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# UpLoad

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The magazine for customers and friends of mobile  
and crawler cranes

2 | 2024

## LIEBHERR



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Publisher:  
Liebherr-Werk Ehingen GmbH  
Postfach 1361  
89582 Ehingen, Germany  
Email: [upload@liebherr.com](mailto:upload@liebherr.com)  
[www.liebherr.com](http://www.liebherr.com)

Editorial team:  
Wolfgang Beringer, Tobias Ilg, Berenike Nordmann , Annika Strahl (Liebherr-Werk Ehingen GmbH)  
Willi Wilhelm (Willi Wilhelm Industriefotografie, Badenweiler)

Photographs:  
Christina Schmucker, Patrick Fähnle (Liebherr-Werk Ehingen GmbH)  
Willi Wilhelm (Willi Wilhelm Industriefotografie, Badenweiler)  
Boris Golz (Boris Golz Fotografie GmbH, Arnsberg)  
Sebastian Grenzing (Grenzing Fotografie, München)

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We use male pronouns simply to make our articles easier to read.  
However, the content of the articles applies to all genders.

## Dear Readers,

### “Consistently innovative”

was the slogan under which we welcomed many of you to our Customer Days in Ehingen. Or to be more accurate, in Berg near Ehingen, at our repair centre. And at this point, let me express special thanks to all our employees for all their efforts in preparing and staging this event. Our plant expansion in Berg is scheduled to start shortly. We have a clear goal in mind for this expansion – we want to build mobile and crawler cranes as environmentally friendly and climate-friendly as possible. What that means for us is that we want to build a factory that will use zero fossil fuels. In doing so, we are consciously hoping to set a new standard, both for future generations, but also for decarbonisation. During our Customer Days, we unveiled a number of measures that we have already implemented or initiated at our plant. We report on a special project on page 90.

However, it is not just in our production that we want to be consistently innovative - we want every single development in our crane range to be the same. We were able to demonstrate the LTM 1400-6.1 to you for the first time during our event. It is a powerful new 6-axle crane with a long boom and extremely easy handling. Find out more about the new heavyweight in our portfolio on page 66. We also presented a number of other cranes to a wide audience for the first time – the LG 1800-1.0, the successor to and “big brother” of the LG 1750. We report on its first job on page 70. We were also able to unveil the LTM 1300-6.4, the successor to the LTM 1300-6.3, and the LTR 1150, the first telescopic crawler crane with VarioBase®. However, it is not just new cranes that are innovative, but also a whole raft of advanced developments – for example the new assistance systems (page 76), the SPMT ballast for the LR 12500-1.0 (page 82), boom assembly without an auxiliary crane (page 88) and our Crane Finder app for smartphones and tablets (page 79).



Many of our customers also show their own long term innovations in how they use our products every working day. For example, floating wind turbines are being erected off the coast of Marseille, France (page 50). Film enthusiasts in Sydney, Australia have been able to admire the “most beautiful cinema in the world” every year for over a quarter of a century (page 24) – thanks to Liebherr mobile cranes. Our cranes with innovative solutions are also being used in the reconstruction of the Ahr Valley in Germany, which was severely affected by the 2021 floods (page 28). And Liebherr cranes literally took things right to the top (page 34) in what is probably the most complicated project in Paris in recent years, the reconstruction of the famous Notre Dame Cathedral.

Finally, I would like to mention a bit of history – 75 years of Liebherr! A whole series of innovations, a massive number of patents and a wide range of products – take a closer look into our history from page 100.

Enjoy your read.

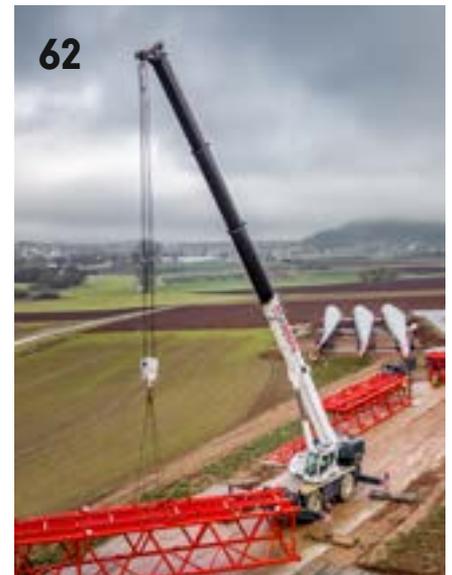
A handwritten signature in black ink, appearing to read 'Ulrich Heusel'.

**Ulrich Heusel**  
Managing Director Production  
Liebherr-Werk Ehingen GmbH

# The subjects of our articles.

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**Also online:**

UpLoad is also available at [liebherr.com](http://liebherr.com) to read, look at and download.

[www.liebherr.com/upload](http://www.liebherr.com/upload)



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# Moments

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## **Piece by piece**

An LTM 1650-8.1 from Digging & Rigging, Inc. dismantles a tower crane that was used on a construction site in Reston (Virginia). A road closure was necessary to assemble the 700-tonne crane in the tightest of spaces. An LTM 1090-4.2 assisted with the assembly work.





## **A perfect line-up**

Near the Chapada Diamantina, a high plateau in the Brazilian state of Bahia, there is a mountain range that offers ideal conditions for wind turbines. Fourteen turbines with a hub height of 120 metres were erected by an LR 1600/2-W provided by crane hire company I.V. Transportes e Locações Ltda. The crawler crane was in operation for five months during this project. Its narrow-track travel gear, which allowed it to master the narrow roads high up on the mountain ridge, came in extremely handy.





## Next up: the LTM 1300-6.4!

Our LTM 1300-6.4 made its debut at Intermat in Paris. Well, sort of – it's actually an LTM 1300-6.3 in a new guise. With its 90-metre boom, it also cuts a fine figure in the LICCON3 design and with the usual LICCON3 equipment. You can find out more about our first large crane equipped with the new crane control here:





75  
Years

LEIBHERR



## Customer Days in Ehingen

We welcomed around 4,000 visitors from all over the world to our Customer Days in Ehingen in mid-June. Numerous new developments, from large cranes to digital products, were presented and jointly researched under the motto "Consistently innovative". Thank you for paying us a visit!

## Pure ecstasy

After more than 40 years, Athletic Bilbao won the Copa del Rey, the Spanish football cup, in 2024. While many other clubs celebrate their successes with open-top bus parades, on balconies or terraces, in Bilbao the parade takes place on a barge called a "gabarra". The vessel was lifted onto the River Nervión by an LTM 1750-9.1, which is why we also want to say a heartfelt: felicidades!





## At work in the permafrost

The GARS O'Higgins polar research station in the Antarctic needs a refurbishment. This was no problem for an LTM 1040-2.1 from Schmidbauer, despite a complex journey and the toughest weather conditions. The crane set off on its journey to Antarctica shortly after Christmas 2017 – disassembled into individual parts.







## Reach for the sky

VfB Stuttgart ended its 2023/2024 season in the German Bundesliga with surprising success. Less surprising was the performance of an LTM 1300-6.3 during the conversion of the Mercedes-Benz Arena, home ground of the Swabians – its record-breaking 90-metre boom makes it possible to reach new heights at will!





s-Benz Arena

Mercedes-Benz Arena Stuttgart

STUTTGART

# Made with Liebherr

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## **A journey into the eternal ice**

14,400 kilometres, 53 days and four different ships – some logistical ingenuity was required to bring a mobile crane to its destination on the world's southernmost continent.

21 December 2017. Three days before Christmas, Schmidbauer received the go-ahead from the German Aerospace Centre (DLR). A Liebherr LTM 1040-2.1 mobile crane needed to be transported to Antarctica for the renovation of a polar research station. As the logistics options in Antarctica are extremely limited, the crane had to be shipped just two weeks after the order was received. Otherwise, due to the weather, there would have been a whole year's delay. Despite the tight deadline, this was not an option for those involved.

Another challenge was the need to comply with strict environmental regulations! To protect the penguins, ships are not to sail directly to the research station and therefore have to load their cargo onto pontoons around two kilometres off the coast. However, these flat vessels can only transport loads weighing up to eight tonnes. Within around two weeks, Schmidbauer not only had to organise the challenging transport operation to Antarctica, but the crane also had to be dismantled into its individual parts and the reassembly planned on site. The LTM 1040-2.1 successfully mastered its workload under adverse conditions. It will remain in its new icy home where it will continue to work at the research station.

### Stadium extension with unique challenges

The ravages of time affect not only research stations in the Antarctic, but also the ever-changing requirements of a sports stadium. Over the years, the Mercedes-Benz Arena in Stuttgart has not only repeatedly changed its name, but also its face. Since 2024, it has been called the MHPArena – and it now shines with a new brilliance.



The arena was built around 90 years ago in the Bad Cannstatt district of Stuttgart. Following its latest renovation, in the run-up to the European Football Championship, it can now accommodate over 60,000 spectators. During the last renovation project, around 15 years ago, the original sports temple was transformed into a dedicated football stadium – at that time, the racecourse and show jumping arena, among other things, had to make way. Now, the main stand has been modernised and new changing rooms, a media centre and new business areas have been created. And right in the middle of it all – a brand-new LTM 1300-6.3 from crane hire company Gräser Eschbach GmbH. The time window for the construction work was extremely limited due to VfB Stuttgart's ongoing matches in the 1<sup>st</sup> National League. In addition, the entrance to the existing stadium was severely restricted in both height and width.

Since the work took place under the existing grandstand roof, the pulley head height was limited to a maximum of 28 metres. As a special challenge, the concrete steps for the new main stand, weighing up to 16 tonnes each, had to be lifted to just below the roof. This proved no problem for the South German crane hire company's new 300-tonne machine. Equipped with 88 tonnes of ballast and with a full support base, the lifting work for the grandstand was completed on schedule within four weeks.

### Tasting success again after 41 years!

Winning the Copa del Rey is a symbolic event for Bilbao and the inhabitants of this northern Spanish city. Grúas Ibarro is equally proud that it was able to transport the Athletic de Bilbao football club's barge from the Maritime Museum to the Ría de Bilbao, where its staff celebrated the victory together with the club's representatives and tens of thousands of fans.

Shortly before the parade, the Liebherr LTM 1750-9.1 mobile crane from Grúas Ibarro began its big job. The challenge during the lift was to position the crane in the smallest possible space and safely lift the approximately 60-year-old barge. No sooner said than done! The barge was transported from the museum's dry dock to the mouth of the Nervión River without a hitch.

Amidst enthusiastic cheering from the banks and bridges, around 60 people – including players, coaches and managers – sailed down the Nervión through Bilbao. By the way, the 58-tonne, 18.5-metre-long barge was also used in 1983, when the team from the Basque Country won the Spanish championship. The reason: the square in front of Bilbao City Hall was deemed too small for the celebrations at the time.



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# Mobile and crawler cranes

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## **Precision work in the Middle East**

In the Hamriyah Free Zone Authority, which was founded around 30 years ago in the United Arab Emirates, the Al Faris Group was commissioned to lift a 175-tonne steel deck. After several ground surveys, the job was completed quickly and safely thanks to meticulous job planning and the use of a Liebherr LR 1600/2 crawler crane.





# A great show



## Playtime in Sydney – a screen goes around the world

In Sydney Harbour, opposite the world-famous Opera House, the city skyline and the Harbour Bridge, an enormous screen has been regularly hoisted into the air for 27 years. From January to February, when it is summer in Australia, an open-air cinema is set up in the botanical garden – at a location that a French fashion magazine once named the “most beautiful cinema in the world”.

The screen resembles a sail and measures 25 by 13 metres. Mounted on a scaffold, it is erected every year 25 metres from the shore in Sydney Harbour. To assemble the screen, a crane is needed on land and divers are needed underwater to put all the steel components in the right place. Precision and an adept technical approach to the construction work are essential attributes for everyone involved.

This spring, local crane service provider Two Way Cranes was responsible for the lift and used an LTM 1350-6.1 – the exact same crane that did the same job for Gillespie Cranes in 2015. Coincidence? No. “When we took over Gillespie Cranes five years ago, we added ten of their machines to our fleet,” explains Frank Zammit, Managing Director of Two Way Cranes. For years, the organiser Westpac and screen rental company Cinerent have been able to rely on tried-and-tested machines and a well-coordinated team.

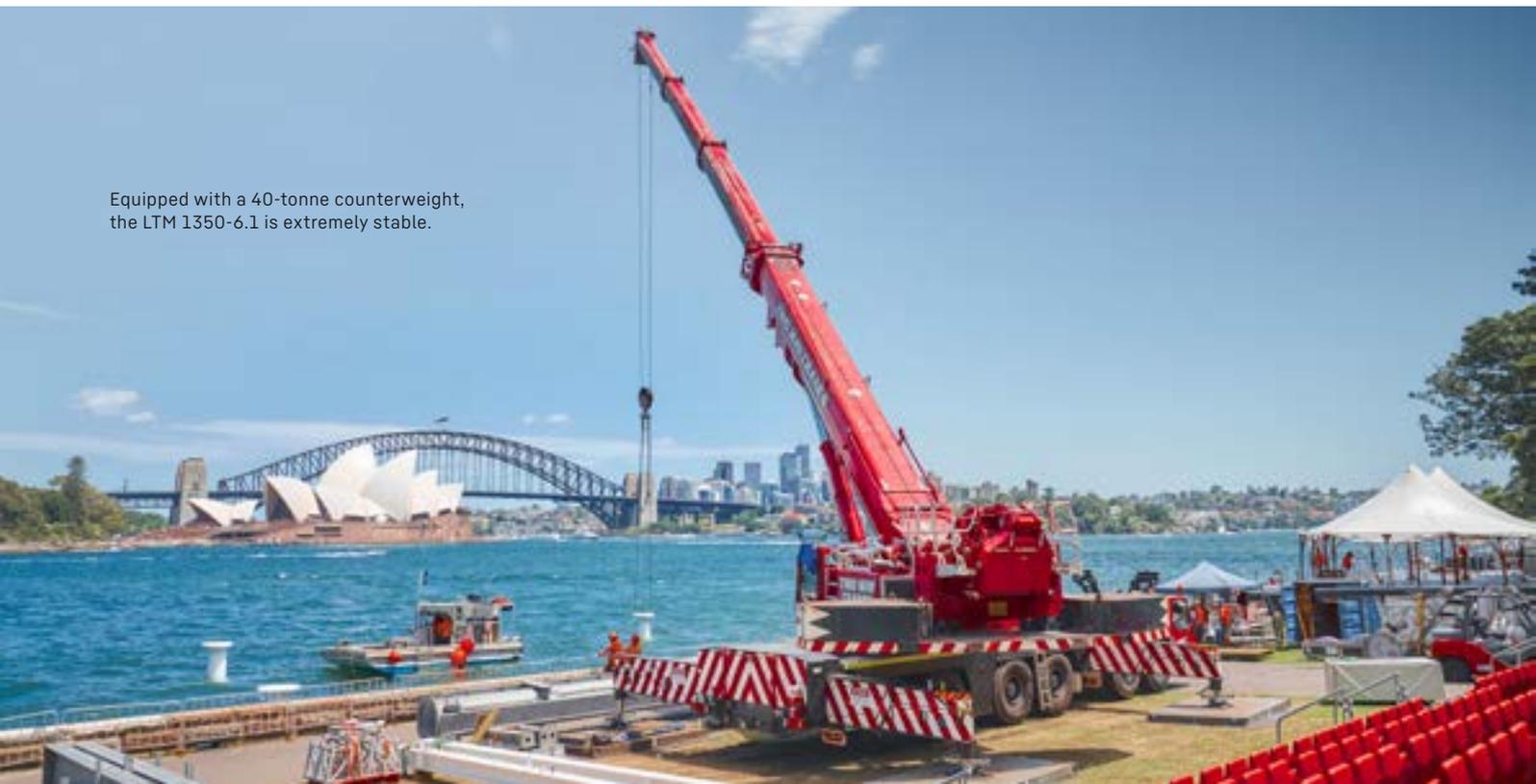
### Light work

Equipped with a 40-tonne counterweight, the lift was easy for the 350-tonne crane. “The garden area where the crane erected the screen offers good access and sufficient open space. The heaviest parts weighed nine tonnes and had to be installed at a radius of 31 metres,” explains Dave Gillespie, the project manager responsible for this assignment in the botanical garden.

