UpLoad

The magazine for customers and friends of mobile and crawler cranes

2 | 2021

LIEBHERR

“There is nothing like a challenge to bring out the best in man.”

Sir Sean Connery
1930-2020, actor

Dear Readers,

Challenging. That may be the best word to describe the last year perfectly. And it continues to date in 2021. I was really looking forward to being able to welcome you back to see us at our Customer Days in Ehingen this year. Unfortunately that has been added to the list of many events which have had to be cancelled. I would therefore like at least to use this opportunity to welcome you and to say thank you to you all! Thank you for everything that has been overcome in the way of challenges over the last 18 months, regardless of whether it has involved our customers, suppliers, partners or staff.

We would have been looking forward to offering your a new “Liebherr experience” at our Customer Days because we have revised our brand identity over the last few months and made it more memorable. Today, in fact, you will be experiencing our UpLoad magazine for the first time in our new livery. The explanation as to why we have done this is on page 100 – and we look forward to receiving your feedback.

The coronavirus has led to us facing a number of challenges throughout the entire group. Some product divisions have had to fight against a difficult market situation over the last year. You can find out how we have found the last year as a group on page 94. In our Mobile and Crawler Crane Division, fortunately, we have only had to deal with some minor changes. And we assume that we will once again reach the levels achieved in 2019 this year or maybe even slightly exceed them. From page 70, you can find out how the sterling efforts of our personnel have achieved this pleasing development.

I am delighted to report that our cranes continue to be in demand in these challenging times, supporting our customers all over the world in some truly impressive jobs. For example, the cleaning work on the German Chancellery in Berlin (page 62), building the largest logistics centre in Japan (page 54) or salvaging a boulder in Emsland (page 48). On page 88 we also report on how, despite travel restrictions, our cranes are still being handed over the customers all over the world and how we are still providing induction training on them.

Finally, I would like to take this opportunity to take a look into the future with you. Over the last year, we have learned a great deal and overcome many hurdles. The lessons we have learned during this time will be used to create our outline plans for the future. One thing that stands out is that we are definitely stronger together. For example, where sustainability is concerned. Like many others, we are making our contribution to this, whether it involves the refurbishment of used cranes (page 58), the complete recycling of whole machines (page 102) or the development of alternative drive unit types. The theme of sustainability will stay with us for the next few years, which has led us to introduce a whole new series of articles on the subject. See page 78 for more details.

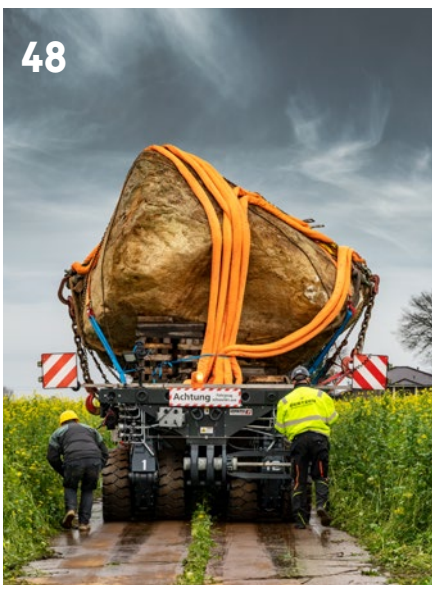
I hope you enjoy reading our latest edition. Stay healthy and I hope that I will be able to welcome you all in person at the very latest at the Bauma in October 2022.

Yours

Sophie Albrecht
Member of the Administrative Board of Liebherr-International AG

The subjects of our articles

Mobile and crawler cranes



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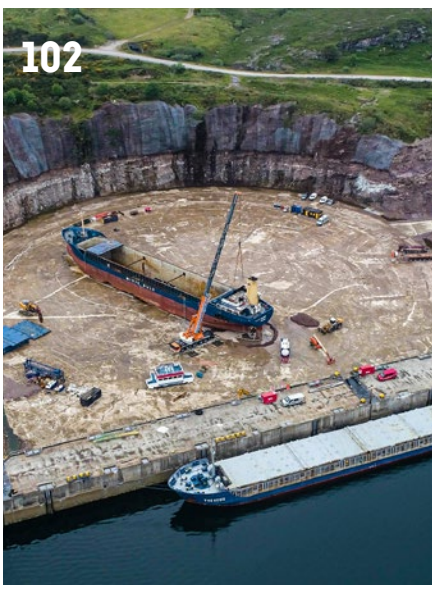
In focus

The world with Liebherr



Moments

A long night shift
Set up with 204 tonnes of counterweight and Y guying, the new LTM 1750-9.1 operated by Australian crane contractor Johnson & Young Cranes based in Melbourne, installed prefabricated bridge supports well into the night. The work had to be finished before the morning rush-hour started.


JOHNSON & YOUNG CRANES
OVERSIZE

Its final flight

A brand new G-LTM 1090-4.2 gave a former McDonnell F-4F Phantom II fighter jet its final flight. Timed perfectly to coincide with the celebrations to mark the 60th anniversary of the creation of Tactical Air Squadron 74 in Neuburg a. d. Donau, the former fighter plane was relocated from the nearby airbase to the Wilhelm Frankl Barracks. The camouflage-coloured mobile crane had to hoist the fighter jet over the fences around the barracks several times until the 47 year old exhibit reached its final resting place at the site's main guard post.

Very close to the sky

One of the most powerful telescopes in the world is currently being built in the north of Chile. On the 2682 metre El Peñón peak on the Cerro Pachón Ridge, an LTM 1500-8.1 from Chilean crane contractor Burger Grúas can be seen here installing a component measuring ten metres in width and weighing in at 28 tonnes through the narrow opening in the cupola of the Vera C. Rubin Observatory. In the future, the images will be recorded by a 3.2 million pixel camera, the largest digital camera ever planned, weighing around 2.8 tonnes and measuring 3 metres in length with a diameter of 1.6 metres.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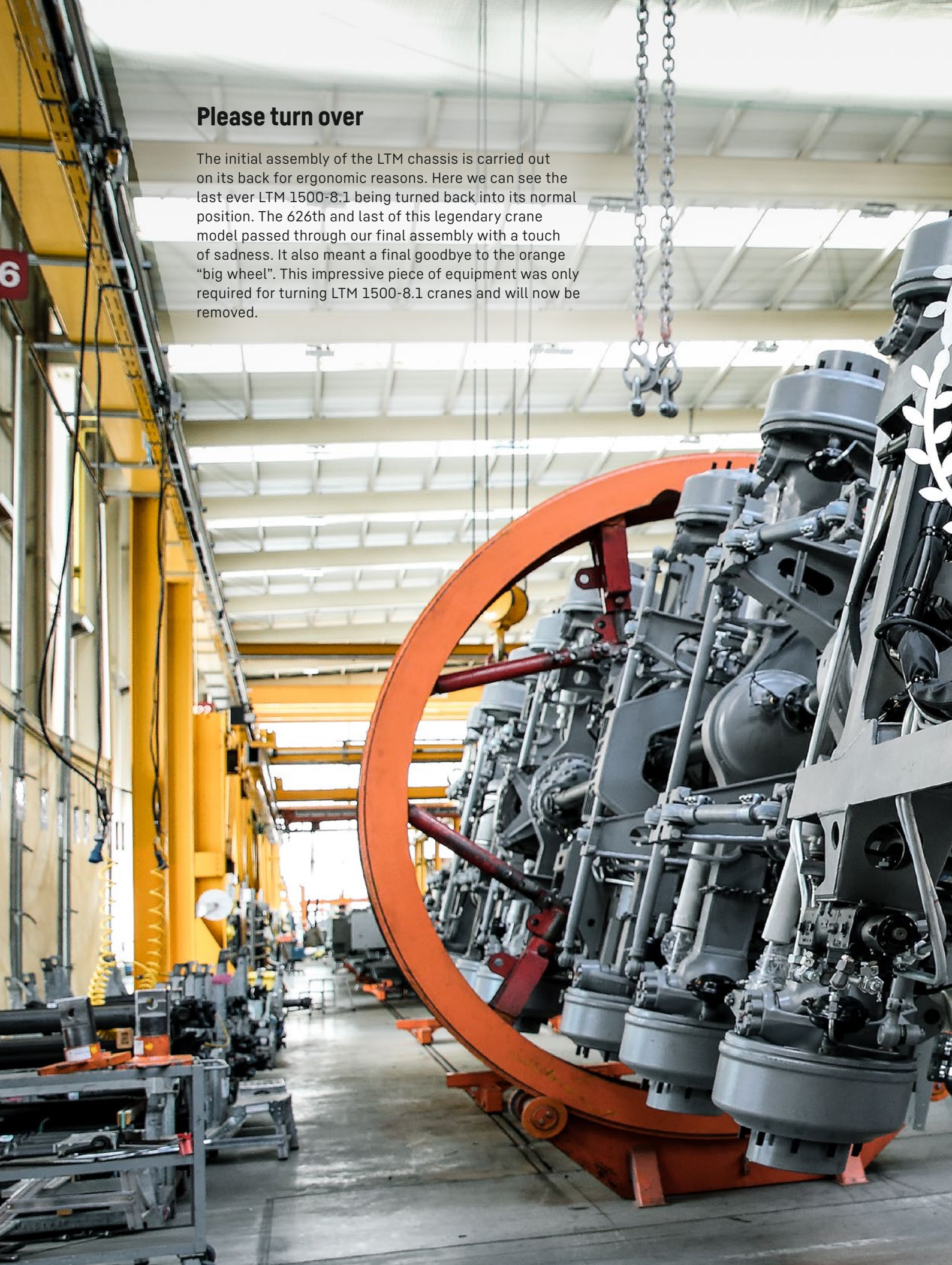
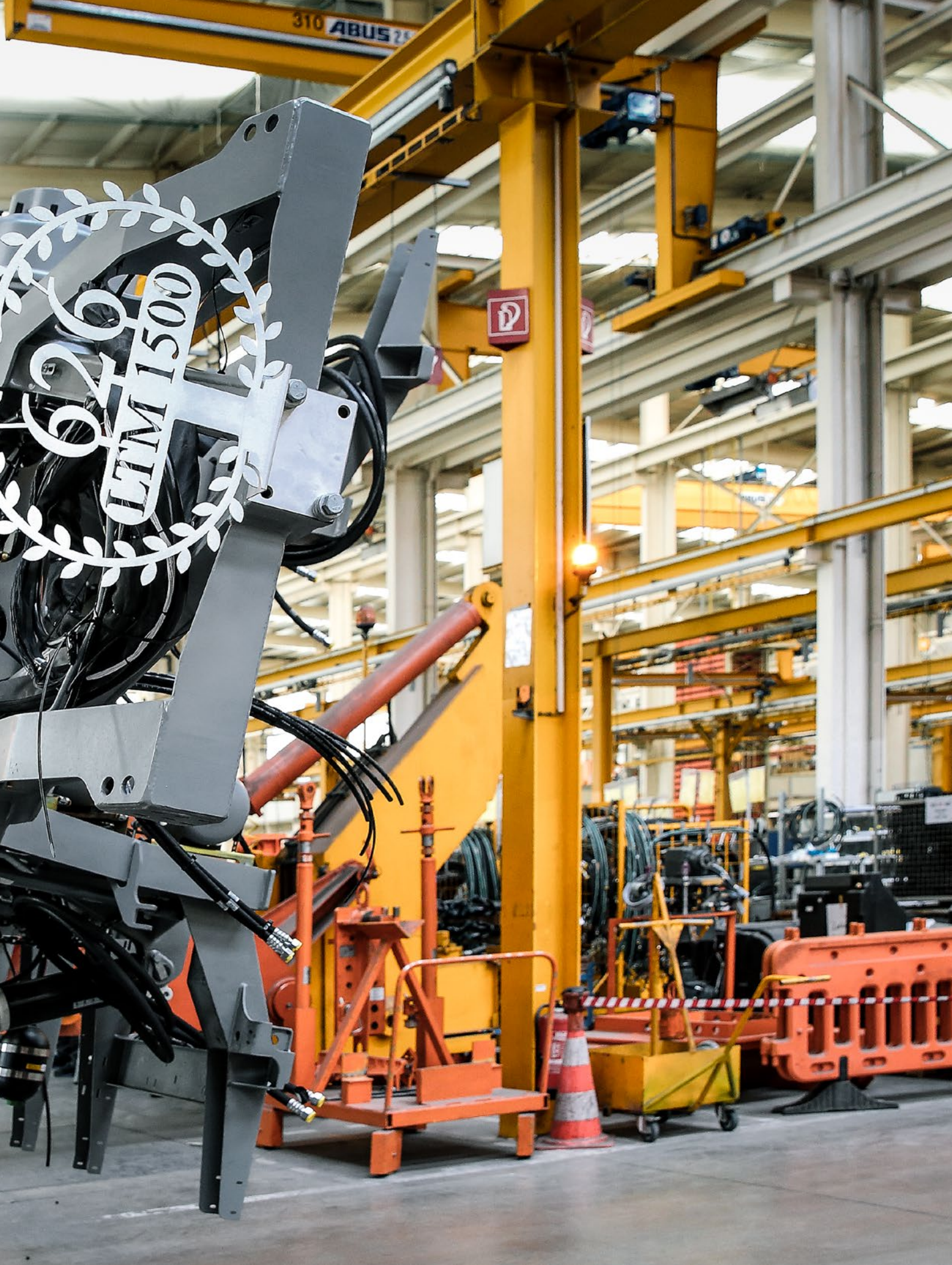
Please turn over

The initial assembly of the LTM chassis is carried out on its back for ergonomic reasons. Here we can see the last ever LTM 1500-8.1 being turned back into its normal position. The 626th and last of this legendary crane model passed through our final assembly with a touch of sadness. It also meant a final goodbye to the orange “big wheel”. This impressive piece of equipment was only required for turning LTM 1500-8.1 cranes and will now be removed.




ABUS
UTM 1500

Allegiant Stadium in Las Vegas

The American football and soccer stadium is close to the Mandala Bay Resort and Casino Las Vegas, Nevada. The stadium can hold 65,000 spectators and is the home to the Las Vegas Raiders NFL team as well as the UNLV Rebels, the college football team based at the University of Nevada. And it was finished on 31 July 2020 with the help of an LR 1500.


allegiant stadium
allegiant stadium

Eltz Castle

In the valley of the River Elz, a tributary of the River Moselle in the German state of Rhineland-Palatinate, there is a very special mediaeval treasure perched on a rock 70 metres in the air. Eltz Castle has seen many wars come and go and has remained undamaged. It has been owned and maintained by a single family every since it was built in the 12th century. Its architecture is unlike any other structure and is an original work dating back eight hundred years. Liebherr cranes played a major role in the extensive refurbishment work carried out at the landmark between 2009 and 2012.

The Brussels landmark

Erected in 1958 for the World Expo in Brussels, the Atomium, which represents an iron molecule magnified billions of times, was supposed to have been removed again six months later. However, the people of Brussels could not bring themselves to remove their world famous landmark. And so, in 2005, the Atomium was due for a full refurbishment – with an LR 1350/1 doing the honours.

Made with Liebherr

Monuments, stadiums, outstanding buildings and places for lots of people to gather – Liebherr cranes are needed everywhere and they are in action all over the world. That means we can say with pride – Made with Liebherr.

Building a new stadium in Las Vegas

Work started on the construction of the new Allegiant Stadium for American football and soccer in Las Vegas on a greenfield site in 2017. After three years, it was finished on 31 July 2020. The arena, which holds 65,000 spectators, cost around 1.9 billion US dollars. At times there were more than ten crawler cranes working on the site, including an LR 1500 crane and several LR 1300 SX models. The newly purchased LR 1500, owned by crane rental company Dielco based in Las Vegas, was in action both for erecting the structural steelwork and also for hoisting the shell elements into position. As a result of its large radii and lots of different positions which the crane had to take up during the construction work, it was set up with a ballast wagon. The first official match in the new stadium was held on 21 September 2020.

Beauty therapy for the Brussels Atomium
The quirky formation reaches 102 metres into the Brussels sky. In 2005, a Liebherr crane temporarily towered over it by around 40 metres. Belgian crane and heavy haulage specialist Sarens helped refurbish the city's landmark using an LR 1350/1-LN crawler crane. The complete outer skin of the 18 metre thick globes was replaced with corrosion-resistant steel plates. A lattice boom crane had to be used to complete the work on the topmost of the nine spheres, which also houses a restaurant, as a result of its altitude and the fact that a radius of up to 76 metres was required.

The team spent around eight weeks up in the air simply to place a new skin around the topmost sphere. The LR 1350/1-LN remained in a single position whilst it completed all the hoisting work. With its 66 metre main boom and 78 metre luffing jib, the Liebherr crane was able to carry out work all over the high altitude site.

Refurbishment work at Eltz Castle
Eltz Castle is the archetypal German mediaeval castle and once featured on a 500 mark note. The structure has never been attacked and is therefore fully preserved. What is more, the noble Eltz family, which has owned the castle for more than 800 years, has carried out restoration work at regular intervals. The shaky structure was secured, damaged roofs and half-timbered structures repaired and the rotten internal equipment replaced in extensive refurbishment work carried out between 2009 and 2012. In April 2010, an LTM 1350-6.1 mobile crane erected a 280 EC-H tower crane to assist with the restoration work. The main boom weighed 12.5 tonnes and had to be installed using a radius of 45 metres. The special challenge for the job was that the mobile crane was 29 metres below the level of the tower crane.

Mobile and crawler cranes

Keeping a cool head
Set Win positions large air conditioning units on skyscrapers in Hong Kong using the LTM 1500-8.1.


SET WIN

Stable even in a stiff breeze

Double boom can withstand higher wind speeds

More powerful and stable in the wind – that is a rough summary of the main benefits that Liebherr has delivered for its customers in the form of its innovative SX2 and SX3 boom systems for crawler and lattice boom cranes. The reinforced booms are not only particularly helpful for wind power crane operations, but that is indeed their main purpose. The SX3 version delivers a major increase in lifting capacity of twenty percent and significantly higher wind tolerance compared to the conventional SX version. A new Liebherr LG 1750 crane, which was fitted with the SX3 version, benefited from these features whilst working at a wind farm in February. The lattice boom mobile crane operated by Dutch crane contractor M. Verschoor B.V. erected two Vestas turbines in the north-east of Germany with hub heights of 166 metres. Johan Bezemer, a seasoned crane operator at Verschoor, was also delighted with his new crane system.

"It's certainly not a punishment working with this crane," says the Dutchman delightedly after completing the first of two wind turbines at the site near the German-Polish border. Bezemer had travelled to Germany for this first job for the LG 1750 with three colleagues and a Liebherr mobile crane, which was used to set up and ballast the larger crane. The Dutch crane contractor owned by Maarten Verschoor had significantly expanded its crane fleet upwards with the purchase of its new Liebherr machine. The mobile lattice boom crane was supplied with the SX3 boom system which was required for its very first job at a wind farm to erect a new wind turbine type featuring extremely heavy tower components.

Tower segments weigh up to 120 tonnes

"The first four tower sections each weigh 120 tonnes. Together with the hook block and fastening equipment, that means a load case of around 123 tonnes. At a radius of 35 metres, that means we are using the full lifting capacity of the crane for this job", explains Bezemer. "This crane with its SX3 boom enables us to increase our capacities so that we can also erect these very large turbines", says Bezemer proudly about the new addition to the Verschoor fleet. "Its 165 metre main boom and twelve metre jib mean we have a lifting capacity of 127 tonnes. That is really enormous."

