

Dear Readers,

You might be justified in thinking that it is not very long since the first edition was published. However, the innovations and experiences we have had over the last six months have been more than enough to fill the second edition of UpLoad. So voilà!

We were “Strongly connected” to over 3000 customers and partners at the customer days with the same name in June. Our review on page 46 shows what we did for this highlight in our year.

One thing which really caught the eye was the new LR 1800-1.0. The design and main features of this 800-tonne crawler crane are presented in more detail in the report starting on page 30. Another of our innovations is the LTM 1230-5.1, which is the subject of our report starting on page 24. Our product strategy in the 5-axle segment is also instructive – see page 29 for more details.

After all this steel and engineering hardware, we also have room for the essential software. We know, of course, that each one of our cranes must be backed up by excellent customer service. And that is exactly what we provide – worldwide, prompt and professional support for your everyday crane work. The interview on page 42 tells you about how we are strengthening and expanding this service, and we are very much open to hearing your wishes and ideas.

Finally, we are delighted to be able to tell you that our new magazine now also has its own email address: upload.lwe@liebherr.com. You can send any ideas or thoughts you have during your read to this address. We look forward to receiving your personal upload!

Best wishes from Ehingen



Christoph Kleiner

Managing Director Sales of Liebherr-Werk Ehingen GmbH





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UpLoad is also available at liebherr.com to read, look at and download.



Find out more:
www.liebherr.com/upload



Moments

In action, in production or in review –
in the following we have captured some extraordinary
crane moments for you – and posterity.

Home on the hook

An LTM 1750-9.1 lowers a houseboat
into the water in Leidschendam in the
Netherlands to enable its owner to live
a relaxed life on the waves.







A strong connection

Our welders complete their welds in painstaking work – delivering maximum quality for maximum safety.





Impressive

The entire range of mobile and crawler cranes were on display at the customer days in Echingen in June 2018.





Colossal

Giant is an understatement – the largest Ferris wheel in the world, the Ain Dubai at a height of 260 metres puts all previous Ferris wheels in the shade. And the largest conventional crawler crane in the world played a major role in its erection – The LR 13000 from Mammoet.





A Gothic masterpiece

The world heritage site of Cologne Cathedral is one of the highest churches in the world. Liebherr LTM 1500-8.1 and LTM 1750-9.1 mobile cranes installed and removed giant hanging scaffolds on the impressive cathedral to enable restoration work to be completed.







**As far as the eye can see –
and beyond**

The AIDA Sol provides a special indulgent holiday experience. An LTM 1130-5.1 from Ulferts was involved in completing the cruise liner in 2011.

Made with Liebherr

Structures, engineering and technical masterclasses – wherever things are created in the world which leave onlookers' wide-eyed, reliable partners are needed who often go beyond the limits of what is possible. New wonders are being built all the time around the world – made with Liebherr.



The Ain Dubai giant Ferris wheel

The first wheels were invented around 6000 years ago, probably in several places around the world. The Ferris wheel, on the other hand was not discovered until 1620. That was when Englishman Peter Mundy saw children secured in a gondola riding on a wheel in what is today Plovdiv (Bulgaria).

The birth of the Ferris wheel can be traced back to the World Exhibition in 1893 in Chicago, where George Ferris built the first of its kind. The Ferris wheel was a massive attraction at a height of 80.5 metres and a diameter of 76.2 metres.

Since the start of the 2000s, wheels have been repeatedly reaching ever further into the sky – the London Eye reached to a height of 135 metres, whilst the next record was set by the Singapore Flyer in 2008 at 165 metres. In Las Vegas, the High

Roller at a height of 168 metres was unveiled in 2014 whilst the new New York Wheel will reach 192 metres – but even that is not the record-holder. The new mark was set by the Ain Dubai at a height of 260 metres. By the way, riding this Ferris wheel takes 45 minutes.

Clearly, technical miracles are required to create such superlative structures. In 2016, the largest conventional crawler crane in the world, the Liebherr LR 13000, was called on to hoist the hub of the giant wheel on the coast of Dubai's Jumeirah Beach Residence into the correct position – together with a large stationary crane operated by Mammoet.



Cologne Cathedral

High summer 2013 in Cologne – whilst others are on holiday, an LTM 1750-9.1 on the square near the cathedral was busy removing one of the two large hanging scaffolds on the north tower of the cathedral at a height of 100 metres. Not an everyday crane job, since there were quite a few logistical and static engineering challenges involved.

Six years previously, a similar job was carried out when an LTM 1500-8.1 removed a scaffold from the west side of the cathedral. As a result of the surrounding area, however, the LTM 1750-9.1 in this case faced a new challenge. The scaffold had to be removed from the tower in three pieces, not just at a height of 100 metres, but also with around the same radius. As a result of the difficult location in the inner city, and therefore right at the centre of public traffic and with the underground railway beneath it, simply selecting a place to set up the crane proved something of a masterclass. The job required two years of planning until one Sunday morning when the nine-axle mobile crane was set up with a full boom extension and a 91-metre luffing jib. After a day of preparation, the crane was able to successfully complete the largest crane job on Cologne Cathedral at a height of 160 metres in front of a large crowd of visitors and crane fans.

AIDASol cruise liner

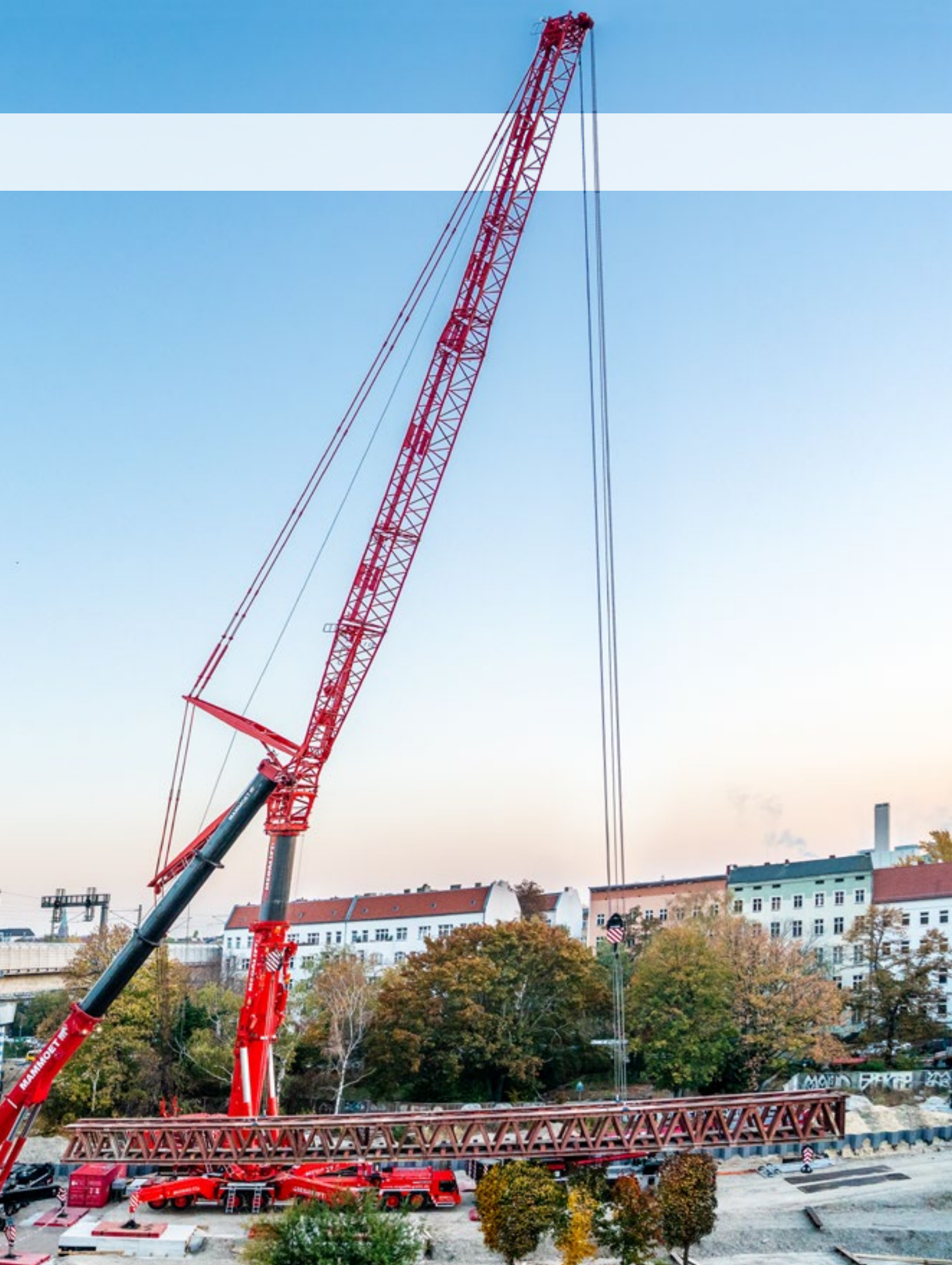
Around 2700 passengers can enjoy a holiday on board the AIDASol. But before the ship could undergo its naming ceremony in Kiel on 9 April 2011, it had taken around three years to build. The final work, such as putting the gangway on board, was completed shortly before the vessel was transferred from the Meyer shipyard in Papenburg to Emden and then on to Kiel. An LTM 1130-5.1 from Ulferts was used for this work.

As an aside, the AIDASol is the first ship in this fleet to have been under the command of a female captain since March 2018.



Mobile and crawler cranes





Power lifting in a steel plant

14 Liebherr cranes carried out a wide range of maintenance work at a steel plant. One of the biggest challenges was to replace an 80-tonne gantry crane track at a great height.



