



800 TONNE TRIO ERECT NEXT GENERATION WIND TURBINES

Three 800 tonne Liebherr cranes have been used to help erect some of the world's latest and highest wind turbines at the Mahlsdorf wind farm in Brandenburg, Germany.

The cranes, a Liebherr LG 1800-1.0 lattice boom truck crane from rental company Nolte, and two LR 1800-1.0 lattice crawlers, one from Neeb and the other from Hofmann - were used to install 10 new 6.8 MW Nordex N175/6.X turbines with rotor diameters of 175 metres and hub heights of 179 metres.

This is the first wind farm to use the new, more efficient turbines from Nordex's Delta4000 series. The larger diameter rotors provide higher yields per turbine, especially in low-wind areas. Taller turbines also increase effectiveness, as the rotor

is further away from the wind boundary layer near the ground and can thus benefit from higher wind speeds, while also enabling the larger rotors to be installed.

At typical low to medium wind locations, the N175/6.X will achieve between seven and 14 percent more yield compared to its sister models, the N163/5.X and N163/6.X, partly due to the newly designed 85.7 metre long single piece rotor blade and its above average capacity factor. The additional yield is particularly noticeable during periods of lower wind speed, at which point the



turbine can produce up to 22 percent more energy than its predecessors.

However, larger rotors, hub heights and higher component weights place high demands on the cranes that install them. The cranes used on this project benefited from Liebherr's HSL4 boom system, VarioTray and V-Frame. Short conversion times, well planned logistics and maintenance support were further factors contributing to its success. Adding in the auxiliary cranes, a total of nine Liebherrs worked on the job.

The 800 tonne cranes are the smallest that can manage turbines of this size and weight. At 83 tonnes the gearbox is the heaviest single component. To this end, all three cranes were equipped with the HSL4 boom system, a 174 metre main boom plus an 18 metre fixed jib. For the lifts, the cranes used 170 tonnes of superstructure counterweight and 100 tonnes of suspended ballast.

A total of around 400 tonnes of suspended ballast was required to erect the masts. With the help of the VarioTray, the large pallet weighing 300 tonnes can be disconnected from the smaller pallet with the remaining 100 tonnes and set down within minutes. This saves time and effort during erection and setting down. This was particularly useful at the Mahlsdorf wind farm allowing work to be carried out during a two day weather window. The V-Frame also saves time as rotor blades stored further away could be picked up with a large ballast radius and mounted with a smaller radius without having to stack ballast.





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MINIMISING CONVERSION TIMES

A key factor in optimising construction costs is minimising crane conversion times, both within and between different wind farms. Hofmann used SPMTs to move them, so that the cranes did not have to be completely dismantled. For example, the base unit without tracks and the entire counter jib were transported as a single unit. Transport considerations were also the reason why Nolte chose the LG over the LR 1800-1.0. "We are basically a mobile crane company. Since the LG 1800-1.0 does not require the transport of

70 tonne crawler tracks, it is a better fit for our low-loader fleet," says Jürgen Peters of Nolte.

Logistics was also the key challenge for Neeb on this project. Ingo Klees of Neeb said: "We were called in at short notice to provide support. The crane was moved within seven days, including dismantling and reassembly, despite the fact that the crane had previously been in use in the Black Forest, some 850km away from Mahlsdorf. This achievement was only possible thanks to an excellently coordinated team and a well thought out assembly and transport concept."



FAST AND COMPETENT SERVICE

Machine downtime is almost inevitable with intensive use. On this job, one of the crawler crane's tracks had a problem with one of the hydraulic motors. A Liebherr technician arrived on site within a few hours, and the problem resolved. Thanks to an additional night shift and taking advantage of a day of bad weather, the crane was erected in time to assemble tower segments in sync with the other crawler crane.

WELL-EQUIPPED FOR THE FUTURE

Hofmann crane and SPMT operator Erik Piper said: "The LR 1800-1.0 is ideal for assembling these new generation wind turbines and is strong enough to be able to work at wind speeds of up to 30kph based on the wind load tables."

Systems which stabilise and control the rotor blade by using two electronically controlled propellers, also contribute to this. "If you tried to do this with ropes and people on the ground, you could only work at significantly lower wind speeds, which would lead to longer downtimes." ■



STS JACK-UP OPERATION

Crane and heavy lift group Sarens recently carried out a jack-up operation to lift two 620 tonne Ship-to-Shore (STS) cranes by 11 metres for Quality Futura at its Intersagunto Terminales facility at the Port of Sagunto, Valencia, Spain in order to install leg extensions.