"This boom system, on which the lower section of the lattice boom has been extended to a width of six metres, is not just a reaction to the ongoing increase in the weights of components and hoist heights for erecting wind turbines", explains Jens Könneker, Product Manager at the Ehingen-based crawler crane factory. "The 28 or 42 metre boom reinforcement (which is also fully compatible with our LR 1750/2 crawler crane) delivers significantly greater rigidity in the boom design and therefore results in less crane downtime due to wind. We calculated the previous systems used on the LG 1750 with a maximum wind speed of nine metres per second. The SX system now allows work to continue in wind speeds of up to 10, in some cases even up to 11.2 metres per second. That is a massive benefit, particularly for cranes at wind farms."

Ready in a flash
A three metre intermediate section extends the jib to 15 metres for the final hoists.
The team from Verschoor only required two hours for the modification work – also thanks to VarioTray.

Higher wind tolerance saves three working days

The Dutch crane team travelled to the Vestas construction site in full knowledge of this benefit, which should not be underestimated. An initial look at the data on the wind gauge mounted at the top of the boom at an altitude of around 180 metres often provides the answer to the question of whether the crane is allowed to operate. “I reckon we saved a total of around three days in waiting time at this site as a result of this more powerful boom version,” says crane operator Bezemer, totting up the hours in which the greater wind tolerance of the boom system allowed the crane to operate.

But Bezemer is also extremely happy with the practical handling of his new machine. “We set up the crane with suspended ballast and the VarioTray detachable ballast pallet. That saved us an enormous amount of time and effort”, he says. After erecting the crane with 415 tonnes of suspended ballast, we simply had to remove the centre section using four pins, install the guide frame on the ballast pallet and we were then able to continue working without first having to stack or remove all the ballast slabs. It works brilliantly.”

Powerful and robust
The bottom section of the lattice boom is extended to a width of six metres to deliver greater power and rigidity.

On the top
The gondola, weighing around one hundred tonnes and generating 5.6 megawatts of electricity, is positioned at an altitude of around 170 metres.

This practical feature, which has now become almost essential, also saved a great deal of time when the powerful long boom had to be adjusted. After all the tower segments had been installed, the lattice jib actually had to be extended to a length of 15 metres by inserting an intermediate section. Only then was the crane able to provide the required hoist height for the other components – including the gondola which weighed in at around 100 tonnes. The team from Verschoor required just two hours to modify the jib.

“Inside the crane is a great place to work”

The new crane is now the most powerful machine in Verschoor’s fleet. “We will probably only use the LG 1750 for wind power jobs”, says Erik Hans van de Kop, the company’s Managing Director. After spending several weeks in Germany, his team travelled back to the Netherlands with their LG 1750. Since then, the crane has been working full-time on erecting wind turbines in the north of the kingdom using its SX2 boom. As a result of its full order books, Verschoor has since ordered another LG 1750.

M. Verschoor B.V. has a total of 70 cranes and 115 employees divided between its headquarters in Sassenheim (between Amsterdam and Den Haag) and a branch office in Almere. In addition to crane work, Verschoor also provides heavy haulage services and is active in the used crane and crane component business.

And because here at Liebherr we are not just interested in feedback from our partners but we are also always very happy to receive technical praise, we will give the final word once again to Johan Bezemer: “It’s fantastic working with a brand new Liebherr crane! It’s like sitting on a throne, simply brilliant. A really good place to work.”

Team Cool
Johan Bezemer, Remco van Riet, Jan Dijkhuizen und Bradley v. d. Gaag (from the left)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The merging of two worlds

A crane which will change the world of crawler cranes. A crane which combines transport benefits and performance. A crane which links the elements of wind and earth. A crane which combines the benefits of two classes. Powerful, economical and pioneering. Steffen Schwertle is a Project Manager in the Structural Department and talked to us about "his" masterpiece. The LR 1700-1.0 has positioned itself in the market as a miracle of transport and capacity between the 600 and 750 tonne class.

Mr Schwertle, how did the new crawler crane come about? Which crane provided the genes for the LR 1700-1.0?

The LR 1700-1.0 is an update of the successful LR 1600/2, 200 of which have been built. One idea was to simply use the boom sections of the LR 1600/2.

At the beginning of the development phase, we realised that a single reinforcement of the boom system would not be enough to increase lifting capacity. We therefore completely revised the superstructure and undercarriage and equipped them both with our latest developments.

Which good features of the successful 600 tonne crane have been used on the new crane?

We have used the luffing jib and the boom heads – a major financial benefit for operators of the LR 1600/2. We also made sure that the LR 1700-1.0 is designed to be transported as easily as is now commonplace in the 600 tonne class.

What are the outstanding features of the LR 1700-1.0?

It is a genuine all-rounder! It is ideal for industrial work because it is so powerful and has a long luffing jib. In addition, it can be used very flexibly and is precisely tailored to the latest requirements for the erection of wind turbines. Its powerful SA-frame and luffing gear make the LR 1700-1.0 look pretty good even in main boom mode.

"Our aim was to build the perfect crane. And actually, we managed it."

Steffen Schwertle
Project Manager in the Structural Engineering Department

And what are its differences to its predecessor, the LR 1600/2?

There have been quite a few changes. We have fitted the LR 1700-1.0 with an H system with a width of 3.5 metres. In addition, the derrick boom is longer to enable the crane to be erected with long boom lengths. The superstructure ballast has been increased from 190 to 230 tonnes so as to achieve better lifting capacities without the derrick system. At the same time, we have increased the weight of the ballast consoles from 5 to 15 tonnes to keep the number of ballast slabs low.

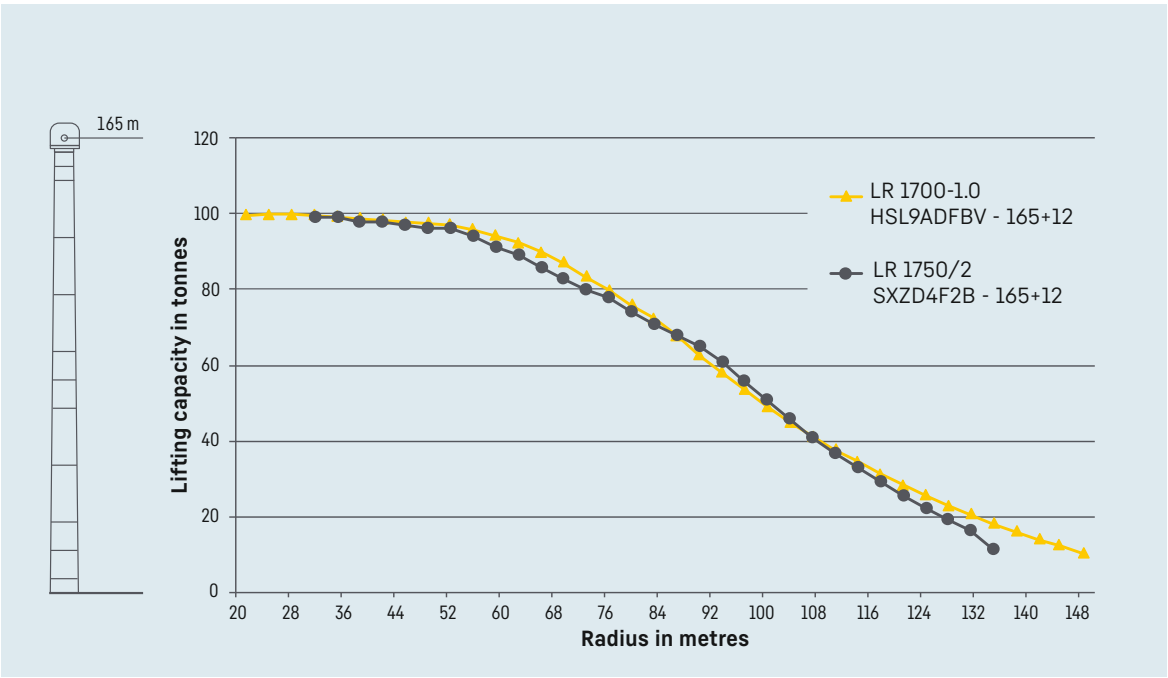
The crane can be used effectively thanks to load charts in the S system and load charts in the H system. The wider H system delivers maximum lifting capacities while the S system provides particularly economical transport costs since not a single component exceeds a width of three metres.

Of course, it proved quite a task because we had to prepare multiple load charts for each of the fifty operating modes. The crane is still simple for all users as the selection of the charts with various ballast versions and wind speeds is very straightforward. A number of charts is active in the background of the control system.

Where was your special focus in the development work with a view to wind power applications? And how did you manage to achieve the high lifting capacities?

One of the most successful features of the LR 1600/2 was its 108 metre main boom in SL3F mode and, later, also SL13DFB with a 156 metre main boom, each with a 12 metre fixed jib. As wind turbines are now becoming ever higher, the customer can no longer erect these new turbines using the LR 1600/2. For the LR 1700-1.0, therefore, we focused on a wind power system with a 165 metre main boom and a 12 metre fixed jib to ensure that it could erect turbines with a hub height of 165 metres. Hoisting 100 tonnes to this height is a challenge which we solved. In the past, it has only been possible to do so using the LR 1750/2 and the LR 1800-1.0.

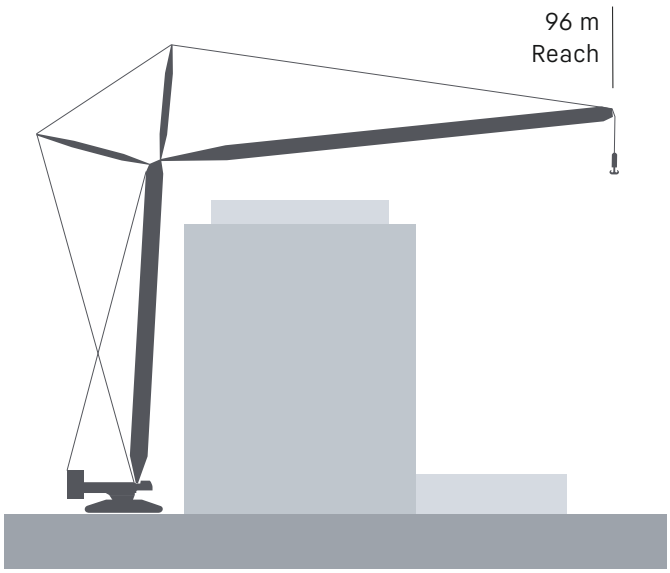
With our new crane, this is definitely only possible because we paid special attention to this performance parameter during the development phase. You could say that we developed the boom for the LR 1700-1.0 specifically for this purpose. It is due to the interaction of the perfectly coordinated weight and rigidity of the various boom sections on a superb base machine.



Lifting capacity comparison for erecting a wind turbine: LR 1700-1.0 and LR 1750/2

Does the crane have any other extraordinary features?

The LR 1700-1.0 is primed for the future. Its LICCON2 control system including monitored erection delivers a high level of safety. It also features the VarioTray adjustable suspended ballast. Another feature worth mentioning is the new S2W system, which can be raised without a derrick boom – 66 metre S2 main boom with 96 metre W jib or 72 metre S2 with 60 metre W. The boom sections have been tailored perfectly to the various operating modes.



LR 1700-1.0 achieves an enormous radius with the S2W boom – 60 metres + 96 metres

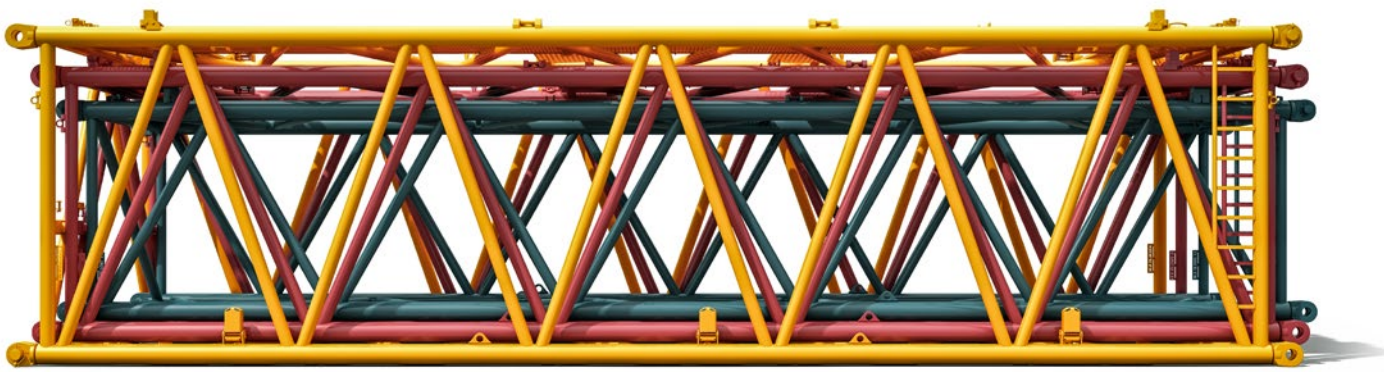
The intermediate sections can be used in all operating modes and can be used flexibly both for jobs in industry and in wind power.

And of course, we have designed the complete crane to be easy to transport. The boom sections slide into each other using the time-tested Russian doll principle. In other words, an L intermediate section will slide into an S intermediate section and then also into an H intermediate section.

Do you have any anecdotes from the development phase of this crane?

Well, we structural engineers have to take a very close look when a boom section gets heavier due to a change. After all, the overall weight of the boom is the main criterion for raising the system – and if it's too heavy, it is impossible to raise it. So my colleagues used to call me the weight police – and I suppose they were right! (with a laugh)

Find out more about the LR 1700-1.0 here:
go.liebherr.com/39f328



Boom concept designed for economical transport

Top global performance on four axles


1120-4.1
LIEBHERR

There's nothing more on 4 – around the world

We unveiled our 120 tonne 4-axle crane at the last Conexpo held in March 2020. To mark our 50th anniversary in the United States, the LTM 1120-4.1 was unveiled with a striking US paint job. Now, of course, there is a whole army of the powerful 4-axle cranes on the road. Worldwide. The crane is now showing what it can do all over the world a little more than one year after it was first unveiled, true to its slogan – There's nothing more on 4! Here are just a few samples of the jobs it has carried out.

Germany

Mobile crane and recovery contractor Schwientek & Sohn in Leverkusen mainly uses the powerful 4-axle crane for jobs in industry. Its high lifting capacities and long boom are proving extremely useful for jobs in the petrochemicals industry, which often means constricted sites.

Switzerland

Structural steelwork assembly jobs and tower crane erection work are typical jobs for the first LTM 1120-4.1 bought by Christen + CIE AG, based in Biel in the Canton of Bern.

Italy

Repair work is being carried out at the Sarlux Reforming Plant close to the capital Cagliari on the Mediterranean island of Sardinia. Here, too, the long boom is a major benefit for crane hire company Mintor SRL.

France

Tight corners, narrow roads, old towns and salty sea air – CNC Levage often uses its new all-terrain crane to erect tower cranes on Corsica.

Poland

Pomoc Drogowa i Parking Strzezony Przemyslaw Boczkiewicz uses its 120 tonne crane in Lodz, Poland for heavy hoisting work. Here it is installing a 41 tonne machine for manufacturing refrigerators.

Australia

The assembly of a Liebherr ship-to-shore crane at the container terminal in the port of Townsville, Australia, in April 2021. Universal Cranes Pty Ltd, based in North Queensland, uses its new crane in tandem with an LTM 1130-5.1.

USA

Digging & Rigging Inc. operates this 4-axle crane with its striking livery in Washington DC, USA. Here it is removing an air conditioning system in the American capital.

USA

The first job for the new 4 axle crane operated by crane hire company Stevenson Inc. – hoisting an air conditioning unit weighing around 18.5 tonnes in Wilmington, Illinois, USA.

Spain

Quality Grúas in Barcelona uses the 4-axle crane in the Catalan metropolis for erecting tower cranes. Its 66 metre boom makes the work child's play for the crane.

Great Britain

Jobs in industry are typical for crane hire company Davies Crane Hire Ltd in Wales. The VarioBallast® on the 4-axle crane is ideal for these jobs.

Portugal

The first 120 tonne crane bought by Transgrua in Portugal is active in Lisbon, where its long boom often makes a big difference for erecting tower cranes.

No signs of old age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Retirement not an option –
Liebherr LG 1550 lattice boom crane in action for Thömen for 29 years

With a great deal of logistics work and an extremely ambitious timetable, Hamburg-based crane contractor Thömen installed the abutments for a railway bridge near Flensburg in just three days and then installed the new bridge structure on them in a tandem hoist. The cranes used for the job not only included modern Liebherr cranes such as an LTM 1750-9.1 and a brand new LTM 1110-5.1. Also at the site was a seasoned LG 1550 lattice boom crane, which has been doing sterling service for the Hanseatic crane contractor for almost three decades. And it is still working to their complete satisfaction.

Still going strong
Thömen's LG 1550 was the third of this crane model to leave our factory in Ehingen. That was in 1992.

“We really have had our LG for 29 years.”

Marc Bernschneider
Managing Representative and Project Manager at Thömen

“We really have had our LG for 29 years”, says Marc Bernschneider, Managing Representative at Thömen and Project Manager for Crane Operations at the extremely busy site on the edge of Flensburg. Bernschneider had a mass of men and machines available over the weekend to install a railway bridge. The timetable for the job was extremely tight – which meant that the advance planning for this challenging job had to be correspondingly accurate and extensive. In addition to the two large cranes and two smaller Liebherr mobile cranes for the set-up and assistance work, over a dozen heavy haulage transporters were permanently in action on shuttle runs, delivering the various components, some of which were enormous, in quick succession.

Modular abutments

The main reason for the immense time pressure was that the four-lane major road had to be fully closed so that the new trough bridge, weighing 260 tonnes, could be positioned over it. To enable the abutments to be installed as quickly as possible, a type of modular principle was used to enable the prefabricated elements to be stacked next to each other and on top of each other. Almost as soon the two large cranes had been fully set up, ready for action, the heavy haulage transporters started to arrive with the components for the structures. Two low loaders always arrived together at the site so that both the LTM 1750-9.1 and the LG 1550 had a component each for “their” abutment. A total of 42 large reinforced concrete segments weighing up to 92 tonnes had been cast in the weeks leading up to the installation day and stored at a site around 25 kilometres from the bridge. The support of the small mobile cranes was required to erect the side sections for the abutments.

Brand spanking new
Thömen's latest addition, a Liebherr LTM 1110-5.1, provided support for the large mobile crane for setting up and handling loads.

Naturally, however, the main work was carried out by the two large cranes. “We had actually planned to use our two LTM 1750-9.1 cranes for the work”, explained Marc Bernschneider. But one of the powerful mobile cranes had not finished a job at a wind farm promptly and therefore, the oldest member of the 50-crane fleet was dispatched from Hamburg – Thömen’s LG 1550 mobile lattice boom crane. Built in 1992.

“Over 20,000 hours of service on the clock”
Thömen crane and heavy haulage contractors, a family-run company with a 150-strong workforce now headed by the fourth generation, which will soon be celebrating the 100th anniversary of its first opening for business in Hamburg, was one of the first crane contractors to buy the LG 1550 in 1992. The first two of these machines were supplied to customers in Iran. Thömen’s was the third in the series and was also the first to feature a derrick boom.