The ArcelorMittal steel plant in Eisenhüttenstadt on the border with Poland was shut down for one week to enable the maintenance work to be completed. Local crane contractor, Kranlogistik Lausitz GmbH, received the order for the work. The challenges facing Gerd Wieder, Manager of Kranlogistik Lausitz's branch in Eisenhüttenstadt, and his team of crane operators, included an extreme lack of space and deadline pressure.

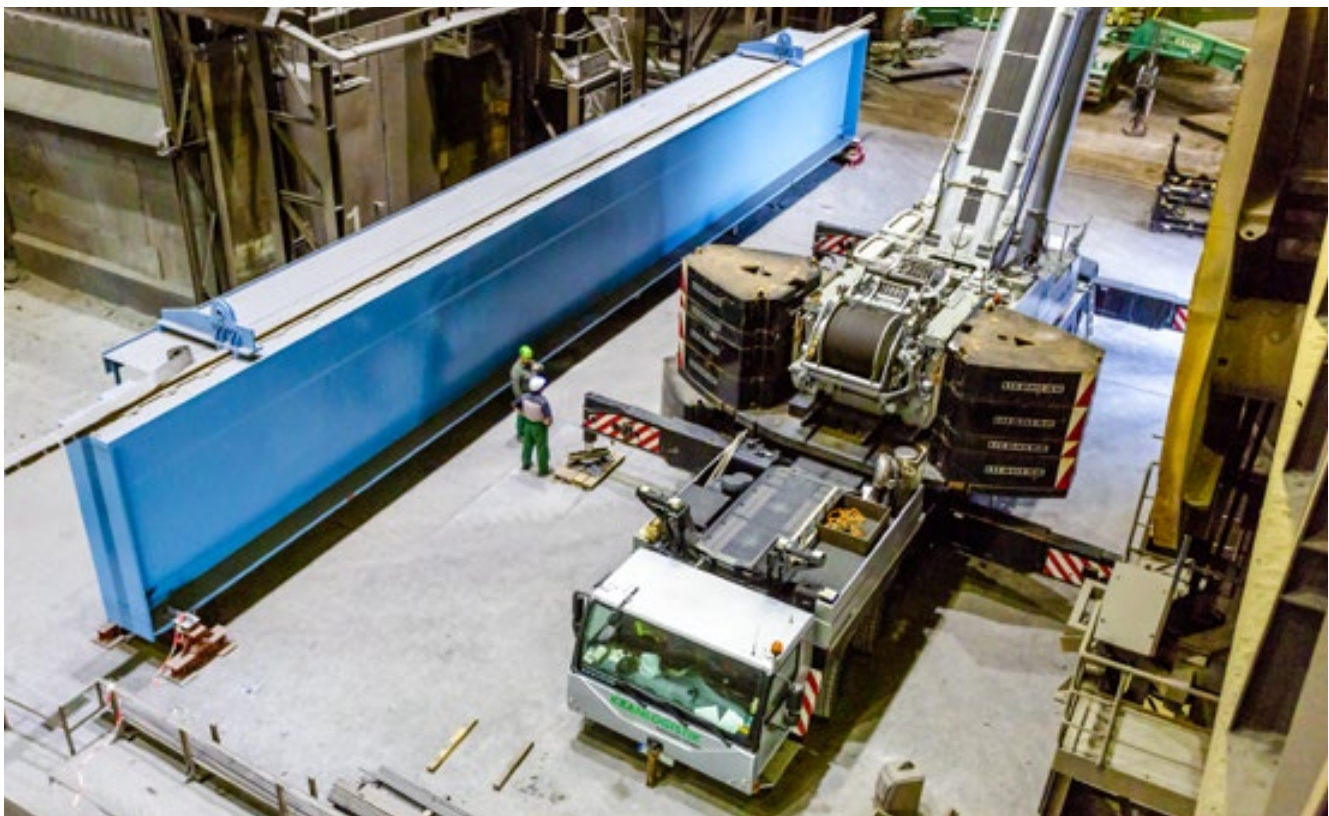
Dance in perfect rhythm with 80 tonnes

Gerd Wieder had hired two large cranes to complete the complex and professionally planned tandem hoist to replace the steel support. An LTM 1400-7.1 was obtained from his Dresden-based group colleagues, Kranlogistik Sachsen. The even larger LTM 1750-9.1 was sent to Eisenhüttenstadt by crane contractor H.N. Krane based in Rostock.

After attaching to the gigantic steel support and raising the load using the lifting gear, the flame cutters were then ignited at a height of 30 metres. It took around seven hours to release the section of crane track so that it could be removed. This finally left 80 tonnes of metal hanging on the two Liebherr cranes, which then hoisted it out. The LTM 1750-9.1 had to handle the slightly heavier load at around 44 tonnes. To be able to lower the four-metre high support inside the steel plant, the telescopic booms had to be retracted synchronously with the load still on the hooks as a result of the fact that they were so close to the roof structure. Since the crane booms had to hold the load at different angles, a synchronous slewing procedure was also required.

This complex manoeuvre by the two cranes cooperating perfectly demanded maximum concentration from both drivers. Peter Böhm in the LTM 1750-9.1 and Klaus-Peter Franz, who was controlling the joysticks in the silver 400-tonne crane, completed the job with flying colours. After half an hour, it was finally done and the removed support was placed next to the new component on the floor. The preparations for installing the new element in the crane track could then begin. As a result of the deadline pressure, the work continued almost without a pause. Both the crane operators and the fitters worked on site in shifts around the clock.

Kranlogistik Lausitz provided a total of 14 Liebherr cranes for the maintenance work at the Brandenburg steel plant. Another support was replaced and work was also carried out on the blast furnace.



The two crane operators discuss the details of the planned hoists.

Innovation with the same look





The mobile crane redesigned

Liebherr unveiled a new 5-axle crane at its customer days in June this year – the LTM 1230-5.1 is extremely versatile, powerful, safe and efficient. And it has a surprising structural steel design.



A case for the patent office

We're not reinventing the wheel. But we're rethinking everything else carefully. This is how we are preparing for the future. Our engineers have redesigned the basic structural steel construction, tailored it to current requirements and integrated the digital features of innovative Liebherr technologies. The result is a powerful, highly flexible mobile crane which delivers an excellent hoist height and range. The LTM 1230-5.1 sets the new benchmark in the 5-axle class.

“Single and double-stage outriggers have been combined on a crane for the first time.”

Joachim Henkel, Statics Department Manager

“We developed and used new ideas for the structural steelwork of the LTM 1230-5.1”, says Joachim Henkel and continues: “The front outriggers are single-stage, the rear ones are double-stage – unlike anything that has gone before.” He has been with the Design and Development Department in Ehingen for 28 years and has worked on the design of more than 40 crane models. He has been manager of the Statics Department since 2011. His team carries out complex calculations to improve the steel structure of Liebherr cranes.

The support base overall is smaller than on the predecessor model LTM 1200-5.1 despite the new crane's significantly

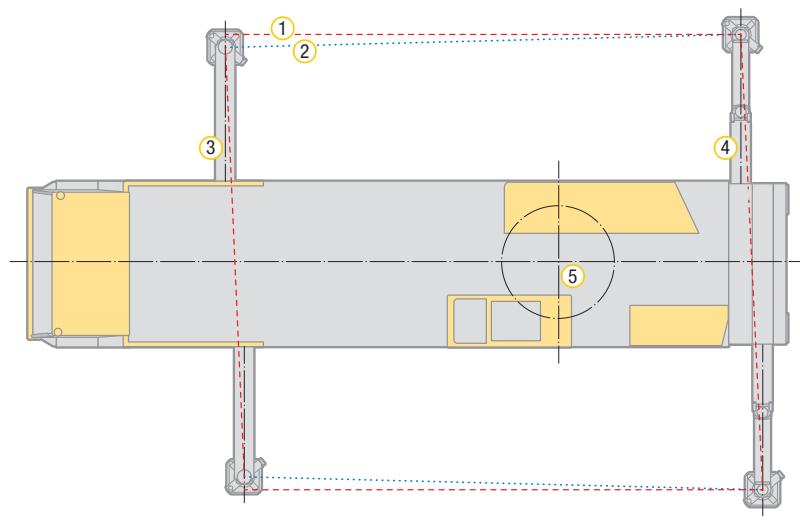
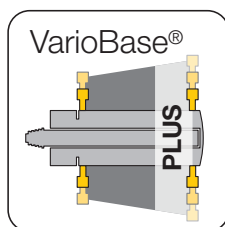
higher lifting capacity and a longer boom. “This brings the crane closer to the load”. Henkel explains the concept on which a patent is pending: “We have designed the support base to have a trapezoidal shape. At the rear the maximum support width to the side is 8.1 metres and to the front 7.4 metres. With a working range of 360 degrees, this means that we



have almost no reductions in lifting capacity compared to a rectangular support base with a support width of 8.1 metres to the front and rear.” The single-stage outriggers at the front are lighter. This weight reduction can be used to extend the boom length. Furthermore, the single-stage outriggers feature greater rigidity. The extended rear supports, together with Liebherr's VarioBase® deliver particularly high lifting capacities. We call the combination of the trapezoidal and variable support base “VarioBase Plus”.

Trapezoidal support base by combining single and double telescoping outriggers

- 1 Parallelogram-shaped support base
- 2 Trapezoidal support base
- 3 Single telescoping outrigger
- 4 Double telescoping outrigger
- 5 Centre of rotation superstructure



Special effect – VarioBase®

VarioBase® makes the trapezoidal support base even more efficient. The multi-award-winning technology calculates the maximum lifting capacities in real time – based on the current support situation. The LTM 1230-5.1 delivers particularly high lifting capacities for hoists over the rear and the wide support base at the rear with part ballast, which are performed very frequently in practice. This can make a second ballast transport superfluous!