The extensions raised the lift height of the two cranes by 11 metres, which allows the terminal to offload larger vessels with up to 10 container levels above deck, boosting the terminal's handling capacity and operational efficiency.

The terminal has an annual capacity of around 190,000 TEU (Twenty-foot Equivalent Units) and complements the Port of Valencia with container, general cargo and bulk traffic, offering an alternative with transport connections for industries around Sagunto and between Valencia and Teruel.

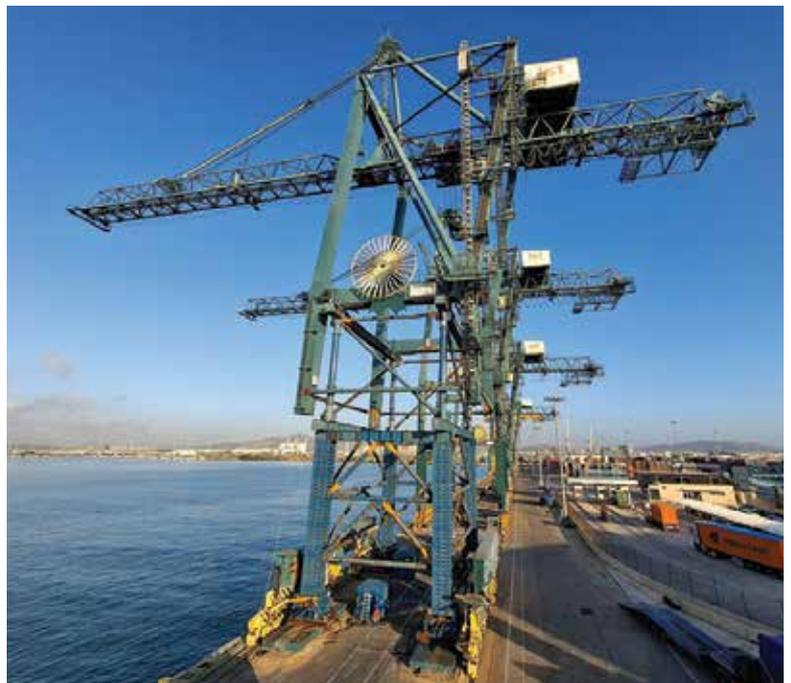
This was the first project of this type that Sarens has carried out with its 350 tonne capacity, bottom feeding CS350 climbing system, which it developed in-house in 2020. Stability during the lift was a primary concern as the centre of gravity of the two cranes was 42 metres above ground level.

Sarens selected four CS350 bases for the lift due to their stability. The bottom-feed design negates the need to work at height, unlike top-feed systems. The CS350 has a 450mm jack stroke,

while the height extension elements are 300mm. It can lift loads of up to a height of six metres without the need for extra shoring. Above this, as in this case, it was required to stabilise the towers. A modular steel beam structure at the top of the lifting towers, weighing around 100 tonnes, was employed.

In total 16 truckloads of machinery and material were required, all of which was delivered and assembled at the port over five days - the main difficulty was fitting all of the bracings.

During the operation, Sarens' engineering team



closely monitored wind speeds, with delays caused by adverse weather conditions, including days with temperatures exceeding 30 degrees C and periods of heavy rain, preventing work from being carried out. When the weather cleared, it took a team of six from Sarens just two days to jack each crane to its final height and install the extensions. ■



REPLACING COKE DRUMS IN CANADA

The saying 'time is money' is particularly relevant when facility shutdowns are required, especially in the oil & gas sector where trimming even a single day can result in significant savings. The key to ensuring a schedule is completed on time or even accelerated is thorough planning and having skilled people and the right equipment in place.

Dutch international crane, heavy lift group Mammoet helped Canadian energy provider Suncor extend the life of its upgrader Base Plant site in Fort McMurray by 20 to 30 years by replacing the eight original 29.8 metre high, 7.9 metre diameter coke drums - each of which weighed 270 tonnes. The challenge was to do it with as few lifts as possible. An upgrader is a facility that uses thermal and chemical processes, including coking and hydrotreating to convert bitumen - extra heavy oil - into synthetic crude oil. The coke drums gather the petroleum coke that is separated from the feedstock during the refining process.