There is a solid foundation at the bottom of the harbour to which the pylons are attached. “These are removed every time the canvas is dismantled so as not to interfere with shipping traffic,” explains Two Way Cranes operator Adam Morris, who carried out the lift together with advanced rigger and fellow operator, Craig Ainsworth. Both men became familiar with Liebherr at a very young age. Even their fathers worked with cranes from Ebingen back in the day.

During the two-day job, Morris and Ainsworth performed around 100 lifts. One of the special aspects of this job is that the crane driver communicates with the divers via a supervisor in order to anchor the piers underwater in the foundations.

Equipped with a 40-tonne counterweight, the LTM 1350-6.1 is extremely stable.



### In demand internationally for over 20 years

A special feature of the cinema screen, which is used worldwide, is its folding function. "Its enormous size of 350 m<sup>2</sup> offers a correspondingly large area exposed to the wind. To ensure safety, the screen is hydraulically foldable," says Rob Bryant, Managing Director of screen hire company Cinerent in Australia. "What's more, the cinema events – no matter where in the world – take place in beautiful locations. Therefore, whenever the screen isn't being used, it is folded down to keep the view clear."



When the screen rises in Sidney Harbour, the audience falls silent.



The divers and crane drivers are a well-rehearsed team.

Bryant has been involved as a creative mind for almost as long as the event itself has existed. "There have been some emotional and amusing moments," he recalls, recounting how 1,700 people sang along to *You've Lost That Loving Feeling* at a screening of *Top Gun* or how a stalker ran in front of the screen during a surf film – to thunderous applause from the audience. At such an event, it is only natural that international film stars should present their latest works. Sylvester Stallone, Nicole Kidman and director Danny Boyle have all appeared in front of the screen at Sydney's open-air cinema.

- In 1993, the Swiss company Cinerent began developing mobile open-air cinema screens.
- At 350 m<sup>2</sup>, the Cinerent screen is one of the largest in the world and is in demand internationally from Europe to Australia.
- Continuously upgraded over the years, it can withstand wind speeds of up to 55 km/h.
- Four freight containers are needed to ship the screen together with the sound equipment and projection booth.



Frank and Nichole Zammit outside the company headquarters in Sydney's Western suburbs.



# Helpers, rescuers and bridge builders

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## Twelve new mobile cranes for the German Federal Agency for Technical Relief



### Ready for collection

The THW has procured a total of twelve LTC 1050-3.1 for its specialist bridge construction teams throughout Germany.

**The Federal Agency for Technical Relief (THW) is the German government's voluntary emergency organisation and an indispensable part of the country's civil protection system. Around 88,000 dedicated volunteers throughout Germany form the heart of the THW and play a major role in its success. With its expertise, state-of-the-art technology and extensive experience, the THW is ready to provide rapid and effective assistance in crisis situations worldwide on behalf of the German government. The THW saves lives, minimises damage and restores infrastructure. Reliable vehicles and technical equipment are indispensable for fulfilling its diverse range of assignments.**

The THW has ordered twelve LTC 1050-3.1 mobile cranes from Liebherr, mainly for the construction of temporary bridges. They will be delivered to its specialist bridge construction groups throughout Germany in the course of this year. THW President Sabine Lackner explains: "The cranes are an indispensable tool for the specialist groups. They enable the THW emergency services to lift the heavy bridge elements and assemble them into structures that can reach spans of over 80 metres. Over three dozen temporary bridges that the THW has built in the past three years alone show how important these vehicles are."

Andreas Schneider is responsible for vehicle procurement at the THW: "After 25 years of using our mobile cranes, it was necessary to replace them with new machines. Liebherr was awarded the contract for the LTC 1050-3.1 in the tender. We wanted a compact, manoeuvrable mobile crane with high performance. The Liebherr 50-tonner meets all our requirements. The new cranes are also planned for a service life of 25 years." The LTC 1050-3.1 is the heaviest and most expensive emergency response vehicle that the THW has procured in large numbers to date.



Bridge construction is among the THW's core competencies. The construction of temporary bridges is of crucial importance, especially after natural disasters, as they are an important part of the infrastructure. The THW has demonstrated its skills in temporary bridge construction at numerous locations both nationally and internationally. The THW's emergency response teams erected 30 tempo-

rary bridges in the Ahr valley following the "Bernd" floods in summer 2021. Last summer, they installed several bridges in Slovenia. In addition to bridge construction, the THW uses its mobile cranes for general handling and lifting work, and also when responding to road accidents involving heavy vehicles.



**Vehicle expert**  
Andreas Schneider is responsible for vehicle procurement at the THW.



**First job**  
The compact mobile crane travelled directly from the Liebherr manufacturing plant in Ehingen to the site in Bad Neuenahr-Ahrweiler.



#### **Tandem lift**

For work on larger bridges, the teams practise the assembly procedures with two mobile cranes.

#### **Practical applications providing real-world training**

Following intensive training at the Liebherr manufacturing plant in Ehingen, some of the THW's specialist groups have already gained some initial experience with the new cranes. The municipality of Halbergmoos in Upper Bavaria, for example, asked the THW to build a temporary bridge because the existing bridge there is dilapidated and needs to be replaced. "We were happy to fulfil this request, as we are always on the lookout for training opportunities," explains Florian Wigger, Group Leader Bridge Construction THW Freising. "In this case, we found a realistic training scenario for the two new LTC 1050-3.1s that are available in Bavaria – in the Fürth and Freising specialist units."

The bridge was pre-assembled on an assembly track consisting of multiple elements connected with pins. The two cranes then lifted the bridge into place in tandem – one on the left bank and the other on the right bank. "We were able to practise procedures that we also need to master for larger temporary bridges. How is a bridge

pre-assembled, how is it lifted into place, what dangers need to be taken into account and how can we implement this effectively later in a real emergency? Pre-assembly of the ten-tonne bridge took two hours, the lift itself only ten minutes," explains Wigger.

The team leader and his team are completely satisfied with the new cranes: "We've been using the LTC 1050-3.1 for around two months now and are absolutely delighted with it. It's a compact crane that can lift a lot over short distances. At the same time, it's light enough to reach different locations. The LTC has all its ballast and equipment on board so we don't have long set-up times on site and can start work immediately. Highlights include the telescopic crane cabin, which allows the crane driver to look down on the construction site from above. This improved visibility increases safety for the response teams."



### Flood of the century

The LTC 1050-3.1 from the THW Witten local organisation assists with the dismantling of a temporary bridge in the Ahr valley.



### Satisfied

Group leader Florian Wigger is full of praise for the new Liebherr cranes.

### Bridge dismantling in the Ahr valley

In July 2021, the flood of the century left a trail of devastation in the Ahr valley. Dozens of bridges were destroyed and temporary bridges had to be built to support the restoration of the local infrastructure. Some of these structures are no longer needed and are therefore being dismantled. Once again, a new LTC 1050-3.1 from the THW was used during the dismantling of the bridge. It belongs to the Witten branch and travelled directly from the Liebherr plant to the site in Bad Neuenahr-Ahrweiler.

Benjamin Albrecht is the leader of the specialist bridge construction group at the Witten local organisation: “We received a one-week training course at the Liebherr plant and familiarised ourselves with this new crane. We were able to test all the functions and our contacts there supported us with help and advice. We were then able to put what we had learnt into practice on our way back to Witten via a detour to the Ahr valley. We are supporting the Bad Kreuznach specialist bridge construction group here.”

**LIEBHERR**



**Chapeau  
la France!**

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## **Five years after the fire – Liebherr mobile cranes during the reconstruction of Notre-Dame**

The ghostly chimeras and mythical creatures that act as gargoyles on the towers of Notre-Dame de Paris are said to ward off the forces of evil and the devil. Legend has it that these grotesque figures protect the city and its cathedral on the Île de la Cité in the heart of the French metropolis. However, the stone sentinels were evidently powerless during the major fire on 15 April 2019, which destroyed large parts of the 800-year-old sacred building. The entire roof was consumed and the crossing tower on top of it collapsed, burning, into the nave, taking the supporting stone vaults with it. A short time later, reconstruction of the cathedral began with full vigour. And at the end of last year, a Liebherr crane completed the installation of the ornate crossing tower on the new roof truss. Our mobile cranes were involved in the reconstruction of Notre-Dame from the outset.

In a national tour de force, France has achieved an almost unbelievable feat by resurrecting this historic cathedral in its capital city. This endeavour was initiated by the French President Emmanuel Macron, who, unlike the aforementioned mythical creatures, is not endowed with mythical power, but with plenty of worldly power. He declared the French to be a “nation of master builders” and made the reconstruction project a top priority: “Cinq ans!” Five years! This was the slogan that Macron proclaimed to the Republic and the world the day after the fire. He claimed that the Gothic building on the île de la Cité, the small island on the Seine in the heart of Paris, would rise from the ruins of the fire.

A bold promise. But even the pandemic could only briefly rob this proud national endeavour of its presidential momentum. France’s absolute will to perform the much-cited “miracle of rebirth” of Notre-Dame was irrepressible. And the planning of this miracle was, quite literally, meticulous. Macron sent a former high-ranking general in the French army to the construction site as his special envoy. Top architects from all over the world provided designs for the reconstruction. Material experts, historians and luminaries from the world of research, as well as the country’s best engineers, were happy to be recruited. The most knowledgeable craftsmen and skilled artisans of the “Grande Nation” were hired, and the straightest oaks were sought, found and felled in French forests. One superlative followed another.

### **Liebherr crane rescues apostle**

If truth be told, we are more than a little proud that the mobile cranes used in this unique project bear our logo. They were and will continue to be important tools in the reconstruction of Notre-Dame until at least the end of the year. As early as December after the fire, two Liebherr cranes from the French company Montagrués arrived to erect the huge construction crane that has characterised the scene on the île de la Cité ever since. And by the way, just a few days before the fire, a Liebherr mobile construction crane from our partner Foselev’s fleet had lifted the mighty figures of the apostles and evangelists off the church roof for the planned restoration work – and thus ultimately saved them.

Since spring 2022, the crane and transport company Dartus Levage has been responsible for mobile crane operations at the construction site. In addition to several smaller machines, two large LTM 1350-6.1s have extended their enormous lattice masts across the capital’s skyline. They supply the workers and scaffolders with materials over enormous radii of up to 80 metres and up to great heights. While wooden beams, blocks of stone or machines are typically suspended from the crane hooks, stone gargoyles, cross flowers and even statues are also transported back to their original places by air.



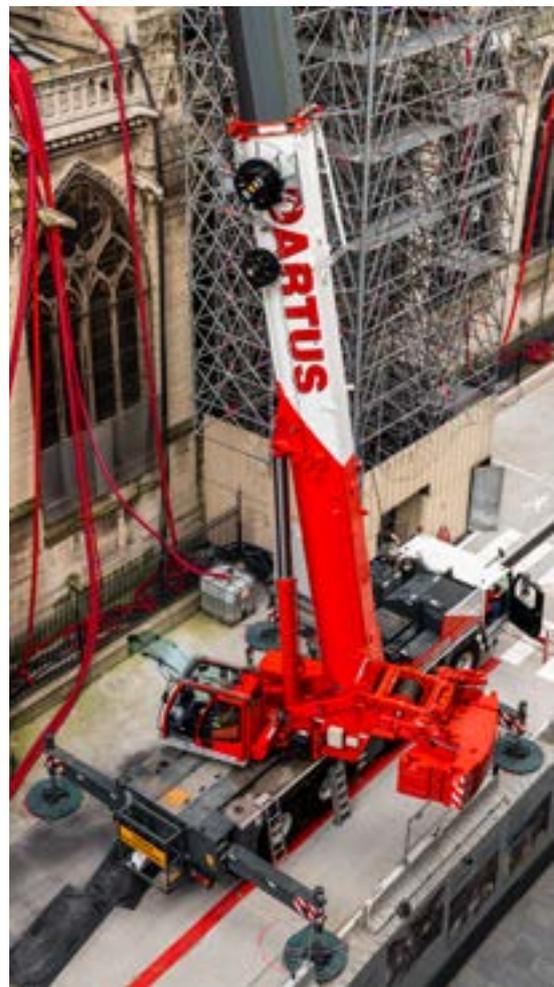
### **At the very edge of the building**

The LTM 1120-4.1 extends far beyond the nave. With its 19-metre-long, hydraulically adjustable double folding jib on the telescopic boom, the crane is able to transport its loads over long distances despite being positioned by the cathedral wall.



### **Scorch marks**

In the summer of 2023, blocks of stone displaying traces of the fire were still hanging from the crane hooks in large nets. The LTM 1120-4.1 shown on the right retrieved this hewn ashlar from inside the cathedral. Two of these compact and manoeuvrable Liebherr cranes are in use here. The variable supporting base allows the vehicles to be set up within the narrow strip between the building and the site fence. And thanks to the adjustable VarioBallast® ballast radius, swivelling is also possible in this confined space.





**Headless rescue →**

Four days before the fire, a Liebherr mobile construction crane had lifted the copper statues of the apostles and evangelists from the church roof, thereby saving them from the flames.



**Four and a half years...**

... after the inferno, the spire of Notre-Dame rises into the sky once again. An LTM 1350-6.1 lifts the last section of the faithfully reconstructed crossing tower into the air. A few days later, it was followed by the cross and the gilded cockerel, which is now once again enthroned almost a hundred metres above the île de la Cité. In its belly, it carries relics and a scroll with the names of around 2,000 people who were involved in the reconstruction of the cathedral.

**“La Flèche” for Christmas**

The greatest lifting heights were required for the construction of the wooden crossing tower, which they rather elegantly call “La Flèche” here. It is the French word for arrow. The ornate spire reaches a proud 96 metres in height, towering far above the two stone towers of the church building. The mobile crane on the north side of the cathedral was equipped with a 78-metre-long luffing lattice jib for the assembly of its upper sections. When the tower with its golden rooster and cross was completed a few days before Christmas last year, it wasn't just the men and women on the construction site who celebrated. For Emmanuel Macron, too, the completion of the exterior of Notre-Dame was reason enough to climb the scaffolding for a photo shoot high above the rooftops of Paris.