In summary: a real power pack

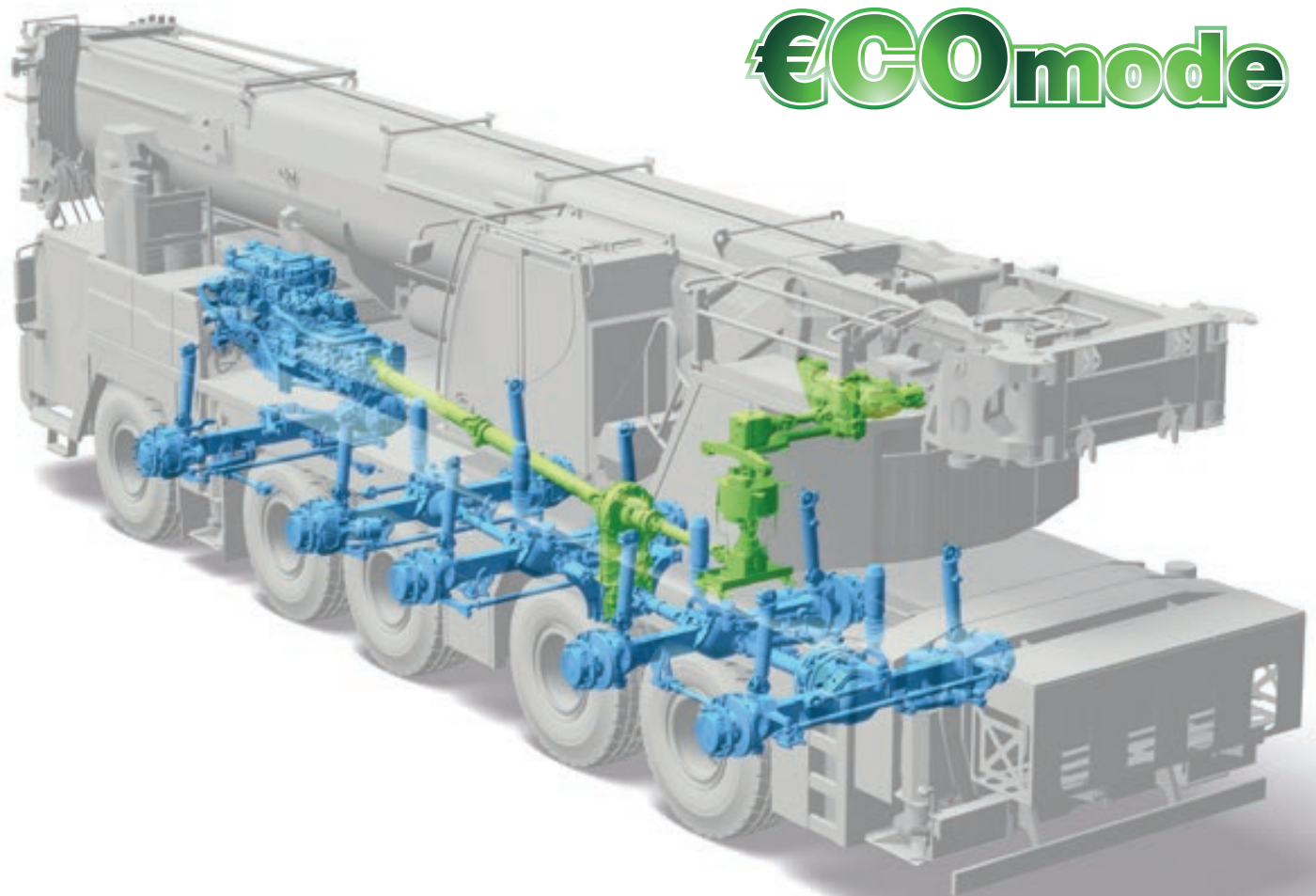
Finally, VarioBallast® completes the enormous increase in lifting capacity and flexibility – the radius of the 72-tonne ballast can be adjusted from 4.8 metres to 5.7 metres. Want a comparison? With the same ballast height compared to the predecessor model, the LTM 1200-5.1, the new 5-axle crane can on average hoist over 20 % more. That's a significant increase!

Green and powerful

The drive technology is ready to tackle the challenges of the future – the Liebherr diesel engine develops 400 kW whilst complying with stage V, including a particulate filter, to provide all the power you need. It transfers the power using the innovative ZF-TraXon gearbox, including ECOdrive, comfortable driving, noise reduction and the hill start aid. In addition, the time-tested single-engine concept with ECOmode from Liebherr reduces both fuel consumption and noise level.

€COdrive

€COmode



The LTM 1230-5.1 is the fifth crane to feature the Liebherr single-engine concept.

Back ground

Why does Liebherr have two powerful 5-axle cranes in its range?

For over 20 years, Karl Stöhr has been jointly responsible for Liebherr's successful mobile crane concepts in the role of Head of Product Management.

"We have two powerful, modern 5-axle cranes, the LTM 1230-5.1 and the LTM 1250-5.1. As the names suggest, they are relatively similar mobile cranes with a maximum lifting capacity difference of just 20 tonnes, 230 tonnes versus 250 tonnes. So we are quite justified in asking – why do we have both of them in our range and what are the differences between them?"

The LTM 1250-5.1 is the most powerful 5-axle crane on the market. It is designed for maximum performance. If it cannot manage a job, no other 5-axle crane will manage it. In that case a 6-axle crane will have to be used – with the road licensing problems which that brings. The Liebherr 250-tonne crane was designed to be a heavy load crane and can be fitted with a maximum ballast of 88 tonnes.

The booms: The LTM 1250-5.1 has a 60 metre telescopic boom length versus an enormous 75 metres on the LTM 1230-5.1. The 230-tonne crane is designed for working at great heights. The new LTM 1230-5.1 is perfect for jobs involving wind turbines, tower crane erection and in industry. Its real strength is working with the boom fully raised and at great hook heights.

It is worth noting that this is actually the continuation of a successful concept – there are around one thousand each of



Karl Stöhr, Head of Product Management

its two predecessors, the LTM 1220-5.2 and LTM 1200-5.1, around the world and showing their strengths on a daily basis. One of them is designed for maximum lifting capacity whilst the other has a long telescopic boom.

Since the highest demand on the market is currently in the 5-axle class, our new powerful 5-axle mobile cranes by no means signals the end of our development offensive. We will once again be unveiling a new model in the 5-axle range at Bauma 2019, which is something to look forward to."



The most powerful 5-axle mobile crane on the market: LTM 1250-5.1



Powerful!

New crawler crane, new transport concept, new ballasting system, new model designation – and truly powerful as well. Liebherr unveiled the LR 1800-1.0 crawler crane at its customer days in June. In its basic concept, the 800-tonne crane is designed for jobs in industry.

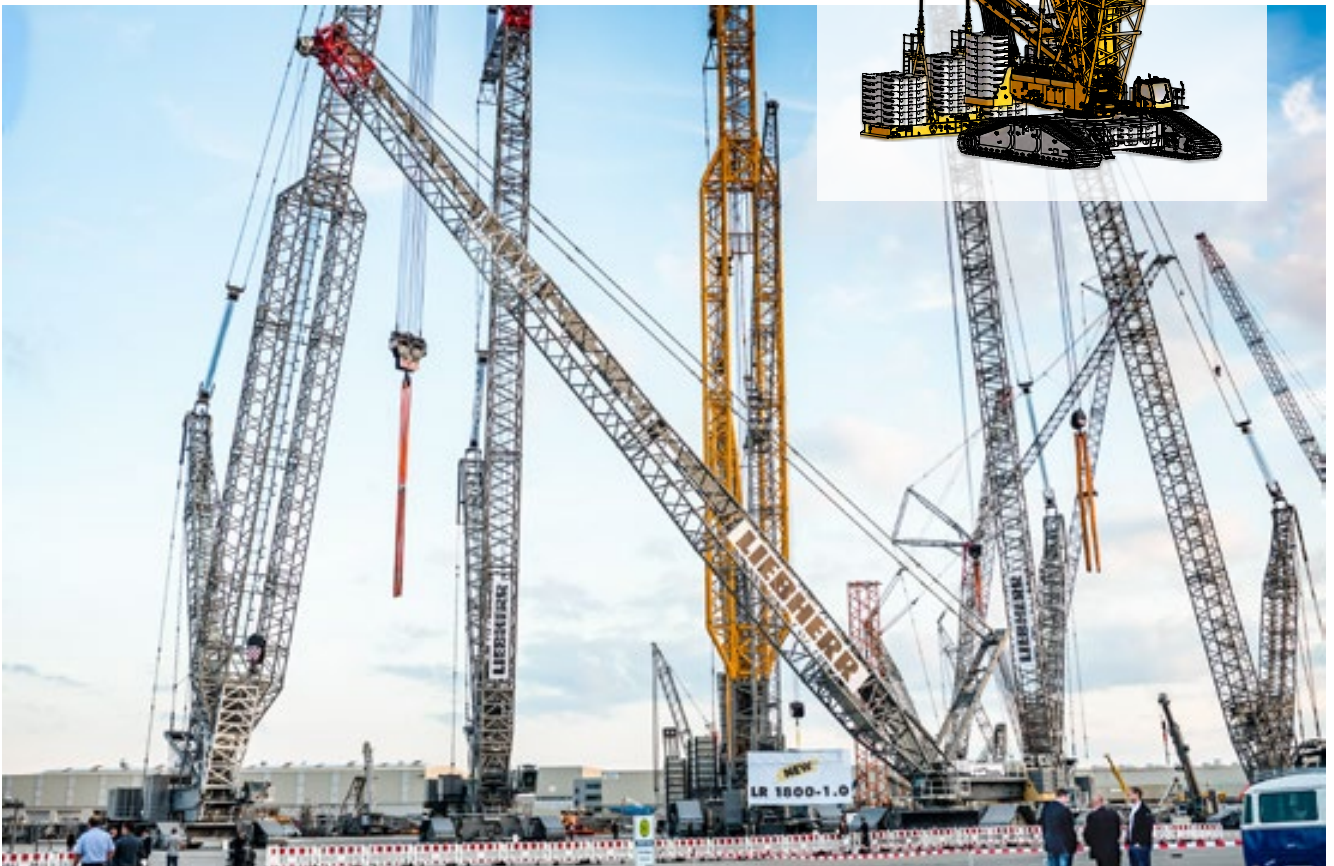


Tailored for power

The new LR 1800-1.0 power pack is designed for maximum power and delivers outstanding lifting capacities. It has a passion for jobs involving a luffing jib and derrick system in industry, for power plant construction or in petrochemicals. Wind power is another of its strengths. After its initial unveiling at the customer days, Liebherr will exhibit the new crane as a highlight at Bauma 2019 in Munich.