The LG 1550 was developed at the end of the 1980s in Ehingen as a lattice boom version on the undercarriage of what was then the LTM 1800. Up to the end of its production in 2009, around 50 LG 1550 cranes were built at the factory. Even today, the concept of a powerful lattice boom crane on a road-going undercarriage is still popular with many users and loyal fans on sites around the world as the successor to the LG 1750 with its lifting capacity of 750 tonnes.

Marc Bernschneider, certainly holds his machine in extremely high esteem: “The superstructure of our LG now has over 20,000 hours of service on the clock.” The team at Thömen is still delighted to have access to this all-rounder at all times. The black and yellow vintage machine with its striking green driver’s cab can still be seen just as often at wind farms as on industrial estates and at the ports of northern Germany completing heavy handling work. Or, perhaps, installing bridges like this one in Flensburg. “We have the full set of lattice equipment for the crane in all lengths, including the derrick boom. We also have the heavyweight and lightweight luffing jibs”, says Bernschneider. The Managing Representative’s response to the question as to whether the LG 1550, which is now almost 30 years old, is still performing well, is an emphatic yes.

All done
The reinforced steel elements used to assemble the modular abutments weighed up to 92 tonnes. They are shown here on the hook of the LTM 1750-9.1.

Finale
The two large cranes effortlessly placed the 260 tonne bridge construction on the abutments, which they had installed at record speed beforehand.

“For its age, the machine is extremely reliable, but obviously we have to do a few things to keep it fully fit. We can also do a lot of the repairs on the LG ourselves and when necessary we simply get the service team from Liebherr to help us.”

In Flensburg on this rapid-action bridge building operation, at least, the LG 1550 certainly provided an excellent, effortless performance. At the end of the construction work, it completed a tandem hoist with the LTM 1750-9.1 right on schedule to position the 44 metre railway bridge on its abutments. Of course, the 30-strong Thömen team (from the planners to the drivers) also provided an impressive performance at the northern tip of Germany. And the team even managed to significantly undercut the required timetable – the last mobile crane was already on its way back towards Hamburg a full eight hours before the road closure was due to end.

Teamwork
Managing Representative and Project Manager Marc Bernschneider (right) with Marc Kuebart, who was responsible for the CAD project planning for the job.

Pure gold

Seek and you shall find
Contrary to the widespread belief that you mainly need luck to find gold, some slightly more tangible factors also play a major role. Experience, the right equipment, expertise and stamina are what are required gold prospecting. A good set of basic equipment also helps. Successful gold prospectors have an enormous amount of expertise and are generally also very familiar with history. They can read landscapes, rivers, waterways and sand formations as others read books. They can distinguish types of rock by just looking at them. They are experts in geology and prospect using their own time-tested techniques.

So what has gold got to do with Liebherr? We believe there is a comparison to be made between the enormous quantities of sand and rock on our Earth and the massive opportunities which extreme technical progress and digital change have brought over the last few years. What we need to do now is sift them for gold nuggets. We can then use those nuggets to create masterpieces to make the next generation of cranes even easier to operate, even safer and more comfortable.

That is our aim and the driving force behind us continuing to build top quality products. So now you can look forward with us – to LICCON3!

Ready for the future
Electronics is the greatest masterpiece for the new generation of cranes. The LICCON3 control system is a dazzling array of new software, a dizzyingly fast data bus, new programming language, significantly more storage space and high computer performance as well as improved safety tools. And as you will already realise, these are factors which run in the background initially. Factors which are primarily dealt with by Liebherr engineers. “The progress made in microelectronics has been immense. We want to keep up with it, which means we also have to continue to develop our cranes,” explains Nikolaus Münch, Manager of the Control Systems Department at Liebherr in Ehingen. The electronics professional explains that complex applications such as VarioBase®, which require high performance data, will undergo ever more frequent development in the future – and that means that the current LICCON2 control system will be unable to keep up with them. “We can’t forecast today when and what type of applications will arrive. But one thing we do know is that they will definitely arrive. And when they do, the infrastructure must be ready for them”, says Münch.

“LICCON3 improves and simplifies the crane control system in one.”

Nikolaus Münch
Manager Control Systems

Totally **digital**

Clear, ergonomic and modern – a view of the new operator's cab for LICCON3 cranes

Artistically forged

At the Bauma in 2019, we unveiled a prototype of the new operator's cab for LICCON3 cranes. "The newly designed operator's cab actually has nothing whatsoever to do with the new control system. However, as a result of the very high synergy effects involved, we decided to design the operator's cab at the same time as launching LICCON3," continues Nikolaus Münch. In addition to modern design, the operator's cab also features some additional improvements for the crane operator. These include the new multifunction steering wheel, improved fittings and modules as well as new displays. In the superstructure cab, a display with touchscreen functions delivers significantly greater convenience and ergonomics. The way in which the displays show information has also been revised and has also been simplified. With the modern, anthracite-coloured

Modern automatic heating and air conditioning system and self-explanatory button modules

background, our control screens match the design of other devices in the Liebherr world. However, Nikolaus Münch and his display development team attach a great deal of importance to one particular point: “We pay very close attention to ensuring that a person who has never operated a Liebherr crane before can continue seamlessly with the new crane after very brief induction training.” The new system is extremely similar to the old control system. “You can quickly get to work with the new display”, adds Münch. “The touchscreen function and the large display mean that the system is even easier and more convenient to use.” The installation of identical modules in the undercarriage and superstructure also ensures almost 100 percent availability. If one module fails, the crane always has its own “spare part” available as the modules are interchangeable.

Anthracite-coloured exterior with powerful LED lighting

Display with touchscreen function in the superstructure cab ensures intuitive, convenient control

In addition to the new visualisation system, the completely new heating controls in the driver’s and operator’s cabs deliver outstanding comfort. Both the cabs feature a modern automatic heating and air conditioning system. A sun sensor detects strong sunshine and automatically adjusts the heating settings. In addition to the standard radio with hands-free facility, a double DIN DAB+ radio is available as an option. Images from the rear-view camera can also be shown on its colour display.

Nikolaus Münch believes that the revised lighting system is another highlight: “LED technology is a real plus as a result of its long service life. It will last for many more hours of service and also provides better lighting.” The lighting packages for the crane cabs, the superstructure, the rear of the vehicle, the front headlights and the telescopic boom as well as jibs have been improved and now feature LEDs.

In addition, LICCON3 cranes are also prepared for telemetry and fleet management systems as standard. Crane contractors can view and monitor all the relevant data using the MyLiebherr customer portal. We will notify you as soon as all these nuggets are available for you. However, we are already looking forward to unveiling our first LICCON3 machine, scheduled for autumn 2021 – the LTM 1110-5.2. Gold!

Modern multifunction steering wheel

Get in and drive away

Much of the knowledge which passed through our hands during the development of the LICCON3 was gained from our LRT rough terrain cranes launched in 2016. The overriding theme throughout the development phase was: Keep it Safe and Simple (KISS). The crane control system, in particular, was reviewed time and again to ensure it was simple and safe – because these factors are a must for rough terrain cranes.

This process led to us gaining a great deal of knowledge, which does not just relate to our LRT cranes, which have now successfully established themselves on the market. Simple, self-explanatory control and the support of assistance systems to ensure a particularly high level of safety are just some of the things we learned during the development of the LRT cranes. And this knowledge forms the basis for LICCON3.

Get out of my field!

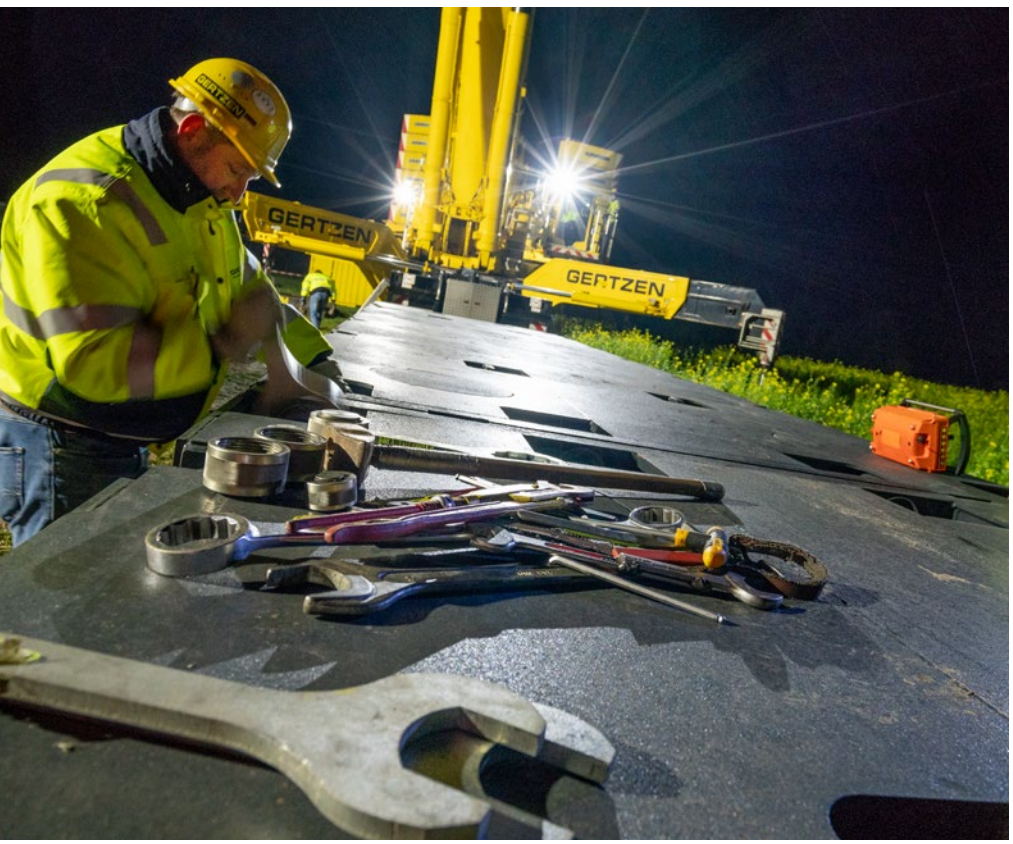

ng
Fahrzeug
schwenkt aus
COMETTO
GERTZEN
Autokrane-Transpo

Salvaging a boulder in Emsland

At some point in 1950, the then fourteen year old Josef Dörtelmann was trudging over a field owned by his farmer family in Emsland with his father's plough horse. The boy and horse were tilling the soil in the field not far from the village of Hüven, when the ploughshare unexpectedly struck the tip of a large rock buried just under the surface. And it is here, almost exactly in the middle of the last century, that our story begins. A Liebherr mobile crane brought it to an end last December. Mobile crane operator and heavy haulage logistics contractor Gertzen, based in Emsland just like the underground rock, salvaged it and then erected it on Hüven's village green. A field study. A field report.

"It was almost exactly 70 years ago that I first stumbled over the rock with my plough", says Dörtelmann, who, at a ripe old age, visited "his" massive pebble in the field for the final time in December, shortly before the boulder was salvaged. For decades, he had had to drive round the troublesome stone resting just below the topsoil, more successfully on some occasions than others. "After forty years, I attempted to lay the thing bare", he says. However, whilst attempting to dig it out, the rocky lump seemed to become ever larger, and the size of the exposed rocky surface simply grew and grew. When it became plain that there was no end to the increasing size of the rock, Dörtelmann finally admitted defeat to his underground nemesis. And then he simply covered the whole thing over with sand.

He spent a further three decades working the land (the farm's fields have long since been tilled using the modern machinery owned by Dörtelmann's son) before another attempt was made to survey the bane of his agricultural life. With a bucket on the front loader of his tractor, Dörtelmann junior started to dig out the rock last summer from one side. The trench in the field became ever deeper and longer. But at some stage, he also had to put an end to his efforts with the tractor: "When I reached two metres, I thought the risk that the soil would simply collapse inwards had become too great." But this did not see an end to the family tradition because the farmer decided he really wanted to know how big the rock actually was. So he obtained an excavator from a friend and then, after many hours of work and many excavator bucketfuls of soil, the boulder was finally revealed in all its glory. The rocky colossus lay in its earthen nest like a misshapen egg.



The boss armed with spanners
During the night before the salvage operation on the massive boulder, Managing Director Wolfgang Gertzen lent a hand linking the three powerful SPMT transport modules.

On some days, hundreds of curious onlookers came to marvel

The notoriety of the “Boulder of Hüven”, as it became known in the newspapers, grew quickly. It soon started drawing large crowds to the area. On some Sundays, Hüven’s Deputy Mayor, Alfons Kohne, estimated that up to 400 onlookers found their way to Dörtelmann’s field. After all, the boulder is one of the largest rocks ever to have been found in Lower Saxony. State geologists also travelled to the site to study, record and appraise the rock. The initial estimates of the experts calculated the rock’s weight at around 70 tonnes. Alfons Kohne was able to engage the services of mobile crane and heavy haulage contractor Gertzen, based in Kluse around 20 kilometres away, at acceptable terms, to hoist the boulder out of the field and transport it a few kilometres away to the village of Hüven. For Managing Director Wolfgang Gertzen, this rather unusual job in Emsland was something of a local affair. And it was also a matter of course for him to become deeply involved. “The whole thing turned out to be almost a work of charity”, Gertzen admitted when asked. Initially he thought his Liebherr LTM 1500-8.1 would be perfect for the hoisting work.

The erratic came with a glacier from Scandinavia

However, before the end of the tale, the crane contractor was going to have to demonstrate an even greater level of loyalty to his local area. Another survey by the Geological Service not only discovered that the boulder had been pushed from Scandinavia by or in a glacier during the Saalian Glaciation, the last but one ice age, more than 150,000 years ago, but in addition the geologists decided, after taking accurate measurements and rock samples, that the star in the trench was actually in a whole different weight category and comprised 100 to 140 tonnes of granite. This made it obvious that a more powerful crane would be required – definitely a case for the flagship in the Gertzen crane fleet.

“We are prepared for a load of up to 148 tonnes.”
Managing Director Wolfgang Gertzen used the most powerful crane in his fleet, the LTM 1750-9.1, to salvage the boulder.

And so, two weeks before Christmas, the Liebherr LTM 1750-9.1 rolled up to the undulating yellow and green mustard field. By that time, the exposed boulder had been declared a natural monument so as to prohibit any drilling into the rock. It also meant that Gertzen's Project Manager, Franz Gruber, and Dieter Hilgefort, the long-time operator of the 9-axle crane, would have to do attempt to remove the gargantuan rock with silk gloves rather than coarse work gloves.

Although they are old hands in the crane business, handling the heavyweight rock was far from straightforward for the two seasoned professionals . The enormous boulder with a circumference of around 15 metres was immobile in the deep hole. Support was provided for attaching the fastening equipment under the load by a local horizontal borehole contracting company. Using this special technique, massive steel ropes were threaded under the solid granite stone. Lashing straps finally ensured that all the ropes and chains around the rather misshapen colossus were firmly attached to it.

A place on the winners' podium?

Accompanied by a large showing from the press and a horde of onlookers behind the fence, hoisting the enormous rock the next morning proved to be a fairly exciting venture. However, the nerves at the outset were not due to concerns that the thick lump might be even heavier than the maximum weight for which they had planned. "We are prepared for a load of 148 tonnes", said Wolfgang Gertzen. "If the boulder weighs more than that, we will have to adjust the crane." In fact the main question was the position that the Hüven rock would take in the Lower Saxony boulder rankings. The leading boulder was well out in front, weighing in at a massive 330 tonnes. It was close for positions two and three on the state list, both of which weighed in at around 110 tonnes. The secret was not unveiled until the gigantic rock was finally suspended from the hook after being pulled out of the hole in the ground. Dieter Hilgefort immediately reported the net load on his radio from his crane cab: 102.5 tonnes. So it was fourth position for this entrant.

It was then loaded onto three connected SPMTs with a total of 18 axles and lashed firmly to them. Boss Wolfgang Gertzen had also got involved the night before to lend a hand connecting the powerful load carriers. In theory, just one of these three heavy load vehicles would have been sufficient for the forecast weight. However, the maximum axle loads permitted for travelling on the road meant that the additional two units were required.

102.5
tonnes

Piggyback
Project Manager Franz Gruber joined in with the operation from a cherry picker. Massive chains and lashing straps were used to secure over 100 tonnes of granite to the special transporter.

Tricky manoeuvre
The 18-axle vehicle had to complete a 90 degree turn on the spot to get around the crossroads in Hüven.
The Gertzen team proved to be a well-oiled machine for both hoisting and transporting the heavyweight boulder.

The subsequent transport from its original resting place on a temporary road installed over a length of 380 metres on the field and then around three kilometres on the road went like the proverbial clockwork. The professional, precision planning by the Gertzen team paid absolute dividends. The clock on the village church was striking midday as the heavy load finally arrived in Hüven. During its trip through the village, there was still one tricky turn to overcome, however – the vehicle, measuring almost 30 metres in length had to complete a turn through 90 degrees at a crossroads to get around the corner. But Ingo Wigglinghoff at the remote control for the special transport unit got the whole thing around the corner smoothly in the end. Gertzen's man for self-driving, electronically controlled heavy haulage transport modules, who was in control of eighteen axles for the first time in his life that day, completed the impressive manoeuvre with flying colours.

Another very impressive point was the short time of only around four hours in which the Liebherr mobile crane was dismantled in the field, moved into the village and then made ready for another hoist. This probably also set a new record. The work to unload and position the boulder at the edge of the village was then completed in an incredible 15 minutes. And after its Sleeping Beauty act for thousands of years, it brought an end to a rather busy day for the Boulder of Hüven.

There at last
Wolfgang Gertzen, on the right in the photograph, with his team after the successful completion of the job

Big in Japan

Armada of cranes for logistics centre

Roughly 30 kilometers from the city center of Tokyo, the Japanese capital, a full fleet of crawler cranes is on the move. But – what is a full fleet? We are talking about eight crawler cranes, manufactured by Liebherr in Ehingen (Germany), as well as more than five other smaller crawler cranes. A project where more than 13 crawler cranes are involved is certainly worth a closer look.

In September 2019 the construction company Nishimatsu, acting as general contractor, broke ground for a new logistics center in Nagareyama City, in the province of Chiba (Japan). The construction work for the 'Daiwa House Project Logistics Nagareyama IV' is expected to be finished by the end of October 2021. Just two years to build one of the biggest logistics centers in Japan – a challenge Nishimatsu was proud to accept. And, it nearly goes without saying: the new logistics center Nagareyama IV is built with a seismic isolation system, like all new larger buildings in Japan.

Together with our customer Nishiyama Transport Machinery Co. Ltd., a team of engineers visited the Liebherr factory in Ehingen several months before the project started. The goal of the trip: Learn, check and make sure that the Liebherr cranes were right for the job. Especially the slewing speed of the crawler cranes and their ability to move their hooks even at a distance of 100 meters from the crane cabin were important for this job. It was quite clear that many cranes were necessary to build this huge logistics complex with a front of 400 meters and a width of more than 200 meters in this short timeframe. The cranes would be lifting pre-constructed elements into position. These positions could be anywhere on one of the four floors of the building. Going big in logistics is a general trend worldwide, but an especially big one in Japan. New logistics centers here often contain up to four floors, which can all be accessed by trucks to ensure a fast, easy and smooth running operation.