Mammoet's engineering team first considered using a 1,350 tonne Liebherr LR 11350 crawler crane placed beside an upgrader wall, but this wasn't feasible as it interfered with operations and maintenance work in the area. Therefore, the team chose a 3,200 tonne Mammoet PTC210DS ring crane with. Not only did the crane have the required capacity to lift the heaviest component - a six-drum derrick weighing over 1,200 tonnes - but, because of its impressive reach, it could be



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assembled far enough away so as to not disrupt or disturb other on-site work.

However, as the PTC had to be erected inside the coke pit, civil engineering work was needed to strengthen the ground, including installing 200 driven piles to build a solid foundation.

The PTC 210 DS is an upgrade to the PTC 200 DS with the main boom strengthened and additional counterweight added, allowing it to manage heavier lifts at longer radii. The PTC 210 DS has a maximum main boom length of 140 metres and can lift 442 tonnes at 141 metres radius. It can also manage 3,200 tonnes at 58 metres.

Mammoet was an integral part of planning the project more than seven years prior to the first lift and advised on the right crane for the job. The main consideration was reach rather than maximum capacity. This helped when one of the new components was heavier than originally estimated. The team also helped accelerate the schedule by shortening the time between two of the biggest lifts enabling the upgrader's early return to operation.

GETTING EVERYTHING READY AND IN PLACE

The first step was having the new drums delivered to site from the fabricator in Edmonton. The process began 18 months before the shut down.

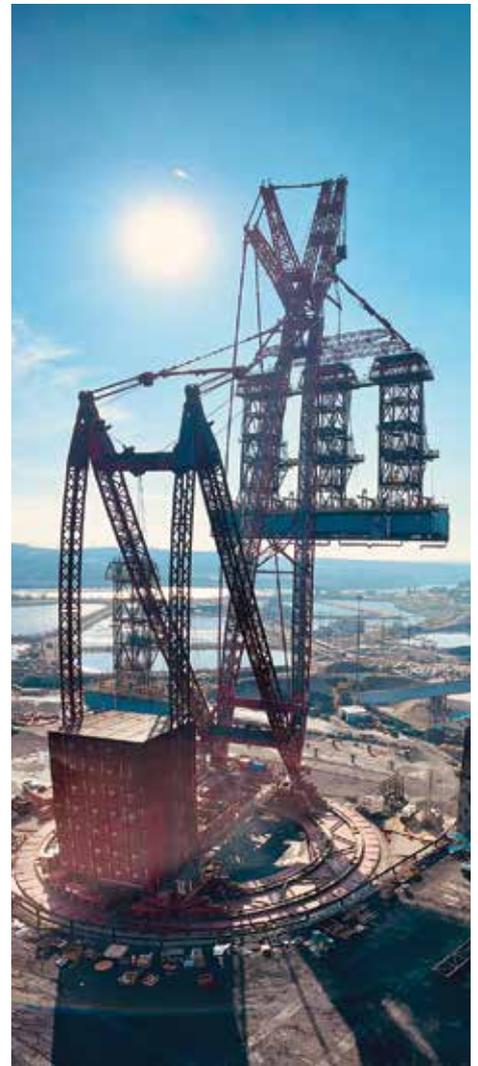
"Our plan was to have everything the company needed - equipment, materials and components - on site by December 2024 so that on May 1st when the plant was shut down, the turnaround

could begin without interruption," said Mammoet's Niek de Winter. "The crane was assembled and everything on site months ahead of time, allowing us to eliminate delays mid-project."

The old derricks - in a two drum and six drum configuration - were lifted first, followed by the eight coke drums and finally their concrete foundation sections. The old components were placed onto SPMTs and driven to a nearby laydown area for decommissioning. The process then happened in reverse for the installation of the new components.

The fourth deck derrick 'supermodules' - named for their mammoth size - were transported in smaller sections and assembled on site.

Thanks to the detailed planning, production at the site continued right up until the day before the shutdown. "As soon as we are called on, we were ready to perform the next lift," said Reid. "When you have a client that is planning their multi-week event right down to 15 minute intervals, time is of the essence." ■