Klaus Huberle is one of the experts when it comes to lattice boom cranes at Liebherr. In the role of Manager of Technical Sales for Crawler Cranes, he and his team initiate the design of new crane models and systems in close cooperation with the design departments. He says: "I was delighted to receive such a positive response at the customer days after we unveiled our 800-tonne crane. You can see that this is a really good concept with several innovative features."

One of the main features of the 800-tonne crane is its extraordinary performance. The Liebherr designers focused on the rigidity of the basic machine and developed the individual components with a greater design height for this purpose. Furthermore, the lower section of the main boom has a wider design. This enables the LR 1800-1.0 to achieve particularly high lifting capacities.



The Russian doll principle



“Low-cost transport ideas are becoming more and more important to our customers”, says Klaus Huberle and continues: “We looked for new solutions and for the 800-tonne crane, we developed three system dimensions for the standard crane for the first time. These are simply pushed inside each other for transport. In principle, just like a Russian doll.”

Regular contact with customers in his department goes well beyond simply selling cranes. Receiving input from practice is an important source of information. Huberle emphasises: “We talk to our customers about the challenges of everyday

practice and look for possible designs together. That means that we know what the problems are and we react by developing new solutions.” The three system dimensions for a boom length of 96 metres for the main boom and 96 metres for the luffing jib means that five complete transport units can be dispensed with. The basic LR 1800-1.0 machine is just 3 metres wide and weighs 45 tonnes – perfect values for low cost transport.



“The LR 1800-1.0 is the most powerful 3-metre crane on the market. Our focus during the product development phase was firmly on achieving maximum power.”

Klaus Huberle, General Manager Crawler Cranes

**Folding the first:
Suspended ballast with an
adjustable folding frame**

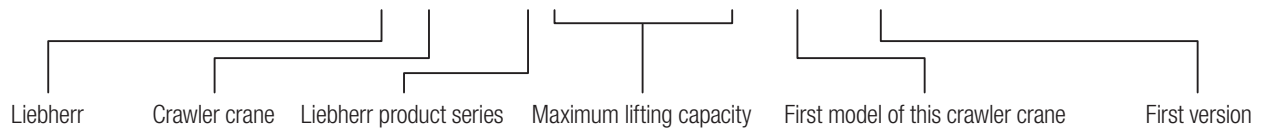
Lights, camera, action – for extremely innovative and highly flexible derrick ballast. The LR 1800-1.0 features a new type of ballast system – the V frame is a hydraulically adjustable folding frame. It enables enormous adjustment distances of between 14 and 23 metres. That delivers maximum flexibility compared to the standard rigid system for large ballast radii. With good job planning, the V frame creates an enormous range of uses and makes it possible to dispense with ballast transport.

The LR 1800-1.0 also features VarioTray – a small part of the derrick ballast can be unbolted quickly and easily. This small part is generally sufficient for hoisting work with the boom fully raised. The large ballast pallet is often only required to raise and lower the boom. This means that there is no need to stack and unstack the ballast slabs – VarioTray saves an enormous amount of time and money.



New crawler crane designation

LR 1800-1.0



This new crane model also saw Liebherr introduce a new suffix to the model name for crawler cranes: The "1" after the hyphen stands for the first model of the 800-tonne crawler crane. The "0" after the dot means the first version – this number will be incremented by 1 with each major technical modification in the future.



Building bridges in a nature conservation area







“They are worlds apart!”

The old railway bridge had spanned the Buchenbach Valley as part of the railway line between Burgstetten and Affalterbach, around 20 kilometres north-east of Stuttgart, for a whole century. But now the days of the historic lattice construction were numbered. Deutsche Bahn AG set the bridge at time limit until the end of the year as a result of its structural strength and condition. The Liebherr LR 11000 crawler crane from Wiesbauer has now replaced the bridge with a temporary structure.

“... but then things went relatively quickly because the crane has a very logical design.”

Thomas Kley, crane operator at Wiesbauer



You might think it's a large crane for a relatively small bridge. After all, weighing just 60 tonnes, you would not necessarily think that a massive crane with a 1000-tonne lifting capacity would be required. However, things were a little more complicated than they seemed at first glance. The railway line with the ageing metal bridge actually passes through a flora and fauna habitat, a nature conservation area with a high protection status. There is no road on which the cranes and low loaders could have driven to the bridge and it was not possible to build a temporary road as a result of the nature reserve.

A large set-up area for the large crawler crane was created at the edge of the habitat on a slope, on which it would also be possible to dismantle the removed bridge afterwards. The plans also had to take into account the fact that the new 150-tonne bridge would be assembled and hoisted into place from this site in two years time. Until then, the trains would use the temporary bridge.

First of all, however, the LR 11000 had to remove the construction which took the form of a so-called fish-bellied bridge, using a radius of around 60 metres. Fitted with a 96-metre main boom and a derrick boom, the crane moved the decommissioned lattice construction out of the nature conservation area. A total of 405 tonnes of ballast, 225 tonnes of which were on the derrick pallet, ensured that the crawler crane

had sufficient counterweight. However, before the load could be placed on the floor, the fish-bellied girder had to be cut. The fitters used flame cutters on the arched girder underneath the bridge support from which the bridge derived its name. Hoisting in and assembling the parts for the temporary bridge was then a matter of routine for the professional team from Wiesbauer.

Crane operator Thomas Kley, who alternated in the cabin of the 1000-tonne crane with his colleague Hans-Günther Zelewski, is delighted with his new machine. After almost three years operating a crawler crane from a rival brand,

he says the switch to Liebherr was not a problem at all. “When I arrived in Eningen for the crane handover, at first I thought that the switch would be difficult,” admits Kley frankly, “but then things went relatively quickly because the crane has a very logical design.” The set-up procedure, crane controller and the whole crane logic system is much easier for the user. “They are worlds apart. Worlds.”



In focus





Customer service – challenges and objectives

Liebherr is well known for its good, reliable service. At the same time, the demands on customer service are rising steadily. Christoph Kleiner is the director responsible for global sales at the Mobile and Crawler Cranes Division. This means that he is also responsible for customer service.

Mr Kleiner, where do you see the current and future challenges in the service sector?

The hardware and software of cranes is becoming ever more complex. Furthermore, there is an enormous range of models and equipment packages for the machines on the market. Our service technicians around the world are very well trained and have an enormous amount of expertise. Even if they cannot know all the details themselves, our customer service around the world is on a very good footing. And by that I mean both in terms of support and in the availability of spare parts.

Our objective is still to satisfy our customers perfectly and to ensure that our cranes can be used for as long as possible.

What measures is the Liebherr Plant in Ehingen taking to achieve this?

We continue to train our service technicians around the world with regular courses to ensure maximum expertise at the plant and on site. For certain subject areas it makes sense to train individual specialists who then act as multipliers to pass on their expertise. We also provide training to our customers around the world. Investments in other measures such as the expansion of e-learning tools are another central topic.

At the same time, we are focused on expanding our worldwide service locations to guarantee a personal local contact to every customer if possible.



Customers regularly award top grades to Liebherr service. Is there still potential to improve?

Our objective in the future is to actively look even more closely at individual customers, identify their needs and satisfy them as well as possible. For this purpose we offer a tailored range of services, for example with attractive service packages, training courses and a 24-hour hotline. We are also continuously working on making our local field service even better.

Another topic is the establishment of standard, professional processes around the world. This involves the efficient collaboration between our branches and the specialists at the manufacturing plant.

What changes and developments have there been in the spare parts sector?

The first thing I must mention is "MyLiebherr". This portal contains extensive service and additional information relating to the world of construction machines, mining, mobile and crawler cranes, handling equipment and maritime cranes including an electronic spare parts catalogue. At the same time, we are constantly reviewing our pricing structure for spare parts and services. Only if we provide realistic, market prices for spare parts and services can we serve our customers on the one hand, and on the other be successful as a company so that we can continue to be a strong partner for our customers.

Mr Kleiner, you insist on the use of the term “Customer service” within the company. What exactly do you mean by this?

The fields of customer service and spare parts sales must continue to merge and grow closer and this step

is very important to me. Customer service is the generic term for everything that these departments do. The intention is to see customer service as an integral part of our services and therefore to regard and market it as a “product”. This will enable us to get closer to our

customers. And in the long term, this will provide us with an advantage over our competitors.



Find out more:
www.myliebherr.com



New ways: E-learning for mobile crane operators

Digital mobile crane operator training is a joint product from e-learning production company Krassmann Produktion GmbH, lawyer Dr. Rudolf Saller and Liebherr-Werk Ehingen GmbH. It was unveiled for the first time at the customer days in Ehingen in June 2018. UpLoad spoke to Liebherr Training Manager Sascha Brenner, Product Management Manager Karl Stöhr and Sales Manager Dieter Walz about the background and content.

How did Liebherr come to look the topic of electronic learning for crane operators?

Karl Stöhr: As is so often the case with product developments, the initiative came from the users. We were asked directly by customers to provide them with support for training and regular statutory guidance procedures. The request was for a modern, manufacturer-independent training instrument which would not just be for Liebherr.

I would also like to mention the personal initiative of Dr. Saller, who, like us, took up the cause of accident prevention during the operation of mobile cranes. He's the author of the training segment entitled "Legal principles".

