iltgen appointed new head of Communications & Investor Relations at DEUTZ AG



Leslie Iltgen has been appointed the new head of Communications & Investor Relations at DEUTZ with effect from 1 November 2018. Ms Iltgen is also the new press spokesperson of DEUTZ AG.

Leslie Iltgen has extensive experience in capital market communications. Before moving into investor relations, she worked as an equity analyst for many years. Ms Iltgen has held various senior positions, including Vice President Investor Relations at Fresenius SE & CO. KGaA and, most recently, Vice President Investor Relations at STADA Arzneimittel AG, where in her role as head of corporate communications she also helped to shape internal and external communications.

DEUTZ AG’s former press spokesperson, Christian Krupp, was appointed the head of Finance & Controlling in May 2018 and has now handed over responsibility for Communications & Investor Relations to Ms Iltgen.

Dr Frank Hiller, Chairman of the DEUTZ Board of Management, said: “We are delighted to have appointed an experienced investor relations manager who is deeply familiar with the requirements of the capital market. We wish Ms Iltgen every success as she embarks on her new role with us.”

Between 15 and 21 September 2018, DEUTZ immersed itself in the world of electrification. Under the headline of “DEUTZ ELECTRIP – Get electrified”, the company invited customers, investors, media representatives and politicians to its facilities in Cologne. The guests got to enjoy the first live presentation of various hybrid and fully electrical drive systems from the new E-DEUTZ portfolio. Dr Frank Hiller, Dr Andreas Strecker and Michael Wellenzohn of the DEUTZ Management Board remembered the eventful week and talked about their personal highlights with DEUTZWorld.



DEUTZ ELECTRIP

„Get electrified“

DEUTZWorld: Dr Hiller, what was your personal highlight of the ELECTRIP week?

Dr Hiller: Hard to say! There were so many. The handover of the first E-DEUTZ prototype to our customer Manitou was doubtlessly one of the greatest moments of the week. Manitou have placed their trust in our vision of becoming the world's leading manufacturer of innovative drive systems. They asked us to develop the first E-DEUTZ prototypes for them. The handover of those prototypes was a very special occasion. But the event as a whole was an incredible highlight to me. We got to take our guests on a journey through the world of electromobility and let them experience our

innovative drive systems up close. Close, personal relationships with our customers, our analysts and the media are important to us. We are delighted that we got to present our new technologies to them during such a successful event.

DEUTZWorld: Mr Wellenzohn, you are the Member of the Board of Management responsible for sales, marketing and service. The customer event must have been especially important to you. What message did the VIP event convey to your customers?

Wellenzohn: We wanted to grant our guests a direct insight into the future of DEUTZ AG and show them the progress

we have made in electrifying the off-highway segment. This is an incredibly exciting period: our markets, including the off-highway segment, are heading towards electrification at full speed. As an integrator of drive systems, we want to spearhead this transition. Our live presentation of the Torquedo boats on water and the prototype presentations of the telehandlers have underscored our plans for shaping the future of electromobility with our E-DEUTZ strategy. We have completely revamped our strategic and technological focus. By taking our customers on our ELECTRIP, we want to show them the strong systems expertise of DEUTZ – live on site. The event achieved all that and more!



Henriette Reker, Mayor of Cologne, also enquired about the company's progress in the field of electrification during the Electrip Event Week.



We want to do more than just develop products. We want to advance our technologies with a focus on our target groups. Direct exchange with our clients is our best opportunity to provide products that are tailored towards their specific requirements.

Dr Frank Hiller, CEO DEUTZ AG

ELECTRIP events, however, we deliberately decided to go beyond conventional corporate presentations to offer a comprehensive experience. We want our audiences to be convinced of our products and their performance. We wanted to demonstrate our massive technological leap towards electromobility in a real and tangible way. Our guests' feedback for the day confirmed that we achieved our goals.

DEUTZWorld: Dr Hiller, how did the various groups of participants respond to the innovative products on show?

Dr Hiller: Their feedback was resoundingly positive. I was especially happy to hear our guests' interested questions, which really showed that all target groups had engaged critically with the topic. That is important to us: we want to do more than just develop products. We want to advance our technologies with a focus on our target groups. Direct exchange with our clients is our best opportunity to provide products that are tailored towards their specific requirements.

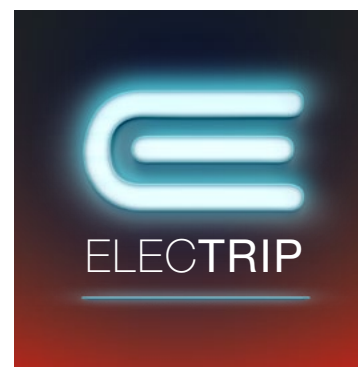
DEUTZWorld: That leads us to another question: Mr Wellenzohn, how important is it to make your customers engage with your product from the very start?

Wellenzohn: As Dr Hiller just said, it is very important to involve our customers directly

in the development phase. It allows us to learn about their wishes and requirements, which we can then take into consideration when developing our technologies and products. This is why their feedback is so crucial to us: our customers help us get better. Events like our ELECTRIP week are excellent opportunities to receive that feedback, of course. They give us a chance to discuss new technologies and potential collaborative endeavours in a casual, comfortable atmosphere. We want to work as closely as possible with our customers, investors and media representatives. We are a company that offers technology you can experience and touch. We know our target groups inside and out.

DEUTZWorld: Dr Strecker, what do you think about the ELECTRIP week? How do the investors view the topics of electromobility and electrification?

Dr Strecker: Electrification is an important topic for the capital market representatives, too. Under pressure from globally heightening emissions regulations, the mobility sector has been ramping up efforts to implement alternative drive concepts. I do believe that we are currently in the middle of a massive cultural change. Of course, we want to spearhead this incredible technological leap with our extensive systems expertise. And our analysts and investors approve of that.



There are many agile methods of development. 'Scrum' is one of the best known. Everyone seems to be talking about it, but what is it? And what does it all have to do with rugby? DEUTZ relies on this innovative method for the development of its new electric and hybrid engines. Thanks to Scrum, it has been able to realise fully functional electro prototypes in record time.

The term 'Scrum' is short for 'scrummage' and originally comes from rugby. Specifically, it refers to the situation that takes place whenever the match is restarted after a minor infringement: the players pack together closely with their heads down and plan their next attack. This recurring step, during which all team members discuss their tasks and flexibly tackle a complex problem together, is the central element of the Scrum method.