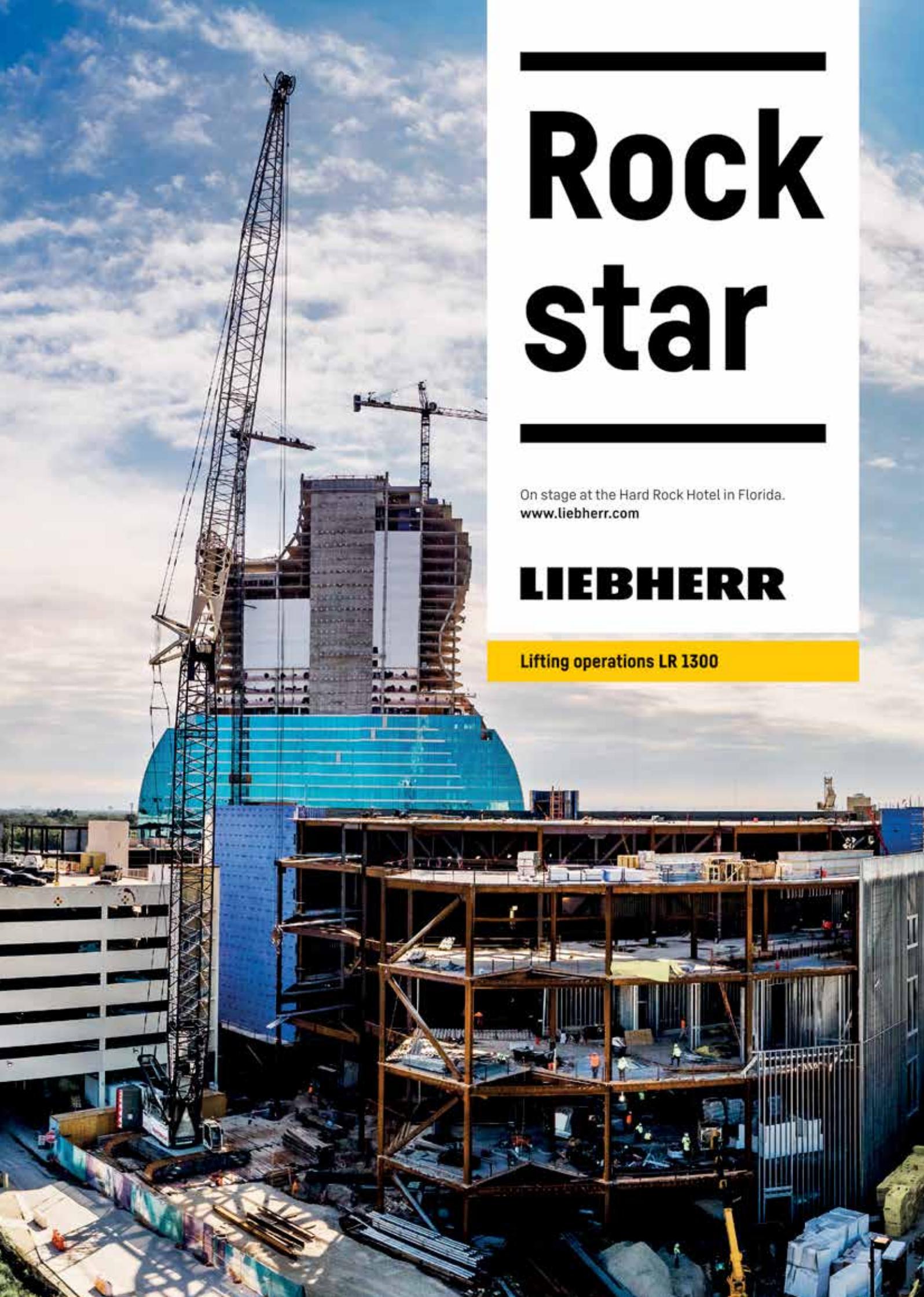


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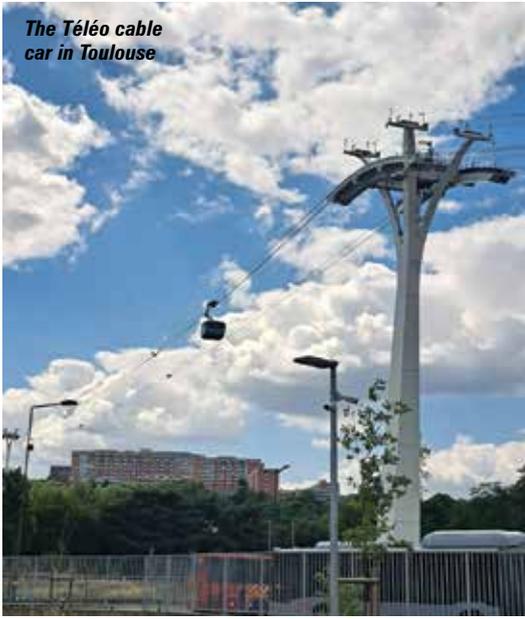
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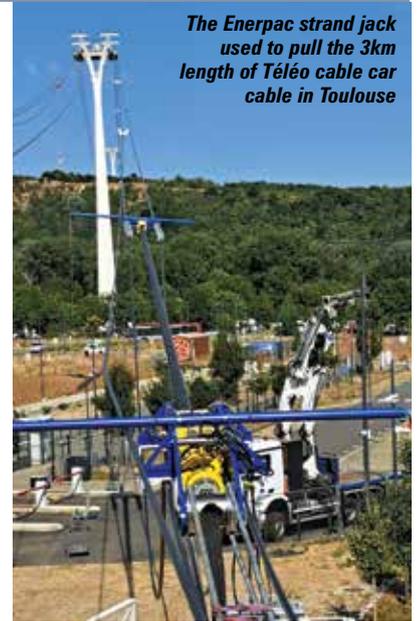
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The Téléo cable car in Toulouse