Fast relocation of the cranes on site using the ballast wagon

“During the first talks, it was already clear to us that we’re going to have a big fleet operating at this job site due to the huge complex which would be constructed in one huge operation”, remembers Willi Schmidt, sales manager crawler cranes for Japan. “Knowing there would be loads of up to 20 tonnes, placed with a radius of up to 128 meters on all floors of the new building, it was important to simulate the loads, tail swing and speed here on our test area in Ehingen.”

Tsutomu Nishiyama, President and CEO at Nishiyama Transport Machinery Co. Ltd. explains: “In the past, we always put a 350 to 500 t crawler crane in the center of such a building and did all the crane work from there. After finishing the crane job, the crane was hoisted out from the center. This was over long years the only way for us, because in the market there were not enough big cranes to do that kind of a job." For this job, this wasn’t an option Nishiyama goes on: “The seismic isolation system is placed in the center of the building, and there is no other way than positioning the cranes around the building. On top the work area is limited and too narrow, so that’s why we needed to install compact and powerful cranes such as the LR 1750 and the LR 1600/2. To complete this kind of job under such special conditions, we’ve contacted the Liebherr engineers in Ehingen for checking and solving each problem one by one.”

The challenges for the crane operators are still huge. Placing the fragile pre-constructed concrete parts, sometimes more than 100 meters away, requires crane operators to adjust the loads very carefully when placing them on the correct positions. Usually there is less than a centimeter of tolerance. In addition, even more agility and care is required to operate some of the cranes that are fitted with ballast wagons. “We are on our way to complete this project using the best match of crawler cranes and skillful operations. So far no accident has happened and we’re focused to complete all the work without any accident,” explains Nishiyama.

Masanori Kanazashi, managing director of Liebherr-Japan Co. Ltd, adds: “That’s why some of our specialists from Liebherr-Japan have been on-site, supporting Nishiyama on this. On top of this, there have been trainings for the operators in advance and on site to ensure every hoist is performed with a maximum of safety, knowledge and reliability. Nishiyama first noticed our big crawler cranes which would be a perfect fit for the Japanese market, and decided to bring them in, playing the role of a pioneer. We’re looking forward to the opening of the building at the end of this year.”

Willi Schmidt, Sales Manager Crawler Cranes for Japan

Tsutomu Nishiyama, President and CEO of Nishiyama Transport Machinery Co. Ltd.

Masanori Kanazashi, Managing Director of Liebherr-Japan Co. Ltd.

From accident-damaged crane to jewel

Every crane has a story
From large to small, old to new, on wheels or crawlers – the daily bread of our colleagues in the Repair Department is the refurbishment of used cranes. Every crane is different and has its own story. And the refurbishment is also an individual affair – the buyer decides which work is carried out. Depending on what the customer wants, our professionals can carry out repair, installation, polishing and modernisation work on the cranes.

This is where cranes are revamped
At our plant in Ehingen, even the most complicated cases are brought to a highly polished conclusion. Around 60 personnel take care of repair work at the manufacturing plant. These are people with lots of experience, technical expertise and unrestricted access to every crane component as well as all the documentation and drawings. Furthermore, the same equipment, machining centres and specialist tools used for crane production are used for the repair work.

We followed an accident-damaged LTM 1130-5.1 crane, which was written off by the insurance company, during its refurbishment to give you a look behind the scenes. So how is the refurbishment work carried out? What are the procedures and how do the personnel approach the job? After operating for around 2 years, the 130 tonne crane built in 2018 came off the road and rolled over. The entire crane suffered major damage. After a general refurbishment for Korean crane contractor Muhan, the LTM 1130-5.1 looks like a new crane, performs just as well and features the very latest technology!

It even delight our experts: “Major projects are really exciting”, says Stefan Kneissle, Manager of the Repair Department. “When we get a crane which is a total write-off and we refurbish it so that it looks like new and, of course, also features top quality and technology, it gives us all a real buzz.”

“Only professionals can return accident-damaged cranes to the same quality and technology level as a new crane.”

Stefan Kneissle
Manager of the Repair Department

Easy process
Everybody would prefer to avoid an accident, but sometimes they just happen anyway – whatever the cause. To provide you with the best possible support in this situation, we can take back the crane – either with or without you giving us permission to deal with your insurers.

After all, we all know that dealing with insurance companies can be very complex and time-consuming. That is why we take care of it, leaving you to concentrate on your core business, crane contracting.

Crane dismantling
The badly damaged LTM 1130-5.1 was transported to Ehingen on a low loader. In the repair shop, the personnel dismantled the crane, documenting and assessing the damage.

For example, the luffing cylinder was so badly damaged that it had to be completely replaced. The ballast base plate, on the other hand, was intact and could be reused according to the report.

Repair and replace
The specialists dismantled the entire slewing platform. The roller turning connection and the slewing gear were removed, washed and returned to the manufacturer for assessment. The refurbished slewing gear was then re-installed whilst the roller turning connection was replaced.

The superstructure engine was broken and had to be replaced. The personnel dismantled the entire drive train, disposed of damaged parts correctly and installed the new engine. That included function tests and inspection work.

The refurbished, resprayed used crane en route to its new owner

Assembly after refurbishment
The refurbishment of the crane has reached its final phase. The repair specialists have carefully and painstakingly removed the crushed crane cab to retain the main cable looms for connecting the new cab.

Every single telescope section and the pivot section on the dismantled boom have been inspected in full for signs of cracking. The personnel tested the telescoping cylinder, which had been repaired by the manufacturer, on the press test bench after it had been assembled and then conducted a function test. Once the boom had been assembled, it also underwent tests on the test bench.

Finished!
The refurbished 130 tonne crane successfully completed its first test drive. After the braking test, the personnel set up the LTM 1130-5.1 on the test yard and completed the necessary function tests.

For example, they inspected the full length of the hoist rope and coiled it up under tension. The crane and all its accessories, such as ballast and the folding jib, were then prepared for the paintshop.

Find out more:
www.liebherr.com/used-cranes

3 questions to Stefan Kneissle

1

What is the procedure for the general refurbishment of an accident-damaged crane?

First of all, we make a detailed record of the damage. In other words, the complete crane is inspected for damage. This also includes dismantling the crane and taking its components apart. We remove some of them to return them to the suppliers. For example, the workforce at Liebherr-Ettlingen GmbH are experts at dismantling and inspecting the engine, whilst the specialists at the Liebherr plant in Biberach take care of the roller turning connection. Depending on what we find, a decision is made as to whether the components are repaired or replaced in full. During this, our staff check every individual part on the crane and start the refurbishment work from the very beginning. Every metal plate and every pipe, every screw connection and cable is cleaned, refurbished or replaced. This means that every single part of the crane is inspected. At the same time, we carry out servicing work such as replacing oil and filters and conduct all the required function tests. This also includes test drives and the acceptance procedure in the test yard. Finally, we hand over a fully functional, powerful crane with the familiar high Liebherr quality to the Shipment Department for delivery to the customer.

2

Why does Liebherr refurbish cranes which have been written off and what do you think is particularly important in this process?

A Liebherr crane is still a Liebherr crane, even if it has been badly damaged. It is a quality product and still has a residual value, particularly if it is relatively new. Our aim is to bring the crane back to life. When we, the manufacturer, refurbish a Liebherr crane, we can be certain that the crane will continue to meet our familiar high quality standards and our internal factory standards.

We attach great value to safety when we refurbish accident-damaged cranes. At the same time, we ensure that we reuse as many parts as possible. For example, intact electrical and pneumatic systems or even individual components can be removed from a damaged driver's cab and installed in a new driver's cab. That saves resources. We clean damaged components and dispose of them for recycling.

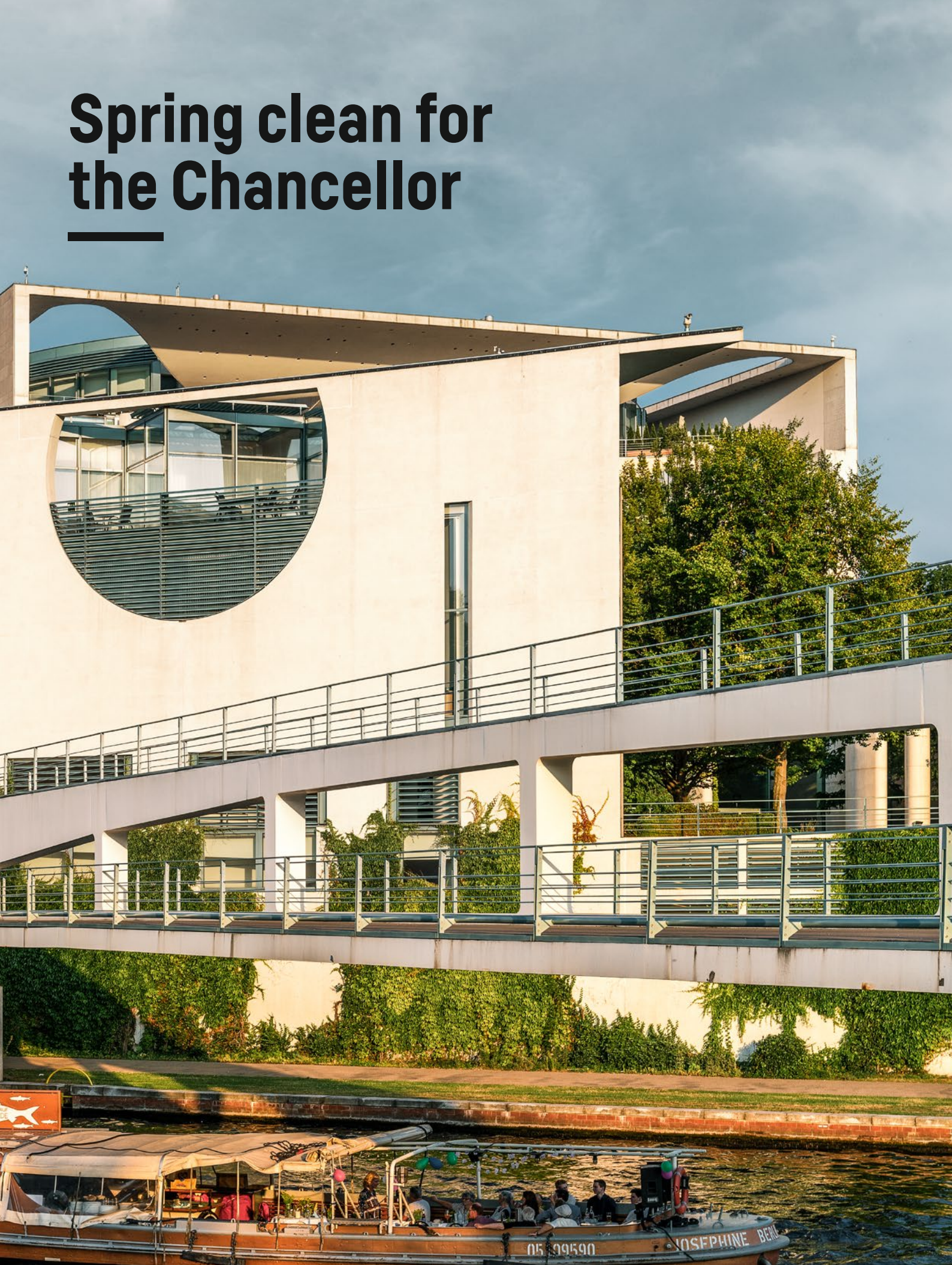
3

Which refurbished used crane is the one that really sticks in your memory?

That was an LTM 1800 which we repaired in 1989. It was an 8-axle crane and the largest in the Liebherr product portfolio at the time. It took us almost three-quarters of the year to complete. After an operating error, the crane collapsed and was badly damaged. We had to dismantle it down to its chassis. We then gradually reassembled it and returned it to full working order. I particularly remember it because I travelled with it on a 2-week trip to take it to Spain and hand it over to our customer Usabiaga. That crane is actually now in Panama where it sees regular action.


Hardinger
JOSEPHINE
L.21,90 B.4,96 60 PERS.
VAN LOON
MIETEN AUF VANLOON.DE

Spring clean for the Chancellor



Liebherr crane cleans the façade of the Federal Chancellery

We all know the frustration – you've just had the façade of your house freshly rendered and already you can find areas that could do with either minor or major freshening up work. The official seat of German Chancellor Angela Merkel is not immune from this type of problem. Last year, the sensitive, fine-grain sandstone on the external façade of the Federal Chancellery had to be cleaned. What was required was a massive washing machine. And a powerful mobile crane whose long telescopic boom could hoist the enormous cleaner to every point on the wall of the building. And you know what? Liebherr has the perfect crane even for this job.

It was by no means the first time that the exterior of the Federal Chancellery in Berlin had been cleaned. The sensitive sandstone needed its first beauty treatment just a few years after the new building had been completed and occupied by the then Chancellor Gerhard Schröder. An unexpectedly high level of algae and moss had discoloured parts of the light walls to a black-grey shade. Initial attempts to maintain the gloss of the monumental building proved to be not particularly sustainable. The troublesome invaders attached themselves to the exterior of the government headquarters and proved to be extremely stubborn. "Chancellery in junk look" mocked the tabloid press at the time.

Warburg-based Hartinger first travelled to the most secure site in Berlin's government district with a crane and a type of façade washing machine, which we will talk about later, in 2013. The experts, who normally tackle hoisting, installation and heavy haulage work, persuaded the officials that their concept for removing the uninvited organisms without the use of ugly, expensive scaffolding was perfectly sound. Since then, the company has carried out repeated facelifts on several of the many external walls of the chancellery.

Last summer, a team from Hartinger once again made its way to Berlin. This time it was the turn of the north façade of the nine-storey government building, the central cube of the ensemble. Senior manager Karl Hartinger, whose responsibilities at the family-run company include remaining in constant contact with the seat of German power, sent one of his many cranes in the company's red livery to the German capital to carry out the cleaning work. It carried with it a cleaning robot weighing several tonnes.

Brushes cover 2000 square metres a day

According to Hartinger, the impressive machine, measuring 4.50 metres in width, is capable of mechanically, yet gently, cleaning up to 2000 square metres of a façade every day using rotating brush rollers and then coating the surface. "The whole thing is our own invention", says Burkhardt Hartinger. His father continues: "Around fifteen years ago, we were looking for new sectors to get involved in. We always seemed to be taking our cranes to customers with large surface areas of walls which required cleaning. So we designed and developed this cleaning robot and finally we even made it in-house."

The Liebherr LTM 1250-5.1 was the crane of choice from Hartinger's fleet for the Chancellery. "We selected it because of its powerful boom configuration and its low support loads", says Hartinger. The machine could not be any larger or heavier as the set-up area for it was directly above an underground car park. Nevertheless, the Liebherr crane had all the power and lifting capacity required for the work. And this is hardly surprising as it is currently the most powerful mobile crane on five axles in the world. Fitted with a 22 metre hydraulic luffing lattice jib and 63 tonnes of ballast, it could only access the full length of the north façade of the centrally positioned cubic building with the cleaning robot up to the height of the eaves at 36 metres from two locations. Radii of up to 48 metres were required for this purpose. The cleaning machine had to be hoisted over the office block located in front of it.

The job for the Warburg-based crane specialists at the Chancellor's site took around three weeks. Whilst the mobile crane allowed the cleaning machine to move vertically along the stone façade of the building, the cleaning system inside it was operated using a remote control. However, it could only operate outside normal working hours at the seat of government. Therefore, the brushes in the powerful cleaning machine mainly carried out their scrubbing work at the weekend when the Chancellor and most of the 700 staff were not present at the site.

And we have one final word about the job – the security teams at the Federal Chancellery deserve a great deal of praise. Our photographer, who was only able to document the crane operation from outside the site and had to hold his camera over the massive steel fence using a high ladder, did not remain hidden from the patrols and surveillance cameras at the Federal Chancellery for very long. But all the checks were carried out competently and politely. And we are also delighted to be able to comply with the officials' wish not to describe the high building in the text as a "washing machine" (its nickname in Berlin as a result of its cubic shape and circular windows). Although the temptation to use the title "Cleaning service at the washing machine" was extremely great.

Insight
You can clearly see the two massive brush rollers here which rotate to remove moss and algae from the façades.

Liebherr remote control – from 30 to 3000 tonne cranes

What has been standard on tower cranes for decades is now becoming ever more established on mobile cranes as well – remote control from outside the crane cab. The benefit is obvious – the crane operator selects the location from which he has the best view of the site. This means greater safety, more comfort and easier communication on site. The introduction of the second generation of the LICCON control system around ten years ago enabled us to make the remote control of our mobile and crawler cranes particularly comprehensive and economical – the same control system for cranes between 30 and 3000 tonnes. Alexander Wirth has been working in the crane control department at Liebherr in Ehingen for 15 years. He explains the technology behind it.

Complete remote control
Plug in an existing BTT into the BTT-E and off you go.

Most crane manufacturers install a remote control system from a third party supplier. We did the same thing in the past. But then two different systems have to communicate with each other and the remote control functions are limited. It is difficult to make adjustments and add functions.

Our LICCON2 control system took a completely different approach – the remote control is an in-house development. That also means that its ongoing development is also completely in our own hands. And that has already proved to be a good thing.

The new and unique feature for mobile cranes was that all the cranes with the new control system were supplied with a remote control for setting up the crane as standard – using a hand-held control console, the BTT, the crane operator can extend the crane's outriggers, attach the hook block to the bumper and larger cranes have more functions, such as attaching the ballast or installing the telescopic boom. And all of this work is carried out in the operator's direct line of sight – safely, quickly and conveniently.

The BTT, featuring a display and function keys, makes it possible to level the crane fully automatically, start and stop the engine and adjust the engine speed remotely. The telescopic boom, hoist winches and the axle suspension on the crane can all be controlled using the BTT. Many crane operators first had to get used to this new luxury, but very few of them would want to set up a crane without the remote control these days.

And now we come to the real highlight of Liebherr's remote control system – you only have to buy a single BTT-E, a console with two master switches, and you can control every LICCON2 crane in your fleet by remote. For several years now, we have been installing the software for complete remote control in all our cranes which feature the LICCON2 control system. You cannot control mobile and crawler cranes remotely at a lower cost! The system will work on all cranes from the small LTM 1030-2.1 to the gigantic LR 13000. All crane movements can be controlled economically and conveniently from outside the cab with clear lines of sight and close to the load.

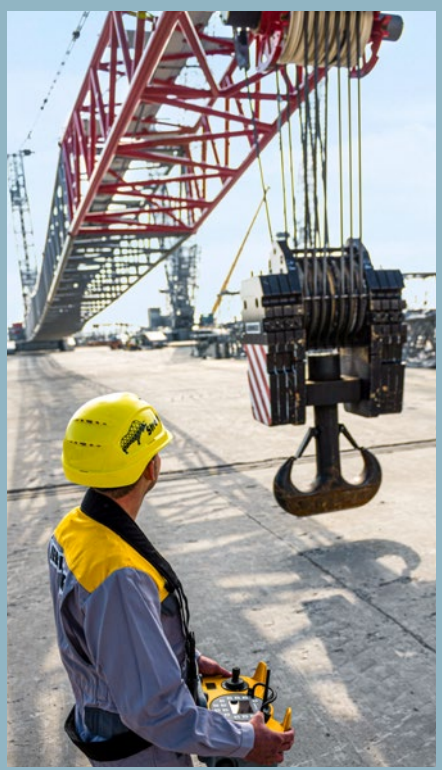
It is now also possible to control the crane chassis remotely on the compact LTC 1050-3.1. Using RemoteDrive, the operator positions himself in the problem area to manoeuvre the crane safely through constricted areas. Several additional components are required in the drive system for this new option, but it also works using exactly the same hardware, the BTT and BTT-E control consoles.