Traditional development projects often involve individual departments or persons working on their own tasks in isolation over extended periods of time. In the worst case, the team realises after several months that the result is not up to par. Agile development, in contrast, breaks down the entire project into the smallest possible sub-projects. These are tested in short cycles by everyone involved; if necessary, they are immediately adjusted to meet requirements. DEUTZ announced its first electrified drive concept at the beginning of the year. Its engineers were able to integrate the new concept successfully into multiple prototype machines in just six months – thanks to Scrum.

Michael Halfen, the Director of the Agile Competence Centre at DEUTZ, explained: "Our team meets up for their Daily Scrum every day. During this fifteen-minute meeting, they use a task board to discuss all current tasks and goals, provide each other with feedback and eliminate problems. This ensures that everyone is fully aware of their tasks for the day and capable of complet-

ing them. We work in a 14-day cycle. After each cycle, the development team presents its results to the customers or the specialist department that issued the order. Based on the customer feedback, we then define the tasks for the next two-week cycle."

"Scrum speeds up the product development process enormously. Even more importantly, it breaks up the counterproductive silo mentality," Wolfgang Titze, Agile Coach at DEUTZ, explained. "Everyone knows exactly what to do on any given day. And the team spirit benefits, too. The recently completed E-DEUTZ prototypes of a hybrid and a fully electric telescopic handler prove the effectiveness of the method perfectly."

In the study "Consortium Benchmarking: Agile Invention" conducted by the Fraunhofer Institute, DEUTZ was voted into the top five of more than 140 assessed companies for the processes and methods it employs. The results presentation and award ceremony will take place on 28 November 2018 at the Fraunhofer Institute for Production Technology (IPT) in Aachen.

Faster electrification with Scrum

Scrum refers to the situation when the players of a rugby team pack together closely with their heads down and plan their next attack.



Why even cows love electromobility

Within the scope of the ELECTRIP week of events, Dr Frank Hiller (DEUTZ CEO), Michael Wellenzohn (Member of the Management Board), Dr Christoph Ballin (CEO Torqeedo) and Dr Markus Müller (Director of Product Development and Technical Customer Support at DEUTZ) discussed the developments in the field of electrification. Their expert round table yielded a lot of surprising facts. The discussion was moderated by André Brockschmidt, the well-known technology expert of Bauforum24.

André Brockschmidt: Dr Hiller, one year after the launch of the E-DEUTZ strategy, we got to see the first fully functional E-DEUTZ drives in off-highway machines today. What is your interim assessment of the project?

Dr Hiller: Thoroughly positive. What we have achieved in this short time is really impressive, and I am incredibly grateful to the whole team. Ever since our acquisition of Torqeedo in the autumn of 2017, we have been working intensely on our first hybrid and electric drive solutions. After just sixth months of our collaboration, we presented our first concept at Intermat 2018. The speed with which our cross-functional team has applied their electric expertise to a DEUTZ field is just as impressive as the result. We can show our customers: our E-DEUTZ solutions work. I can unreservedly say that we have fulfilled the goals we set for ourselves.

Brockschmidt: Mr Wellenzohn, what proportion of the off-highway segment do you think will be electrified in future?

Wellenzohn: We have realised that we have genuinely assumed a leading market position as a provider of hybrid and fully electric drive systems. After the acquisition of Torqeedo, we started defining our modular product system in close coordination with our customers. Suddenly, our image as a 'producer of diesel engines' was a thing of the past. Our customers changed their strategic direction, and we suddenly had completely different conversations with them. Our current market analyses show a strong dynamic, and I think that a 30% share throughout all fields of application is quite realistic.

Brockschmidt: Dr Ballin, when I first heard about the collaboration of DEUTZ and Torq-

eedo, I was quite baffled. One year later, I am looking at a live demonstration and I can see that things are happening. How did you manage to unite the two companies so effectively?

Dr Ballin: We are delighted that everything worked out so well. As a start-up, we already had a certain degree of stability, and DEUTZ had already started moving towards agile methods of developments, sprints and sophisticated time constants. In this respect, we essentially put together two topics that had already started growing in the

same direction before – independently of each other. I am delighted to know that we combined our technological skills rather than just two physical locations. We are all pleased with the way everything turned out.

Brockschmidt: Dr Müller, as the Director of Product Development, you are an interface between the company and its customers. You can see what your customers want and what the company can achieve. What is the technical concept behind the strategy?

Technical expert
André Brockschmidt
(Bauforum24) moderated
the expert round table



Dr Müller: We have put together a capable team and, together with Torqeedo, examined what we can achieve in the field of performance electronics. On the other hand, we already had a great deal of experience with the same applications in our traditional field of diesel engines. We listened a lot and reconsidered even more. After all, we are no longer building engines for specific purposes. Instead, we have to ask ourselves: what requirements will this machine need to meet in terms of its load cycles, capacity and service life? Knowing our customers' requirements in depth is important to us. No two engines are alike. We need a modular system to work with the necessary flexibility in future. This puts us in a great position to fulfil our customers' wishes.

Brockschmidt: Diesel has become quite a hot topic. Dr Hiller, can you comment on the future of the diesel engine?

Dr Hiller: First of all: we are not electrifying our products so that we can replace the diesel. We believe that diesel engines still have a long future ahead of them. Especially in our off-road business. Diesel engines are highly autonomous and have an extremely high power density. They are irreplaceable for certain applications where no electric engine could measure up to them at this stage. We are definitely keeping the diesel engine around. Despite the many issues in the car industry these days.



Knowing our customers' requirements in depth is important to us. No two engines are alike.

Brockschmidt: Mr Wellenzohn, how do your customers profit from the E-DEUTZ strategy?

Wellenzohn: This is an extremely exciting, interesting time for us. We are focusing on our customers performance requirements and the different conditions in which our drives are used. They can be quite unusual: some studies have shown that cows give around 10% more milk if the tractor that brings them their food enters the stables quietly. We have to consider all these individual factors, and our modular product system allows us to respond to them. As a result, we get maximal standardisation for us and maximal flexibility for our customers' applications.

Brockschmidt: Dr Ballin, what do you think about the future of electromobility on the water?

Dr Ballin: At present, there are three segments that can be powered by electric drives with the currently available technol-

ogy, and we see a lot of progress in those fields: sailboats, ferries and taxis. Because we sell electromobility, we are becoming more competitive by the year. Ours is an excellent situation to be in. Battery technology is improving steadily without us investing large sums in it. This makes electromobility more competitive than combustion engines – and we do not have to advance this process actively. But our strategy always focuses on the present. We have to exploit current technological possibilities to tap into market segments that offer potential for electromobility. That is not a guarantee for success, of course, but success is possible. If we address the wrong segments in the first place, we have no chance.

Brockschmidt: We also want to know what is ahead, of course. Dr Müller, what can we expect to see in the DEUTZ product portfolio?