Meanwhile, down on the ground, the men from Dartus went about their work. One of them is Christophe. He alternates with a colleague in the cab of the LTM 1350-6.1. On the south side, between the cathedral and the river, they and their crane are constantly ready to perform jobs for the craftspeople and scaffolders. During a short lunch break, we invite Christophe and his colleagues to the neighbouring Rue d'Arcole. However, we don't have too much time to chat in a pretty bistro there. Over a small snack, the men explain to us that they have to change all their clothes and take a shower in an airlock whenever they leave the site, due to the high levels of lead behind the three-metre-high construction fence. And of course, the same applies when entering the construction site, which takes time. After a final espresso, it's back to work.





### Reconstruction

Looking southwards across the Seine from the famous Marais district, the busy Liebherr cranes and their loads have been part of the silhouette of the two mighty stone towers of Notre-Dame for over two years now. The towers were largely spared from the catastrophic fire.

### “The cramped conditions are a major challenge”

If you count the crane drivers and their “chefs de manœuvre”, who are responsible for fastening the loads and manoeuvring the cranes safely on the ground, there are up to 16 Dartus Levage employees on the site on some days. “They are all needed,” explains company boss Victor Dartus, who travelled to Paris to install the spire. “We have to cover the staffing requirements from seven in the morning to nine in the evening in two shifts. After all, we used a total of seven mobile cranes here over the entire construction period. All from Liebherr, by the way. In addition to the two large LTM 1350-6.1 on either side of the cathedral, the four-axle 120-tonners were and are our most important machines here. They are perfect for this construction site because they can be moved very quickly and set up almost anywhere around the building. The variable supports and adjustable ballast make them extremely flexible.”

“Nevertheless,” continues Dartus, “the spatial conditions here are an absolute challenge for everyone. The complex and simultaneous interactions of so many participants on the cramped construction site result in major restrictions

in terms of the crane parking areas. It’s always difficult to find optimal solutions. Setting up the cranes or changing the jib configuration without disrupting the construction work is often very complicated. But when we started here, everything was much more difficult because the safety precautions were very strict due to the lead contamination from the fire.”

### Victor Dartus

“Our mission has not yet been completely fulfilled.”





## Planned completion by year's end

Liebherr cranes from Dartus Levage will be on display around Notre-Dame until at least November. If the work remains on schedule – and it looks like it will at the moment – the first public Mass will be held in the cathedral on 8 December 2024. Will one of the crane drivers be

among the congregation? Perhaps. However, it fills everyone “with honour and pride to be involved in the reconstruction of this symbolic and world-famous cathedral.”

At the end of the year, the men will presumably dismantle the last cranes and head home to the south-west of the country, where the company's operations are focused. And so Christophe, Axel, Lyes or Paul will retract the boom of their LTM 1350-6.1 for the last time at this unforgettable workplace. “But our mission here has not yet been completely fulfilled,” says Victor Dartus. “Now we have to concentrate fully on our work. I don't think we can even begin to imagine what it means to work on this historically significant construction site. But in a few years' time, we will be able to look back with satisfaction on our contribution to this great endeavour.” The resurrection of Notre-Dame de Paris.

### Follow the construction site of the restoration of Notre-Dame de Paris:

- Website of the public institution: [rebatirnotredamedeparis.fr](http://rebatirnotredamedeparis.fr)
- On Facebook: @rebatirnotredamedeparis
- On Instagram: @rebatirnotredamedeparis
- On LinkedIn: Etablissement public Rebâtir Notre-Dame de Paris
- On Youtube: Reconstruction of Notre-Dame de Paris



### On y va – let's go.

A glance at the watch is obligatory during our short photo session with crane operators Christophe (left) and Axel in a charming bistro near Notre-Dame. Time to get back to work.

### The light of the full moon

...and the brightly lit scaffolding gifted us – and the cycling photographer at the bottom of the picture – this atmospheric image. The LTM 1350-6.1's 66-metre-long lattice jib is an impressive sight.



On the road







## LR 1700-1.0W Our new narrow-track crawler crane tackles its first job in Portugal

**In a mountainous region of eastern Portugal, an LR 1700-1.0W crawler crane erected a wind turbine in spring. Our newcomer passed its baptism of fire without any problems: The 5.5 megawatt turbine from the manufacturer Enercon is up and running and its imposing rotor star with a diameter of 160 metres is now turning in the Portuguese wind. The unique feature of our brand-new 700-tonne crane is that it can drive to the next location on its crawler carriers – its narrow-track travel gear can navigate paths just over six metres wide. We visited our first delivered specimen on location in the Iberian Peninsula.**

The assembly and dismantling of large crawler cranes is often a much longer job than the actual lifting work. This also applies to jobs in the wind energy sector. When erecting several turbines or building large wind farms, the ability of a crawler crane to drive to the next construction site saves an enormous amount of set-up time. This is because numerous heavy transports, including the necessary load handling, are no longer needed. We have 20 years of experience with cranes on narrow crawler tracks. The LR 1400/2-W was our first machine of this type. But we didn't just give the new model – the successor to the LR 1600/2-W – an upgrade. Instead, we completely redesigned the crane and equipped it with a stronger base machine and more powerful travel gear. With its significantly higher load capacities, longer boom system and large-area star-shaped supports, the new machine is ideally positioned – in both senses of the word – to master the challenges of building today's wind turbines with hub heights of up to 170 metres.



### Stable

The star support of the LR 1700-1.0W provides the crane with a solid base measuring around 13.5 by 13.5 metres. "Alignment using the support cylinders is very easy to handle. Levelling by remote control works smoothly and quickly," says Carlos, one of the crawler crane's two drivers.



But back to Portugal. We would like to take you with us, dear readers, as we drive 20 kilometres past the Spanish-Portuguese border through the small town of Sabugal. The route continues westwards uphill, past mighty stone ridges through barren rocky landscapes. Even from a distance, the crane's giant lattice boom draws a yellow line on the clear sky. Next to it, the still bladeless wind turbine, which the LR 1700-1.0W has built over the past few weeks, is waiting to be completed. The men and women on the construction site are also waiting – for the arrival of the huge rotor blades. "Unfortunately, the blades aren't here

yet," explain Carlos and Samuel, the two drivers of the new crawler crane, after greeting us. Transport problems!

### The art of waiting

Waiting is part of everyday life on wind turbine construction sites. It's usually the weather that throws the schedule out of kilter. To be more precise: high winds can make crane operations unsafe. Wind speeds of more than ten metres per second are usually the limit. Above this it's simply too dangerous. The wind-sensitive rotor blades in particular cannot be held steady enough for their installation. Sometimes, however, the delivery of large or heavy plant components is delayed. Just like now.

However, a few days later they suddenly appear in the distance. In a three-vehicle convoy, the 80-metre-long blades are being transported on man-high, driven multi-axle trailers, pulled by heavy trucks along the small mountain roads. The trio meanders leisurely through the hilly landscape to the construction site.



### Massive load carriers

The specialised vehicles with up to twelve axles can elevate the 80-metre-long rotor blades on their backs when cornering. The last few metres to the construction site are covered in reverse gear.



Actually, work could start now, but strong gusts of wind and dense fog repeatedly give Carlos and Samuel, as well as the assembly team, a few more days of tedious waiting. When the wind finally dies down, things progress rapidly. Within 36 hours, all three rotor blades are hoisted by the crawler crane and lifted into place. The Enercon crew is experienced and makes rapid progress, even as low-hanging clouds swirl around the nacelle. And our two crane drivers keep up this pace. Using their new, still somewhat unfamiliar crane, they deliver the bulky components precisely at a height of 120 metres.

#### **“Taller towers every day”**

With this in mind, the two men have equipped their crane with a 132-metre lattice boom. At its end is a lattice type fixed jib that adds another twelve metres. “We’re actually building taller towers every day. The dimensions of the rotor blades and the weights of the nacelles are constantly increasing. Of course, we also have to keep pace in terms of our cranes, which is why we purchased this machine,” says Edgar Garcia, managing partner of the Tagar Group, which also includes EuroTagar, the company operating the new crane. Garcia has come to the construction site in person to take a look at his new machine. And to exchange ideas with the crane drivers and project managers on site.



#### **Visit from the boss**

Edgar Garcia, the managing partner of GrupoTagar, personally oversees the first deployment of his new narrow-track crawler crane.



**Carlos Lé and Samuel Figueiredo (right)**

The cab of the LR 1700-1.0W offers space for both crane drivers. Large windows and numerous monitors ensure a complete overview and allow optimum control of the machine.

“GrupoTagar” operates around 100 mobile and crawler cranes and has a broad nationwide presence. With its headquarters in the Porto area and branches in Leiria and the capital Lisbon, the company is represented in all regions of Portugal. A focal point of its activities is the construction of wind turbines. With a strong presence in Chile, Mozambique and Nicaragua, EuroTagar is almost a global player in this industry. “We will mainly use this crane in the wind energy sector. That’s why we opted for the variant with the narrow track system,” says Edgar

Garcia. “And because we only have to partially dismantle the lattice boom in order to drive the crane from one construction site to the next on a wind farm, we can save a significant amount of time and effort compared to complete disassembly.” “We’re ready to move again about five days earlier,” estimates crane driver Carlos, “than if we had to completely dismantle, transport and reassemble the entire crawler crane.”



**Disassembly**

The elements of the lattice boom are removed piece by piece. Some of them are up to 3.50 metres wide. In the end, 70 metres of the boom remain on the base unit. This allows the crane to drive to the next construction site.

### Fast handling of loads and ballast

Carlos and Samuel are satisfied. “The crane is really easy and quick to operate. The divisible derrick ballast and its hydraulically adjustable radius save us a lot of time here,” they report. When picking up a rotor blade together with the 25-tonne blade gripper, they need a little extra counterweight due to the distance to the storage area. The small counterweight frame is sufficient for this. It is then simply detached again for lifts with a shorter radius. Even with the heaviest load – the 120-tonne generator – the 70 tonnes of ballast on the small counterweight frame were sufficient. The wide, star-shaped supports and 190 tonnes on the slewing platform give the LR1700-1.0W a secure footing. The two men only need the entire suspended ballast when erecting or taking down the long lattice boom.

With the last rotor blade mounted and the turbine finally complete, Carlos and Samuel attach the 200 tonnes of counterweight on the derrick boom. Their crawler crane now needs to be dismantled. Just a few hours later, the huge boom is finally lying on the dusty track. Over the next two days, the men gradually shorten the mast and erect the remaining 70 metres. They are all set for the journey to the next construction site.

### Ready to help – even in the middle of the night

Edgar Garcia is also ready to set off. Before the Managing Director takes his leave, he gives us a brief insight into the company’s history: “EuroTagar – which includes the companies Cariano SA and Idelgrua Ibérica – has been in the market for over 20 years. Our first unit was a small Liebherr mobile crane with a lifting capacity of 70 tonnes. It was great to work with and the service from Liebherr was so good that we have never bought machines from other manufacturers. That’s still the case today.”

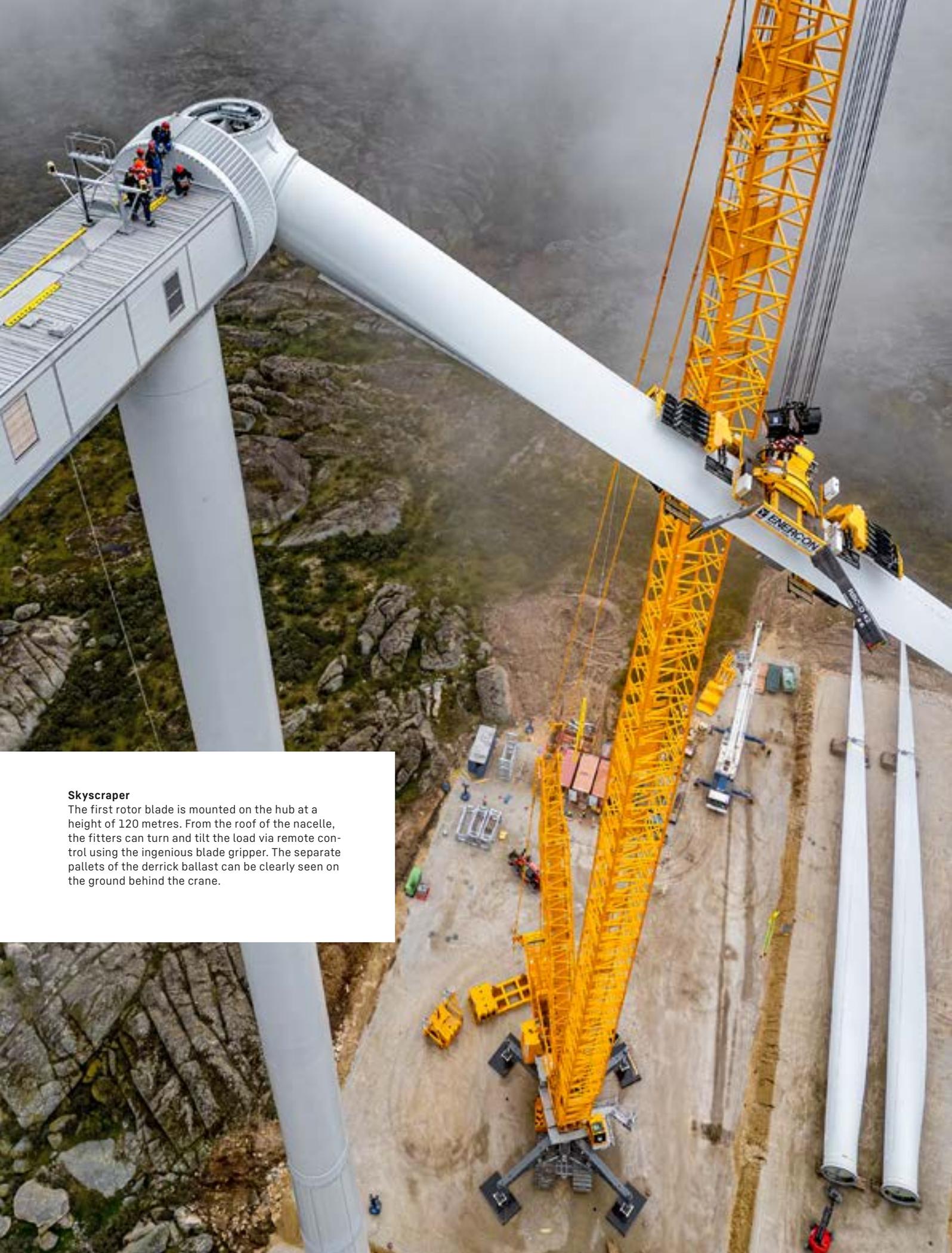
Edgar Garcia has a little anecdote to share on the subject of service: “I remember an incident in Venezuela when one of our cranes had problems at night and blocked the motorway. In Europe it was about five o’clock in the morning, but we actually got a Liebherr technician on the phone who looked after us for two hours. In such moments of despair, it is just very reassuring to know that you have so much support.”