And there is another major benefit, particularly when it comes to selling a used crane – because we decided to use a globally licensed frequency range (ISM band 2.4 GHz), our system can be used in every country in the world.

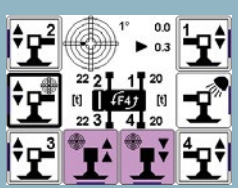
Simply **explained**

“The remote control we have developed in-house makes us ready to face the challenges of the future.”

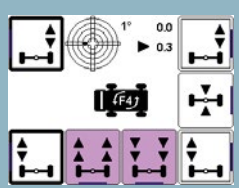
Alexander Wirth
Product Software Developer



From the smallest to the largest
Setting up and operating with the remote control



Supporting with fully automatic levelling



Convenient control of the axle suspension

RemoteDrive
Manoeuvring the crane chassis on constricted sites with excellent visibility

In focus

Dismantling job in Canada
An LTM 1500-8.1 from Mammoet dismantling a tower crane on a skyscraper in the centre of Edmonton. Thanks to Ashleigh Kaliszuk for the photo. She is a crane operator and photographer and is an ardent supporter of a campaign to get more women in the construction industry. She is now in charge of communication for the “International Union of Operating Engineers Local 955” trade union in Alberta. We introduced you to the young Canadian in our last edition of UpLoad (1-2021, page 98).


LIEBHERR

The Enablers

Stefan Dambacher (Purchasing Manager)

Giulio de Fiore (Logistics Manager)

Benjamin Buchmüller (Shipment Manager)

The coronavirus pandemic has now had a firm grip on our everyday lives for around a year and a half. This grip has differed between countries and the waves of the pandemic have occurred at various levels. Nevertheless, during 2020 around 2000 mobile and crawler cranes still left our crane production plant in Ehingen and were delivered to customers all over the world. Sometimes this process involved obstacles or circuitous routes, because our local service and many of our training courses also had to change very suddenly. But we still managed to keep almost everything working. All thanks to being prepared to use new methods and creative ideas, the great motivation of our personnel and our close contacts with you, our customers and partners. So it is high time we had a word with some of our Ehingen-based "enablers" – Stefan Dambacher (Purchasing Manager), Giulio de Fiore (Logistics Manager), Benjamin Buchmüller (Shipment Manager), Stephan Höchstädter (Customer Service Manager) and Christoph Behmüller (Training Manager). Together they gave us an insight into this challenging situation.

In Germany to date the pandemic has been divided into three waves – spring 2020, autumn/winter 2020 and spring 2021. Apart from a few days in the first wave, production at the plant in Ehingen has always continued smoothly. How were you able to maintain this?

Dambacher: We discovered at an early stage that there were major regional differences not only in the character of the pandemic, but also in how it was being approached. From complete lockdown with industry closed, to minor restrictions on cross-border traffic. That meant that the challenge for us was, and continues to be, transporting all materials for production and service to Ehingen promptly – so that we could make cranes using them. We have also had to keep a close eye on the entire supply chain for every component, regardless of how large or small it is. As soon we spot any signs of problems, we have had to take immediate action. Our long term partnerships with our suppliers have been a great help to us in this respect. Together we have managed to avoid any delivery problems to date.

De Fiore: In the Logistics Department, of course, the initial mood was one of chaos. At least as far as actually dealing with the situation was concerned. But we quickly created some level of safety for our personnel in the Logistics Department – hygiene rules were implemented and masks, disinfectant and gloves were made mandatory. Even though these initially had to be sourced using platforms like eBay, safety took precedence. Trucks were only cleared for unloading and loading if drivers observed social distancing and wore a mask covering their mouth and nose. Compliance with these measures meant it did not matter which country the freight originated from as everything was received using exactly the same conditions.

Many countries temporarily closed their borders, including within the EU and in the Schengen Area. What do closed borders mean for the flow of goods to the factory?

De Fiore: We quickly noticed that the whole system became even more volatile. Time lost on the road meant that we had trucks queueing to enter the factory site. This meant that the commissioning times, in other words the time between their arrival at the plant and the actual

Stephan Höchstädter (Customer Service Manager)

Christoph Behmüller (Training Manager)

demand for the goods in the production process or for spare parts shipments, were significantly reduced. That resulted in more rushing and stress for our workforce. In addition, there was an increase in special unloading operations, particularly towards the end of the late shift.

Dambacher: Normally, the flow of goods is very precisely controlled. As a result of the border closures and testing obligations for truck drivers, some transport times increased dramatically. That meant that we always had to include several days buffer time for goods from the regions concerned. But this also meant changing the procedures at Ehingen and the mass arrivals mentioned above.

Behmüller: It has also been a real challenge for our training courses. Our crane customers, but also our fitters from around the world, were unable to come to our Ehingen training centre as they had done in the past. That made it a matter of course for us as the global market leader to support them in these challenging conditions by continuing to provide a wide range of training courses.

For example, we quickly prepared a large number of digital responses to our familiar face-to-face training and the majority of these courses were then made available from April 2020. By taking new, digital measures we were also able to continue to offer a wide range of face-to-face, live online and e-learning courses. Furthermore, we are treading new paths involving live streaming and combining time-tested face-to-face courses with digital attendance opportunities. That means that we can provide the perfect model for everybody, wherever they may be in the world. Obviously, that also means taking into account the technical facilities available. By offering video tutorials for all new developments, we are able to provide our fitters with fast, reliable and prompt training all over the world for the main changes and new features in our products. Lots of short topics are now permanently available in our Mediathek in the form of live online courses. But face-to-face courses for our customers continued to be possible using our sophisticated training concept, including booking larger premises here in the region and now using the rapid testing facilities.

How can crane deliveries continue to be possible despite the restrictions on the transport of goods?

Buchmüller: Fortunately, our exports to overseas faced very few restrictions due to the pandemic. Shipments from Europe to all over the world continued to be possible, but numbers were reduced and longer lead times were required than normal. However, we took this into account by agreement with our forwarding partners. The greater challenge was definitely our crane deliveries within Europe, particularly in view of the lack of accommodation and return travel facilities for our drivers. Hotels were closed in many countries and the trains and flights back to Germany were extremely restricted and in some cases did not exist at all. Then there was also the fact that the travel regulations imposed by various countries changed on an almost daily basis. In the first year of the pandemic, we drove our cranes to 29 countries in Europe alone. With our logistics partners, the national companies and the support of our customers, we managed to find alternative delivery methods together, even in the most difficult of cases. For example, we transported machines on special low loaders, used shipping facilities wherever possible and even handed over cranes at the border so as not to be affected by quarantine measures when entering countries.

Closed borders, yet reliable spare parts supplies and crane repairs by experts from Ehingen. How has all this been possible?

Höchstädter: Long before the start and completely independently of the pandemic, we took the decision to be as close as possible to our customers by means of having our own global service network providing them with service with maximum competence. The establishment of this local competence took many years of hard work and will never be completely finished. Local parts stocking is a matter for permanent improvement whilst parts which mean downtime are held locally wherever possible. That has enabled us to achieve a situation where well over 90 percent of all service work is carried out locally – even during a pandemic.

Buchmüller: In general we can say that the transport of goods by truck within Europe has worked fairly well throughout the entire pandemic. Fortunately, the borders were never completely closed to trucks. However, in some cases there were long tailbacks at border crossings. The difficulties for supplying spare parts during the pandemic were therefore mainly caused by other factors, including the massive reduction in passenger flights. Before the pandemic, up to 50 percent of global air freight was flown in the freight compartments of passenger aircraft in the form of "belly freight". This capacity disappeared overnight at the start of the pandemic. In addition to massive increases in price, this also resulted in significant delays.

This situation has at least stabilised, albeit at a fairly low level, over the course of the last year. Furthermore, the trend towards online trade, which was accelerated by the pandemic, has also resulted in shortages in capacity for the parcel, courier and express services which are important for our spare parts deliveries. I believe that this trend will continue after the pandemic is over and will require new and creative long term solutions to ensure excellent spare parts logistics.

90 percent of service work is completed by local Liebherr branches spread all over the world. In addition to remote services, was this the key to successfully dealing with the crisis?

Höchstädter: The short answer is yes. But the preparations for this, too, were completed long before travel restrictions were imposed. We permanently invest in the quality of our close-knit network of in-house service outlets and also in a small number of highly qualified service partners. Our customers appreciate the fact that lots of technical problems can be solved on the telephone by our service specialists. So you could say that we have been providing remote support services for decades. If the deployment of a service technician is required, we benefit from the fact that they are available at regional bases, thus reducing travel distances. Crossing national borders is not necessary for many jobs. That helps to keep the service costs low for the customer and also enabled us to provide our service in our familiar quality even during the pandemic.

In addition, our cranes have lots of remote diagnostic features which are standard in our new cranes. We can deliver value for money retrofits for cranes which have been in our customers' fleets for decades. Providing remote advice and online support for crane diagnostics and settings are key technologies for us which we provide all over the

world and keep up to date at all times. Our digital services deliver added value and give our customers additional safety for difficult and time-critical jobs, particularly at this time.

So how do we regard the work of emergency service crane experts in this situation?

Höchstädter: All our deployment managers are genuine crane experts and normally have the benefit of decades of experience as fitters. They can visualise the situation on the crane with their eyes shut, ask the right questions and often even supply the answer to the technical problem, providing immediate help. Video calls and the remote diagnostic software mentioned before are also part of our digital toolbox. If the deployment manager decides to send a service technician to the crane, an attempt is always made to clarify as much as possible in advance. What spare parts does he need to take with him? What must the technicians know? Every department has to be involved in the deployment – purchasing, spare parts warehousing, logistics and shipping. Ultimately, our main aim is to get the crane operating again as soon as possible. Even during the pandemic and despite travel restrictions we were able to maintain this service pretty well using our own PCR facilities for coronavirus tests.

What do you think we are learning from this pandemic?

Buchmüller: The pandemic has shown us how important the diversification of transport and logistics solutions is. We will attach a great deal more value to this in the future, ensuring we always have a plan B. I personally also hope that the increased recognition given to the transport and logistics sector by the public continues afterwards, just like the health sector. We have several challenges to face as a company over the next few years in this respect, starting with a lack of truck drivers and the necessity to make this profession more attractive again and there is also the development of the infrastructure, of course.

Dambacher: We have been faced with an exceptional situation for the last one and a half years – and despite this, our supply chain has continued to work. This is our reward for maintaining long term, fair partnerships with our suppliers. I am already looking forward to all the personal talks we will have together about how we continue our working relationships and grow together. I believe we have all got plenty of opportunity to improve in the future.

Live broadcast
The LICCON2 screen is broadcast live so that as many people as required can watch.

De Fiore: It is important that the management staff keep a cool head in a situation like this so that they can meet the expectations of the workforce and show them that "I'm here for you!". Emergencies create invention and force us to embrace progress! Unfortunately, we are also learning that social contacts suffer massively due to measures such as social distancing. We have people working for us who originate from 20 different countries. A pandemic means that they are unable to visit their own families in other countries during their holidays. We have to learn to deal with this. And we have also developed a great deal – I'm not sure we would be so far advanced with our digital media if it had not been for the coronavirus.

Behmüller: These digital challenges have been a massive benefit. Advanced and basic training must continue, even during a pandemic. The combination of online and face-to-face formats is definitely an approach that we would like to build on after the pandemic is over.

Höchstädter: If we can take anything positive from the pandemic, it is that it has been a sort of catalyst for remote service, in other words it has accelerated the process of digitalisation. We will definitely continue along this route, particularly in technological terms, to ensure that we can provide our customers with efficient services in the future. During the pandemic we have had to overcome obstacles together with our customers quickly and with great flexibility. This partnership as equals cannot be underestimated. We will continue to overcome the challenges facing us currently and in the future on the basis of this solid foundation.

“We’re glad we could help”

Power Lift Tower meets Power Lift Crane

Uwe Langer is an acknowledged expert when it comes to particularly tricky hoisting work. The boss of crane and heavy haulage contractor Riga Mainz and his team have managed to meet a whole series of challenges by developing several new or particularly smart solutions. His latest baby is the PLT. It stands for power lift tower. And they can really move things. But what effect do the towers have on the heavy haulage vehicle that they operate from? To find out, Langer needed some serious support – so he called us. Would we be able to help? Of course we would. And we did. And we were delighted to do so!

A little while later Uwe Langer then drove into the yard with five of his eight towers and a 22-axle SPMT (self propelled modular transporter). He parked everything at the Liebherr acceptance site between the LR 13000, which was fortunately at the test site at the time of his telephone call, and 1250 tonnes of test weights. These were attached to the hook of the 3000 tonne crane. For the load test, two PLTs are placed on the concrete floor and three are evenly spaced on the SPMT.

The entrepreneur from Mainz explained his latest idea which he had had built by Neuenstein-based Greiner: “Each power lift tower can hoist 500 tonnes, so with eight hydraulic lift towers we have a total of 4000 tonnes of hoisting power. The synchronous hoisting by the towers, which are operated using a standard site electricity supply and a wireless remote control, is controlled electronically.” He is also proud of the fact that the hoisting height can be increased using stacking elements and that neither hydraulic hoses nor additional power units are required. “And, of course, each PLT is completely autarchic.”

The thing that Langer does not yet know and wants to test is what happens to the SPMT when a load is placed on it in a specific position. He knows the theory thanks to simulations and calculations. But is that really what would happen in practice? To find out, he needed around 1200 tonnes of test weights and a crane for hoisting.

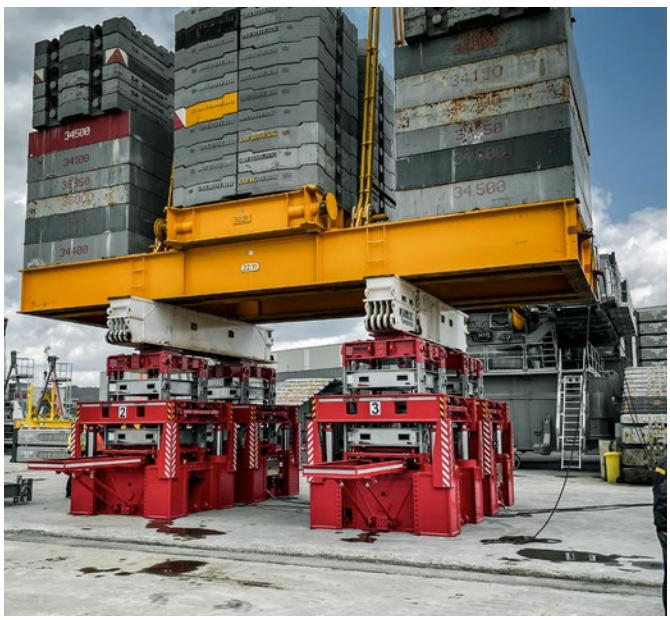
No problem – his call to Liebherr was all that was required. We had an LR 13000 at the acceptance site (the sixth so far, by the way) and we also had plenty of test weights. And there was no shortage of motivation on the part of our colleagues at the site – we firmly believe in developing close partnerships and we know that this has led to many products and processes being improved.

And so the trial was made possible by collaboration and produced some pleasing findings. Firstly, the deformation suffered by the SPMT was significantly less than forecast, resulting in a high precision of the towers in the vertical. And then secondly, the synchronous operation of the lift towers ran like clockwork. The end result as far as we are concerned is that working with our customers is actually great fun and brings benefits to both of us. So all that remains it to wish full power to the tower!

Expert for tricky hoisting work – Riga Mainz boss Uwe Langer.

PLTs on SPMTs move prefabricated bridge components weighing up to 1850 tonnes to their final position in their first job.

Five power lift towers and a 22-axle SPMT stand ready for a static load test.



In the dynamic load test, the PLTs had to raise the 1250 tonnes all on their own.

Sustainability and protecting the environment

We are delighted to announce the launch of a new series of articles, entitled: “Sustainable”. We have at least three reasons for doing so: Firstly, the topic is extremely important. Secondly, it is much too complex and multi-faceted for a single article. And thirdly, it is constantly changing due to technical developments.

“The energy revolution will be expensive!” The media loves headlines like this and produce them on a regular basis. But one thing has now become very clear – “No energy revolution” is far more expensive. Climate change is already costing incredible amounts of money and, sadly, also people’s lives. Australia is one of the latest examples of this, after the country experienced severe drought with horrendous forest fires followed by once-in-a-century flooding. Millions of climate refugees around the world are looking for new homes. And the situation is only going to get worse.

Unanswered questions

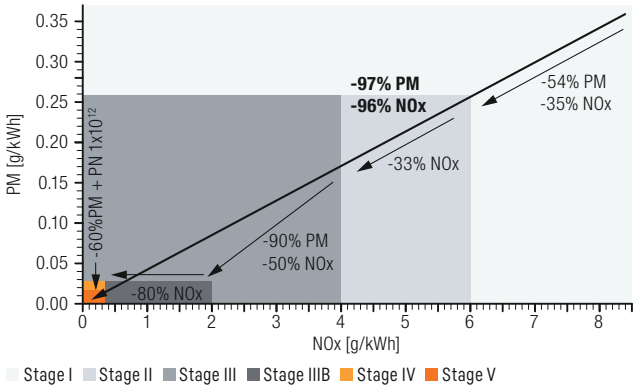
Will the climate targets from the Paris Accord of 2015 be achieved? Do they actually go far enough? We do not know (yet). But what we do know is that we all have our part to play, as consumers and manufacturers. The same applies to both categories – important decisions have to be made. But to make the right decisions, we need knowledge based on science, particularly about what we are trying to achieve. And there is still plenty of uncertainty about this. What heating system should I install in my home? Will it really be sustainable? Should I buy an electric car with a battery or fuel cell? What else will the future bring? We read about the development of new batteries with significantly higher capacities, which can be charged more quickly and are also cheaper to buy. There are also some interesting technical developments in hydrogen and fuel cell technology. But will these only work in laboratory conditions or are they suitable for mass production and also affordable?

Good news

Despite all these unanswered questions, there is at least one piece of good news – the sun, wind and water supply more than enough energy. And the curve for the global use of these renewable energy sources is on a steep upward trend. For example, in 2020 China produced twice as many systems for wind and solar energy than in the previous year – 72 gigawatts of wind energy plus 48 gigawatts of solar energy in just one year. Other countries are also gearing up their expansion of renewable energy sources.

And we as a company also have to make some good decisions, both for us and our customers who will continue to need powerful, economical and high quality products. Sustainability must not result in any compromise in these features.

Sustainable



Emissions of particulate matter (PM) and nitrogen oxides (NOx) have been reduced by over 95 percent in stages over the last few years.

Openness to technology
Liebherr manufactures machines which must perform reliably in a very wide range of conditions in a whole host of different industries. Machines which our customers use to tackle a wide range of different projects and earn money. Machines which have to satisfy some very complex requirements. So what is the Liebherr approach to these latest challenges? It embraces them by being open to technology! That means that we never turn our back any type of power unit without checking it out very carefully. We look at every one of our machines in great detail and ask ourselves what sort of drive unit we could use to best satisfy our customers' demands whilst also helping to reduce the level harm they do to the environment. This is why Liebherr carries out research and development work in several very different directions.