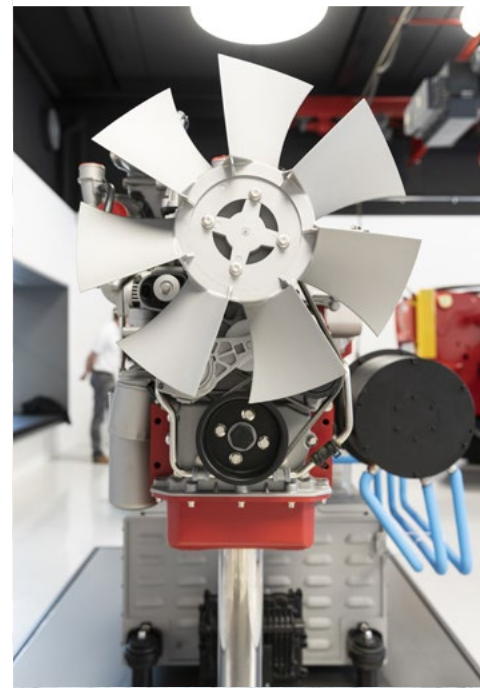
Dr Müller: That all depends on battery technology and the voltages we want to use. Buses use around 700–800 volt; we are at around 360 V. Never forget that machines are getting more complicated, too. We also have to take handling during service into consideration. We are primarily looking at fields where electrification is replacing the diesel engine. This will take place at up to 37 kW, and we are well prepared for it. We have positioned ourselves as a strong systems supplier and say: DEUTZ has the right solution, be it diesel, gas, hybrid or fully electric.

Experts among themselves: Dr Frank Hiller, Michael Wellenzohn, Dr Christoph Ballin and Dr Markus Müller (from left to right)



ELECTRIP IMPRESSIONS

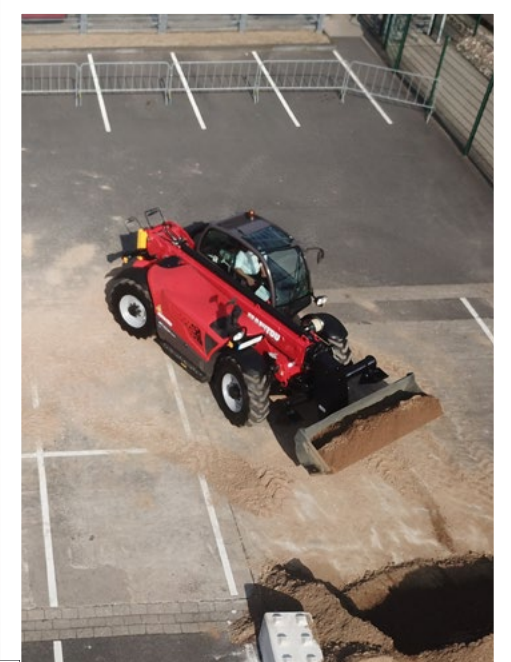
DEUTZ INNOVATION CENTER



ON WATER

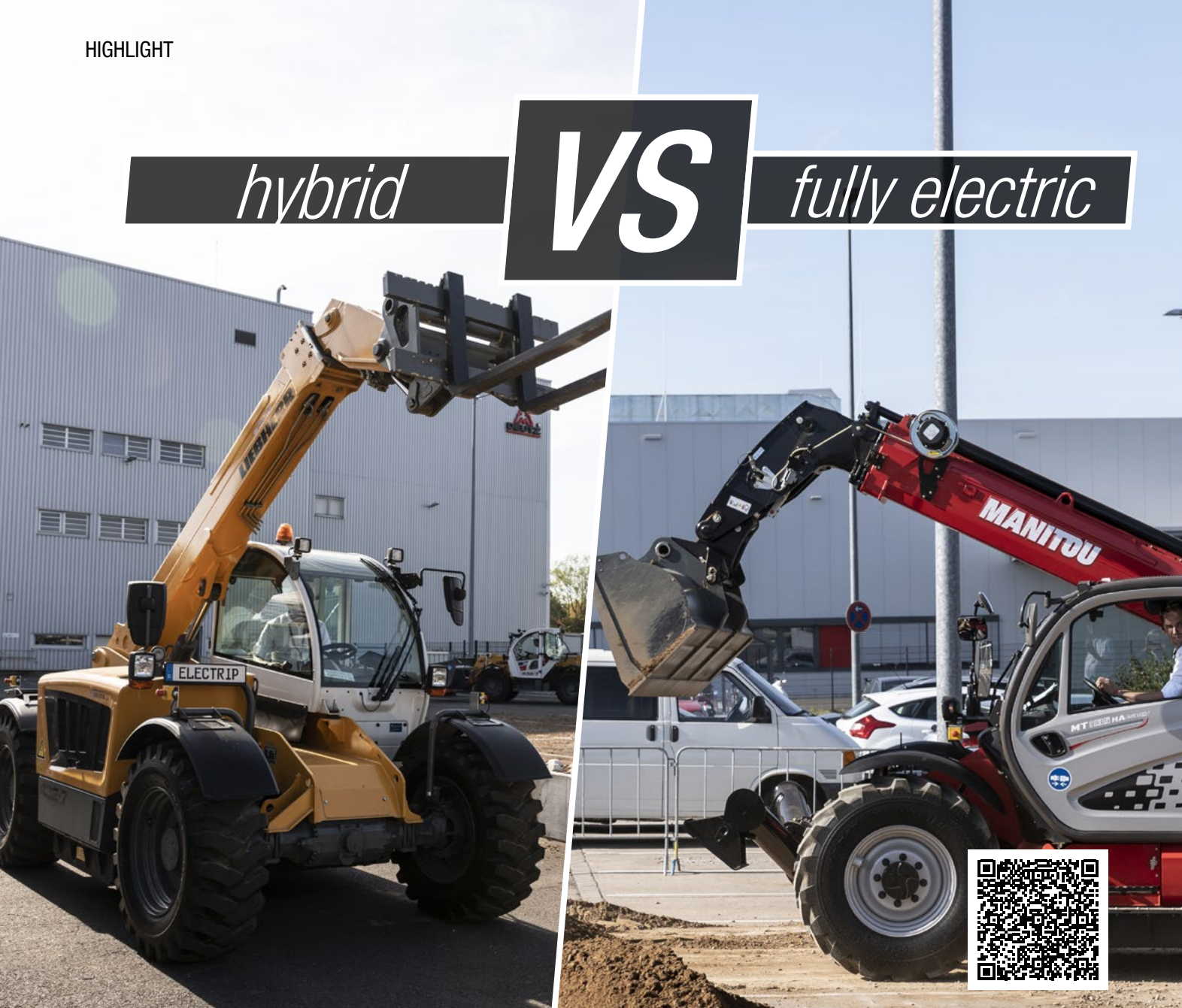


ON GROUND



VIP DINNER





The new world of mobility

What will power the off-road segment in the future? Hybrid engines, fully electric drives or the traditional diesel? The topic has been generating a lot of debate. For certain applications, diesel engines remain the best option (see the expert round table on page 10). But alternative drive concepts are becoming increasingly interesting to customers: especially small and medium-sized machines are suitable for hybrid or fully electric operation. DEUTZ offers a solution for both options.