### Below: Travel preparations

The load distribution plates at the feet of the mighty support cylinders are aligned for driving. For safety reasons, they are spread as wide as possible – depending on the width of the path – and remain approximately twenty centimetres above the ground while driving. The narrow-track crawler travel gear can handle construction site paths of six to seven metres in width, and can even cope with gradients of up to six degrees.





### Skyscraper

The first rotor blade is mounted on the hub at a height of 120 metres. From the roof of the nacelle, the fitters can turn and tilt the load via remote control using the ingenious blade gripper. The separate pallets of the derrick ballast can be clearly seen on the ground behind the crane.

# Wind power is learning to swim

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## Floating wind farms open up 'new territory' on the high seas

Just off the coast of Marseille, a new chapter is being written in the annals of the energy revolution. “Provence Grand Large” is the very first floating offshore wind farm to be built in France. Standing sentinel over the docks of Port-Saint-Louis-du-Rhône for this history-making moment of engineering innovation, which saw three 8.4-megawatt wind turbines installed onto floating platforms, was one of the largest crawler cranes, an LR 11350, from Liebherr.

“The scale of it certainly commands respect!” So says Werner Schmidbauer, who has seen his fair share of cranes in his lifetime – including some really big ones. But in June when the owner and Managing Director of the Schmidbauer Group travelled to the Mediterranean coast and saw the vast, shimmering yellow crane with its 150-metre boom stretching skyward, even this experienced crane rental expert of many years was in awe.

And that’s before he was even anywhere near Port-Saint-Louis-du-Rhône. The industrial port lies just shy of 50 kilometres north-west of Marseille, in the Provence-Alpes-Côte d’Azur region. In spring and summer of 2023, the port became the epicentre of a whole new chapter in the revolution of energy. It is where Siemens Gamesa Renewable Energy joined forces with energy providers EDF Renouvelables and Enbridge to establish the first floating wind farm in the Mediterranean Sea. This saw three 8.4-megawatt wind turbines positioned on special floating foundations. They were then towed by tugboats out to the high seas some 17 kilometres from the shores of Port-Saint-Louis-du-Rhône, where they were fixed to the seabed using anchor ropes for a relatively low impact. The operators, together with the scientists and ecologists involved in the project, are anticipating that this approach will deliver important findings for the future of offshore wind energy generation that is even more efficient while also being kind to marine life and seabirds.

### Cranes for the energy revolution

Werner Schmidbauer is fascinated by the complex background to the project and the science and research incorporated into it: “We see ourselves as partners and co-creators of the energy transition. We are contributing to the creation of a high-performance infrastructure for renewable energies by providing the right cranes and construction machines, as well as our decades of expertise. Most of these cranes and machines come from Liebherr.” On Gloria quay in Port-Saint-Louis-du-Rhône, an LR 11350 stretches its 168-metre-long lattice boom skyward. In order to lift extremely heavy loads, the crane has been fitted with a PowerBoom for this operation – its dual design allows the lattice boom to extend to a length of 80 metres in parallel in the lower section. This increases the crane’s load capacity by almost 50 per cent. The LR 11350 has a maximum lifting capacity of 1,350 tonnes and was primarily designed for loading heavy cargo in ports or for industrial applications.

The project was actually supposed to start in late 2021, recalls Minka St. James, Head of Business Development at Schmidbauer. “But then we had the COVID-19 lockdowns firstly, and the subsequent supply bottlenecks, which caused major delays to the erection of the floating foundations in particular. It was a real test of patience for all those involved.”



**Minka St. James**  
Head of Business  
Development at  
Schmidbauer



**Werner Schmidbauer**  
Owner and Managing  
Director of the  
Schmidbauer Group



A Liebherr LR 11350 crawler crane is installing three 8.4-megawatt wind turbines on floating platforms in the harbour of Port-Saint-Louis-du-Rhône. Foto: Iann Hanning

“Getting the special crane operational for this demanding wind turbine construction was a huge undertaking, and one which we shared with Liebherr,” explains Werner Schmidbauer. “You don’t find a crane of this scale just lying around in a yard. It was made specially for us and delivered straight to the building site. A precision landing!” Dismantled into individual parts, the LR 11350 was transported directly to France from the Liebherr plant in Ehingen, Germany, on more than 90 articulated lorries. Not to mention another 45 HGVs carrying additional equipment. Fifteen experts from the Schmidbauer large crane team took delivery of the LR 11350 in the harbour area, which had been specially stabilised with special mats and additional steel plates. Accompanied by up to four Liebherr engineers, it took the team one and a half months to assemble the crawler crane for the first time.

#### **A building site with no blueprint**

“A first-time build is always a bit of an adventure, shall we say. On Friday, 6 June, the safety inspection and the final load test were carried out by the French authorities. On Monday after that, it was already straight to work,” reports Matthias Wirtz, Project Manager for Schmidbauer.

The 33-year-old construction engineer has been with the crane company for two and a half years and specialises in large-scale projects. “This job was exceptional in many respects, and that’s what made it so appealing. After all, there was no blueprint for how to install wind turbines on floating foundations. However, we were able to calculate a lot of the process and simulate it digitally. But it was really exciting to see it take shape in reality, for instance when it came to one-sided loading and unloading on the dynamic foundation during rotor assembly.”

The LR 11350 had reinforcements, in the shape of a 400-tonne crawler crane and a mobile crane for smaller supply jobs. “Working in tandem, they were very effective in stabilising the lifts of up to 130 tonnes of hard-steel segments of wind turbine tower,” explains Wirtz. “These giants had to work in perfect harmony, especially when the nacelle had to be lifted to a height of around 120 metres. This is the very heart of the wind turbine and registers some 260 tonnes on the scales. When a suspended load of this scale spans a crane-to-hook distance of almost 50 metres on the PowerBoom, every single movement of the crane has to be made with complete precision.”

**It's good to talk – in fact it's crucial**

This kind of precision work with super-heavy XXL components is all part of the day job for Fabian Ueck. The 48-year-old is an experienced crane operator, whose journey with Schmidbauer's largest cranes has already taken him to a vast array of major construction sites the world over: "In truth, building a wind turbine always follows the same general pattern. But this turbine here in France is something very special for all of us," he confirms. He explains that conveying hundreds of tonnes of weight onto a floating, and therefore moving, platform by crane

is a physical feat. Everything has to be just right. Matthias Wirtz knows that "to work efficiently, and above all, in total safety, complete professionalism and teamwork is needed." Fabian Ueck can testify to this: "When dealing with large loads and large machines, it's paramount that everyone talks to each other, openly and honestly, so they are best prepared for anything that might happen." He explains how everyone soon grows together as a team on the construction site – across all company and language barriers.



Sitting in his cab some six and a half metres off the ground, Fabian Ueck, assisted by a range of cameras and the high-performance crane control system, has an excellent view of the entire site. This is particularly important when the crawler crane is carrying a part around. That's because Ueck has to keep an eye not only on the load on his hook, but also the suspended ballast, which keeps the crane balanced while lifting. With the lift complete, Ueck places the 500-tonne suspended ballast down on its own mobile platform, a 48-axle SPMT (self-propelled modular transporter). "Every little thing is dependent on everything else," he says contentedly.



### Sheltering from the storm

Much to the disappointment of the project managers from Siemens Gamesa Renewable Energy, it was often necessary to put the crane on Gloria quay completely into idle mode for several hours or even days at a time. That's because the mistral blows through here every few weeks. The famous Rhône valley wind often sweeps out to the Mediterranean at speeds well in excess of 100 kilometres per hour. "When it's really howling through, just pointing the crane into the wind is not enough. Then we have to put the boom and the suspended ballast down completely and wait until the storm blows over," explains Ueck. However, making the crane safe costs a lot of time. It takes four hours to lower and raise the boom. "But, that's mother nature for you, we can't do much about it. Once the wind turbine is up, everyone is excited by the prospect of a strong breeze. Just not before!"

Consequently, checking the weather forecast is one of the must-do tasks for the team on the construction site on these high summer days. The tight schedule doesn't leave the construction team much time to soak up the sun or the holiday atmosphere of the Cote d'Azur. Nevertheless, Fabian Ueck's crane crew are staying in mobile homes on a nearby campsite that leads straight to the beach. "There is plenty to look forward to when the working day is done," explains Ueck happily. This is much needed too, especially since what was supposed to be a six-week job turned into three months in total. "Of course, it's lovely to work on a building site in a place where people come to spend their holidays. The weekend day trips to Marseille, to the lagoon in Étang de Berre or to see the flocks of flamingos in the Camargue were really special for us all."

The LR 11350 is equipped with a PowerBoom for this application, which increases the crane's lifting capacity by almost 50 per cent.

Foto: Iann Hanning



Floating wind turbines can be anchored to the seabed with steel cables in areas with a water depth of up to 300 metres.  
Foto: Iann Hanning

### The construction site as a visitor attraction

“Provence Grand Large” gave Fabian Ueck something of a new experience in that his work attracted the attention of sightseers. “We had busload upon busload of schoolchildren, students, politicians, scientists and journalists coming by to find out about the project and to get a tour of the construction site,” he explains. “The whole world is watching what we’re doing here,” adds Minka St. James. “Floating offshore wind farms take green energy generation to a whole new level. This has great implications for the future. And everyone involved in the project really senses that.”

But that doesn’t fluster Fabian Ueck. Once the first wind turbine goes up, the tension just disappears. He keeps full focus while the parts are transported and lifted. “It all just came together. The right crane, in the right place, for the right purpose,” says the crane operator with a look of satisfaction on his face. By 11 October 2023, when the “Provence Grand Large” project management team announced that three floating wind turbines had successfully been installed at high sea, the LR 11350 and the team from Schmidbauer had long since moved onto the next construction site. High up in the French Alps, in cramped conditions, a bridge across a gorge is being deconstructed. “You rise to each and every challenge, learning as you go,” says the crane operator with a glint in his eye. At least there’s no mistral to worry about. That said, it might well snow soon.

### The offshore research field

Floating wind farms open up “new territory” on the high seas. Only a small fraction of the world’s oceans is shallow enough, at less than 60 metres deep, to accommodate conventional offshore wind turbines anchored by what are known as monopiles in the seabed. However, floating wind turbines can now also be used in regions with a water depth of up to 300 metres, since they are anchored to the seabed by steel cables. This makes them a viable solution for generating wind energy in offshore locations around the world that had previously been deemed unusable.

As well as researching the benefits of the location of the “Provence Grand Large” pilot project, our partners in the field of science are also investigating the ecological and marine biological considerations of expanding offshore wind energy. This includes an ornithological radar to record the movements of migratory birds and seabirds. This involved installing a radar station on the Napoléon beach at Port-Saint-Louis-du-Rhône and another on one of the floating platforms. This will for the first time tell us whether, and if so how, offshore wind farms influence the natural flight routes of the birds.

# First movers in a new dimension of offshore wind energy generation

Is the pilot project “Provence Grand Large” (PGL) setting new standards in the field of offshore wind energy generation? We asked Jan Vollrath, VP of Sales at Siemens Gamesa Renewable Energy.

**Mr. Vollrath, what does the pilot project Provence Grand Large mean to Siemens Gamesa?**

PGL is both our first offshore and our first floating project in France. It is also the first project in which the so-called tension-leg platform (TLP) with a vertically anchored, floating structure is being used. This has several advantages over other concepts, and we anticipate that they can be used on other even larger floating projects in the medium term.

**How much did project partners need to be involved in the pilot project?**

The PGL project was, in many respects, “a first of its kind”. It brings with it many specific demands on all of those involved in the project. A whole series of measures were planned and completed for the first time ever, such as installing the hub straight onto the floating foundations. New tools, processes and crane technologies were put into action. And, even for our teams, much of this represented uncharted waters.

**What does that mean for the cooperation between the companies involved?**

By their very nature, pilot projects pose a very particular challenge for the working relationship between project partners. This requires communication and coordination on another level of intensity. And it is absolutely paramount that the project partners have total faith in the abilities of others involved. The collaboration on the PGL project was fantastic; it was what made it the success it is.

**What were the takeaways from the project, in regard to the future of offshore wind energy?**

We learned that we could be even better prepared for specialist projects like this, both in terms of training and technical preparation for employees, and in terms of preparing our equipment. We generally build our offshore plants in northern European waters, where the conditions are different to those in the Mediterranean.

**Like what, for instance?**

Specifically, high external temperatures combined with strong winds were something we hadn’t encountered before and limitations were revealed in some areas, which we are now working on. I am very confident we will continue to see more and more offshore wind turbines cropping up in warmer regions. That’s why PGL was such a valuable experience.

**Jan Vollrath**  
VP Sales at Siemens Gamesa  
Renewable Energy





**Compact.  
Flexible.  
Strong.**

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#### Space miracle LR 11000

The overview shows the cramped conditions on the construction site on the banks of the Danube. Made up for by good positioning and the folding ballast frame V-Frame®.

## LR 11000 lifts bridges in confined spaces

**There are over 25,000 bridges in the German railway network. Almost half of them are more than 100 years old. An extensive renovation program has been underway for several years now, during which around 900 bridges have already been renewed. A Liebherr LR 11000 crawler crane from Wiesbauer recently replaced a 130-year-old steel bridge in Fridingen an der Donau in southern Germany with a solid new truss structure. Only thanks to its variably adjustable ballast frame V-Frame® was the crane able to compensate for the limited space on the construction site and carry out the lift on the banks of the Danube.**

This was the fifth large and heavy bridge structure that Wiesbauer has renewed for Deutsche Bahn and for which a 1,000-tonne class crawler crane was required. In 2020, after purchasing its first LR 11000, the company replaced a river crossing from the imperial era. Depending on the space available, these operations with Liebherr cranes were always more or less complex. However, the most recent job was the most challenging for both the planning team and the crane crew. A very limited construction site area and a new abutment drastically restricted the freedom of movement for the huge machine. In addition, at 440 tonnes gross weight, the heaviest and longest of the

railway bridges installed to date was suspended from the crane's hook at a large radius.

“Without the highly flexible ballast frame, we wouldn't have been able to do the job here,” says Marco Wilhelm after the successful installation of the new flyover in the Danube valley. The graduate engineer is a project manager and authorised signatory at Wiesbauer GmbH & Co. KG, a major crane and heavy-duty specialist in Baden-Württemberg. As with the previous projects, he had also meticulously planned this bridge replacement in Fridingen. “Even accessing the construction site was problematic,” says

### Narrow point

In order to be able to swing past the new abutment with the 450 tonne suspended ballast, the radius over the folding frame had to be reduced.



Wilhelm. “The bottleneck here was the old railway subway, which was only 3.9 metres wide and through which we had to bring the entire crane equipment – up to 3.7 metres wide – to the construction site.”

The area directly on the riverbank was elaborately prepared in advance for the operation. Special foundations and a concrete slab provided sufficient stability under the crane pad. “With the crane and attached load, the subsoil had to bear a total weight of around 1,780 tonnes,” explains Marco Wilhelm. The extra-wide 2.4 metre crawler tracks ensured optimum distribution of the surface pressure.