Electric motors with a power cable or batteries are a good option for some machines. And hydrogen could be one possible alternative where this technology hits the buffers. With this in mind, Liebherr is working flat out on the development of hydrogen engines. The development of CO_2 neutral fuels could also make a valuable contribution to limiting global emissions of greenhouse gases.

You can look forward to lots of interesting articles and topics in our new "Sustainable" series in future editions of UpLoad. And we have another piece of good news. In the past we have managed to achieve a great deal and are currently working on implementing some detailed solutions which will have a massive effect. Let's look at a few examples from our Mobile and Crawler Cranes Unit.

Exhaust emissions reduced by over 95 percent
Liebherr has been developing and building its own diesel engines for almost 40 years. Massive progress has been made, particularly over the last few years, in the reduction of exhaust emissions. This has gone hand-in-hand with the ever more stringent statutory requirements that have been implemented in stages. Emissions standard Stage V currently applies to mobile cranes in Europe. Over the last 20 years, exhaust emissions have been reduced in several phases by over 95 percent, despite the fact that the cranes work very hard every day both on roads and on sites. The standard mainly concerns nitrogen oxides and particulates. Today, you can reach into an exhaust pipe whilst wearing a white glove. It will stay white. Particulates are at the limits of what can be measured whilst a crane is driving and operating.
This means that new engines and exhaust treatment systems have an enormous amount of potential because the Stage V limit values have only applied in Europe to date. And even there, they only apply to new models.

Total emissions could be reduced even faster and more effectively than is happening anyway by replacing older cranes with new ones. This would definitely be significantly more effective than imposing even more stringent limit values, which are already very low and have been achieved at massive expense.

CO_2 reductions through technical developments
We launched ECOmode and ECOdrive around ten years ago. ECOdrive reduces fuel consumption and CO_2 emissions by around 5 percent when the crane is being driven. The reductions achieved by ECOmode during crane operation are up to 10 percent. This is done exclusively by means of intelligent software. At almost the same time, we converted our entire crane portfolio to the single-engine concept. This means that instead of one engine each for driving and lifting, only one common engine is installed. This also reduces the CO_2 footprint during both production and maintenance work.

The progress we have made in lightweight design is another important point. Today, we achieve at least the same performance from a crane which weighs significantly less than previously. One outstanding example of this is that our current 5-axle LTM 1250-5.1 crane can hoist loads which, just a few years ago, had to be handled by the 6-axle LTM 1250-6.1. This means that a crane weighing 60 tonnes rather than 72 tonnes now drives to the site (with a maximum ballast 148 rather than 169.5 tonnes). Within just 10 years we have reduced its weight by around 15 percent. This results in a corresponding reduction in fuel consumption and CO_2 emissions while the crane is on the

road and on site. This reduction on a 250 tonne crane also applies to all other crane models and the time period can be extrapolated to 30 years – representing an extremely significant reduction in the volume of CO_2!

CO_2 neutral fuels

One very interesting approach is based on the following consideration – perhaps it is not the engines which require modification but the fuels. Perhaps we do not have to make that many changes to the drive trains, but simply use different fuels in them. The biggest challenge is storing fuel on a crane. Currently, of course, we have a diesel tank for this purpose. However, new problems may arise, for example with hydrogen, due to the fact that as a fuel it is massively different in terms of weight, volume, pressure and temperature.

Hydrogenated vegetable oils (HVOs) do not pose the same problems and may therefore be an interesting alternative. These are edible oils which can be converted into hydrocarbons by adding hydrogen. They are mainly produced from vegetable and other edible oil waste. So waste oil becomes fuel! As it is possible to adjust the oil's properties fairly accurately, the fuel can be used in various mixtures and even in a pure form. Its use will significantly reduce greenhouse gas emissions.

We also believe that these fuels are very interesting because Liebherr manufactures industrial machines with extremely long service lives. If Germany and the EU continue to reduce their emission limits in the next few years, this does not mean that older machines with diesel engines simply have to be scrapped. On the contrary, in Asia, Africa and South America, these machines continue to operate for many years, which also has an effect on our climate.

Regardless of whether and how quickly we can fit more machines with engines which reduce CO_2 emissions, the advanced development of fuels based on hydrogenated vegetable oils or synthetic fuels from renewable energy sources can make a valuable contribution to reducing global emissions of greenhouse gases. It is simply not possible to make the process any faster or more effective than through the use of HVO!

We are currently working on making our entire mobile and crawler crane fleet HVO-ready. Our cranes have already undergone extensive testing and trials. On a 5-axle mobile crane, for example, emissions of CO_2 fall by 74 percent if we take into account the whole of the crane's service life, including the production process. Cradle to grave, in other words. This is a whole new milestone for CO_2 emissions. The main reduction comes, of course, during its long operating phase, due to the fact that our cranes deliver such a long service life.

To make HVO or other synthetic fuels attractive for our cranes, they must be available nationwide and in plentiful quantities at filling stations, as is the case today with diesel. That will not be possible from one day to the next. But we are making a start.

Local zero emissions

In addition to achieving the goal of climate neutrality, more and more towns and regions would also like to achieve the status of local zero emissions. We are therefore also continuing our development work to meet this local zero emissions strategy. At the start of 2022, we are planning to unveil a standard, practical machine fitted with an additional electric crane drive unit. We do not want to give away too much at this stage. But it will be a particularly compact crane with a hybrid drive which will also be very useful for operating inside buildings.

One thing that all these extremely important changes and developments have in common is that progress and innovation are evolutionary processes. You have to stay on the ball and you can never relax. So, let's do what is required using the same method we always use – working together in a successful team.

Inspiration in Oslo

In 2019, the EU Commission named Oslo as the European Environmental Capital – mainly because of its conservation of natural areas and low pollution levels. However, the capital of Norway is by no means resting on its laurels. On the contrary, it plans to reduce its emissions by 95 percent by 2030 and be an inspiration for other cities.

The no less ambitious crane and transport contractor Kynningsrud Nordic Crane AS is based not far from the aspirational capital city. “In Norway we have to face the challenge that our government wants construction sites with zero emissions”, explains company boss Eirik Kynningsrud. “And we want to be a leading contractor for these projects. We always try to win orders by being the green alternative.”

Kynningsrud has therefore already replaced lots of its older mobile cranes with new machines whose engines comply with the Stage V emissions standard. In addition, it has purchased its first MK 88-4.1 mobile construction cranes which can be operated with electricity on site to meet the local zero emissions requirement. The company already has firm plans in place to purchase more cranes.

Kynningsrud’s latest addition to its fleet is an LR 1250.1 unplugged, a battery-powered crawler crane from the Liebherr plant in Nenzing. Eirik Kynningsrud placed the order for the crane before he had actually seen it: “It’s great that we can work without creating any emissions and, of course, that is attracting certain amount of attention and generating a lot of positive publicity for us. We want to be the leading company for providing zero emissions cranes. The future of the crane industry in Norway is zero emissions.”

Liebherr Representative Thomas Bohlin and Eirik Kynningsrud (right) at the crane handover.

Kynningsrud is open to any alternatives which can reduce exhaust fumes and CO_2 emissions. The company was therefore a valuable partner for testing the use of HVO fuel in Liebherr mobile cranes. The field test with HVO, which is already well established in Scandinavia, lasted for a year involving 2200 hours of operation. The positive results confirmed the tests carried out in-house at Liebherr in Ehingen using around 7000 litres of HVO.

Why is Liebherr now supplying the LTC 1050-3.1 with two booms?

We have developed another option for our successful LTC 1050-3.1 compact crane – in future you will have the choice between the existing 36 metre telescopic boom with the TELEMATIK high speed telescoping system and a new 31 metre boom featuring rope extension technology. The first machines with the new telescopic boom will be delivered in the autumn. Our Technical Director, Dr Ulrich Hamme, explains why we developed the new boom.

The LTC 1050-3.1 is the only all-terrain crane in our product portfolio which contains the letter “C” in its name. That stands for “Compact”, and means that it is a particularly compact single-cab crane which is designed for operating in very constricted site and space conditions. On the other hand, the LTC 1050-3.1 is also designed to be suitable for universal use, just like a conventional LTM crane. In other words, the idea has always been to make this crane a jack of all trades.

To date, the LTC 1050-3.1 has been fitted with a 36 metre telescopic boom based on our “TELEMATIK” single-cylinder high speed telescoping system. Although this system has proved to be very practical on our LTM cranes, it has not been able to meet all the requirements placed on the LTC model. This has become apparent in our in-depth discussions with our customers and lots of crane operators.

Your choice – “powerful and long” with TELEMATIK (top) or “fast and familiar” with rope pull mechanism.

LTC 1050-3.1 with TELEMATIK boom and with rope pull mechanism (right)

Background

"In-depth discussions with our customers and lots of crane operators made us decide to develop a boom with a rope extension mechanism for the LTC 1050-3.1 as well."

Dr Ulrich Hamme
Design Director

Various criteria play a role when selecting the boom and telescoping system – in addition to the "hard" arguments based on technical matters and engineering facts, which can be expressed in figures, there are also "soft" conditions which are based on everyday practice.
These include the following:

- High lifting capacities (in terms of radius and hoist height)
- Short basic boom length (fully retracted)
- High maximum boom length (fully extended)
- Precision telescoping, including with a load on the hook
- Flexible operation in highly constricted areas (for example under an industrial unit roof, installing a gantry crane)
- Intuitive, proactive telescoping (simple telescoping paths)
- High telescoping speed (telescoping handling jobs, for example assembling trade show equipment) and fast boom length adjustment
- Sensitive, smooth telescoping
- Permanently visible length adjustments to the boom whilst telescoping (transparent movements)
- Time-tested, familiar operation using suitable telescoping technology (crane operator's experience)

The overall situation relating to these criteria led to us adding another boom and telescoping system based on a two-stage hydraulic cylinder with a rope extension system for use with the LTC 1050-3.1.

In the future, therefore, you can decide which boom technology you would prefer for your LTC 1050-3.1. Can't make up your mind? Then why not use multiple LTC 1050-3.1 cranes with both boom and telescoping systems, rope extension and TELEMATIK, to ensure you have every eventuality covered.

Find out more here:
go.liebherr.com/6a13r8

Standing steady in the wind!

The winners of the ESTA Awards of Excellence 2021 were announced on 22 April during an online ceremony. We are delighted to have won the award in the safety category for our development of special "WindSpeed load charts". These deliver enhanced safety and longer operating times for crane work in windy conditions. The Liebherr engineers in Biberach, Ehingen and Nenzing have made a large number of new mobile and crawler cranes more stable for use in stormy weather.

This development started in the year 2000 for mobile construction cranes with the MK 80 and in 2008 for crawler cranes with the LR 1600/2. Recent LTM models and all cranes in the MK series have also been available with this feature since 2020. The major benefit for our customers is that the cranes are safer, jobs can be planned better and there is less downtime caused by strong winds. That also means increased profitability.

If the wind speed measured on the crane's boom during a job exceeds the set chart wind speed, the crane operator can simply switch to a load chart with a higher maximum wind speed which will often allow the job to be continued.

Holger Schilke, Structural Engineer at Liebherr in Ehingen explains how jobs can be planned in advance using the new load charts for higher maximum wind speeds.

"Our WindSpeed load charts enable you to plan jobs better and also work safely in strong wind."

Holger Schilke
Structural Engineer

An excursion into practice

After presenting details of the theory behind the load charts with higher maximum wind speeds in UpLoad 01/2020, we now want to demonstrate their practical use with two actual examples and show the practical benefits for you, our customers.

The example we have selected has a genuine link to everyday practice because this is exactly the enquiry made by a customer to our Structural Engineering Department. We were asked to consider a load case with the LTM 1750-9.1 (800t upgrade) in TYV2EN mode:

- Set-up status: T-49.1 (92/92/92) + A-19 + N-28
- Support base: 12 m x 12 m
- Counterweight: 134 t
- Radius: 21 m
- Load: 70.0 t
- Area impacted by the wind including c_W value: 68 m²

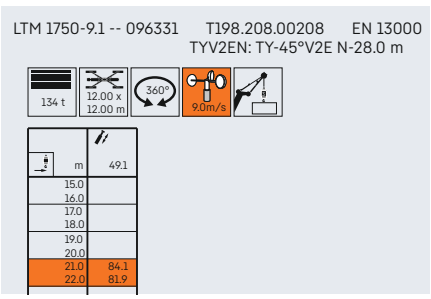
So what is the maximum wind speed at which this hoist could be carried out?

The first thing to do is to find the ratio of area impacted by the wind (including c_W value) to load:
A_w/L = 68 m² / 70.0 t = 0.97 m²/t

Perhaps you will remember that the effective area exposed to the wind in the load chart calculation and as specified in the standard is 1.2 m²/t. Since we are below this value in this case, this means that we do not have to worry about the ratio of area impacted by the wind to load in the rest of the assessment.

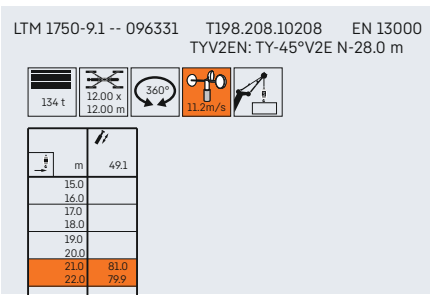
So here we go.

Wind speed 9.0 m/s



A quick look at the load chart for a wind speed of 9 m/s shows that the maximum lifting capacity is 84.1 t. In other words, the hoist can certainly be carried out in winds up to this speed.

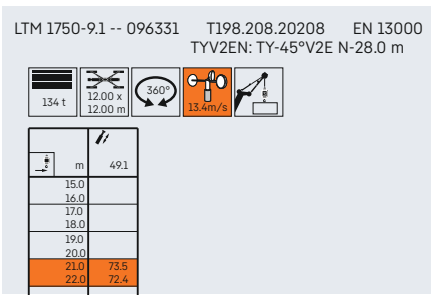
Wind speed 11.2 m/s



But would the hoist also be possible if the wind were stronger?

The first thing to do is to look at the wind chart for a wind speed of 11.2 m/s. In this case, the lifting capacity is 81.0 t, in other words slightly lower than for a wind speed of 9 m/s. Nevertheless, it is higher than the planned load of 70.0 t, which means that the hoist is also possible at this wind speed.

Wind speed 13.4 m/s



And as the LTM 1750-9.1 can operate in a maximum wind speed of 13.4 m/s at the luffing jib, it also make sense to have a look at this load chart. In this case, the lifting capacity is 73.5 t, in other words still more than our 70.0 t, which means that the load can even be hoisted at this wind speed.

If the lifting capacity for the maximum wind speed of 13.4 m/s had been less than 70.0 t, we would only have been able to carry out the hoist at a maximum wind speed of 11.2 m/s.

This therefore means that if the area impacted by the wind (including c_W value) is less than 1.2 m^2/t, the maximum possible wind speed can be found quickly and reliably using the existing load charts with no great effort and without losing any time.

But what do you do if the ratio of area impacted by the wind to load is greater than 1.2 m^2/t? You may already have guessed that this may take a little more time but is nevertheless not all that complicated.

Let's stay with our previous example. However, in this case the area impacted by the wind including c_W value is now 110 m^2 and the load for hoisting is 70.0 t. The ratio is now Aw/L = 110 m^2 / 70.0 t = 1.57 m^2/t and is therefore above the standard value for calculating lifting capacities. The wind force diagrams, which can be found in any load chart book, now come into play.

So the first thing to do once again is to ensure that the lifting capacity in the wind-dependent load chart is greater than the load which has to be hoisted. Now the load and the corresponding area impacted by the wind must be entered into the relevant diagrams (the table wind speed and the wind speed in the diagram must be identical!). The maximum wind speed is where the two lines intersect. And that's it!

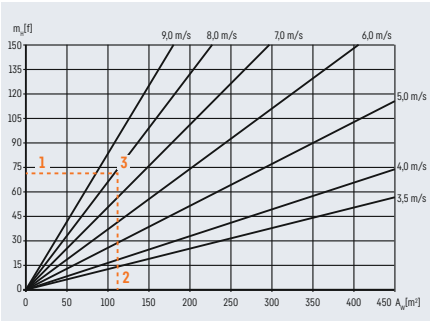


Diagram for 9.0 m/s

1. Enter the load = 70.0 t
2. Enter the area affected by the wind = 110 m^2
3. The maximum wind speed is where the lines intersect. If the point of intersection is not on one of the drawn lines, the maximum wind speed must be interpolated between neighbouring lines.

In this case, the maximum wind speed is 7.9 m/s.

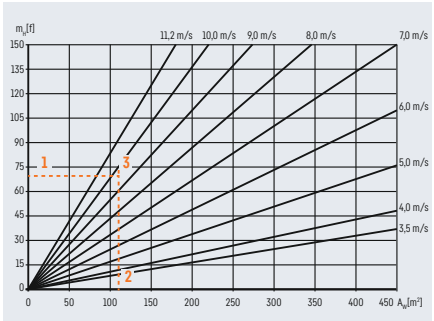


Diagram for 11.2 m/s

1. Enter the load = 70.0 t
2. Enter the area affected by the wind = 110 m^2
3. The maximum wind speed is 9.8 m/s.

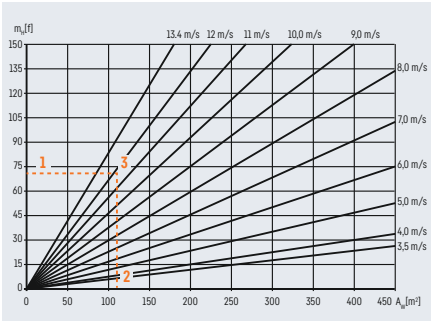


Diagram for 13.4 m/s

1. Enter the load = 70.0 t
2. Enter the area affected by the wind = 110 m^2
3. The maximum wind speed is 11.7 m/s.

This shows once again the practical benefit of the additional load chart for use in higher maximum wind speeds because for this load case the maximum wind speed can be increased by almost 50 percent – from 7.9 m/s to 11.7 m/s.

Another point to note is that you will get the same result if you calculate the maximum wind speed using the wind speed calculator in the LICCON work planner – try it for yourself.
Load charts with higher maximum wind speeds – a safe haven in stormy weather.

We hope you enjoy using them and they make your work even more successful!

“We will never forget that trip!”

Our fitters have seen a thing or two – jobs have taken them to the far ends of the world where they have experienced extreme heat and snowstorms, unusual cuisine and some hotels which really do not deserve the name. The coronavirus pandemic has taken them one step even further. And so, twelve days before Christmas, three hard-bitten colleagues from our Customer Service and Crane Acceptance Departments set off. They were destined for Karimun, one of countless islands in Indonesia. Their task was to provide training and also to erect and hand over one of the largest crawler cranes in the world. Their report: “Unforgettable!”

Strong lads!
Anton Egle, Alexander Röder and Erdinc Keceli (from left to right) overcame all the obstacles placed before them.

After the lovely young woman had pushed the coronavirus test stick very conscientiously up his nose towards his throat and noticed the tears forming in Anton Egle’s eyes, she let go, put her hand on his shoulder and said in a calm voice: “Relax, relax!”. It really wasn’t Anton’s first test. “But you never get used to them!”, says the technician.

His colleague Erdinc Keceli continues: “We had to travel for around ten days before we actually arrived on Karimun. From Munich, we had a stopover in Doha in Qatar, then we flew to Jakarta in Indonesia where we had to undergo lots of checks and coronavirus tests. We stayed the night, before flying to Batan, quarantine, coronavirus test, wait, second coronavirus test: negative. Then we were finally able to embark on the ship which would take us to our island.”