ts customers know their priorities: the machines must work economically and reliably with each relevant load profile. Their requirements are as unique as the machines themselves. But different fields of application require different

technological solutions. Construction and agricultural machines almost exclusively use diesel engines due to their high power density and efficient fuel consumption. But electrification and hybridisation offer enormous potential for optimising performance,

efficiency and operating costs. During its ELECTRIP event, DEUTZ recently presented its first fully electric and hybrid telehandlers. We have had a close look at both versions of the modular E-DEUTZ product system.

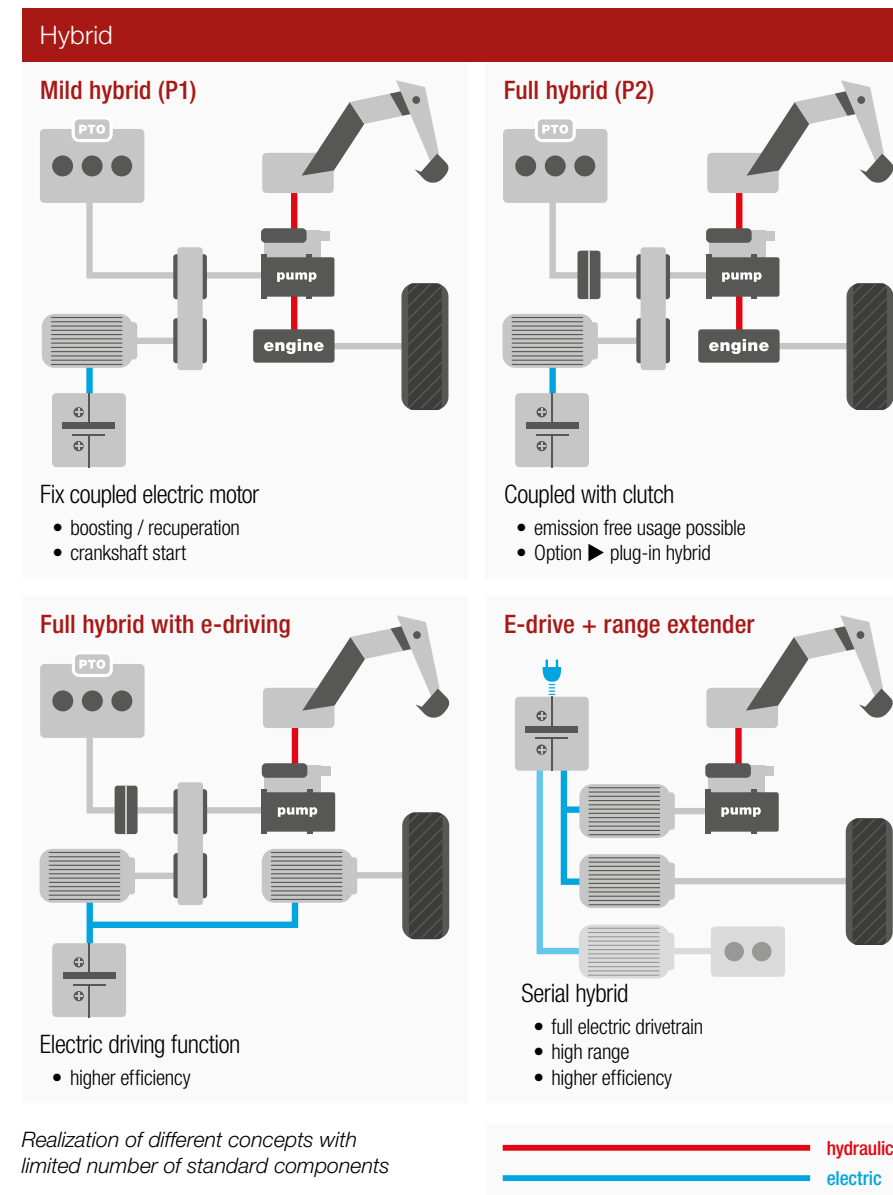
Hybrid:

A powerful e-engine that simultaneously functions as a generator. It is integrated into the transmission system mechanically. The combustion engine continues to constitute the foundation of the drive train, but the electric motor contributes during periods of high power requirements. Applications with dynamic load profiles are especially suitable for hybrid operation: mobile work machines such as excavators or telehandlers only re-

quire high amounts of power intermittently, e.g. for lifting their loads. Thanks to the supporting e-machine, hybrid systems can contain considerably smaller combustion engines, which saves fuel.

In concrete terms, the hybrid solution described above is equivalent to the replacement of a DEUTZ TCD 3.6 diesel engine (74 kW) with a TCD 2.2 (56 kW) combined with an e-machine (20 kW) in a telehandler. This system has achieved fuel savings of 15% in a typical telescopic handler: the ELECTRIP demonstrator, a Liebherr TL 432-7. The investment already pays off within the first two years, but the concrete savings potential always depends on the load cycle and the operating time of the specific application.

Realization of different concepts with limited number of standard components

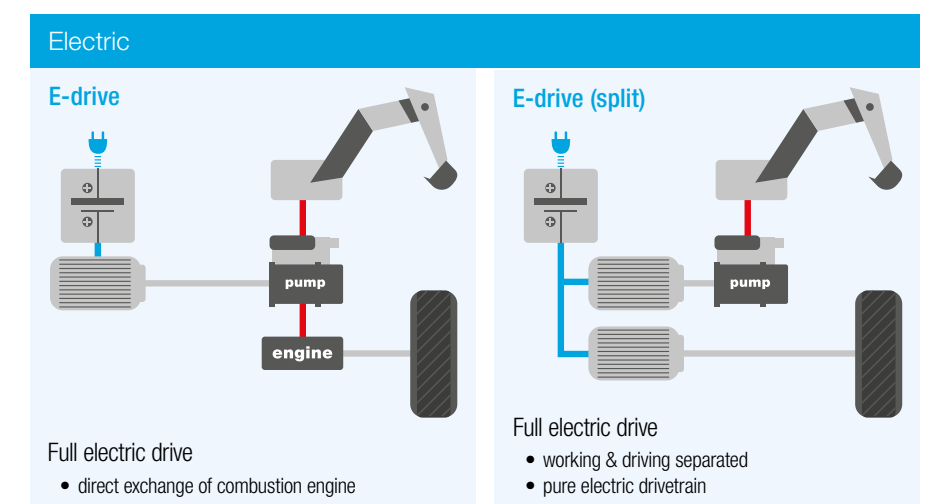


Fully electric:

The drive of the fully electric test machine is operated at a system voltage of 360 V. But the diesel engine has been replaced completely with a 60-kW e-machine. To ensure the constant supply of sufficient energy to the drive system, the telescopic handler is also equipped with a powerful 30.5-kWh battery, so it can handle even long operating periods at high loads. The fully electric E-DEUTZ drive offers great potential, especially considering the issue of air pollution in urban areas: it allows mobile work machines to operate at zero local emissions. On top of eliminating exhaust gases completely, it also emits considerably less noise.

A recent VDMA study put forward more good arguments in favour of electrifying mobile work machines: The use of plug-in hybrid drives and fully electric motors (partially) facilitates operation with zero local emissions. Besides the emission of toxic pollutants, this potentially also applies to noise. In tractors, electrification enables the use of electrically powered attachments.

High-capacity machines with long back-up periods and flexible work locations will continue to be powered by combustion engines. The fully electrical drive train will be used in machines that permanently work at zero local emissions, while applications in between the two extremes are interesting for hybrid concepts.



Versatile use, limited complexity

Strong brand in China

DEUTZ sets the course for more growth in China

We see great market opportunities and interesting cooperation potentials in the Chinese market for us and our advanced technology. At the same time we distance ourselves from activities that did not meet our expectations in the past. This will ensure that nothing stands in the way of realigning our China commitment.

Dr Frank Hiller, CEO DEUTZ AG

DEUTZ has a long-standing tradition in China. In recent years, however, DEUTZ has gradually divested itself of its Chinese joint venture companies and, most recently, announced last August that it would also dissolve the long-standing joint venture DEUTZ Dalian. The background: DEUTZ is completely realigning its role in China.

No country has experienced comparable economic growth as the People's Republic of China. From 2000 to 2010, China achieved economic growth between 8% and 14% and ultimately became the world's second largest economy. Most notably, however, China is also the world's largest engine market. It is therefore clear that companies such as DEUTZ AG have to position themselves strongly with their local brand identity in order to capture all the opportunities available to them.

In August, the DEUTZ Management Board therefore decided to completely withdraw from the DEUTZ Dalian joint venture and to sell its 50% stake in this company to its partner FAW. This decision gives DEUTZ the opportunity to completely realign its presence in China. That being said, FAW and DEUTZ will continue to cooperate as partners and DEUTZ will continue to source engines for off-highway applications from DEUTZ Dalian.

A few months ago, Christian Zürnstein was hired as the new CEO for the Asia/Pacific region. He has a long track record in the

50%

The global construction machinery market is on the rise: after six months, sales were up 26% compared to the previous year and will reach a new record high in 2018. This year, China and India in particular are the primary growth contributors (both with more than 50% growth in the first half of the year).

Source: VDMA



Chinese market and is based in Shanghai (China). Under Zürnstein's leadership, DEUTZ AG will continue to strengthen its sales activities in China and significantly expand its dealer network. "By changing our market presence, we want to grow faster in the future and become even more successful in China," explains DEUTZ CEO Dr Frank Hiller. Discussions regarding new collaborations with important local partners in the construction and agricultural sectors are already at an advanced stage. The start date of the China 4 emissions stages for off-highway applications was moved up to 2020 and represents one of the strictest emission levels worldwide. This provides new market opportunities for DEUTZ in China. DEUTZ already has the necessary off-highway market technology, which represents a major challenge for many local market participants - especially in light of the short lead time. This provides DEUTZ with new market opportunities and options to negotiate with leading Chinese equipment manufacturers to establish new promising collaborations. Thus, DEUTZ will not only be active as a distributor in China in the future, but also with its own production activities.



Convincing Performance

Manitou, a global OEM leader in the field of all-terrain telehandlers, was the first E-DEUTZ project partner to equip two units with both a hybrid and a fully electric drive. In an interview with DEUTZWorld, Michel Denis, CEO of Manitou Group, reveals why the company relies on electrified drives by DEUTZ.

our customers now expect further specific developments from us.

DEUTZWorld: Why did you choose DEUTZ drives for this project?

Michel Denis: With the acquisition of Torqeedo, DEUTZ quickly became a leader in the electrification sector. The Group has the necessary expertise and understands the special requirements of our applications. We have been building a strong, trusting, technically sound, and innovative relationship with DEUTZ over many years.

DEUTZWorld: How do you rate the performance of electric drives compared to conventional diesel engines?

Michel Denis: The performance potential of the engines is extremely impressive. After all, the performance of electrified drives for indoor applications has been established for many years. Thanks to the progress we made in working with DEUTZ, we can now offer our customers the same performance power of electric drives for outdoor and off-road equipment. That's a huge step forward! From a financial perspective, the total cost of ownership is structured quite differently, since, by today's standard, diesel engines are considered to be more cost-effective in terms of overall operating costs. However,

with continued improvements in battery prices, the total cost of ownership for electric drive systems will be comparable to that of diesel drive systems in the near future.

DEUTZWorld: What demands do your customers have for electric drives?

Michel Denis: All our customers frequently inquire and closely follow what we are developing in the field of electrified drives. They mainly try to understand Manitou Group's global strategy and CSR strategy in areas where alternative energies plays an important role, and to determine how to achieve certain (technical and financial) performance goals in their own business activities.

DEUTZWorld: In your opinion, how do you assess the market development in this segment with regard to electromobility?

Michel Denis: Electric drives will definitely represent part of the market in which Manitou Group operates. How quickly electric drives evolve will depend on improvements of individual components and reduction in maintenance requirements, as these factors lower the total cost of ownership. At the same time, customer focus on a similar strategic direction and compliance with regional regulations will also play an important role.



Green light for 9 to 18 litres

The DEUTZ TCD 9.0 / 12.0 / 13.5 and 18.0 engines, produced at Liebherr, expand the upper performance range of the DEUTZ portfolio. They have been integrated seamlessly in the DEUTZ sales and service organisation.