Dieter Walz: The aim of everybody concerned was to make working with mobile cranes on sites around the world safer by means of preventative measures. Since the basic and advanced training for crane operators is primarily the responsibility of the crane contractors themselves, we wanted to provide them with an instrument which would support our customers' training activities. E-learning provides the knowledge in compressed form and supplements practical training on the machine.

Sascha Brenner: As a leading crane manufacturer, we are very interested in not leaving our customers to their own devices in the basic and advanced training of the personnel. Furthermore, Liebherr itself has been providing high quality courses



Karl Stöhr, Dieter Walz

and training for many years using extremely experienced trainers at the training centre in Ehingen.

What are the options open to crane contractors today for training their operators?

Dieter Walz: First of all, I would like to point out that the industry currently has a major problem – there are simply too few crane operators and the prospects are actually getting worse. Additional training packages are absolutely essential. Since there is no training standard in Europe and in Germany, for example, there is also no statutory training pathway for mobile crane operators, we therefore have to take a different route. In addition to classic learning-by-doing and the exchange of experience from crane operator to crane operator, there is a whole range of training providers. However, the training market is far from clear and the quality of the courses differs widely.

What do you think makes the e-learning attractive?

Sascha Brenner: These days most people can handle digital media very well. The main benefit of our e-learning tool is that crane contractors can provide their employees with annual guidance and advanced training as well as professional qualifications at any time.

Interested?

The German version for Germany, Austria and Switzerland is available from Krassmann Produktion: www.betriebinbestform.de

The English version and the German version for other countries are available at www.liebherr.com/mobile-crane-operator

Furthermore, you can also contact your Liebherr sales partner or send a mail to michaela.gogeissl@liebherr.com



Armed with his personal access code, the mobile crane operator can study the training modules he wants in his own time, repeat them if necessary and complete them. The system has a progress indicator to make things easier.

What is new about the e-learning training package for mobile crane operators?

Sascha Brenner: In terms of the content, in principle we take the same approach as we do with our courses here in Ehingen. Our proximity to our customers all over the world provides us with all the ideas we need to and keep everything up to date. Images, graphics, texts and language and even videos ensures that the content is presented in an entertaining and varied way. In learning mode, users can display the correct answer and, if necessary, switch to the appropriate training content. In test mode, the system poses an arbitrary sequence of test questions. After the final test has been passed, the learner receives a certificate which can be confirmed by the employer.



Sascha Brenner

The e-learning package for mobile crane operators is only available online around the world and saves the progress by the various learners. In addition to the entire course, various topic and even individual modules can be booked for up to 6 months. These are particularly suitable for annual recurring safety training. In addition to a personal single station licence, it is also possible to book a so-called “annual corporate flat rate” package for a specific country – regardless of the number of learners.

What is the content concept behind the idea?

Karl Stöhr: The e-learning package is structured in a similar way to the typical procedure for a crane job in practice. What needs to be considered in advance during the planning phase? What needs to be known for operating the crane at



The new e-learning tool was unveiled at the customer days in Ehingen

the site or place of use? What needs to be done at the end of the job?

In detail, there are topics such as legal principles, crane technology, crane physics, load chart tables, selecting the crane position, safety equipment, setting up, special conditions of use, attaching to loads, load handling equipment, crane inspections, what to do in the event of faults and much more.

Have you had any initial feedback from users?

Dieter Walz: Yes. The feedback has all been extremely positive. The customers regard the content and structure as very good. Large crane contractors have already included the e-learning tool in their existing training systems.

Other crane contractors have been using it to train both beginners and experienced operators in all crane classes. Individual modules are also being used to train dispatchers and external sales personnel.

- Interactive self-learning programme
- 18 individual modules
- Final test with certificate
- 18 to 20 hours of learning
- German and English versions
- Available online: Learning without restrictions on time and place

Strongly connected

3,000 international guests visited the Liebherr plant in Ehingen in June. New products in the world of cranes, exciting demonstrations, equipment to touch and try, interesting discussions and an impressive range of additional events ensured that our customer days were extremely diverse.





Digging deeper: How did the Liebherr spider come about?

It was October 2017. A new email from his line manager popped up on the screen, looking for ideas for a technical highlight and eye-catching display for the customer days in 2018. At the same time, structural engineer Thomas Stangl reviewed the highlights of previous customer days in his mind's eye: The crane mobile with three suspended crawler cranes and the M sculpture with two rotating LTM 1750-9.1 cranes standing on their heads. There is a tradition in Ehingen of presenting its mobile and crawler cranes, which are so popular throughout the world, in something of a different light.

Thomas Stangl spent his lunch break in a quiet office. His pencil was poised over blank sheet of paper. He thought hard. Cranes have already been presented in unusual positions fairly frequently. He wanted to combine crawler and telescopic cranes. But not all the ideas he had would work. This is because not everything is possible from a statics point of view and, of course, safety is a priority. But somehow he wanted to combine crawler cranes and telescopic cranes. The crawler cranes could form a type of roof with a telescopic crane below it. "The idea of a spider's web then came to me quite suddenly", recalls Thomas Stangl. The central component of the installation, the spider, was to be the new LRT crane, which at the time had just been launched.

The engineer drew an initial sketch straight away, and it immediately proved popular with his colleagues. "They fitted the bill as extraordinary eye catchers which at the same time could be achieved without enormous expense", says Stangl. This idea led to the creation of a suitable slogan for the customer days – "Strongly connected".

From paper into practice

The design departments brought the spider to life. Designer Manfred Rechtsteiner produced a detailed technical drawing on the basis of Thomas Stangl's sketch. This process particularly looked at the details which he worked out together with his colleagues. Gerold Mohr studied the lifting capacity of the construction using various load assumptions and wind speeds in very great detail. The design of the equipment on which the LRT crane could be suspended centrally was left to Alexander Springer.

Then the spider continued to spin its web and reached Liebherr's crane acceptance section. The three men mainly responsible for its practical production, Wolfgang Grab, Josef Ried and Benjamin Lock, remember their first impression: "The drawing looked interesting, we'd never seen anything like it before. It also appeared to be feasible from a practical point of view although at the back of our minds we continued to ask what other challenges would appear. There is always a difference between theory and practice. But from the very beginning we had a good feeling about it."



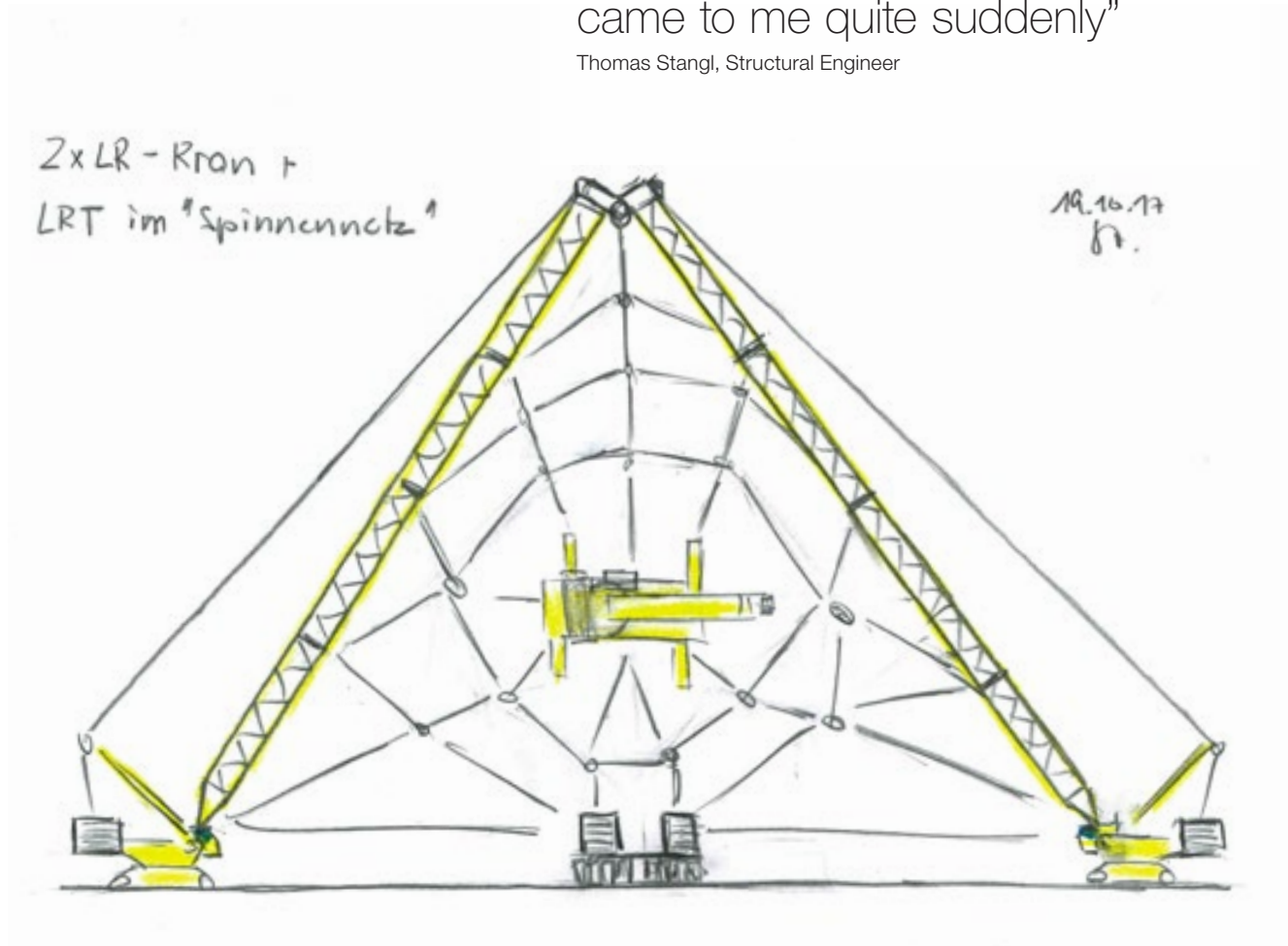
Great expectations – the spider crawls into its web

The objective was not only to implement the idea in technical form, but also to create an attractive look. Using standard steel ropes as the spider's web was not possible as a result of their poor visibility. With Thomas Stangl and Manfred Rechtsteiner on board, the creative minds decided to use highly visible, round textile slings in orange. Hemp ropes were drawn through the empty sleeves in the round slings for the non-load-bearing connections.