“The Indonesians are very hospitable and working with an international team was really great.”

Anton Egle

“The only thing that was missing was the actual crane”, says Alexander Röder, the third musketeer. “It had been delayed on its sea journey from the Netherlands. That probably had nothing to do with coronavirus, but it certainly put paid to the timetable. The nerves were stretched to breaking point.”

After a delay of five days, the ship carrying the giant crane finally arrived at the quayside and the LR 13000 was unloaded on New Year’s Day. The erection work and customer training started. One massive benefit was the fact that the customer’s crane operator had already operated a different LR 13000. That was fairly unusual because we have only ever delivered five of our 3000 tonne cranes. And Anton, Erdinc and Alexander were mostly involved in the erection and commissioning.

“It is fascinating to encounter new cultures. Indonesia is an incredibly culturally diverse country. They speak more than 300 different languages there.”

Alexander Röder

“It is always quite special to erect such a massive crane. You can feel the respect the people on site have when they see its impressive dimensions”, says Anton. After 15 long days, which started at 7 in the morning and did not finish until 9 in the evening, the work was completed, alongside temperature measurements and more coronavirus tests. “The Indonesians are very conscientious with the tests. And despite all the precautions, there was always uncertainty. Had we been infected anyway? And how would I get home then? Would I have to go into hospital in a different country? Obviously, that was something we wanted to avoid.”

“As we flew in, the masses of islands created a fascinating panorama. The weather changed extremely quickly, from sunshine to violent monsoon rainfall. Some of the fruits we had never seen before tasted great, but they had a very strong smell.”

Erdinc Keceli

The return journey posed a whole new set of challenges, including heavy seas which caused seasickness and, of course, more tests. After six and a half weeks, they finally landed back in Germany. And how did the three of them sum up the experience: “It was fun working with people from foreign cultures. It was a fantastic experience, solving problems together and learning from each other – we’d love to go again, but next time without coronavirus!”

Ready for action – the job is finished.

The dimensions of the LR 13000 are impressive.

Hook with sea view

How to crawl properly

If you drive over delves, the crane weight can only be supported by the rollers in the centre of the crawler carrier.

The wind turbine is fully erected. The components for the next turbine are waiting to be erected 200 metres away. Hundreds of tonnes of steel start to move and the crawler crane crawls towards its next job. Dozens of turbines will be erected at this wind farm which is just one of many around the world.

Crawler travel gears are designed for moving cranes on sites, sometimes even with a full load on the hook. And this is precisely where crawler cranes come into their own. But the requirements for moving them, particularly over large distances at wind farms, have increased over the last few years. Oliver Schwenkkrauß has been working on the design of crawler crane undercarriages for 10 years. He has particularly focused on the requirements for the travel gear for moving the crawler crane so as to reduce the stresses which occur during this process and therefore minimise wear. He shares his tips with you.

Crawler cranes are primarily lifting units, but they are also ideal for manoeuvring on site. However, if the crane is moved frequently or with heavy equipment on uneven terrain, signs of wear will obviously occur more quickly. In the worst case scenario, cracks may even appear on load-bearing components and the travel gear may suffer permanent damage.

The travel gear on the crawler carrier consists of a travel drive with sprockets, cast base plates and hardened track rollers. It is simply not possible to prevent wear on these components as a result of the high stresses on the steel-to-steel contact surfaces.

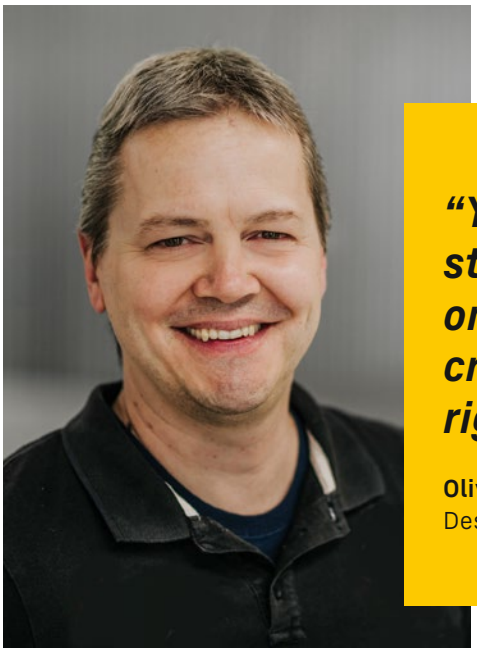
The service life of the components mainly depends on the following factors:

- Ground conditions of the site track: Is the track level? Is it made of concrete, timber, gravel or sand?
- Length and direction of the distance to be covered: Is the route straight or does it include curves?
- Weight (basic machine/equipment/load) and centre of gravity of the crane
- Maintenance and cleaning of the crane's travel gear

Ground conditions

The crawler crane should always be moved on a horizontally levelled surface with adequate load bearing capacity. Delves, bumps, ruts, tracks that fall away to the side and other

My Tip



"You can reduce the stresses and wear on your crawler crane by taking the right action."

Oliver Schwenkkrauß
Designer

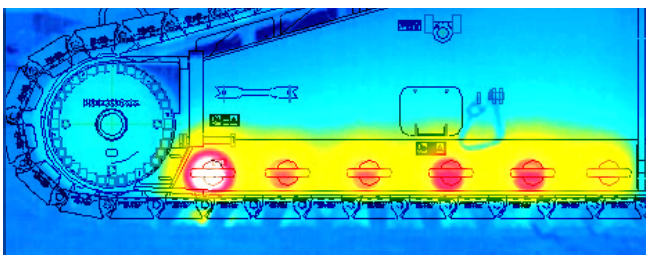
types of unevenness must be avoided as the whole weight of the crane will then no longer be borne by all of the track rollers and components may only be stressed on one side. This will increase wear on the track rollers and base plates. The cost of levelling tracks may be significant, but it is always a worthwhile exercise.

Monitor the temperature
Overheating increases wear. We therefore recommend that you monitor the temperature on the travel drive and the crawler carrier's track rollers, particularly the outer track rollers, during the manoeuvre. A thermal imaging camera or an infrared thermometer may be used for this purpose. The travel drive must not exceed a temperature of maximum 90°C for any length of time. The place to measure the temperature is between the gearbox and brake. The temperature of the track rollers should never exceed 100°C.

Regular maintenance
Clean the crawler chains at regular intervals and remove any materials which may increase wear such as sand, mud and stones. It is also important to check the chain tension at regular intervals. If the chain tension can no longer be adequately achieved using the chain tensioning cylinder, a base plate must be removed. Once this becomes impossible, components will have to be replaced.

And last but not least, ensure that everything is properly lubricated. The track rollers and sprockets are greased by the automatic lubrication system. Check the lubricant level at regular intervals and also check the system for leaks and signs of damage.

We want to ensure that you can operate your crane for as long as possible. With this in mind, we have compiled some more detailed information on this topic. The download is available here on our website.



Hot stuff!
The camera shows exactly where things are heating up.

Find out more:
go.liebherr.com/ux31h9

The world with Liebherr

Teamwork in Switzerland
A brand new LTM 1120-4.1 from Christen + CIE AG Biel assembling a Liebherr EC-B series tower crane in the Canton of Bern.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“We will emerge stronger from this phase, too”

In conversation with **Dr. h.c. Isolde Liebherr,** Vice President of the Administrative Board of Liebherr-International AG, **Dr. h.c. Willi Liebherr,** President of the Administrative Board of Liebherr AG, and **Sophie Albrecht** and **Patricia Rüf,** members of the Administrative Board of Liebherr-International AG.

It was roughly one year ago that we were sitting together and discussing the upcoming financial year. And soon after this, the coronavirus started to change the world in ways we could never have imagined. Can you describe what it was like for you at the beginning of the pandemic?

Willi Liebherr: We received reports that a virus was spreading around China from staff based at Liebherr's Chinese subsidiaries. And this was subsequently confirmed by the media. At the beginning of February, we had to shut down our Chinese manufacturing companies, and our employees working in China switched to remote working. We only really realised the global extent of the virus at the beginning of March when the situation in Europe started to look more serious.

Sophie Albrecht: I can remember it really well. I was visiting Conexpo, the construction machinery trade fair in Las Vegas. The atmosphere was very different – you could sense a general feeling of uncertainty. We had been looking forward to meeting our customers from Asia, but they were unable to travel. On some stands, machinery was on display but there were no personnel. And people had also stopped shaking hands when they greeted each other. Whilst I was at the trade fair, the situation in Europe changed dramatically. The borders were closed shortly after I returned and we had to partially or completely shut down production at many of our sites. It was really surreal and difficult for us all to comprehend at first. But it soon became clear that we needed to learn how to adapt to the situation as quickly as possible.

How did the outbreak of the pandemic affect you personally?

Isolde Liebherr: It affected us the same way as it did many other families. Our lives were suddenly very different. We had to practise social distancing and were continually worried about contracting the virus or passing it on to others. We also kept contact with our children and grandchildren to a minimum. It is difficult not seeing them very often.

Patricia Rüf: Having to suddenly adjust to living every day within the much narrower confines of our homes and having to dramatically reduce our contact with others is a big change. Face-to-face contact with our customers and employees as well as regular contacts to customers and our companies and offices all around the world are an important part of our jobs. This all disappeared overnight. Fortunately, we were able to keep the communication lines open thanks to digital technology. However, I can't wait to meet people in person again and speak to them face-to-face.

What were the biggest challenges from a business perspective during this time?

Willi Liebherr: This unprecedented situation has unquestionably had an impact on the entire Liebherr Group. We had to strike a balance between protecting every Liebherr employee and ensuring that our factories and company offices continued operating. As a family-owned business, the health and well-being of our employees is our top priority. We responded quickly to facilitate remote working wherever possible. We modified shift patterns, converted canteens, implemented the 'Hands. Face. Space' rule and provided face masks and disinfectants. And we also listened. We appreciated every suggestion for improvement that we received from members of staff.

Isolde Liebherr: At the beginning, the economic uncertainty, global lockdowns and supply chain disruptions thankfully only resulted in a few cancelled orders and our companies only had to be closed on a temporary basis. Looking back, it's fair to say that we quickly got the situation under control. The Group's decentralised structure has once again worked to our advantage. We were able to manage the Group at a central level, whilst allowing our companies to respond as they saw fit and take into account requirements based on the country, region and specific legal situation.

What conclusions do you draw from this?

Patricia Rüf: The pandemic and its effect on conditions in general must not stop us from looking positively into the future. We've learned that unforeseeable circumstances can quickly turn everything on its head. But we've also learned that we are capable of dealing with these kinds of situations. We are a strong, financially independent company. Our job is to make sure this continues to be the case. And it became apparent one again that we are flexible. We are able to react quickly to changing circumstances. To put it briefly, we have proven that we are an adaptable company. We have been able to progress during the pandemic. We have digitalised numerous processes and found new ways to collaborate with our customers and partners. We are working on new development projects

and processes and will continue to do so. All of this allows us to look forward to a bright future. We will emerge stronger from this phase, too.

Nearly 48,000 people work for Liebherr all around the world. What measures are you currently taking to safeguard jobs?

Patricia Rüf: Anyone who experienced the financial crisis whilst working at Liebherr back in 2008 and 2009 will remember that the Group introduced every possible type of measure to safeguard jobs. The same applies to the current situation. We are very happy that we could keep our headcount stable throughout 2020. We've introduced some measures to cushion the impact of the pandemic on our employees. For example, we have introduced short-time working, temporarily reduced working hours and have ensured that we continue to pay wages at all times. We've also boosted certification programmes and enabled employees to transfer to other departments. In addition, we've temporarily redeployed staff at different sites in order to balance out capacity fluctuations between our manufacturing facilities.

Let's turn to some of the Group's key figures. Liebherr achieved a turnover of € 10,341 million. What does this mean to you?

Isolde Liebherr: We already knew during the spring of 2020 that we would not meet our sales forecast for the year and we soon realised that we would have to factor in a substantial drop in sales. However, as the year went on, we were able to make up for the lost months in some of our product segments. We are very satisfied with the results, considering the circumstances.

Sophie Albrecht: We are pleased that we were able to achieve a small positive operating result. Despite difficulties in the currency markets and tax accounting challenges, we were able to report a moderately positive result after tax.

What were the key milestones and highlights of 2020 for you?

Isolde Liebherr: I think an overwhelming feeling of togetherness is what will stay with me the most. We have all had to deal with an extremely challenging year on a personal level. And despite this, our employees have quickly adapted to new ways of working and shown an amazing amount of commitment, creativity and loyalty. We would not have gotten through the year without them.

The performance of our Refrigeration and Freezing product segment has also been a particular highlight for me. For the first time in our company's history, we posted a net turnover of 1 billion euro for this segment.

I was also delighted when I found out that some of our chefs had received prestigious awards from Gault&Millau Austria. Our head patissier at the Interalpen-Hotel Tyrol was awarded 'Patissier of the Year' and our head chef at the Löwen Hotel in Montafon won his third Gault&Millau toque. These are truly remarkable achievements.

Willi Liebherr: I was particularly pleased that despite a fall in sales, the order book for Earthmoving was much healthier by the end of the year compared to its starting position in January. We were also able to continue developing new technologies such as electric drive concepts in our Materials Handling Technology segment. I think we can draw very positive conclusions from this which apply across the entire Group.

2020 also marked an important anniversary – our 50th year in the USA. We celebrated this special event at Conexpo in Las Vegas with the slogan "50 Years United by Success". It was great to celebrate this event with some great machinery on show.

Our Concrete Technology segment also reached an important milestone in 2020 when it delivered its 100,000th truck mixer manufactured since 1967.

Liebherr Aerospace was also awarded the "Best Supplier Award" by Comac and Embraer. We were very pleased to be honoured with such an accolade, which demonstrates that we are able to provide our customers with high-quality products and services, even during difficult times.

Patricia Rüf: I was pleased to see the strides we are continuing to make in digitalisation across the Group. This was particularly evident in the first-ever remote assembly of a mobile harbour crane. Our team of technicians based in Germany assisted with the construction of the crane in Argentina using our digital service app.

We are also very excited to be one of the founding members of the "Center Construction Robotics" project. The project is being run by a consortium of companies from Europe and an interdisciplinary team of researchers at RWTH Aachen University who are working together to develop "the construction site of the future".

Another highlight was that we were able to maintain our position as the global market leader of duty cycle crawler cranes within our Deep Foundation Machines segment.

A number of innovations were also premiered by our Gear Technology and Automation Systems segment, including the LGG 500 gear grinding machine, the LK 280 DC gear skiving machine and an innovative automated assembly concept for battery packs.

Sophie Albrecht: I was very pleased that despite the conditions last year we were able to present several products to the world in the digital space. This included the LR1250.1, which is the world's first battery-powered crawler crane, the TA 230 Litronic articulated dump truck and a new addition to our mobile crane fleet, the LTM 1150-5.3. We are also very pleased that sales remained high for our Mobile and Crawler Cranes segment and that we could efficiently resume crane deliveries following the difficult period in March and April.

Our Mining segment also achieved great things in the customer service arena. The team pulled out all the stops to provide each customer with the best possible solutions. The 1,000th mining excavator also rolled off the production line – an achievement we are particularly proud of.

We also learned that Asia continues to be an important market for the Components division, particularly the wind energy sector. This is why we are investing in new facilities in China and India.

You have already touched on the fact that Liebherr is working on a wide range of digital technologies. But a lot is also happening in the area of product stewardship. Could you outline what is happening on this front?

Sophie Albrecht: Product stewardship means ensuring that our products are safe, efficient and environmentally friendly. Workplace safety and emission reduction are therefore key components of our development work. You only need look at the many innovations that are mentioned in the 2020 Annual Report. These include the electrification of the T 236 mining truck and the fully-electric and hybrid construction machines, such as the LR 1250.1 unplugged crawler crane and the ETM 1005, our fully electric truck mixer. We are also working on fuel cell systems for mobile equipment in Aerospace and Transportation Systems.

And we are promoting new ways of working through our new digital technologies. Our condition monitoring solution allows our customers to monitor the life cycle of their machinery and components at any time. Our augmented reality tools and Remote Service App enable us to provide excellent customer service and maintenance solutions which help to avoid multiple visits. Our digital services, such as the Crane Planner and MyJobsite, also help our customers to carefully plan on-site activities before they even use any construction machinery.

Finally, can you give us your outlook for the current financial year?

Willi Liebherr: We are certain that this year is going to be better, and our sales forecasts are looking promising. We also have good reason to feel more optimistic due to changes in the geopolitical situation, now that there no longer appears to be a major trade war on the horizon and renewable energy solutions are becoming increasingly relevant. This opens up many opportunities in the future, and we are certainly in a good position to offer plenty of excellent solutions.

We strongly believe that the technical projects we have already initiated have put us on the right track for the future. And this is why investing in the future is and will remain so important to us. We believe that investment is a critical factor for healthy growth and for the future of our company. This also applies to the current financial year.

The year 2020 in numbers

The Liebherr Annual Report

10,341
Turnover in € m

605
Investments in € m

47,925
Employees

Turnover by product segment

		€ m	%*
	Mobile and Crawler Cranes	2,504	-4.8
	Earthmoving	2,008	-10.4
	Aerospace and Transportation Systems	1,024	-31.3
	Refrigeration and Freezing	1,007	2.4
	Mining	964	-9.8
	Maritime Cranes	795	-10.4
	Material Handling Technology	477	-24.2
	Tower Cranes	444	-18.5
	Components	403	-6.3
	Deep Foundation Machines	258	-17.0
	Gear Technology and Automation Systems	213	-12.3
	Concrete Technology	193	-10.2
	Others	51	-33.8

* Changes to previous year in percent

> 140
companies

> 40
production sites

Present in over **50**
countries on all continents

International presence

You can find the Annual Report online:
www.liebherr.com/annual-report

More than just a logo

What's behind Liebherr's new brand identity

You've probably already noticed that something has changed when you first opened this magazine or visited our website: Liebherr has a new brand identity – and it's not just about the logo.

Strengthening the brand
Strong brands don't come about overnight. They have a history, and they are the result of years of effort and systematic work. They emerge when what a company promises its customers and the public is actually delivered and people have certain positive associations with a brand. And this needs to be consistent over many years.

Which is exactly what Liebherr does. A recent study on Liebherr's brand image has confirmed that Liebherr is a strong brand. But we aren't just going to sit back and be content with what we've achieved so far. The Liebherr brand has the potential to become even stronger. To this end, the Group has decided to update its brand identity. However, a professional brand presence is not a product of chance or something that just happens. There is a structured process behind it, from analysing the previous brand image and developing a sound strategy to elaborating and implementing essential elements of the new brand image. And we have gone through this process to a large extent here at Liebherr.

Our new brand identity covers a wide range of aspects, from our logo, typeface and colours to what the design looks like overall, and how we present ourselves at trade fairs. We also created a new communication basis that reflects the content of Liebherr's brand experience and presents our key corporate messages. There will also be changes in our language: we plan to round off our brand experience with a fixed set of terms and guidelines on tone and style. All those changes together will determine how people will experience the Liebherr brand from now on.

Bringing the brand experience to life step by step
The first results of this development have been evident since April. We gave our website a facelift, for example, and premiered new elements of our revamped corporate design – just a few clicks is all it took! As part of our new brand identity, our website now also features Liebherr's new look and feel.