DEUTZ is expanding its product portfolio by four new in-line engines. The TCD 9.0 / 12.0 / 13.5 and 18.0 are the result of a collaboration from August 2017. They are produced at Liebherr Machines Bulle SA. The products have been integrated successfully into the DEUTZ sales and service organisation, and customers will have access to them from 2019.

for heavy-duty construction and agricultural machinery.

DEUTZ has acquired the global sales and service rights for the engines from Liebherr and sells them under its own brand. Its customers profit from the extensive application expertise of DEUTZ and its global sales and service network.

The collaboratively developed engines have been integrated seamlessly into the DEUTZ organisation to ensure that customers receive a complete DEUTZ product in every respect. Jens Wannhoff, Head of Application Engineering at DEUTZ, explained: "This crucially required documentation to DEUTZ standards, the same electronic interfaces and functions, and full integration into the service processes and systems. Customers will not notice any difference to an engine that has been produced in the DEUTZ facilities, from the installation in their machine to its servicing during operation."

Documentation plays an important role during the sales and application phase. It provides customers with all necessary information about the engine: specifications, installation guidelines, performance data, consumption levels. With its specific application expertise, Jens Wannhoff's team has



This crucially required documentation to DEUTZ standards, the same electronic interfaces and functions, and full integration into the service processes and systems.

Jens Wannhoff, Head of Application Engineering at DEUTZ

created marketable documentation. Compatibility with all existing DEUTZ systems, such as the motor diagnostics software SERDIA or the digital spare-parts documentation system SERPIC, is just as important. Both tools are essential for the later use of the engines in the field. They ensure suitable repair and maintenance processes

through the global DEUTZ dealer network. Appropriate service manuals and training programmes have been established to support the professionals on site.

"The project was a real challenge for us," Wannhoff emphasised. "To integrate the new engines – actually, the new control

units – into the DEUTZ system landscape, we put together an interdisciplinary team of experts from the fields of application, IT and service. This close collaboration allowed us to complete all project steps at the start of the serial production phase."



Essential for field operation: the new engines are fully compatible with all existing DEUTZ systems, including the SERDIA engine diagnostics software and the digital spare-parts documentation system SERPIC.

Great Service, Satisfied Customers



From excavators and tractors to forklifts, DEUTZ engines are the heart of a large amount of machines from a wide variety of industries. With the first use of the device in the field, one of the most important tasks for DEUTZ begins: The best possible supply and support of customers through impeccable service - worldwide, unique and for an entire engine life span.

More than 1.5 million DEUTZ engines are in use around the world in a wide variety of machines. The cost-effectiveness of all these machines depends on the life cycle costs, i.e. the sum of all costs over the entire service life. At this point it becomes clear: The obligation of an engine manufacturer towards its customers is far from over with the delivery of the product! In order to meet the requirements for availability and service life, expert maintenance and repair must be ensured worldwide, which is not an easy task considering the large number of DEUTZ engines in circulation. How can the DEUTZ Service Network fulfil this enormous challenge? It will only succeed if the interaction between field service, logistics, know-how and the correct tools works optimally.

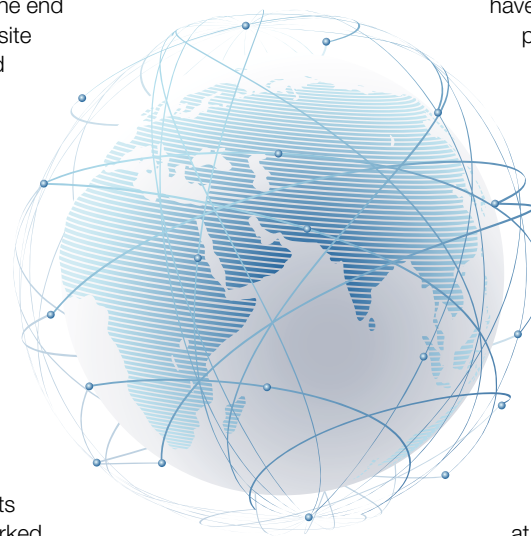
Powerful Service Network

13 sales companies and more than 800 sales and service partners are available to serve customers in more than 130 countries at any time. The requirements to become a certified DEUTZ partner are high: Frequent intensive training and audits are the basic prerequisite for optimal maintenance and repair of complex engine systems. Expansion of the service network is an ongoing process for DEUTZ: Each year, new service partners are added or company-owned service centres are established, most recently in the USA, Russia and Italy.

Logistics Services at the Highest Level

Approximately 40,000 different parts are stored in the central DEUTZ spare parts

warehouse in Cologne (Germany), and more than 4,500 order items with a shipping weight of more than 35 tonnes are shipped daily all over the world, sometimes even directly to the end consumer, construction site or farm. The end-to-end supply chain to the end consumer is ensured through additional warehouses in the US and Asia, as well as numerous local storage sites around the world. Such an extensive logistics network cannot exist without global supply chain management and modern IT technology: All DEUTZ spare parts warehouses are networked to enable computer-assisted optimisation of global warehousing. With 97%, customer satisfaction is at a very high level. Nonetheless continuous global and regional improvement is a core task of international logistics strategists. In 2017 alone, delivery performance in the highly



important Asian market was improved by 23%. The final link in the supply chain to the customer is made up of the more than 800 local service partners who must have the most important spare parts available at short notice in urgent cases. In order to ensure precise logistical performance at this level, material storage and inventory planning are monitored by DEUTZ dealers through frequent audits. The results are incorporated into the DEUTZ Dealer Evaluation System, which is used to systematically audit the service network. If, for any reason, a part is not in stock at a particular location, the regional central warehouses will fill in and deliver directly to the customer with drop shipments to ensure that the machine in the field can get up and running again as quickly as possible and the life cycle costs are stable.

Extensive Know-How

From a technological point of view, modern, electronically controlled diesel engines have little in common with their mechanical predecessors: The complex interaction of hardware and software, and especially the multi-step exhaust gas after-treatment systems, require a high level of technical expertise to efficiently and reliably perform maintenance and repair. Training DEUTZ's international service partners is therefore a key factor for ensuring global service at the highest level. More than 500 training courses with over 4,000 participants are conducted each year in the central training centre in Cologne and the national training facilities. The programmes focus on hands-on education: All maintenance and repair measures, as well as establishing the correct diagnosis of real damage scenarios are practised on actual training motors. The participants must find the previously prepared malfunctions and fix them. On-site training is supplemented with online training on service products and tools. After successful training, each technician receives an official certificate that is valid for two years. Because this subject matter is too complex and the technical progress of engines is

too fast, a refresher course must be taken every two years. If a service technician in the field ever runs into a stumbling block, he can call on the support of experts from the headquarters in Cologne at short notice via a web-based ticket system – after all, one rule applies to life cycle costs: Time is money.