### V-Frame® enables swivelling process

However, the fact that the radius of the derrick ballast could be adjusted hydraulically via the V-Frame® was crucial to the success of the project. For the necessary swivelling and turning movements to position the bridge over the river, one of the abutments was in the way of the suspended ballast after the load had been lifted at a radius of 32 metres. Thanks to the folding frame, crane

driver Joachim Göckelmann was able to reduce the ballast radius effortlessly and at the same time reduce the radius of the load. The pallet, loaded with 450 tonnes, then swung past the concrete structure without any problems. Both radii were then enlarged again and the LR 11000 reached the required radius of 29 metres to lower the steel structure over the Danube.

The installation of the 62 metre long Danube bridge – the new one weighs more than twice as much as its predecessor – went smoothly and after two hours the lifting means between the crane and load were released again. After the lift, Marco Wilhelm draws a positive conclusion about the job and the crawler crane: “For me, the LR 11000 from Liebherr is the perfect combination of compactness, flexibility and lifting capacities in the 1,000 tonne crawler crane class. It’s always a pleasure to plan and work with this crane.” The engineer can be pleased: The next railway bridge is due to hang on the hook of the LR 11000 as early as October.



### Self propelled modular transporter

The new bridge construction was transported with two SPMT units from the pre-assembly site to the lifting position of the crane.



### Mission accomplished

The new bridge is in place – time for a group photo (from left to right): Marco Wilhelm, Philip Eberlein, Tim Lippa, Nancy Koch, Sylvio Hieronymus, Jochen Wiesbauer, Joachim Göckelmann, Mathias Frenz and Tim Moll

# Flexible power pack







## Liebherr LRT 1100-2.1 rough terrain crane at a wind farm

**We discovered one of our LRT 1100-2.1 rough-terrain cranes working on a wind farm pretty much in the dead centre of Germany, in the federal state of Hesse. This powerful, rough terrain crane, which is usually seen in quarries, open-cast mines or handling heavy goods, was providing support for a lattice boom mobile crane involved in the erection of four huge wind turbines.**

Our Spanish customer Aguado provided a Liebherr LRT 1100-2.1 rough terrain crane to support a large lattice boom crane. The manoeuvrable machine provided assistance to an LG 1750 on a job for repowering old wind turbines. Four 6.6 megawatt turbines built by Siemens Gamesa with a hub height of 165 metres were erected. The versatile two-axle vehicle was used both for the set-up work on the large crane and for the pre-assembly of individual components such as the nacelle. However, the benefits of the extremely manoeuvrable rough terrain crane, which can be moved whilst holding a load, really came into their own for moving the suspended ballast between the individual hoists by the LG 1750. The ballast blocks were transported quickly to the new position to take on the next load. After all, this mid-range of our three LRT models can travel with maximum loads of up to 20.9 tonnes on its hook.

### **Muddy paths – no problem**

The rainy spring in Germany made things difficult for the team from Aguado. But even ankle-deep mud on the roads and surfaces could not stop the all-wheel drive rough terrain crane from travelling quickly and easily between the sites of the individual turbines as required. Its huge tyres with their pronounced tread meant that it always arrived at its destination quickly.

“Transportes y Gruas Aguado”, to give the company its precise name, is one of the largest transport and special haulage companies in Spain, based in the capital city of Madrid. The Aguado Group has established itself as one of the leading providers of crane services, particularly for the wind energy sector. Aguado has branch offices in Mexico, Chile, Colombia, Peru, Morocco and South Africa. Its activities extend to logistics, industry, construction, energy, petrochemicals and wind turbines – both onshore and offshore.





400 t



70 m



96 m



120 m

**Strong, long and easy**





**Spectator magnet:**

The LTM 1400-6.1 garnered significant interest during its initial presentation at the Customer Days.

## Raring to go: maximum performance in the six-axle class

**The crane presentation during the Customer Days at the Liebherr plant in Ehingen was eagerly awaited. And for good reason, because we presented our new member of the LTM family for the first time. A 400-tonne crane – powerful, economical and quick to set up. The initial response from the audience was overwhelmingly positive. Everyone is already talking about the newcomer. Keep reading for more details.**

A powerful 400-tonne lifting capacity – this makes the LTM 1400-6.1 the most powerful six-axle crane on the global market. The new crane replaces the successful LTM 1350-6.1, which has been in our line-up for 15 years. “The LTM 1400-6.1 is the perfect crane for entry into the large-crane segment thanks to the enormous increase in lifting capacity provided by the Y-guying system,” explains Julian Rapp. On the product management side, he played a key role in developing the concept for the new 400-tonne machine. “At the same time, this is also a striking difference compared to its predecessor, as we were able to significantly simplify the set-up processes,” he emphasises. In the following paragraph, we explain exactly what our resourceful engineers have come up with for assembly of the Y-guying system.

### **Arrive on-site and get straight to work**

Ready, steady, go! Thanks to short set-up times, the LTM 1400-6.1 can start work on the construction site in next to no time. The Y-guying for the telescopic boom is quick and easy to install: “With just one lift, the 400-tonner places the Y-guying system onto its own chassis, where it is first centred and then pinned in place. The

hydraulic Likufix quick coupling between the boom and the two Y-frames closes automatically when the boom is then luffed down. Then all that remains to be done is to close the electrical plug connection and the crane is ready for use,” explains Franz Ölberger, Head of telescopic boom design and development. “We were able to reduce the work steps to a minimum. The resulting time savings are enormous.”

### **Heavy ballast for heavy-duty applications**

Like its predecessor, the LTM 1350-6.1, the new 400-tonne crane is equipped with 100 tonnes of basic ballast and 40 tonnes of additional ballast. The proven concept whereby the hydraulic ballasting device is integrated in the counterweight frame has also been adopted for the new LTM 1400-6.1: ballast assembly is simple, quick and does not require an auxiliary crane. At the same time, the plates are compatible with other Liebherr large cranes, allowing greater efficiency and streamlined logistics for crane operators with several Liebherr cranes. “An absolute plus point is that the ballast is now designed as a continuously variable VarioBallast® system,” says Julian Rapp, noting a fundamental difference to its predecessor: “The 140

Find out  
more here:



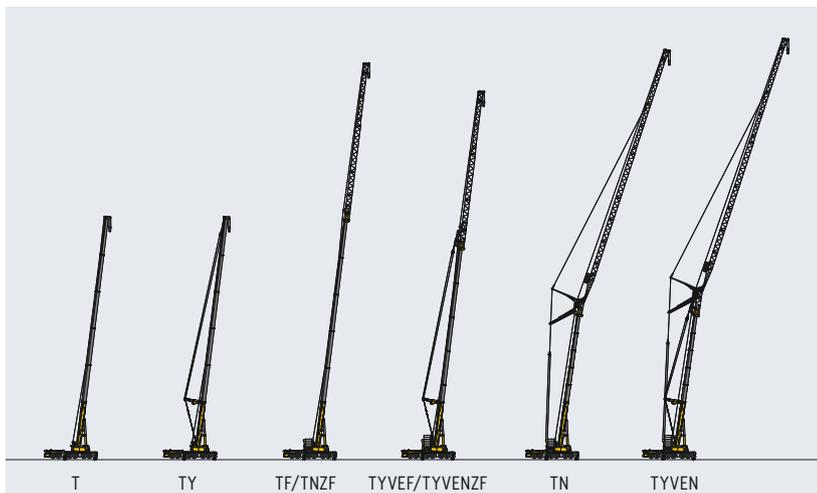
***“We’ve done everything we can to make set-up on the construction site quick and easy and, above all, safe.”***

**Franz Ölberger**  
Head of telescopic boom design and development

tonnes of ballast achieve an enormous radius of 7.7 metres and thus ensure maximum lifting capacity. The ballast radius can be reduced to 5.6 metres for use in confined spaces.”

The new crane is also equipped with the VarioBase® variable supporting base, which also boasts an alteration.

Like previous systems on large mobile cranes, the outriggers can be flexibly positioned at the predefined supporting positions with pinning options of 0, 25, 50, 75 and 100 per cent. However, the sliding beams can now be freely extended between 0 and 50 per cent for the first time. Until now, this was only possible on mobile cranes with up to five axles.



**Strong and flexible:  
the boom of the LTM 1400-6.1**

- 70-metre telescopic boom – can be carried on the crane with a 12-tonne axle load
- 120-metre maximum hook height
- Y-guying for maximum lifting capacity, designed for easy assembly
- 45.5-metre lattice type fixed jib, optionally hydraulically adjustable between 0° and 40°
- Eccentric including 3.5-metre telescopic boom extension
- Luffing lattice jib up to 80.5 metres

# The legend grows







**State-of-the-art lattice boom crane technology**

V-Frame® and VarioTray offer maximum flexibility and economy for applications with derrick ballast.

**But history repeats itself!**

At Bauma 2004 in Munich, we presented the LG 1750 lattice boom mobile crane, which combined the advantages of a mobile crane with the lifting capacity of a 750-tonne lattice boom crane. Painted red and white, it stood on display at the trade fair and was then sent to Nolte Auto-Krane in Hanover. Exactly 20 years later, the same customer has received the successor model, an LG 1800-1.0, with the same licence plate number. The driver has the same surname as back then: Rainer Schlesner is the son of the former driver Detlef.

Company owner Dirk Nolte tells this wonderful story: “Detlef Schlesner is now enjoying his well-deserved retirement. His son Rainer has been a crane driver with us for 17 years. It’s really something special that he is now driving the successor to his father’s crane.” Over the years, Nolte has purchased several LG 1750, at times operating three of these 750-tonne cranes at the same time in its fleet. “The licence plate of our first LG 1750 had become free again in the meantime, so we can now use it for the new LG 1800-1.0,” says Dirk Nolte, delighted with this charming detail. “Mobile lattice boom cranes are ideal for the assembly of wind turbines. Our LG 1750s spend around 70 per cent in this area. The LG 1800-1.0 is even more powerful and we can now install wind turbines with hub heights of up to 180 metres. Like its predecessor, the new crane is also well suited for industrial applications.”

Over the course of two decades, the LG 1750 has become a legend in the crane market. As the new 800-tonne crane



**Like father, like son**

Detlef Schlesner drove the first LG 1750 delivered 20 years ago. Today, his son Rainer is at the controls of the first LG 1800-1.0.

clearly exceeds its performance, we have created the slogan “The legend grows” for the LG 1800-1.0. The new crane also features state-of-the-art crane technology such as V-Frame®, VarioTray, ZF Traxon Torque transmission with ECOdrive and WindSpeed Load Charts.

**Suitable for all markets thanks to flexible driving modes**

A highlight of the new nine-axle LG 1800-1.0 is its unique chassis. Thanks to the special arrangement of its axles, this lattice boom crane is suitable for all markets worldwide. With an axle load of just ten tonnes, the crane can drive on public roads with all four supports and a total



**Bauma 2004**

Liebherr presents the LG 1750 lattice boom mobile crane for the first time.

weight of 90 tonnes. Alternatively, transport is possible with only two supports and a total weight of 70 tonnes, as well as completely without supports at around 50 tonnes.

In contrast to its predecessor, the 8-axle LG 1750, the folding beams on the new 800-tonne crane are not telescopic. The required support base of 13 x 13 metres is sufficient for the LG 1800-1.0 to achieve enormous load capacities with the derrick system, and very good erectable lengths without it. The benefit: fixed supports are more stable and save weight. They are also easier to assemble and disassemble – we have installed a quick coupling system to make this job even faster.

**Proven prowess on its very first job**

The new Nolte crane's first job took it to the northernmost end of Germany. In Wanderup, not far from Flensburg, the entire rotor of a 6-megawatt wind turbine had to be removed in order to replace the defective rotor shaft. "At 147 tonnes, the rotor star alone was extremely heavy. But the wind conditions were such that we were able to lift it without any problems," reports crane driver Rainer Schlesner.

The 800-tonner was equipped with 129 metres of main boom and a 12-metre lattice type fixed jib for a hook height of 144 metres. The necessary counterweight was provided by 170 tonnes of ballast on the slewing platform and 130 tonnes of suspended ballast. "With the Vario-Frame®, the lift was carried out without any problems. We removed the rotor with a ballast radius of 15.6 metres and the suspended ballast was extended to 24.5 metres to place it on the ground," reports Schlesner. "I was able to adapt to the new crane very quickly. The controls on all Liebherr cranes are highly standardised, from small to large machines."



**Robust on supports**

Maximum performance on a support base of 13 by 13 metres.

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# In focus

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## **Maximum safety**

In the future, Liebherr mobile cranes will be equipped with driver assistance systems to ensure additional safety on the road. These systems assist crane drivers by monitoring blind spots, such as on the passenger side, behind the crane or directly in front of it.



COMING SOON!  
Moving Off  
Information  
System

LIEBHERR

LTM 1110-5.2

# More than two eyes

## Driving assistance systems ensure extra safety on the road

Keeping an eye on the entire area around a large crane with just two eyes is a challenge. Mirrors and cameras are already available to help with blind spots and awkward corners. All new Liebherr mobile crane models are also equipped with driver assistance systems that support the crane driver with additional “eyes”. In future, these systems will ensure greater safety on the roads and will focus above all on protecting vulnerable road users such as pedestrians and cyclists. Christian Sauter works in Liebherr’s Technical Trial Department, where he is responsible for the application of driver assistance systems. Alongside his colleagues from the Technical Office and Product Management, he plays a key role in the roll-out of new driver assistance systems and explains everything we need to know about this technology.

### The background

With its Regulation 2019/2144, the EU has set itself the goal of achieving an enormous increase in safety for all road users. The number of deaths and serious injuries on the roads must be reduced. State-of-the-art safety technology will become standard equipment on all vehicles and will take particular account of vulnerable road users such as pedestrians and cyclists. All new vehicles must therefore be equipped with specific safety features. The required measures are defined across various vehicle classes.

As a manufacturer of mobile cranes, safety is an important issue for us. For example, we began offering a camera system for rear-area monitoring on all our mobile cranes long ago, as this area is difficult or impossible for the crane driver to see. With additional assistance systems for our mobile cranes, we can now contribute to greater safety on the road.



The driver assistance systems scan the surroundings and warn the crane driver to prevent accidents.

All new crane models, including the LTM 1300-6.4 and the LTM 1400-6.1, will be equipped with these assistance systems as standard. We will gradually convert our existing crane types in order to equip the entire portfolio with the required driver assistance systems by summer 2026.