This issue of our magazine also sports the new design for the first time, with many new basic graphic elements. Immediately obvious are the technically optimised Liebherr logo and our new corporate typeface. The latter, in particular, creates a characteristic and unique effect. Finally, the updated colour scheme is intended to give the magazine a modern and inviting touch.

Of course, that's not all that has changed and will change. So keep an eye out for innovations – they are just around the corner!

Memorable
The high recognition value of the new Liebherr design

The most important visual changes

There were many changes. They are based on a modular system of basic elements and layout principles. How does this work? Like building blocks, the individual elements can be combined to create different designs and layouts. The three key elements are:

Optimised logo
The existing logo is strong and characteristic of our brand, so we have made only minimal changes. The shapes of the letters have been optimised, and the spacing between the individual letters has been increased. This makes the logo easier to read and ideal for small sizes and digital applications.

New Liebherr typeface
Liebherr now has its own unique typeface with a high recognition factor. This allows us to communicate independently and autonomously.

Whether in headlines, continuous text or product labels – the new typeface is easy to read in every setting.

Liebherr Head Black
Liebherr Head Regular

Liebherr Text Bold
Liebherr Text Medium
Liebherr Text Regular

Liebherr Text Bold italic
Liebherr Text Medium italic
Liebherr Text Regular italic

Liebherr Text Condensed Bold
Liebherr Text Condensed Regular

LIEBHERR PRODUCT

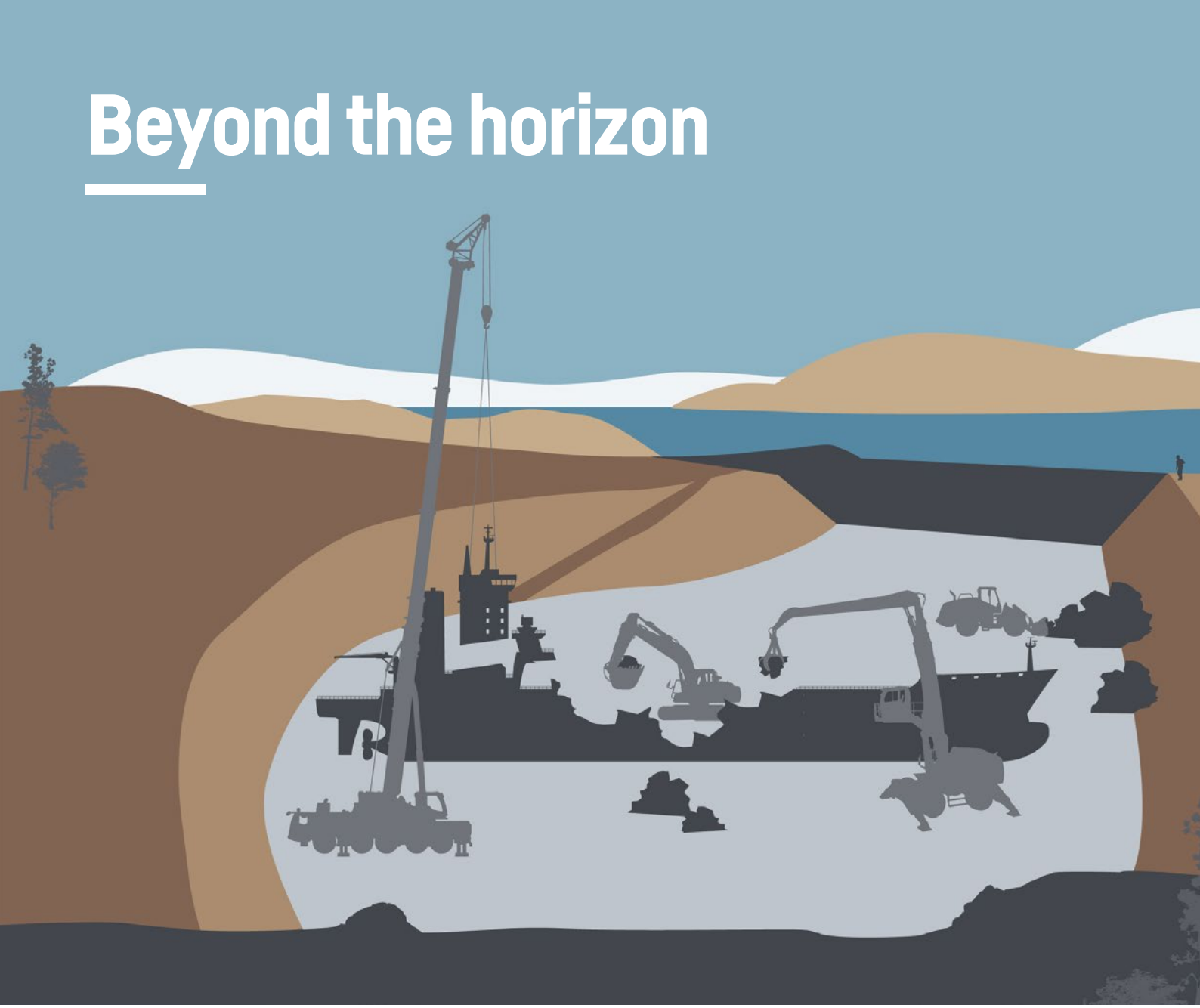
Distinctive colour scheme
In the future, both the Group as a whole and the individual product segments will communicate in yellow. Only the Refrigeration and Freezing product segment will keep the colour blue. Our colour scheme continues to be white, black, and yellow. An additional secondary colour palette rounds off the new colour design.

Liebherr Yellow
Liebherr White
Liebherr Black

Liebherr Arctic Blue

Steel
Slate
Terra
Clay
Leaf
Ruby

Beyond the horizon



Ships are a very special means of transportation. Since time immemorial, people have boarded ships to brave the elements and travel to distant continents. The value of a ship, however, is not limited to the high seas. Scrapping and recycling can open up unexpected new horizons – both for the circular economy and for the environment. And for us, who send our powerful machines to the site.

"Mayday Mayday Mayday - this is MV Kaami..." It was a dark and stormy night in March when the radio operator sent out a distress call. The Norwegian freighter had run aground on the north-west coast of Scotland on its journey to Sweden from Ireland. For a seafarer, this is one of the worst disasters imaginable. The eight crew members had to be airlifted to safety by helicopter. But there was no saving the ship, which had been originally launched in 1994. Experts soon confirmed that the damage caused by the accident was irreparable.

But what do you do with a ship written off as a "constructive loss" by the insurance company? Nowadays, simply scuttling it is out of the question. But towing the wrecked vessel to a ship graveyard and leaving it there to slowly decay, as is still the case today with well over 100 larger fishing vessels in the Bay of Nouadhibou on the Mauritania coast (West Africa), harbours incalculable environmental risks due to oil losses and the gradual release of pollutants.

The alternative is to have the ship dismantled properly in a ship-breaking yard. These yards could be found all over the world until well into the 20th century. Over time, this business migrated from Europe to Asia – especially India, Pakistan, Bangladesh and China – because of the availability of cheaper labour and less stringent environmental laws. This brings its own problems, however. Catastrophic working conditions in many of these ship-breaking yards and the extreme hazards they pose for both people and the environment have often put this type of scrapping in a very critical light.

Ships as a source of recyclable materials

This is why the International Maritime Organisation (IMO) placed the safe and environmentally sound dismantling of ships on its agenda for 2009. The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships has set globally applicable rules for this purpose. For example, each ship must be issued with an Inventory of Hazardous Materials drawn up in advance. Ship-breaking yards will in future be required to have a certificate and submit a specific recycling plan for each ship before it is dismantled. But there is a catch: the Hong Kong Convention cannot enter into force until it has been ratified by at least 15 countries, representing more than 40 per cent of the world gross tonnage of ships. In 2019, Germany was the 13th state to certify ratification - thus raising the achieved quota to 29.42 per cent. So there is still work to be done.

In the meantime, however, the European Union is already implementing some of the rules in the Convention. According to Regulation (EU) No 1257/2013, ships of 500 gross tonnage and more that are flying the flag of an EU member state may only be dismantled at specially authorised recycling yards. The purpose of this regulation is to prevent, reduce, minimise and, where possible, eliminate accidents, injuries and other adverse effects of ship recycling on human health and the environment.

The shipping industry can thus make an important contribution to a circular economy where products or materials can remain in use longer, thus protecting the Earth's natural resources. For example, life cycle assessments have shown that for every tonne of repurposed steel there is a CO_2 equivalent saving of more than 97 percent over new manufactured prime steel products. CO_2 equivalents are a unit of measurement that allows us to compare the effect of all greenhouse gases on the climate. This is quite an impressive figure, especially since CO_2 pricing and the legal regimentation of ecological footprints in business and trade are continuing to gain momentum worldwide.

A pioneering project for the circular economy

Scrapping the MV Kaami and recycling its materials thus also proved to be a pioneering project in terms of sustainability and the circular economy. A general cargo vessel recovered the wreck and towed it to the dry dock at Kishorn Port at the north-west coast of Scotland, which opened one of its 13,000-tonne gates for the first time for this purpose. The state-of-the-art facilities served as a sort of workshop for the oil boom in the 1970s and was renovated and converted into a gigantic recycling facility after 20 years of inactivity.

Covering an area of 160 metres by 160 metres, the dry dock provides ample space for large freighters such as the MV Kaami and all the cranes, material handling equipment, crawler excavators, wheel loaders, lorries, and other vehicles needed for a meticulously planned and safe dismantling, sorting and removal process – while at the same time complying with all the COVID-19 social distancing and hygiene rules required by law.

13 weeks passed from the shipping company's initial consultation with the recycling company and the operators of Kishorn Port to the delivery of the dismantled and sorted material to the steelworks. The sheer size of the ship should be enough to give you an idea of the scale of the project. The MV Kaami measured 89.8 metres in length and 13.19 metres in width. The material to be processed and transported weighed in at 1,200 tonnes. The demands placed on the workers and materials in the dry dock were correspondingly high. Efficient and safe cooperation between all the parties involved is essential – as are the powerful Liebherr machines that perform reliably even under rough sea conditions. The operation ran smoothly with no safety incidents - thanks to great communication and teamwork.

Working on the rough Scottish seas

But material handling technology was not the only important factor in the decommissioning of the MV Kaami at Kishorn Port. Recycling experts took a very close look at each piece of material and tested its recyclability. The goal was to avoid sending waste to landfills and to recycle as much material as possible.

After the ship had been dismantled, the materials were sorted and separated by the scrapping team. Several Liebherr machines were involved in the decommissioning of the cargo vessel. Two crawler excavators, an R 944 C Litronic and an R 956 Litronic, equipped with scrap shears, dismantled the ship into its individual parts. Two mobile material handling machines were used for loading during the removal process. An LH 40 M Industry Litronic loaded the material onto the lorries waiting in the dry dock below. And a LTM 1250-5.1 supported the loading of the heavier parts of the ship.

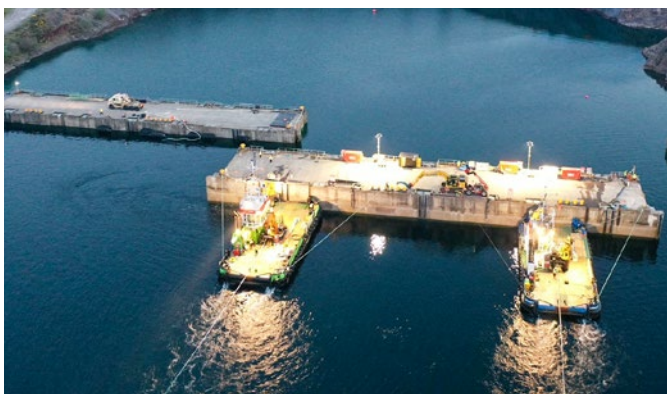
At the quay, an LH 50 M Industry Litronic was ready for loading the scrap onto a ship, which then carried it to a steelworks to be melted down and processed into new products. Shipping directly from the site saved on transport by road (approximately 48 articulated vehicle loads) and therefore helped to cut even more carbon emissions.

"The use of the Liebherr machines clearly demonstrated that without modern handling technology, it would not be possible to recycle materials on such a large scale", explains Andreas Scheuerl, General Manager Sales Materialhandling Equipment at Liebherr-Hydraulikbagger GmbH. This means that the time-consuming and dangerous manual process can be replaced by efficient and economical material handling.

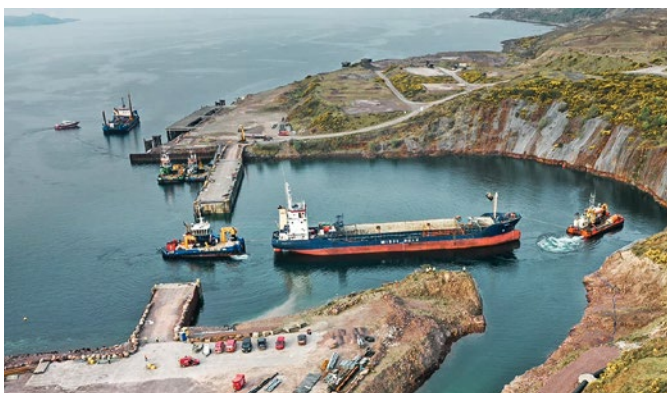
Top performance where it's most needed

"Handling steel scrap and other metals is one of the toughest fields of operation", says Scheuerl. The extremely robust construction of the Liebherr material handling machines, designed to meet the toughest requirements, has proven a great advantage in daily use, especially on the rough Scottish seas. "The sophisticated engine technology and optimised, demand-controlled hydraulics provided maximum performance and efficiency when it came to sorting scrap and loading lorries and ships in the dry dock", Scheuerl comments.

After 13 weeks, when the dry dock at Kishorn Port was ready to open its gates again and flood the construction site for the next decommissioned ship, the MV Kaami finally became history. But the history of sustainable scrapping is still unfolding, with extremely exciting perspectives for a new form of the circular economy.



Kishorn dry dock opened one of its 13,000 tonne gates for the very first time for the damaged ship.



With an area measuring 160 by 160 metres, the dry dock has plenty of space for large freighters like the MV Kaami.

“Robust Liebherr machines designed to meet the toughest requirements are also essential for safe and efficient work in a dry dock.”

Andreas Scheuerl
General Manager Sales Material Handling Equipment bei der Liebherr-Hydraulikbagger GmbH

Find out more:
www.liebherr.com/beyond-the-horizon

A weighty contribution to climate protection

Protecting the climate sometimes requires heavy-duty equipment: Liebherr mobile cranes, material handling machines and earthmoving equipment play a key role in the resource-saving circular economy. They score highly with increasingly environmentally friendly and sustainable, innovative technology.

Reducing exhaust emissions

Jan Keppler
Head of Product Management for Telescopic Cranes at Liebherr-Werk Ehingen GmbH

We have been working consistently on making our mobile cranes more environmentally friendly and sustainable for many years. Over the last 20 years, we have been able to steadily reduce exhaust emissions by more than 95 percent, for example. Having successfully adopted the new Stage V emissions limits, we have demonstrably and effectively reduced our nitrogen emissions in daily use, both on the road and on construction sites.

Our soot particle emissions are at the lower threshold of what can be detected by existing measurement technology. The closed particulate filter system removes almost all soot particles from exhaust gas. Soot is therefore no longer to be found at the exhaust tailpipe.

Less is more:
ECOdrive in drive mode:
-5% CO_2 and fuel consumption
ECOmode in crane operation:
-10% CO_2 and fuel consumption

We have converted our entire crane range to the SingleEngine concept, i.e. we now install only one engine in each crane instead of the former two. This further helps reduce our carbon footprint in production. Improvements in traction drive and crane drive technology, combined with our progress in lightweight construction, have enabled us to substantially reduce the fuel consumption and thus the carbon footprint of our cranes in relation to their lifting capacity.

Today, we are working hard to make our entire fleet HVO-ready. HVO is a synthetically produced fuel that is largely derived from waste materials. And, importantly for us, it is for the most part carbon neutral. Switching to HVO will reduce the CO_2 consumption of a 5-axle mobile crane by 74% if the full 'cradle to grave' approach is applied. This is a milestone on the road to low CO_2 emissions.

Sustainable production

Jürgen Abele
Head of Construction and Environmental / Energy Management at Liebherr-Werk Ehingen GmbH

It certainly helps to have our cranes and many other Liebherr machines working sustainably – but that is only one aspect. The carbon footprint also includes the question of how we produce our machines. And we are constantly working on improving this footprint here in Ehingen.

A few highlights of the sustainably optimised crane production in Ehingen:
- VOC-reduced paint shop (VOCs are volatile organic, i.e. carbon-based, compounds)
- Photovoltaics and solar thermal energy systems on the roofs of our production halls
- Retrofitting all the facades and roofs of our older production halls to make them more energy-efficient
- New halls built according to the KfW 55 standard
- Geothermal energy for our new logistics centre
- Eliminating thousands of haulage kilometres by optimising our material flow
- New repairs centre with photovoltaic panels and 4,000 m² of vegetation planted on the roof of the hall, new equipment and low-energy installations

Heavy equipment used at ship-breaking yards, scrapyards and recycling centres: no matter how hard the work, the environment is always a priority. Our Liebherr developers work across all divisions to ensure this with both large and small innovations – one step at a time, they are making construction and work machines increasingly efficient and environmentally friendly. This not only helps us achieve our climate targets, but also saves the users money and makes our work safer.

Machine efficiency

Andreas Scheuerl
General Manager Sales
Material Handling Equipment,
Liebherr-Hydraulikbagger GmbH

The expectations of customers in material handling have risen considerably, particularly with regard to high machine availability and reliability. Purchasing decisions often focus on high machine quality for sustainable and efficient management, not least because the recycling process ranks among the most demanding areas of application, especially for steel scrap.

We also can observe a clear trend towards resource-conserving operations. Customer demand for machines that are both economical and powerful is on the rise. There is also a steadily increasing demand for alternative drive concepts in the field of material handling technology.

Life-cycle optimisation

Tobias Kienle
Head of Portfolio Management
Customer Service,
Liebherr-EMtec GmbH

Liebherr remanufacturing services offer our earthmoving and material handling customers refurbished components that are on par with new components in terms of performance and reliability. This represents a significant contribution to protecting the environment and conserving resources.

How does this help reduce our carbon footprint? Resource conservation and climate protection are closely interrelated. After all, raw materials such as metals and petroleum are finite, and extracting and processing them requires energy. Oil and gas extraction, ore smelting, metal melting and processing, generating electricity from fossil fuels, and transporting goods by road or sea all generate emissions that have an impact on the climate. This means that maximising the service and operating life of machines and components is a practical contribution to protecting the climate and the environment.

What does the Liebherr Reman Programme involve? Components are sent to our facilities in Ettlingen, where they are completely dismantled, refurbished and inspected in accordance with the latest standards and technology. Inferior and non-remanufacturable components are removed from the programme. The reusable individual parts are then reassembled and refinished. Only original Liebherr spare parts are used. After the component has been tested according to the same safety standards as our series production lines (OEM standard), customers always receive an up-to-date remanufactured component in perfect quality – for continued long-term, reliable operations.

Liebherr Shop

Visit us at: www.liebherr.com/liebherrshop

Email: liebherr-shop@liebherr.com

Liebherr LTM 1110-5.1 mobile crane. Scale model of the 5-axle mobile crane with a maximum lifting capacity of 110 t. Scale 1:50. Zinc die-cast model from Conrad. Length: around 30 cm.
Part No. 12265314 **Price: € 248.00**

Subject to change

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