The Right Tools for Every Situation

The correct part and necessary expertise are the basic prerequisites for being able to perform successful maintenance or repair on modern diesel engines. Furthermore, without the proper special tools reliable execution of service measures is practically impossible. Besides mechanical tools and devices, the diagnostic tool SERDIA plays a central role in professional testing of engine and exhaust gas after-treatment systems. Local experts, fast delivery of parts and the right tool – only by combining all these success factors can global service be provided at the highest level. This is how DEUTZ engines pay off in the long run – for the entire lifetime of the engine.

A conversation between partners



Jens Becker and Frank Lehnen during their interview with DEUTZWORLD

In October, the DEUTZ Service Portal celebrated its first anniversary. It is used by customers from 15 different countries. DEUTZ World has taken the opportunity to talk to two users of the system. Jens Becker, Shift Supervisor of the forklift garage at Aleris Rolled Products Germany GmbH, and Frank Lehnen, member of the Internal Sales Team at Kolben-Seeger GmbH & Co KG, told us how the DEUTZ Service Portal works in everyday operations.

DEUTZWORLD: Mr Becker, Mr Lehnen, please tell us about your experiences with the DEUTZ Service Portal.

Jens Becker: Our repair garage looks after a fleet of around 60 forklifts. More than half of them have a DEUTZ engine. We appreciate machines with DEUTZ engines, as our access to systems like SERDIA and the Service Portal allow us to take care of repair and maintenance tasks ourselves – fast and effectively. We have even retrofitted machines with DEUTZ engines for that very reason. Whenever we need spare parts for maintenance or repair work, I can easily find and order the right part in the online shop.

Frank Lehnen: More than 200 customers of Kolben-Seeger use the DEUTZ Service Portal. We manage the system at our central warehouse near Munich, but all orders

are processed by the respective local branch near the customer. I am always involved when Mr Becker places an order.

DEUTZWORLD: In your view, what are the greatest advantages of the portal?

Jens Becker: Its constant availability, even at 9 o'clock during the night shift. The technical drawings help me identify all required parts and prepare the repair in my own time. That is extremely helpful, especially when it comes to demanding tasks.

Frank Lehnen: The best part for us, the dealers, is the time we save. Our customers can find information for themselves, put together the right order and send it to us directly. This prevents missing parts and unnecessary inquiries, which also benefits the customers.

DEUTZWORLD: Are there any extensions you would appreciate?

Jens Becker: Many repairs require additional parts – seals, for example. It would be convenient to have a complete repair kit available in the shop, with all necessary parts. Additional information would also be useful – starting torques, for example. This would make it easier to prepare repairs.

Frank Lehnen: I completely agree. Having additional information available online will accelerate the order and repair process.

Customers can use the DEUTZ Service Portal to buy original parts from their local DEUTZ partner quickly and safely. Come visit us at www.deutz-service-portal.com!



We appreciate machines with DEUTZ engines, as our access to systems like SERDIA and the Service Portal allow us to take care of repair and maintenance tasks ourselves – fast and effectively.

The right solution – always

DEUTZ is expanding its portfolio of service fluids by three new additives: DEUTZ PowerBlue, DEUTZ FlowBoost and DEUTZ StartBoost. “The expansion of our product portfolio allows us to provide all customers with the right additive for any purpose. This improves the productivity and operational safety of the machines while lowering operating costs,” Ralf Brümmer, Product Manager for Service Fluids at DEUTZ Service, explained.

DEUTZ PowerBlue

DEUTZ PowerBlue is an additive urea solution that replaces the AdBlue® product. It has better spraying properties, allowing it to be added to the exhaust gas flow more easily. In combination with further additives, this prevents crystallisation and blockages in the SCR system. DEUTZ customers profit from a longer service life of their machines and lower maintenance costs. DEUTZ PowerBlue is especially suitable for low-load applications, repeated stop-go operation and cold ambient temperatures.

DEUTZ FlowBoost

Winter is coming, and you are still using summer or transitional diesel? With DEUTZ Flow Boost, our customers can winter-proof their fuel effortlessly. It lowers the minimum operating temperature of the fuel by up to 10 °C, which gives DEUTZ customers greater flexibility when filling their tanks. They get to take advantage of cheaper prices and use up remaining fuel during the winter.

DEUTZ StartBoost

DEUTZ Start Boost is primarily used in emergency power systems. This additive effectively prevents microbial contamination of diesel fuel (diesel bug) and ensures that your machine starts reliably and safely even after a long downtime. By increasing the storage stability of the fuel, it also prevents the need of expensive fuel replacements.



The new additives are available from now on – your local DEUTZ partner will be happy to advise you!

DEUTZ
PREMIUM ADDITIVES

The Power of Matter

Accuracy down to the smallest detail – this is the foundation of excellent quality assurance. DEUTZ is committed to this precision standard and therefore relies on tests for materials and components that are accurate down to the nm.

Dr Klaus Ahlborn and his team from the field of material technology at DEUTZ are like hound dogs. When it comes to testing workpieces and components for their material performance and integrity, the experts at the Cologne-Porz location are called in. They investigate the microstructure and material properties at different areas of the component and analyse the results in terms of manufacturing influences and operating conditions. In order to efficiently meet the different requirements, the department of the testing centre is further subdivided into teams specialising in materials engineering and design strength. The Materials Engineering subdivision has eight employees, two trainees and one student who are working to identify and resolve damage cases as well as quality and assembly problems using material analysis down to the nm range (see below), material analysis, mechanical/engineering and non-destructive testing.

They are also in charge of incoming goods inspection. The four engineers and three technicians of the Design Strength team devote themselves to development tasks, production changes and relocations as well as quality and assembly issues.

“We work for the entire process chain,” says Klaus Ahlborn, while using the cross-section of a piston to explain what cross-departmental detective work looks like. “For example, when the receiving area receives the initial sample for a new product, it’s our job to test it under different conditions for its quality. If we find anomalies during the investigation, for example, a rapid material fatigue or lack of impermeability, we report our findings to the relevant areas.” Although these tests are prophylactic, not all weaknesses can be seen in advance. To avoid mistakes from happening again, the materials engineering team investigates the cause.



We perform analyses on a small scale so that we can make predictions on a large scale.