# Simply explained

***“By combining our specialist knowledge with our supplier’s expertise, we were able to create a customised solution.”***

**Christian Sauter**  
Technical Trial Department



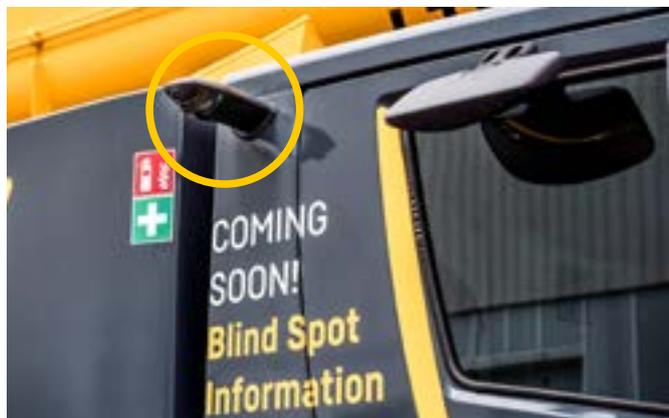
However, it was not possible to simply adopt existing systems from the lorry industry, as there are major design-related differences. Together with an external supplier, the TÜV and our technical design department, we have therefore developed our own system that meets the specific requirements of mobile cranes. It takes into account, for example, the boom projecting over the driver’s cab and the hook block, which restrict visibility in front of the front windshield. Two important Liebherr assistant systems are described below in more detail.

## **Blind Spot Assist**

The Blind Spot Information System (BSIS) is also known as Blind Spot Assist or Turn Assist. Even with large mirrors, the crane driver can’t see the entire area next to the crane – there are always blind spots. The crane driver also needs to concentrate on numerous factors both when in traffic and while navigating the surrounding infrastructure.

As standard, the Blind Spot Assist is operated by means of a so-called “camera wing”, which features two integrated digital cameras. If the system detects cyclists or pedestrians, it warns the crane driver visually and acoustically via an LED traffic light system in the cab, which lights up yellow or red, and also emits an additional acoustic warning tone.

Instead of the LED traffic light, the Blind Spot Assist system can be ordered with an optional digital monitor in the driver’s cab. This ensures that the crane driver can immediately tell where the hazardous situation is and can evaluate it more effectively. In addition, the monitor offers the driver improved visibility at night and in poor weather conditions.



## **Blind Spot Assistant Camera Wing**

The so-called “camera wing” uses two digital cameras to monitor the entire side area of the crane.



***“The new systems increase the safety of all road users significantly and support the crane driver.”***

**Julian Rapp**  
Product Management

### **Collision prevention system**

If there is a person in front of the crane, the “Moving Off Information System” (MOIS) comes into play. Due to their height, children in particular are almost invisible when directly in front of the cab. Despite the specially installed mirrors, visibility is restricted, partly because the hook block is located in front of the driver’s cab.

Two digital cameras on the left and right of the front windshield scan the area and warn the crane driver both visually and acoustically. In LICCON2 machines, the warning appears via a separate LED traffic light, while in LICCON3 vehicles it appears directly on the digital cockpit display.



The collision prevention system warns the crane driver visually and acoustically as soon as someone is detected in front of the crane.

# Totally digital



For smartphone and tablet  
Find the right crane quickly and easily with the Crane Finder app.

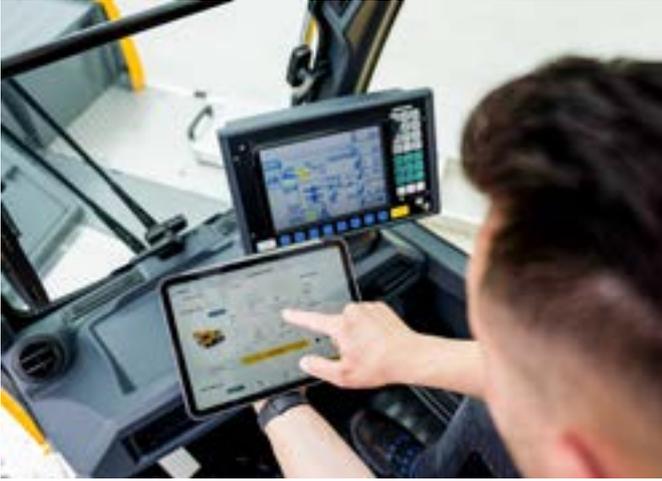
## News from the Liebherr Crane Finder

The new version of the Liebherr Crane Finder has been online since mid-May, surprising dispatchers and crane drivers alike with a multitude of new features and improvements – some under the bonnet, some prominently visible. We have enhanced the Crane Finder, our simple tool for finding the right crane and the optimum configuration, in many areas and integrated new features. We interviewed Isabel Brehm from the Digital Products and Services department, as well as Wolfgang Boos, Product Manager for digital products.

### What's new about the Crane Finder?

**Wolfgang Boos:** Firstly, we have completely revised the underlying crane data on the basis of the latest load charts and compiled them in a new database. And the speed is really impressive: in just a few seconds, Crane Finder checks over 1.7 billion options to find the optimum

crane and configuration. The advantage for our customers is that the Crane Finder now has access to the latest planning data, all operating modes, more information and significantly more cranes from the field when searching.



**What benefits does this offer?**

**Isabel Brehm:** The new database provides many more functions and additional information, such as ballast radius, support, main boom angle, accessory angle and central ballast. This is essential data in terms of evaluating the crane's use on the construction site. And it's also highly practical: as before, all information can be displayed in large tiles or, as a completely new feature, in a compact list view.

**Wolfgang Boos:** The new database is also essential for the future development of the Crane Finder. And we already have some concrete ideas that we are now implementing step by step as we aim to offer our customers even simpler and faster job planning.

**Favourites function**

Crane drivers are primarily interested in information about the crane they are currently operating.

**Is anything else new?**

**Wolfgang Boos:** Yes, namely the "Optimise configuration" button. Background: The Crane Finder has always sought the smallest possible crane for each load case – and always with the maximum load capacity, i.e. with full ballast. In many cases, however, the crane could do the job with less ballast. But what is the minimum amount of ballast required to fulfil the current load requirement? The new feature answers precisely this question. The most economical configuration is found in a matter of seconds. In most cases, the amount of ballast can be reduced – extra weight that the customer does not need to transport to the construction site. In this way, the Crane Finder actively helps to save fuel and therefore CO<sub>2</sub>, contributing to environmental protection. It also helps our customers to save money.

**Isabel Brehm:** Another improvement is the number of cranes included in the search: a total of 76 mobile and crawler cranes from our current portfolio as well as selected older machines. The developers have added a multi-select filter to ensure clarity despite the large number of machines. This lets the users specify with a mouse click if for example, they only want the results list to include the LRT cranes in their own fleet.

**LIEBHERR**

**Download**  
our app now

The app is now available to download free of charge for iOS and Android devices in the respective stores.

Download for iOS:



Download for Android:





**Isabel Brehm**, Department Digital Products and Services, presents the Crane Finder App at the Customer Days 2024.



Product Manager **Wolfgang Boos** answers questions about various digital products at the customer days.

## Liebherr Crane Finder app

**The Crane Finder is now also available as an app for mobile devices. Isabel and Wolfgang, what advantages does the app offer?**

**Isabel Brehm:** We thoroughly considered the target audience, i.e. crane drivers, beforehand and analysed their needs. On the one hand, crane drivers need to be able to use the Crane Finder on the road during their challenging day-to-day work on construction sites. On the other hand, they absolutely need additional information such as the support base or the ballast radius.

**Wolfgang Boos:** The app includes a favourites function that allows users to select their preferred crane models in the MyLiebherr portal and access them quickly. Crane drivers will be particularly pleased about this, as they are especially interested in the information about “their” crane.

**Do app users have to register in the MyLiebherr customer portal?**

**Isabel Brehm:** Not necessarily. This is another advantage of the app. Crane drivers can immediately access a reduced list of results without registering and can use the app without any hurdles.

**Wolfgang Boos:** However, if users register on the MyLiebherr portal – which is free of charge – and log in, they can exploit the full potential of the app and benefit from additional features, such as the complete results list, the favourites function and the “My Fleet” feature.

**Isabel Brehm:** We are convinced that the Crane Finder app will offer added value for crane drivers and dispatchers worldwide. It enables even easier and faster access to the information that users need to carry out their work effectively and efficiently.

**Wolfgang Boos:** The new Crane Finder and the app launch are further steps towards offering our customers innovative solutions that will improve their work processes and thus save them time and money. Try it out now and look forward to further updates in the coming months.

**Thank you very much for your detailed explanations. That all sounds very exciting. The Crane Finder app from Liebherr is available now for many smartphones and tablets in the App Store and the Google Play Store for iOS and Android devices, respectively. Download the app today and discover how easy it can be to find the ideal crane for your requirements.**



# New option for the LR 12500-1.0: SPMTs as a ballast wagon

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The purpose of a ballast wagon is to allow a crawler crane with derrick ballast to drive on the construction site regardless of whether it has a load on the hook or not. The crane carries as much ballast as it needs for the heaviest lift during the current job. This allows faster and more efficient working, as there is no need to stack and unstack counterweight plates, unlike with suspended ballast. This also means that an auxiliary crane is not required. However, as a ballast wagon is not used very often, it would be helpful if its components could also be used for other types of work. Our solution: using SPMTs as ballast wagon.

## The idea

This concept is not new, as we have already tried out similar solutions with other crane models. However, SPMTs (Self-Propelled Modular Transporters) have never been controlled directly by the crane until now. Previously, separate personnel had to communicate with the crane operator and control the SPMTs so that it followed the crane's movements. Therefore, a solution had to be developed that made it possible to move the SPMTs via the crane's control system, just like a standard ballast wagon.

## Development process

In close cooperation with the global crane and heavy-duty company Sarens and the heavy-duty vehicle manufacturer KAMAG, we pushed ahead with the implementation of our idea.

KAMAG developed a special control box to ensure communication between the crane and the SPMTs so that the crawler crane can control the movements of the heavy goods vehicles. One helpful aspect of this was the fact that our LICCON control system and the KAMAG control system have a similar basic structure.

## The result

Jens Könneker, Product Manager Crawler Cranes, reports: "Liebherr, KAMAG and Sarens have already carried out successful trials with the LR 11000 crawler crane in the recent past. The result was a fully functional solution –

circular travel, parallel travel, towing – everything works in exactly the same way as with the standard ballast wagon. We have now transferred this system to our 2,500-tonne crawler crane, the LR 12500-1.0."

Sarens has already placed an order. The LR 12500-1.0 uses 36 SPMT axles consisting of six 6-axle units. This means that 1,400 tonnes of derrick ballast can be operated with a ballast radius of 25, 30 and 35 metres.



Successful trials have already been carried out with the LR 11000 and SPMTs as ballast wagons.

## Advantages of using SPMTs as a ballast wagon

- No special wagon is required for a specific crane type.
- If there is no need for a crane with ballast wagon, the crane can be used separately and the SPMTs can carry out other work. This prevents a large investment from not being utilised.
- SPMTs are available worldwide.
- The new SPMT ballast wagon can be used for several crane types: the LR 12500-1.0 and LR 13000 (planned)
- The crane controls the SPMTs. There is an interface between the two machines. The crane is the "master", the SPMTs are the "slaves". No separate operating personnel are required (except for assembly).



36 SPMT axles are used as ballast wagons for the LR 12500-1.0.

# Is it a safety risk if a support lifts off the ground during crane operations?

The load and radius are well within the load limit. Everything is in the green zone – at least that’s what the crane control system indicates. Nevertheless, looking at the supports gives you a sinking feeling in your stomach: one of the four support legs has clearly lifted off the ground. Joachim Henkel, Head of the Structural Engineering Department, explains why this is no cause for concern.

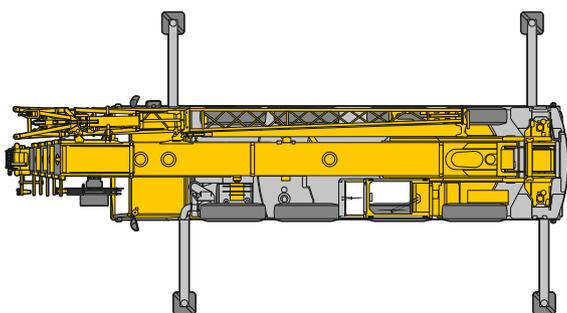
Have you ever thought about why some dogs lift one leg when peeing and do their business on the other three legs? The answer is simple: because they can. And that’s exactly how it is with supported mobile cranes. They can perform



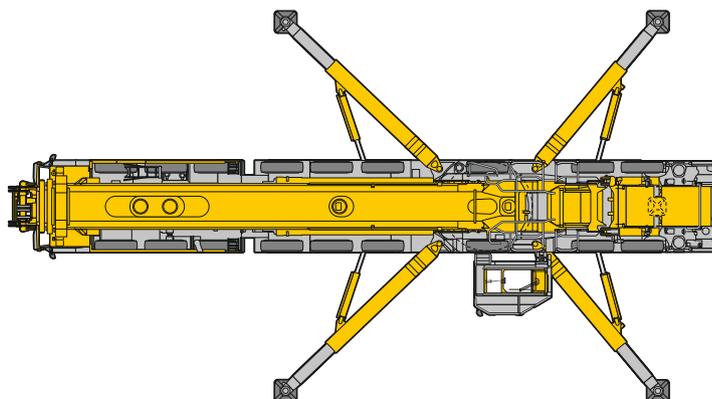
**Joachim Henkel**  
Head of the Structural Engineering Department

their work safely on either four or three support legs. Exactly when and how far a crane support will lift off the ground depends on various factors.

In principle, the phenomenon of “support lift” is unavoidable with modern mobile cranes and is largely due to their lightweight construction and the use of high-strength fine-grained structural steels. Due to the high potential stress ratio of these steels, the elastic deformation in the load-bearing steel structure of the crane’s chassis also increases. This phenomenon makes support lift more likely. Each supported mobile crane has a working area in which all four supports will remain on the ground, even if the superstructure rotates 360°. The smaller the load radius, the sooner all supports are in contact with the ground. If the crane driver increases the radius and turns the superstructure so that the boom is positioned over the support furthest away from the centre of rotation, the diagonally opposite support may be completely unloaded and thus lifted clear off the ground. Although the crane is now only standing on three supports, it is stable and can continue working in accordance with the load chart.