What is easy for any spider proved a real challenge for Liebherr – how did they stop the ropes sagging? "The weight of the rope and the working height could not be underestimated. We conducted several tests in advance and decided to use return rollers. The non-load-bearing ropes ran over these rollers downwards so that they could be tensioned with weights", says Benjamin Lock. For the detailed plans, the focal point

“The idea of a spider’s web then came to me quite suddenly”

Thomas Stangl, Structural Engineer



was that parts had to be used which could then be reused afterwards. That was simple for both the textile straps and the return rollers and also meant that the cost could be kept within budget.

Nothing is finished until it has been tested

At the customer days, there were around 3000 pairs of eyes directed at the installation – not including the local residents and commuters who were able to see the spider from outside the plant. The first test was conducted just two weeks before the customer days. A team comprising a total of ten people from the crane acceptance section undertook this special project. “We wanted to maintain the tension – and if we had tested it much earlier, there would have been photographs of our installation on the net and on social media”, is

how Josef Ried explains why the test was conducted so late. “One of the challenges for the test was that work had to be carried out synchronously on both crawler cranes.”

The test proved successful. Things only became difficult when a sudden gust of wind caused the non-load-bearing ropes to become badly tangled. It took several people several hours at a height of around 50 metres to untangle them. After this, the planning team had one last thing to do – illuminate the spider. “That gave me a real headache”, remembers Josef Ried. “In retrospect, however, fitting the lights was a very good idea. It looked great!” During the development work, too, the slogan for the customer days came to the fore. Lots of those concerned work together to make the Liebherr spider the trademark for the customer days 2018.

Where the frog and car say “Good night” to each other

The construction of a new car park in Ehingen went hand-in-hand with several nature conservation measures. Liebherr looked after local plants, animals and species under threat.

The misty morning air lies heavy on the almost bare bushes and shrubs. Dense dew drops make all the spiders webs visible. A quiet rustle in the brown and black leaves on the floor breaks the autumnal silence. A small frog appears. It is almost exactly the same colour as the area around it. It continues through the undergrowth and stones looking for somewhere to spend the winter. There

is mossy wood, old roots, piles of sand and stones in the middle of nettles and dried thistles. A small stream reflects the cloudy sky.

Only by looking upwards do we realise that we are not in the middle of an ancient landscape which has been aban-

doned to nature. We are at the foot of the Liebherr plant in Ehingen on the new car park P4, and above us we can see several giant steel columns extending into the sky. “The extensive nature conservation measures which Liebherr has implemented here show the company’s great respect for the environment”, says

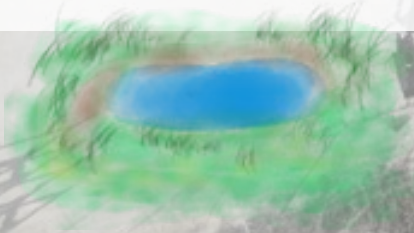


50 newly planted trees

Dead wood for insects and the threatened saproxylic beetle

Habitats for amphibians, beetles, lizards and birds

4 large rain retention basins with a total capacity of 2015 cubic metres



Noise barrier with a wide variety of plants

Alexander Warsow from the Blaser engineering agency which was responsible for the environmental planning for this project. "Liebherr implemented a whole range of small and large measures which satisfy the statutory requirements in full. The collaboration with the management team was always practical and constructive, which is by no means par for the course. For example, trees had to be felled for the staff car park. However, the trunks were not disposed of and instead they play an important role in the new lizard habitat. Another example is

the natural design of the retention basins which are now available as an additional habitat for the amphibians in the area."

An acute lack of parking space for Liebherr personnel meant that a plant expansion of 30,000 square metres and the construction of a car park with 1,000 parking spaces was required. By agreement with the Town of Ehingen and the local residents, Liebherr implemented a wide range of individual measures for nature conservation as part of this process. "We are based in a rural area, and as such we feel obliged to take environmental protection seriously – and not just when we wish to expand our plant.

We work on minor and major improvements throughout the year, which may involve heat insulation, energy efficiency, water management or filter systems in the painting systems", reports Jürgen Abele. In the role of Construction Department Manager, he is responsible for everything relating to construction and modernisation work and keeps a close eye on the environment. Jürgen Abele emphasises the high value attached to environmental protection within the company. "In collaboration with the lamp manufacturers, we have even developed our own solutions such as energy-efficient, powerful LED spotlights for the boom assembly hall."

Limestone wall

with cracks for lizards

The car park lighting is reduced by **80%** after the shift has ended

Amphibian guide system
around the car park

700 m²
flower islands on
the car park

10 nesting boxes on
a meadow orchard

4,570 m²
newly planted area

Cut off your hoist rope.

Johannes Hirschle explains this short tip with a massive effect. He has been using his expertise for Liebherr in Ehingen since 1977. As a customer service fitter, he has been travelling around the world for you and your cranes for almost 30 years.



“Proper rope care can save lots of money!”

Johannes Hirschle, customer service fitter



When you are working with large cranes in a wind farm, your hoist rope is constantly stressed. The high number of hoists, involving heavy loads alternating with zero loads, subject the rope to extreme strain. For applications of this type it makes sense to shorten the hoist rope from time to time.

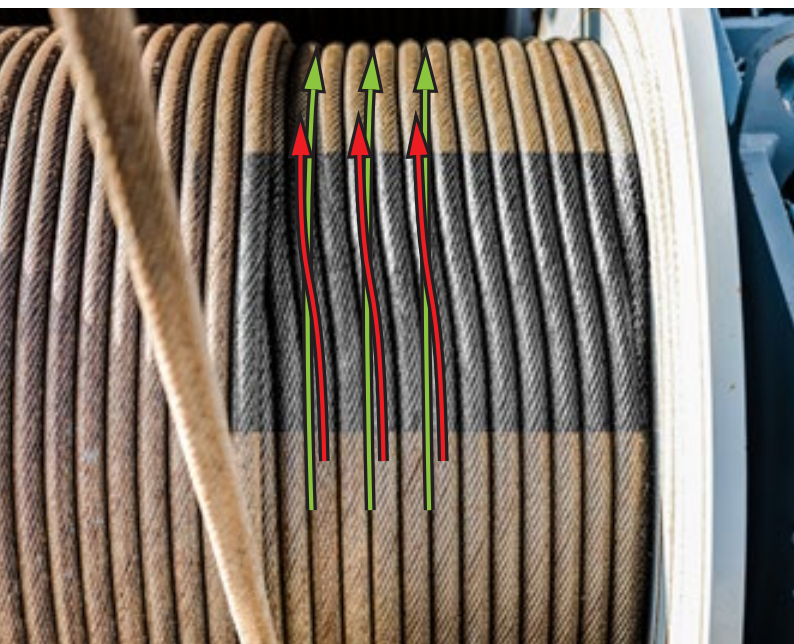
It is wound onto the winch with highly developed multi-layer rope coils in a precise geometry involving lots of layers. The rope windings on the upper layer cross over those on the lower layer. And this is precisely where the rope suffers most stress.

My tip is designed to ensure that this does not result in damage requiring the rope to be replaced. Shorten the hoist rope before it requires replacement. This relocates the stressed crossing areas to the less stressed parallel area of the winch. This results in a significant extension to the rope service life.

Instructions for this process are available in our short training film or from your Liebherr partner. The following is important in this respect:

- The hoist rope must be secured before it is released
- It must be shortened by 20 times the rope diameter
- It must be welded or soldered expertly
- The rope binding must not come loose whilst the rope is being cut.

The Liebherr Customer service team will then reset the safety cut off. After that the hoist rope must be recoiled under load.



Find out more:
<https://www.liebherr.com/training-mobile-cranes>



- ◀ The rope windings on the upper layer across the windings on the lower layer. There is unavoidable friction wear in the rising sections.

Did you know? The service life of hoist ropes can be significantly extended!



The world with Liebherr





Rit Paris
COMITÉ VENDÔME

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TRAVELING SHOWS

La collection
Comité Vendôme
Rit Paris
Comité Vendôme

COMITÉ VENDÔME



Into the future

Putting an end to the permanent traffic jam the ambitious “Grand Paris” infrastructure project is more than a building site. Its objective is to provide France’s capital and the surrounding suburbs with a future worth living. Come with us on a journey of discovery along Metro line 14.

Paris: All systems go

There is the usual daily chaos around the site – throbbing motorcycles, cars hooting their horns and the Eiffel Tower enveloped in smog. Philippe Schalbart, Technical Director at the main contractor Eiffage, has just left behind the permanent traffic jam on Boulevard Périphérique, the overcrowded urban motorway. “I would prefer to travel to work by train”, says the engineer. “But I live outside of Paris. And the rail links there are very poor.”

His current workplace is a major building site in the Paris district of Batignolles, between the Arc de Triomphe and Montmartre. Two Liebherr tower cranes have been erected around

a shaft, a 630 EC-H 40 Litronic and a 280 EC-H 16 Litronic. The shaft goes deep underground where a tunnel measuring almost six kilometres is being built. The Paris Metro line 14 is being extended to the northern suburbs.