No “cold cases” at DEUTZ

“We are the forensic experts of DEUTZ. In the event of damage, we find the cause and figuratively ensure that no case remains unexplained,” says Ahlborn. To assist them in this task, the resourceful team can rely on a database with an almost infinite number of records. It lists the causes of all previously investigated cases that can be easily retrieved and even retroactively digitalised. “You can compare this to picking up the operating instructions of an electronic device that lists possible errors and their causes in the appendix,” explains Ahlborn. “That’s how the materials engineering subdivision at DEUTZ has been treating it for more than 100 years.” The oldest record dates back to 1913 and thus marks the origin of the extensive investigation database. “We perform analyses on a small scale so that we can make predictions on a large scale,” adds Ahlborn. How small this is can be seen by taking a closer look at the test methods, which range from nm (atoms, waves), µm (surfaces and waves) and mm (samples and load-bearing) to cm (components/modules and vibrations) and dm (complete engine). These investigations of the microstructures are performed with atomic emission spectrometry, scanning electron microscope (SEM) and energy-dispersive X-ray spectroscopy (EDX) as well as infrared spectroscopy. But sometimes this is not enough, because when it comes to fatigue strength depending on shape, component tests are performed on so-called resonance fatigue testing machines. The tests can be performed to illustrate the various operational loads by checking tensile & compression, torsion, bending and rotating bending fatigue. The required excitation can be triggered with an electromagnet on the oscillating head, for example. The component to be tested is clamped between the oscillating head and the machine bench of the vibratory resonance fatigue testing machine and tested for its load capacity (up to the order of 20,000,000 load cycles). Over the past 15 years, more than 1,000 orders have been processed using these versatile testing methods.

With its testing procedures, DEUTZ covers the entire spectrum of possible examinations and thus ensures that only the highest-quality materials are used for DEUTZ applications. This ensures sustainable quality of the products and simultaneously contributes to the progressive development of conventional technologies.



The materials engineering subdivision works meticulously and with the utmost care using investigative intuition.

A place with character



Motorworld Cologne-Rhineland is the latest attraction in the region. The former Butzweilerhof airport now hosts a place that brings automotive history to life and exudes sheer passion for mobility. On 16 and 17 June, the grand opening of the new exhibition took place in the Nicolaus August Otto Park on site. Of course, DEUTZ attended the celebration.

The new Motorworld Cologne-Rhineland is an exciting bridge between the past, present and future of mobility. It showcases old and modern treasures of mobility across an area of more than 50,000 square metres. The exhibition is located on the premises of the former Butzweilerhof airport, which used to house the majestic Zeppelin airships in the early 20th century. In the historical part of the former airport, the installation presents a range of companies that have a historical relation to the city of Cologne. Naturally, DEUTZ is one of them: the invention of the four-stroke engi-

ne by Nicolaus August Otto turned Cologne into the starting point of global motorisation. The exhibits include a full-sized acrylic glass replica of the atmospheric gas-powered engine and the four-stroke engine. Visitors with time on their hands had the option of spending the night in the nearby V8 Hotel Köln. This hotel, too, has a DEUTZ-themed room. Guests staying in the "Nicolas August Otto Room" get to enjoy technical drawings and an original Otto engine from 1908. The hotel is also planning to turn one of its seminar rooms into an Otto-themed facility decorated with historical details.

But the world of engine enthusiasts does not just look back. It also honours the stars of the present. Besides the legendary exhibition of Michael Schumacher's private collection on more than a thousand square kilometres, visitors to Motorworld can look forward to new car exhibits every day, ranging from classics to supercars. The 'Four-Stroke Hangar' offers conference and events space for up to 4,000 people – alongside the historical reception hall and various other meeting rooms.



When a choir goes travelling ...

Choirs like to travel, and the DEUTZ Choir is no exception. In 2018, the popular singers went on their traditional concert tour once again. This year's trip was special: the choir decided to tour three countries and combine two of its passions. "Art and industry – building cultural bridges": under this headline, the men's choir travelled Italy, Switzerland and Germany during the first eleven days of October 2018. It was accompanied by its conductor Heinz-Walter Florin and the famous Danish soprano singer Lisa Tjalve.

In Lomagna the choir visited DEUTZ Italy, and Cueno to see the DEUTZ client MERLO. Staff at both factories were impressed with the singers' renditions of popular serenades by Verdi, Schubert and Bizet. A special highlight of the trip awaited the approximately 80 singers of the Deutz choir in Maresio, near Lomagna. Under the title 'Frammenti d'Infinito' [Fragments of Infinity] a choral concert with sacred music was performed in the church of Santi Faustino e Giovita, a magnificent building of Italian Baroque style. The choir was able to inspire a large audience with a representative programme in this atmospheric acoustic setting. The choir also performed at Teatro Toselli in Cuneo and at the concert hall

of La-Tour-de-Trême in Bulle in the Swiss canton of Fribourg. Besides masterpieces by Puccini, Verdi and Bizet, the singers delivered musical greetings from DEUTZ to Italy in the form of well-known show tunes. The employees of LIEBHERR Machines in Bulle were delighted to be serenaded by the choir, and the special visit fully lived up to their expectations. The last leg of the concert tour brought the choir back to Germany. At the factory of LINDE AG in Aschaffenburg, the singers impressed the entire staff with their outstanding musical skill.

After a brief period of rest, our musical masterminds will soon take up their sheets again to prepare for December, when they will treat their fans to traditional Christmas carols at the Gürzenich convention centre in Cologne. If you have not got your tickets yet, hurry: they are already on sale. For more information, have a look at <http://www.deutz-chor.de/home.html>

Pre-Christmas concerts in 2018

Gürzenich, Cologne
Saturday, 15 December 2018, 4.00 p.m.
Sunday, 16 December 2018, 11.00 a.m.
Sunday, 16 December 2018, 3.00 p.m.

Behold, I bring you good news of a great joy

The Czech Christmas Mass by Jakub Jan Ryba will be the highlight of this year's Pre-Christmas Concerts. In more good news, the concerts will also include the pieces "Machet die Tore Weit", Beethoven's "Hymne an die Nacht", the famous "Herbergssuche" and

Goicoechea's "Ave Maria". These and many other beloved tunes will carry the good news of the birth of Christ to the Gürzenich and the hearts of the audience.

Participants:

Lisa Tjalve, first soprano
Christine Hoffmann, second soprano
Raphael Pauß, tenor
Achim Hoffman, baritone
DEUTZ-CHOR KÖLN
Domstadt Philharmoniker

Conductor: Heinz Walter Florin

DEUTZ has taken its next decisive step by launching its E-DEUTZ strategy and combining its low-emission engines with electric drives.

This past April, DEUTZ presented its first off-highway hybrid concept at the INTERMAT trade fair in Paris.

Our E-DEUTZ programme focuses on our systems expertise and the potential of the new technologies.

In future, you will be able to configure your integrated hybrid and electrical system solutions using the modular DEUTZ toolbox.

Get electrified!



E DEUTZ