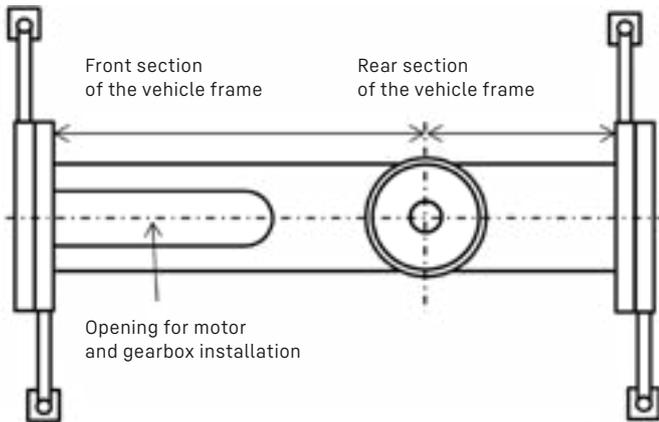


Crane with H-supports

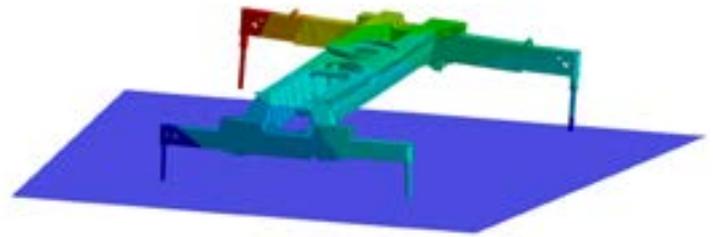


Crane with star-shaped supports

# Background



Vehicle frame with H-support



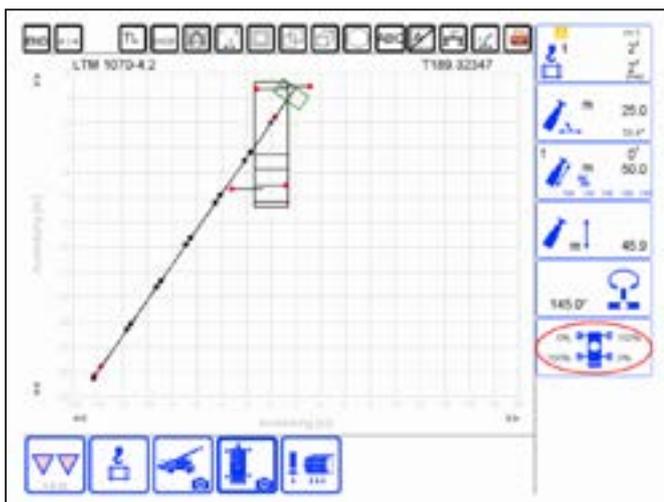
FEM simulation of "support lift"

In general, cranes with H-shaped supports are more prone to support lift than those with star-shaped supports. This is because the load-bearing ratios of the front and rear supports are almost identical in a star-shaped support arrangement.

This is not the case with H-supported cranes, whereby the supports with a shorter distance to the superstructure's centre of rotation – usually the rear ones – tend to lift off the ground. This is especially likely if the superstructure is rotated so that the boom is positioned above one of the front supports. The reason for this is that the front section of the load-bearing vehicle frame is longer and can therefore flex more easily under load than the significantly

shorter, and therefore stiffer, rear section. If the vehicle frame has an opening at the front to accommodate the engine and transmission, it will flex even more when under load. This will cause the rear support to lift more under load.

The engineers at Liebherr keep the phenomenon of "support lift" firmly in mind when developing a new crane type. Using computer-aided simulations, we try to counteract support lift via appropriate design steps as early as possible in the development phase – as far as the constraints allow.



VarioBase® with "exotic" support geometry and boom positioned over the front right support. The rear left support will have a strong tendency to lift.

## What causes support lift?

- Type of support: H-supported cranes are more likely to be affected than cranes with star-shaped supports
- VarioBase® with an "exotic" support geometry (see illustration)
- The front section of the vehicle frame is significantly longer than the rear section
- High load capacity utilization
- Large load radius
- Low ballast weight on the slewing platform
- Superstructure angled diagonally to the support base with the boom over one support

# Pin removal made easy



## Mission successful

The battery-powered pin-pulling cylinder is a convenient alternative to the BZGF 18.2 hydraulic power pack and the Cingo M 8.3 EVO crawler tractor for pinning or unpinning lattice type sections. From left to right: Peter Zander, Mathias Waidmann and Frank Meixner.

**A hammer and muscle power won't get you very far when pinning or unpinning the lattice booms on our crawler cranes. This task requires hydraulic power. We offer precisely this in the form of the BZGF 18.2 hydraulic power pack and the Cingo M 8.3 EVO crawler tractor. In this issue, our experts Mathias Waidmann and Peter Zander from the crane acceptance department and design engineer Frank Meixner present an alternative approach that makes this work easier and more convenient.**

It is proven true time and time again: The best ideas come from practical experience. Mathias Waidmann is familiar with these problems in his day-to-day work as a foreman on the crawler crane acceptance line: "The hydraulic units are heavy and therefore have to be moved on vehicles. We have flat concrete surfaces at our acceptance centre, so it's actually possible there. But things are usually different on construction sites. This is where the Cingo crawler tractor comes into its own. But with both devices you always have to handle hydraulic hoses. I thought to myself, there must be a simpler, handier and more mobile alternative."

## Inspired by fire-fighting technology

Waidmann benefited from his experience as a fire-fighter: "In the fire service, we have battery-powered hydraulic rescue rams that are used to prise open the passenger compartments of vehicles involved in accidents in order to rescue people. This gave me the idea that this technique could also be used to pin together lattice boom sections. I then submitted this idea via our company suggestion scheme."

Frank Meixner was entrusted with producing a workable design: "Our long-standing supplier Weber-Hydraulik was an ideal partner for this project, as the Weber Rescue Systems division supplies battery-powered rescue rams. Together, we now had to adapt the existing technology to meet our requirements."

On the application side, Peter Zander was involved in realising the design: "It turned out that we could manage with just two cylinder stroke lengths: 260 millimetres for cranes with a lifting capacity of 600 to 800 tonnes, and 310 millimetres for the LR 11000 and the LR 12500-1.0."

### With remote control – safety first

Of course, there were also challenges to overcome. Meixner reports: "Compared to the rescue ram, we not only need high compressive forces when extending the cylinder, but also have to apply tensile forces to the piston rod so that we can pull the pins out of the fork-finger connection again when disassembling the boom. It's precisely during this process that the operator is exposed to increased danger when operating the battery cylinder on the appliance. When the last pin is pulled, the released component can move in an unpredictable direction. This made it clear to us that we had to offer a way to operate the cylinder remotely. And that was precisely the challenge. As there was no remote control for the rescue rams, we developed one together with the supplier."

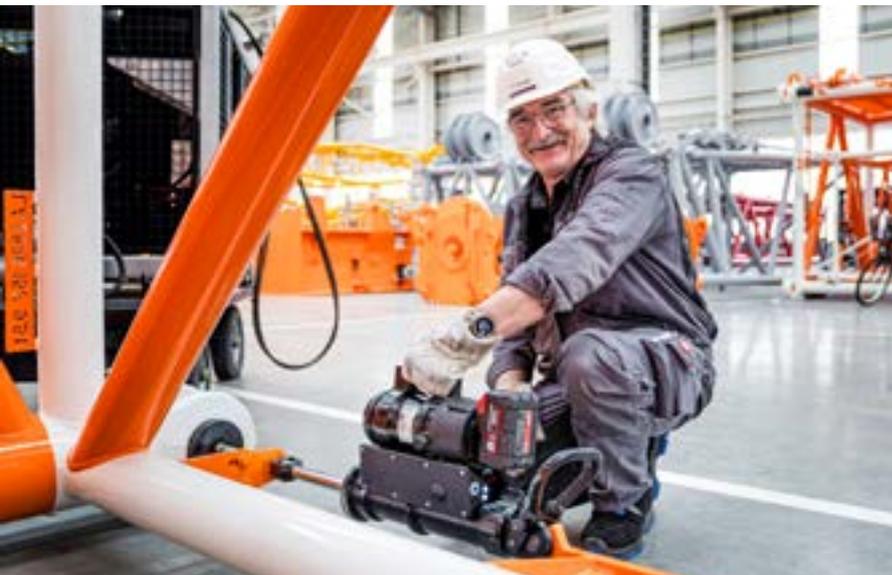
The cylinder can be moved with reduced force using a button on the device when positioning it in the pin-pulling bracket. As soon as a predefined force threshold is exceeded, the device switches off and you have to switch to remote control. In this operating mode, a compressive force of around 85 kN and a tensile force of 70 kN are achieved at 230 bar.

Everyone involved is delighted with the result. "Of course, I'm pleased that we were able to implement my idea. The battery-powered pin-pulling cylinder weighs just 16 kilos and is easy to use in practice," says Waidmann.

Zander adds: "Safety is also increased because there are no hoses to trip over. Several pin-pulling cylinders can even work simultaneously, which shortens the assembly time. Even if the extension and retraction times are slightly longer compared to the hydraulic units, the faster and more convenient handling outweighs this. Furthermore, the cylinders emit neither exhaust gases nor CO<sub>2</sub> during operation."

The scope of delivery includes two 28-volt batteries with 5 Ah each, a mains charger and a 12/24-volt on-board charger. This enables almost continuous operation. The batteries are produced by the global manufacturer Milwaukee and are therefore available worldwide.

We delivered the first battery-powered pin-pulling cylinders to our customers at the beginning of 2023. Dozens are now in operation and the feedback is consistently positive.



## Advantages of the battery-powered pin-pulling cylinder

- Low weight, approx. 16 kilograms
- No hose handling
- Local Zero Emission
- No dependence on fossil fuel, no fuel handling
- "Continuous operation" thanks to second battery and on-board charger
- Global battery availability (Milwaukee)

### Easy as pie

Peter Zander demonstrates the function of the battery-powered pin-pulling cylinder.

# From lightweight to maximum performance on eight axles



Visitors were able to experience the self-assembly of the boom live at the 2024 Customer Days innovation park.

**Avoiding costly driving permits, driving over almost any bridge, preventing detours, and setting up the crane on the construction site without an auxiliary crane. This is now even possible with an eight-axle mobile crane! Liebherr has developed an extremely simple, fast and economical solution for self-assembly of the telescopic boom for the LTM 1650-8.1. Thanks to the newly developed self-assembly device, which is mounted on a standard low-loader, the auxiliary crane that is normally required to assemble the boom can be dispensed with entirely. One of the special aspects of this job is that if the device is not required, the low-loader can be used for other transport tasks.**

The Liebherr LTM 1650-8.1 mobile crane is designed to deliver maximum performance. It usually travels on public roads with a total weight of 96 tonnes and an axle load of twelve tonnes. This sometimes requires complex driving permits and because this weight is not permitted on many bridges, long detours often need to be taken. Some countries don't even allow such heavy vehicles to be driven on public roads.

## **Self-assembly of the telescopic boom**

To reduce the weight of large mobile cranes, a proven solution is to remove the telescopic boom and transport it separately on a low loader. The disadvantage of doing so is that an auxiliary crane is required to dismantle and assem-

ble the boom. We therefore wanted to develop a more economical solution for our customers, i.e. by eliminating the auxiliary crane and using a standard low-loader, which can also be used for other applications such as transporting ballast or lattice equipment.

The self-assembly device consists of three main components: a lifting device at the rear of the crane, a hydraulically adjustable boom transport support on the low loader and a trolley equipped with a chain drive, which pushes the boom onto the crane during assembly and pulls it away from the crane onto the low loader during disassembly.



The hydraulics are connected via quick-release couplings.



A device is attached to the rear of the crane, which raises the boom.



The transport support is extended hydraulically so that the boom can move freely.



The trolley with chain drive pushes the boom towards the crane for assembly.



The boom is bolted together quickly and easily using the remote control.



After releasing the trolley, the boom can be luffed up.

## Fast & easy assembly

To ensure that the crane driver always has everything in view, all functions are operated via the wireless remote control. The assembly process is so simple that the telescopic boom can be assembled and disassembled by just one person if necessary. Incidentally, this solution can easily be retrofitted to any previously delivered LTM 1650-8.1 crane equipped with the “detachable boom” option. The individual assembly steps are:

1. Support the LTM 1650-8.1 on the front jacks and the rear assembly jack
2. Rotate the slewing platform 180 degrees
3. Position the lorry with the telescopic boom behind the crane
4. Connect the hydraulic and electrical quick couplings
5. Raise the boom with the lifting device
6. Hydraulically extend the transport support to create freedom of movement for the boom
7. Push the boom with the trolley towards the crane
8. Pin the boom to the slewing platform, and the luffing cylinder to the boom
9. Detach the trolley from the boom, then luff up the boom
10. Remove the lifting device from the rear of the crane (self-assembly)
11. Attach the sliding beam box at the rear (self-assembly)

You can find  
a video here:



# The course is set

Sustainable

## Carbon-neutral solution will meet the heat requirements for planned plant expansion

Over the coming years, we will expand our plant to one and a half times its current size. Adjacent to our repair centre in the Ehingen district of Berg, 500,000 m<sup>2</sup> of factory halls, acceptance areas and office and social buildings will be built. With this triple-digit million euro investment, we are placing an important focus on climate and environmental protection – from building insulation to the biodiversity roof. Signed and sealed: we will utilise the waste heat from the Sappi paper and pulp mill in Ehingen to cover our heating requirements in a carbon-neutral manner.

With the signing of a long-term waste heat supply contract, Sappi Ehingen GmbH and the energy company e-con AG from Memmingen have laid an important foundation stone for this forward-looking heating supply project. The contract with a term of 20 years regulates the extraction and utilisation of waste heat, which currently has to be discharged, unutilised, into the Danube. e-con AG is planning the construction and operation of a district heating supply system. As the primary customer, we will utilise the waste heat for the planned expansion of our plant in the Berg industrial area. The municipal heating plan involves close co-operation with the town of Ehingen and includes the option for third-party use.

“We are delighted that we can utilise the waste heat generated at Sappi for our planned green factory in the Berg district,” explains our Production Director, Ulrich Heusel. “This initiative by two Ehingen-based companies has led to a real win-win situation, especially for the environment. And we have found a competent partner in e-con AG.”

“It’s great that the contract has been signed,” says a delighted Maik Willig, Managing Director of Sappi in Ehingen. “Utilising our energy for the carbon-neutral heating of buildings will benefit everyone by helping to improve the ecology of the Danube and reducing greenhouse gas emissions. The long-term nature of the agreement gives the project the necessary security and is also a positive sign for our production site here in Ehingen.”

Peter Waizenegger, CEO of e-con AG adds: “For our company, the contract with Sappi forms the foundation for our planned heat supply. We initially aim to supply the new industrial estate – with Liebherr as our primary customer. The waste heat from Sappi is so abundant that there is ample potential for expansion into other areas.”



From left to right: Peter Waizenegger (e-con AG), Maik Willig (Sappi Ehingen GmbH) and Ulrich Heusel (Liebherr-Werk Ehingen GmbH) at the signing of the contract.



Plan sketch Liebherr extension in Echingen-Berg

### **Cold district heating**

The waste heat generated at Sappi during the production process is available as treated waste water at a temperature of between 25°C and 30°C. It will be transferred to an intermediate circuit via heat exchangers and transported to the industrial area by means of pipework. This temperature is entirely sufficient to heat buildings and industrial halls built in accordance with the latest energy standards for a large part of the year. By using decentralised heat pumps, higher temperatures can also be generated, for example to heat domestic hot water.

Construction of the heat pipeline and the necessary infrastructure is scheduled to begin in 2025 as part of the development of the Berg industrial estate. “All stakeholders, and above all the project developer e-con, still have a mammoth task ahead of them and there are still many details to be clarified. But we are confident that we will be heating our first new buildings in Berg with waste heat from Sappi as early as 2026,” says Ulrich Heusel. Maik Willig adds: “The new heat source has been secured for the long term and its potential is more than sufficient.”

***“This initiative by two Echingen-based companies is a real win-win situation, especially for the environment.”***

**Ulrich Heusel**  
Managing Director Production



# From carpenter to model maker



John Murphy presents his latest model, an LTM 1650-8.1.