Schalbart’s site is the first stage in the development of the “Grand Paris Express”. The name stands for four new fully automatic regional underground railways and the extension of two existing Metro lines. By 2030, the planned lines will have doubled the current public transport network from 200 to 400 kilometres linking the suburbs around Paris to each other and to the capital. 68 new stations will be built to act as nodes for

Like many others, Philipp Schalbart, Technical Director at Eiffage, has to fight his way through chronically overcrowded roads every day to get to work.



urban development and commercial growth. It is all designed to catapult the city on the River Seine into the top league of global cities. With over 21,000 residents per square kilometre, the centre of Paris is almost as densely populated as Mumbai and Shanghai. So it will come as no surprise that the people,

like Philippe Schalbart, have to face the challenge of chronically overcrowded roads every day.

A workplace with a view



But that will all change soon. Liebherr cranes and construction machines are working on at least eight sites in the centre and the periphery to make this happen. At Schalbart's site, Thomas Brun controls a Liebherr tower crane expertly above the shaft. The 360° view from the cabin 70 metres in the air is unique – the Eiffel Tower, Arc de Triomphe, Notre Dame Cathedral and much more. But the crane operator concentrates only on the ground beneath him. On the hook of his 630 EC-H 40 Litronic, he transports three arch stones with millimetre precision over the ground shaft and lowers the 21-tonne concrete load into it. His colleagues then load the components for the

“It’s great that I can do something to help modernise my own area.”

Thomas Brun, crane operator with Eiffage

tunnels onto a train which rolls them into the drilling shaft. The inner-city site with its cordon of cranes requires a special style of site architecture: “I can slew over the crane to my right because I am so high”, says Brun. “If my crane were any lower, I would get tangled up with one of the others. The height of my crane has been calculated very precisely taking into account all the sites and cranes in the surrounding area.”

It’s lunchtime. Brun’s shift is ending. Before he climbs down, he points to the north. “I live there, just behind the new Palais de Justice”, he says with a smile. “It’s great that I can do something to help modernise my own area.” When everything is finished, he will leave the car behind more often and definitely travel by line 14 which he and his colleagues are currently extending.

An underground like Swiss cheese



The construction of the “Grand Paris Express” is a real challenge, not only for the crane operators like Thomas Brun, high above the roofs of Paris, but also for the tunnel experts deep below the surface. “Paris is rightly compared to a Swiss cheese, because the underground has holes everywhere”, explains Schalbart. At a depth of up to 35 metres, a gigantic

tunnel drilling machine works its way forward. It creeps along through the Paris earth at a rate of two to four centimetres per minute like an enormous mole. “We excavated 84,000 tonnes of rubble and soil between Pont Cardinet and Porte de Clichy alone”, says Schalbart. “The drilling is now going outwards from the city.”

Hoisting a giant

There is another construction site a few kilometres further north along Metro line 14. Patrick Meublat has been there for several hours. Meublat is Technical Director for the crane’s business at Mediaco, the largest crane contractor in France based in Marseille. The work today involves dismantling and then hoisting a tunnel drilling machine out of the trench. A yellow and white giant will hoist the individual components, each of which weighs several tonnes, up into the daylight – an LG 1750 lattice boom mobile crane. The Grand Paris project will ensure that Mediaco will have plenty to do for some time to come. “Like all crane contractors in the Paris area, we are expecting a healthy rate of orders over the next few years”, forecasts Meublat. Mediaco has erected 25 Liebherr cranes in the Paris area for the project. “The jobs for our Liebherr cranes around Paris over the next few years



will be dominated by assembling and dismantling tunnel drilling machines and hoisting railway and road bridges.”

Today’s crane job is therefore a matter of routine for the crane operators and fitters. The most complicated job is the

dismantling of the tunnel drilling machine. Continuous, precise communication between the fitters and crane operators is essential for it because there is very little room to manoeuvre in the constricted trench. The first step is to remove the front plate on the tunnel drilling machine, which has a diameter of around eight metres. To make it easier, the LG 1750 raises it slightly so that the fitters can start the dismantling work. This part is particularly complicated whilst the subsequent hoist requires less than 20 minutes.

“We are expecting full order books for the next few years.”

Patrick Meublât, Technical Director at Mediaco

Patrick Meublât brings a successful day to a close – the LG 1750 hoists the front plate weighing around 292 tonnes to the surface smoothly and on schedule. The individual components of the tunnel drilling machine are then loaded onto trucks and transported to the next site in Paris – where it will once again drill metre after metre and day after day through the Paris underground, creating the route for the “Grand Paris Express”.



Field test – the latest engine and emissions technology

Over the last few months, there has hardly been a news bulletin which has not mentioned “particulate pollution” or “diesel bans”. The topics of environmental protection and statutory regulations pose a daily challenge to Liebherr as well. For 18 months, crane rental contractor ESB based in Mittelbiberach has been testing an LTM 1070-4.2 with an engine which complies with emissions stage 5. We talked to Karl Engeser, the owner of Kranverleih ESB, Karl Stöhr, Head of Product Management at Liebherr in Ehingen and Daniel Rössner, Test Engineer at Liebherr about the challenges and solutions in this field.

Why is Liebherr currently working on fitting new engines to mobile and crawler cranes?

Karl Stöhr: The main reason for this is essentially a statutory one. The European Union is pursuing the goal of reducing engine emissions further. The main aim of this is to use new filter technology to prevent particulates being emitted into the environment.

The new EU Regulation 2016/1628 will come into force on 1 January 2019 and will affect all the diesel engines fitted in our cranes. In all the countries of the EU as well as Norway and Switzerland, every engine built in 2019 or after will have to provide greater protection to the environment through its particulate filter.



Karl Engeser, Karl Stöhr and Daniel Rössner

What are the special challenges for Liebherr as a manufacturer of mobile and crawler cranes?

Karl Stöhr: Converting our entire crane range to engines which comply with emissions stage 5 is a massive task in itself. More than 30 different engine installations have had to be redesigned. But in addition to this, the same basic machine not only has to be suitable for the new EU engine with a particulate

filter, but also the stage 4 (Tier 4) engine which is primarily aimed at the USA and the stage 3a engine for countries with lesser regulations. That is a massive challenge both for our design team and for our logistics people.

The correct and prompt provision of prototype units featuring the new filter technology and above all, early testing by our test department is another important job.

What technical solution do Liebherr engines feature to enable them to comply with the stage 5 limit values?

Daniel Rössner: In addition to the SCR technology we already have, our cranes feature a sealed particulate filter system. This filters almost all the soot particles out of the exhaust gas. You will notice it in the future by the clean exhaust tailpipes – as you can see on the LTM 1070-4.2 test machine.

Karl Engeser: I can only confirm that. You can put your hand into the exhaust – and it's really clean!

Daniel Rössner: In principle, the introduction of a particulate filter in an existing machine concept is very demanding from a technical point of view. The use of our diesel engines for cranes cannot be compared to applications such as those involved in long range trucking. Furthermore, the load collective of the units, depending on the type of operation, is extremely diverse. For example, in undercarriage mode, the engine operates for long periods at full power, whilst in superstructure mode, high load requirements are more temporary in nature.

One of the big challenges is the recurring regeneration of the particulate filter. Our system is designed in such a way that the regeneration takes place continuously whilst the vehicle is being driven. That enables us to minimise downtimes. If the filter does fill up eventually, it is of course possible to regenerate the filter by active means whilst it is in the machine without it having to be removed.

We made the procedure required for this as customer-friendly as possible together with the Control, Product Management and Testing Departments and the Liebherr engine plant in



Karl Engeser and Daniel Rössner

Bulle (Switzerland) without overburdening the operator with displays.

What are the testing procedures and what role do field tests play?

Daniel Rössner: In general, each prototype goes through a range of acceptance procedures in undercarriage and superstructure tests. The machines are subjected to standardised tests. This is necessary to ensure that the systems achieve an appropriate level of maturity before being released for field tests by customers. A field test can only be started when we are certain that the customer can expect not to have any restrictions in crane operations involving the machine or the new system.

The test should therefore not be regarded as a substitute but actually as a supplement for the testing phase. It is enormously important for us to observe new systems, such as the diesel particulate filter, operating in real conditions for customers. In addition to improving the components, these measurements from the field tests can also deliver important findings for new developments.

Mr Engeser, you have been operating probably the cleanest mobile crane in the world since April 2017.

What made you help Liebherr with the field tests?

Karl Engeser: When you consider that the new emissions stage 5 in Europe exceeds all other limit values, there is no

Kranverleih ESB is a medium-sized crane contractor with 14 employees based in Upper Swabia. It has 12 mobile cranes in its fleet with lifting capacities ranging from 30 to 200 tonnes and serves the regional market within around 40 km of its base, with most of its jobs being at industrial sites. The oldest crane is a LTF 1030 telescopic truck-mounted crane built in 1993 which has now accumulated 32,000 hours of service. The company's whole fleet features the Liebherr name.

doubt that we have been operating the cleanest crane in the world for the last 18 months. And it was actually our consideration for the environment that played a major role in our decision to get involved. In addition, I've always been interested in new technology. The field test seemed an obvious choice as a result of how close we are to the Liebherr mobile crane plant in Ehingen. We are just 30 km away, very close indeed.

What experiences have you had with the new engine and its emissions technology?

Karl Engeser: They have all been positive! The crane has not let us down at all over the entire period. The vehicle remained operational throughout. High availability is a major criterion. We owe that to our customers. We clarified any minor faults we experienced directly with Liebherr's Test Department. There was one breakdown where I phoned Mr Rössner directly. The problem was dealt with straight away. Again, the crane did not suffer any downtime.

Daniel Rössner laughs: I was expecting the phone call. The replacement part had already been ordered. The measurement data records showed that the failure was about to happen. We had direct access to the engine data using the telemetry.



Karl Engeser

Karl Engeser: My crane drivers had reservations at the beginning because nobody wants to look silly in a customer's eyes due to technical problems. But that is absolutely not an issue any more. In fact, everybody wants to drive the new crane. What's more, the drivers are absolutely delighted with the engine performance. The new emissions technology has not resulted in any loss of power. The consumption of both fuel and of AdBlue is unchanged.