A close up of the Enerpac strand jack

The Enerpac strand jack used to pull the 3km length of Téléo cable car cable in Toulouse



ENERPAC STREAMLINES CABLE CAR MAINTENANCE

Poma, the leading cable transportation company has used Enerpac strand jacks to streamline aerial cable maintenance operations on the 3km Téléo cable car in Toulouse - the longest urban cable car in France. The new system, developed in collaboration with cable maintenance specialist Comag, has significantly reduced cable tensioning times.

The Téléo cable car route connects Paul Sabatier University to the Oncopole Institute via the Rangueil Hospital and takes just 10 minutes to travel the full distance at a height of up to 70 metres above ground level and typically carries 8,000 people a day in 15 cabins/cars that can accommodate up to 34 in each. Four carrier cables are used in the system, with two cables per track, as well as a looped traction cable. The cabins run on these continuous cables - similar to a railway track - without breaks.

Rope repositioning is a key part of cable car maintenance and Poma aimed to optimise the time required for the operation and to leave the cable sliders in position by pulling two track ropes at the same time. To achieve this, two of the track ropes are attached to a lifting beam, which in turn is attached to an Enerpac HSL 20006 strand jack. By extending the strand jack, the cables can be tensioned up to a maximum of 240 tonnes in incremental steps of 480mm.

After slackening the cables at Paul Sabatier station, the track ropes were tensioned by the strand jack positioned at the Oncopole-Lise Enjalbert terminus 3km away at the end of the cable car run. During the tensioning operation, 30

metres of cable was moved to regain the correct cable position.

"Pulling both cables at the same time, in perfect synchronisation, was a major objective of the operation, until now we have relied on a pulling winch and hauling system for each cable, a time consuming process," says David Blanchet of Comag. "The Enerpac strand jack was the right choice for us thanks to its operating speed, ease of use and small size, which allowed us to place it between the two track ropes in a horizontal frame. We look forward to deploying the stand jack system on other cable maintenance projects."

The Enerpac HSL 20006 strand jack was supplied by local dealer Faure Technologies, which also played a key role in supporting Poma and Comag. Strand jacks work by gripping and pulling on multiple steel strands in a controlled, step by step manner. By alternately gripping and releasing the strands, the jack effectively 'displaces' or 'lifts' heavy loads.

Poma has been involved with ski lifts since its founder, Jean Pomagalski, 29, designed and installed the very first lift on the snow-covered peaks of Alpe d'Huez, France, in 1934. He patented the concept in 1936 and went on to

Jean Pomagalski with the first Poma lift in 1934



commercialise his invention, incorporating his business in 1946, initially as the Pomagalski company - the Poma name came along in 1958 with the move into the US market.

The company's lifts boosted the popularity of downhill skiing, leading to the development of hundreds of ski resorts across Europe and North America. Some smaller ski lifts, especially in the USA, are still known as Poma lifts. Today, there are more than 8,000 Poma systems in operation for urban transport, tourist attractions, and industrial material transport. ■



COMPLEX FRENCH DAM REFURBISHMENT

The refurbishment of a large dam is always a challenge due to the extremely confined space on top of the structure. As a result, it typically requires a custom solution, as was the case in the comprehensive overhaul of the historic Barrage de Lavalette in the Haute-Loire department of southern France.

The works were led by civil engineering contractor Legendre Génie Civil, which commissioned Wolffkran to provide a lifting solution. It employed a Wolff 7534.16 Clear flat top tower crane mounted on a City Portal base, as a road running along the top of the dam could not be closed for the entire time the remedial work would take. The dam requires the replacement of three floodgates that date back to the 1950s, as well as the modernisation of a fourth gate from the 1990s, all of which have suffered significant wear after decades of operation.