**What began over ten years ago as a hobby involving a small wooden boat has now become Irishman John Murphy's main profession. The trained carpenter has been working as a model maker since 2022, building a wide variety of construction machines to order and sending them all over the world. His latest creation is a Liebherr LTM 1650-8.1 mobile crane with Y-guying.**

The small wooden boat that started it all today is still in John Murphy's workshop in the Southeast of Ireland – alongside various trucks and bulldozers as well as model Liebherr cranes. The latest project completed by the 61-year-old Irishman is an LTM 1650-8.1. "I first became interested in modelling in 2013. At first, I built models from

specialised books. However, I soon realised that my real passion is detailed objects such as trucks and construction machinery. When I showed the models on Facebook, I immediately received enquiries asking whether I would also accept commissions," Murphy explains.



Besides cranes, Murphy also builds trucks such as the Scania 650 S in his small wood workshop.

### Built to last

“At a scale of 1:20, many details can be recreated. There is no engine and only the slewing bearings are made of metal, but otherwise my models have the same functions as the originals,” he explains. So it’s all made of wood – maple for the lighter-coloured components, walnut for the darker ones, sapele for the interior and wawa wood for the lights and mirrors.

Before Murphy sends the not-so-small replicas to their new owners all over the world, some of them are taken to the British Motor Museum for an exhibition or for a technical demonstration in front of a crafts class. When everything is ready, each component is wrapped in protective bubble wrap and packed in a plywood box. “A little prayer before handing it over to the courier never hurts and then the model is on its way!”

### Pandemic as a turbo

He accepted the orders, initially alongside his main job as a carpenter. When work ran out during the pandemic, he finally turned his hobby into a full-time job. Depending on the crane model, Murphy spends between 150 and 400 hours completing each job. Piece by piece: first the wheels, then the chassis, then the boom and the cab. He rarely builds the same model twice. “A 100-tonne mobile crane is of course less work than the LTM 1650-8.1, which has been my biggest challenge so far. The Y-guying system is very complex and the variable ballast system is also a real challenge,” he says.

All of Murphy’s models are made using traditional wood-working equipment: table saw, pillar drill, band saw, sanding machine, planer for levelling the wood – you won’t find any CNC or laser-controlled machines in his small workshop.



Murphy takes some models to modelling competitions before they go to their new owners.

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# The world with Liebherr

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**Since 1949**

In 2024, the Group is celebrating its 75<sup>th</sup> anniversary. Numerous highlights have been created with and by Liebherr during the last three quarters of a century – as well as a virtually limitless portfolio of products and patents. Read more on the following pages.





# Interview with the family shareholders

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# 75 Years of moving forward

Stéfanie Wohlfarth and Jan Liebherr, vice president and president of the administrative board of Liebherr-International AG, share their thoughts.

**Mrs Wohlfarth, Mr Liebherr, the Group is celebrating its 75th anniversary in 2024. Your grandfather, the founder of the company, Hans Liebherr was known for his pioneering spirit. What do you think he would have liked in particular about the group of companies today? Where does his pioneering spirit live on?**

**Jan Liebherr:** We have enjoyed healthy, sustainable and organic growth from the foundation of the company to the present day. Our grandfather would certainly be impressed if he could see how the products that he introduced have been developed and how the range of products has increased.

**Stéfanie Wohlfarth:** He would also be happy that the second generation continued to build up the Group, expanded it immensely and handed it over successfully to us as the third generation. And he would be very pleased about the diverse range of technology that we now offer. His pioneering spirit can still be felt in every Liebherr product in some way, as innovation and progress continue to be at the heart of our company.

# 75

## Years

### of moving forward



**Which moments or successes in the company's history have been particularly significant from your perspective?**

**Stéfanie Wohlfarth:** The first ten years of the company's existence were definitely decisive. They were shaped by some groundbreaking new products. In my opinion, the early internationalisation of our company was a brave and pioneering step. Our grandfather already expanded to South Africa and Ireland back in the late 1950s. Many of the foundations for our current product segments were laid at this time. It was also important that the Group grew organically, from its own strength and own ideas – a principle to which we remain faithful. This goes hand in hand with the fact that we have always been able to successfully overcome periods of economic weakness throughout our company's history.

**Jan Liebherr:** It's equally worth noting that we developed our own expertise in component development at an early stage, which enabled us to offer our customers tailor-made solutions. The efficiency and environmental friendliness of products have also played an important role in our company for a long time. The early introduction of CFC-free domestic appliances in 1993 is a good example of this. Our entire Group – as we know it today – was also shaped by the restructuring into product areas in 2002.

**How does the past influence the company today?**

**Jan Liebherr:** Our past achievements are undoubtedly the basis for our current success. They have got us to where we are today. And they have a significant impact on what we stand for and our ability to position ourselves in the market. The pioneering spirit of our early years is alive everywhere in the company. Our history inspires us to also take on future challenges.

**You both completed your first year as vice president and president of the administrative board of Liebherr-International AG in 2023. What were the highlights for you?**

**Stéfanie Wohlfarth:** The last year took us to many of our sites around the world. This not only gave us a good insight into the current developments on the ground, but often gave us the valuable opportunity to talk to people in person. We were particularly pleased with the exceptionally positive response at Conexpo, North America's biggest construction trade show. It was a striking confirmation of our strong market position and our great customer satisfaction. Equally noteworthy for me was the inauguration of the "Haus Montafon" extension at the Löwen Hotel in Schruns.

**Jan Liebherr:** Our partnership with Fortescue, to develop emissions-free solutions for the mining sector, made significant progress last year. The first T 264 mining trucks from the major contract have already been delivered and the integration of the zero-emissions battery and fuel cell technology into the T 264 is in full swing. And we achieved another milestone with the delivery of the 2,000th crane in one year from our plant in Ehingen.

**What were your greatest challenges last year?**

**Jan Liebherr:** Although we managed to stabilise the supply chains to some extent, they continued to pose difficulties in some of our divisions. There were also declines in demand in some product segments and the global political situation is still creating uncertainty. Despite these challenges, we remained on course overall and navigated our company through these changeable times.



**Let's take a look at the figures. How would you rate the last business year in this regard?**

**Stéfanie Wohlfarth:** Our overall assessment is very positive. Despite the occasionally challenging environment, we were able to increase both our revenue and our operating result. The revenue growth shows that our products and services are in demand and that we can adapt effectively and quickly to market changes. We are managing to succeed in challenging times such as these because we are well positioned with our diversified, international structure, our excellent proximity to our customers and our dedicated employees.

**Digitalisation, alternative drives, autonomy and automation have been your priorities in technology in recent years. What progress have you made here?**

**Jan Liebherr:** In the area of digitalisation, we continued to develop our digital platforms with the aim of further increasing the efficiency and safety of operating our machines. Concrete examples of this include the integration of the Tower Crane Portal into our MyLiebherr customer portal and the development of useful applications such as MyNotifier, which supplies crane drivers with important operating data.

**Stéfanie Wohlfarth:** Progress is also being made with autonomy and automation. One example is our work on the automated disassembly of battery systems. This will allow more vehicle batteries to be recycled in the future.

**Jan Liebherr:** We made remarkable progress in alternative drives, including with the development of machines with electric drives. Our first battery-electric L 507 E wheel loader and the electric material handling machine LH 80 M High Rise Industry are two examples of new innovations. As part of our open-technology approach, we have continued to work with alternative energy sources.

**Let's take a look at the current business year. What are your predictions for 2024?**

**Jan Liebherr:** Although the overall forecasts for the global economy are relatively cautious and the conditions and uncertainties we have mentioned will have an impact, we are confident. A solid order backlog and good demand in many industries give us reason to be optimistic. Due to our high level of diversification and international orientation, we are well placed to absorb declines in individual product segments and countries and maintain our successful course.

**Given that you are celebrating the company's 75th anniversary, what are Liebherr's goals for the next decades?**

**Stéfanie Wohlfarth:** We will continue to focus on healthy growth as a long-term goal for the years and decades to come. We want to achieve this by attracting people who are enthusiastic about technology and want to responsibly help shape the world of tomorrow and beyond with their ideas.

**Thank you for sharing your thoughts!**

This interview was conducted in March 2024.

# How it all began

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**75**  
Years  
of moving forward



## Recognising the signs of the times

After the Second World War ended, the priority in Germany was to rebuild the bombed-out cities. By inventing the mobile tower crane, Hans Liebherr helped to speed up the reconstruction work and laid the foundations for the Group that exists today.

However, success was a little slow in coming. In the first year, he did not sell a single one of his cranes. However, his unswerving belief in his invention proved him right. The prototype crane was used to rebuild the town hall in Wiesbaden (Germany) and was a great success. The Upper Swabian company was about to make history.

When the first TK 10 tower crane left the plant in Kirchdorf an der Iller (Germany), the local highway authority refused let it cross the bridge there, saying it was too heavy. Hans Liebherr disagreed and got in the driver's seat himself and manoeuvred the truck with the crane across. The bridge held firm. A new structural analysis taking account of the large wheelbase of the truck and the more advantageous weight distribution later theoretically proved that Hans Liebherr had been right.

## Milestones in the company's history

Hans Liebherr develops the world's first mobile tower crane, which speeds up the rebuilding of Germany.



The TK 10 set new benchmarks in the construction industry as the first mobile tower crane and laid the foundations of Liebherr's success.

1949



1950



Crane production starts in Kirchdorf an der Iller (Germany) and is later moved to Biberach an der Riss (Germany), when the company starts manufacturing its own components.

When Hans Liebherr is unable to find product components on the market, he quickly starts making them himself.



The demand for cranes increases rapidly and there is a shortage of gear wheels. This prompts Hans Liebherr to go into a new area of business as he develops a gear hobbing machine.

1952



Hans Liebherr develops Europe's first hydraulic excavator, the L300, which is four times lighter than conventional machines.



Low weight plus high performance equals success for Liebherr hydraulic excavators.

1954



1954



Liebherr builds its own refrigerator factory Ochsenhausen (Germany) and starts producing fridges.



Non-stop refrigerators: Hans Liebherr recognized demand at an early stage.

1955



Liebherr widens its range of construction machines to include concrete mixers and starts manufacturing in Bad Schussenried (Germany).



The first reverse drum mixer – still a pre-series model here – becomes a bestseller.

The company expands abroad and builds a plant in Ireland to produce tower cranes and special cranes.



Tower cranes, and later also special and maritime cranes, are produced in Killarney in the Southwest of Ireland.

At the same time as the Irish subsidiary, a Liebherr plant is also being built in South Africa.



## Did you know that ...

**... the first Liebherr subsidiary outside Europe was established in South Africa?**

The demand for high-quality construction machinery was high, but intercontinental transport was expensive. Hans Liebherr expanded to Springs in South Africa in 1958 and was able to supply neighbouring countries from there, too. There are now several subsidiaries in South Africa that cater to the local construction, civil engineering and mining industries and offer back-up service and spare parts for Liebherr machines and equipment.

1958



The "Europe" in Killarney is the first Liebherr hotel. Today, the Group runs six first-class hotels: three in Ireland, two in Austria and one in Germany

1960



Liebherr establishes a plant in Lindenberg (Germany) and enters the aerospace industry.



The aerospace division grows from a repair firm into a world-leading system supplier to the aerospace industry.

1961



Liebherr opens a crawler excavator production plant in Colmar (France) and later expands the product programme.



The RT 1000 crawler excavator produced in Colmar has an operating weight of 20 tonnes.

The establishment of the plant in Ehingen (Germany) heralds the start of the journey to become the global market leader for mobile and crawler cranes.



Bestseller from Ehingen (Germany): the AUK 40T-60 with its 24-metre telescopic boom and fully hydraulic crane drive.

1969



The LTM 1025 is the world's first all-terrain mobile crane and combines on-road and off-road operation.



With the launch of the LTM 1025, Liebherr sets new standards with the world's first all-terrain mobile crane.

1977



Liebherr begins series production of diesel engines, which makes it less dependent on external suppliers.

1984



1970-1976



Liebherr expands to North and South America as well as in Europe and invests in new production sites.

1983



The new wheel loaders have virtually wear-free brakes.



The L 531 and L 541 wheel loaders are launched. Their hydrostatic travel drive reduces fuel consumption. The stepless transmission is ideal for commercial vehicles and the brakes are practically wear-free.

***“We still continue to challenge ourselves to be at the forefront of technology. Technology is not an end in itself – it is always about greater benefits and solutions for our customers, with appropriate value for money.”***

Hans Liebherr, 1985



Hans Liebherr stayed true to his principles his whole life – they continue to shape the company and live on in the Group's core values.

Hans Liebherr dies at the age of 78. The leadership of the family-run company passes to the siblings Isolde Liebherr and Willi Liebherr.

The second generation of the Liebherr family seamlessly continues Hans Liebherr's success and pushes ahead into new markets.

1993



1996



1995



1997



Liebherr begins producing mining trucks for the international mining industry at the site in Newport News, Virginia (USA).



The T 252 mining truck is the first model to be produced in Newport News, Virginia (USA).

Liebherr-Mietpartner GmbH is founded in order to standardise and expand the rental business.

Digitalisation, automation, networking and alternative drives are important areas of research.

Maritime crane production on the Baltic Sea: Liebherr opens a plant in Rostock (Germany) for mobile harbour cranes, ship cranes and offshore cranes in 2005.



Liebherr doubles its revenue and creates thousands of new jobs around the world by investing in site expansions and new production facilities.

The construction of the largest crane in the company's history begins: the HLC 295000 Heavy Lift offshore crane with a lift capacity of up to 5,000 tonnes.

2003-  
2008



Since  
2016



2018

2012



2017



The first members of Liebherr's third generation join the Group's management team.



The HLC 295000 Heavy Lift offshore crane with a lift capacity of up to 5,000 tonnes.

There is a world premiere in the aerospace product area when an Airbus A380 flies with a 3D-printed spoiler actuator valve block for the first time.

In the area of climate-friendly energy sources, Liebherr relies on the alternative fuel HVO, which is obtained from cooking oil waste, fat residues, waste fats and vegetable oil.



The majority of the Group's construction machinery, cranes and mining equipment can be fuelled with HVO.



Launch of the first BluRoX models: the revolutionary technology uses lava rock for cooling and freezing – a quantum leap in energy efficiency.

The Group has made quantum leaps in energy efficiency and circularity in the area of refrigeration and freezing, with the innovative patented BluRoX technology. Liebherr is the only manufacturer in the world to insulate its appliances with a vacuum combined with perlite – a finely ground lava rock with very low thermal conductivity.

2019



With the LB 16 unplugged the Group showcases the world's first rotary drilling rig that can be operated by battery without any restrictions compared to a conventional drive.



All quiet on the building site: Liebherr opens a new chapter with the LB 16 unplugged.

2021



2023



2022

H<sub>2</sub>

**Liebherr has already influenced the history of technology in many industries and will continue to shape the world of the future with its pioneering spirit.**

The first Liebherr hydrogen engine, the H966, also offers great potential for the future and is used in the R 9XX H2 crawler excavator.

# Mobile and Crawler Cranes on WhatsApp

**SUBSCRIBE NOW**

<https://go.liebherr.com/nk9q19>