Daniel Rössner: Emissions stage 5 does not adversely affect fuel consumption. Previous experience from practical tests has also been very positive for Liebherr. We now have other cranes with other engine types undergoing field tests.

The water detective

Small, fine, excellent – Liebherr humidity measurement is essential for many industrial and agricultural processes. The process was invented more than 30 years ago. Since then it has been setting global standards.



Concrete is a very special material – it depends on the correct mixture of cement, sand and gravel after which the additional of water will start the chemical reaction of the binding agent and turn the mixture into a high performance, solid building material for every conceivable application. It therefore comes as no surprise that Liebherr's Concrete Technology Division has always kept a particularly close eye on the significance of water and the moisture content in concrete production.

The whole world of moisture measurement

Moisture measuring equipment from Liebherr is used in a very wide range of different industries, including for processing the following:

- Concrete
- Sand and other rock or mineral particles
- Glass
- Paper and cardboard
- Diesel, oil and other emulsions
- Coolants and lubricants
- Paints and lacquers
- Agricultural products
- Food

Typical installation sites for the rod or plate-type planar sensors include silo discharges, chutes, baffle plates, belts, transfer points, drying systems, worm conveyors, pipes, tanks and many more.

Moisture management "live"

Since 1985, Liebherr-Mischtechnik GmbH has been developing measuring systems for industrial automation at its production site for concrete mixer trucks, mixing systems and now also concrete pumps in Bad Schussenried. "Everything started with sensors for measuring the moisture content of sand in our own concrete mixing systems", explains Thomas Maier. He has been with Liebherr since 1991 and heads up global sales of sensor systems and the corresponding analysis systems. "Today our moisture measuring systems are used in production systems in every conceivable industrial sector. At automotive supply companies in the USA as well as paper factories in the Netherlands or sugar manufacturers on Guadalupe."

"The sensors take measurements up to 40 times per second as the process is ongoing", says Maier. Previously, the moisture content of additives had to be measured in a laboratory using samples to ensure the correct consistencies and, if necessary to make corrections in the production process. "Today, our technology enables us to manage moisture content 'live' and in real-time. And all with maximum precision."



The moisture measuring sensor "surfs" on a metal carriage over the sand on the conveyor belt and records very slight fluctuations in the moisture content.



“If you just rely on the specification for new developments, you can only ‘invent’ what already exists.”

Werner Frey, Sensor Development

The formula for invention – think out of the box

Sensors for moisture measurement are inconspicuous. When they are detecting sand or emulsions, scanning shards of glass or taking measurements in a combine harvester, they are hardly visible with the naked eye. They are not going to win any design awards. And yet, moisture management has its own, very friendly face at Liebherr. The face of Werner Frey. He has been involved in the development of sensors for over 30 years and his inventions have had a major influence on industrial moisture measurement.

Frey came to Liebherr in 1987. “At the time I was employed to establish an electronics laboratory and be the first to develop an evaluation device for moisture measurement”, he remembers. Actually it was a great success. However, the sensors intended for this did not sit

right with the inventor, and the supplier failed to provide the improvements it had promised. “I simply developed and built the first microprocessor-controlled smart sensor for concrete mixing systems on the side”, says Frey smiling mischievously.

The fact that his one-man development operation has now turned into a small,

fine team is a matter of pride for Werner Frey. “Our five-man developer team enables us to share tasks, but nevertheless everybody has to do everything, from electronic and physical problems to pre-development and production and even the documentation. We enjoy working with each other very much, but it also means a high level of personal responsibility”, says Frey.



Liebherr sensors allow extremely precise moisture management in real-time.



Find out more:
www.liebherr.com/wasserdetektive



Household appliances

MyStyle – for more variety in everyday life

The waiting is over – Since May, Liebherr customers have been able to design and compose the refrigerator to suit their taste and mood. The basis for the first, completely customisable refrigerator is the Kcu 701 compact appliance which is manufactured at the Lienz plant in Austria. The next step will be to extend the product range with the customisable fridge-freezer combination CBNsl 48C5.



There are no limits to the design options, from single colours, multicoloured, photos or a favourite quote all being possible. Why not include your best memories in your everyday life or use your refrigerator as advertising space. And you do not have to stick with a single design. You can simply change the exterior walls and decide on a new motif or a new colour. Each side of the refrigerator can be designed individually.



But that's not all – the interior design and the surface material can also be tailored to suit individual tastes. The colour, number of drawers or glass shelves – MyStyle can make individual customer wishes come true.



Find out more:
www.designyourfridge.com



Components

KAMAZ-Master challenges Dakar 2018 and wins

The 2018 Dakar Rally was the 40th rally marathon to encompass the three countries of Peru, Bolivia and Argentina. The race over 9000 km started on 6 January 2018 in Lima (Peru), passed through Bolivia and ended in Córdoba (Argentina) on 20 January.

This year, the race proved to be extremely difficult – in addition to the bizarre landscape featuring dried riverbeds and dunes, fine sand and dry branches and rocks posed a threat to tyres and made for an exciting race. The drivers were also confronted with extreme climatic conditions, ranging from snow with slippery, windy roads to the heat of the desert and provided a real challenge to the participants. After the first few stages, only 30 of the original 42 vehicles were still racing.

Three KAMAZ-Master teams entered the Truck Category of the Dakar 2018 Rally. The team led by Eduard Nikolaev proved victorious at the wheel of one of the three KAMAZ trucks powered by Liebherr V8 diesel engines. The heart of the machine enabled the trucks weighing 8900 kg to reach a maximum speed of 140 km/h by developing 686 kW (920 bhp) and accelerate from 0 to 100 km/h in less than ten seconds.



Neither the challenging route with its extreme weather conditions nor the unforeseeable incidents and strong competition could prevent the KAMAZ-Master recording its 15th victory at the Dakar Rally.



Earthmoving

A unique development and demonstration centre for Europe

Liebherr-Hydraulikbagger GmbH celebrated the opening of its new development and demonstration centre in Kirchdorf in October 2018. In the future, this will be where new construction and material handling machines will be developed, tested and trialed so that they meet customer requirements perfectly. There is no other comparable validation centre an-

nywhere in Europe. A total area of 12.68 hectares contains a testing hall with administration building, a large testing site with a 1.2 kilometre test track and a demonstration area. A total of 2700 tonnes of steel were used in the hall. In addition, around 135,000 cubic metres of soil were moved on the test site, which corresponds to around 243,000 tonnes.



Mining

Testing: R 9400 hydraulic excavator with Liebherr engine

The R 9400 featuring Liebherr engine D9812 is being tested at a cement works in Héming in north-east France. It is the first large hydraulic excavator with a Liebherr engine. The 350-tonne giant must prove itself in real working conditions in a quarry measuring around 300 hectares. Around 600,000 tonnes of bricks and more than 700,000 tonnes of cement are produced at the cement plant which is operated by EQIOM, a member of global group CRH.

Focusing on customer requirements

Liebherr engine D9812 was specially developed for the mining industry. That means vertical integration at Liebherr – the special production of parts for machines and components to meet customer requirements as well as possible. This ensures excellent availability, a longer service life and increased productivity.

The performance of the V12 diesel engine can be adjusted to various emission standards in all applications: Tier 2 or even USA / EPA Tier 4 final. On hydraulic excavators, the engine achieves a capacity of up to 1500 kW and in mining of up to

2013 kW. The composition of the engine and the strong integration of Liebherr key components make the D9812 a very efficient partner.

Use on the very hardest material layers

The R 9400 has been operating since April 2018. From July to August alone, the hydraulic excavator completed around 350 hours of work. “We have tested it on the very hardest material layers and achieved a capacity of 700 tonnes per hour”, says Yannick Laurus, Project manager at EQIOM in Héming. “On the top layer we achieved a capacity of 1500 tonnes per hour, which completely satisfies our needs.”

The hydraulic excavator with the Liebherr engine has also been welcomed by the operators at EQIOM. “They appreciate the precise positioning of the backhoe. Compared to other machines which they have operated, they are very happy with the comfort levels in the cabin and the easy access”, says Laurus. The R 9400 with the Liebherr diesel engine will remain in Héming for several more weeks to continue to improve its functionality.



Liebherr Shop



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1 | Liebherr LTM 1250-5.1 mobile crane. Model of the 5-axle mobile crane on a scale of 1:87 (H0). The model has a two-piece boom. Zinc die-cast model from IMC. Length: around 20 cm. **Part No.:** 12219307 **Price:** € 38.50

2 | LTM mobile crane key fob. Solid metal key fob in the shape of an mobile crane. With keyring and metal plate. Packed individually. Size: around 69 x 22 mm. **Part No.:** 12217250 **Price:** € 4.90

3 | Outdoor jacket. This black outdoor jacket features a number of clever details. Water-repellent and breathable. Padded for great wearer comfort. With removable hood. Various practical external and internal pockets. Material: 100 % polyamide. Sizes: S-3XL. **Size / Part No.:** S/11821298 M/11821299 L/11821300 XL/11821301 XXL/11821302 3XL/11821303 **Price:** € 96.90

4 | Liebherr LTM 1050-3.1 mobile crane. 1:50 scale replica of the 50 t class all-terrain mobile crane. Zinc die-cast model from WSI. Length: around 20 cm. **Part No.:** 10652277 **Price:** € 108.00

5 | Ladies softshell jacket. Fashionable yet functional ladies softshell jacket. Windproof and water-repellent Figure-hugging fit with modern zip sleeves. Two side pockets with zip fasteners. Colour: black. Material: 91 % polyester, 9% elastane. Sizes: S-XL. **Size / Part No.:** XS/11485101 S/11485102 M/11485103 L/11485104 XL/11485105 XXL/11485106 **Price:** € 83.50



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