With a hook height of 20.4 metres, a jib length of 40 metres, and a maximum capacity of 16 tonnes, the crane was used to install temporary structures as well as lifting out and installing the old and new gates.

"The dam crest is only 6.7 metres wide, which made crane erection and delivery logistics a demanding task for our team," says Wolffkran's Cécile Caron. "Wind gusts exceeding 45kph further complicated the installation and extended the assembly time from the planned two days to around 3.5 days."

KEEPS TRAFFIC MOVING

The crane was installed on a 5.2 metre wide Wolff City Portal 520 to allow traffic to pass underneath. The load applied by each of the four portal legs had to be distributed evenly along the dam crest. Two 12 metre long load distribution beams were therefore placed on either side of the road, under the portal. 90 tonne All Terrain cranes were used to place the beams and then install the portal and tower crane on top. In spite



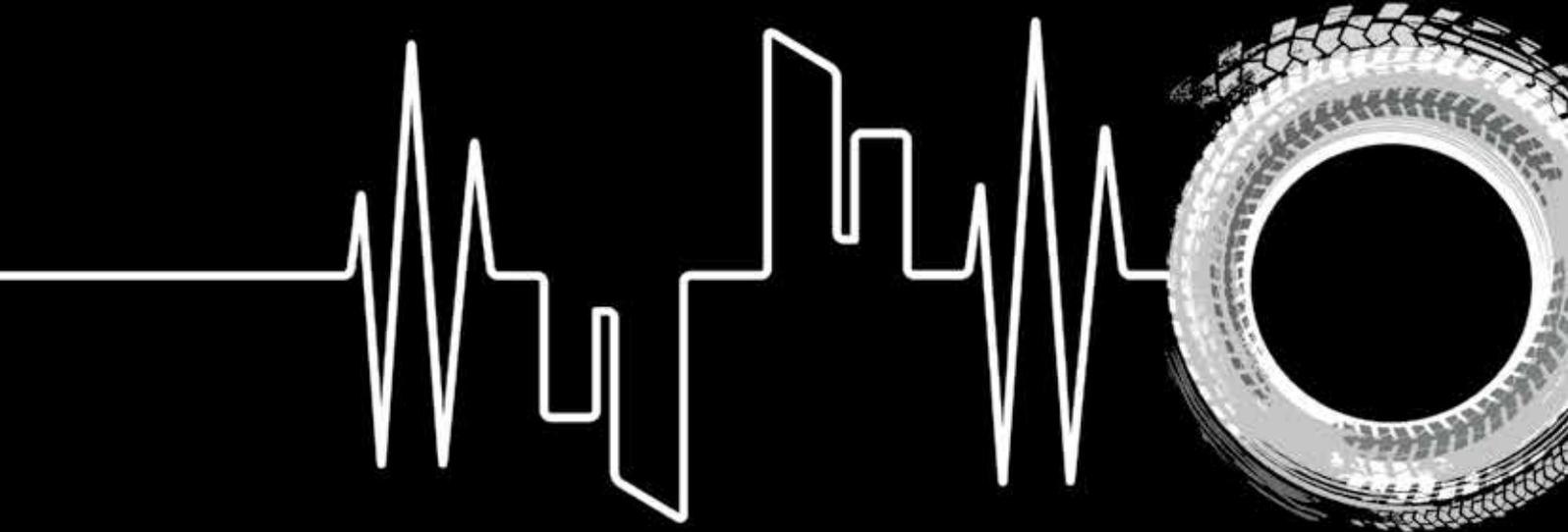
of the portal solution, the road has to be closed on weekdays between 9:00 and 14:00, as the crane is not permitted to slew loads over the active roadway for safety reasons. All lifting operations must therefore be carried out within this five hour time frame.

One particularly challenging phase of the project was the removal of one of the floodgate counterweights. The concrete block weighed around 51 tonnes and so could not be moved as a single unit. It was therefore split into sections on site, each of which weighed no more than 16 tonnes, allowing them to be removed by the crane.

François-Xavier Béthuel, head of Legendre Matériel's crane division says: "Wolffkran was the only provider able to offer a complete solution including the crane, portal structure, assembly and service within the given constraints. The Wolffkran team was closely involved in site planning from an early stage and is also responsible for operation, service, and maintenance throughout the 24 month construction period, allowing us to source everything from a single provider." ■



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