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Heavy lift cranes in action

Lifting heavy loads in challenging circumstances make for interesting overviews and they often include some really good photography, stimulating the interest and creative juices of keen crane people. The following applications really need no introduction, but just to say that we were faced with a huge selection of lifts from the last 12 months to choose from for this item. With space at a premium, we have made the selection based on photography and interest with a selection from the specialist mega lifting machines, a big crawler on its first job with an all-new attachment, to the first job for the world's largest lifting vessel. We hope you find them all as interesting as we did:

Hinkley Point heavy lift

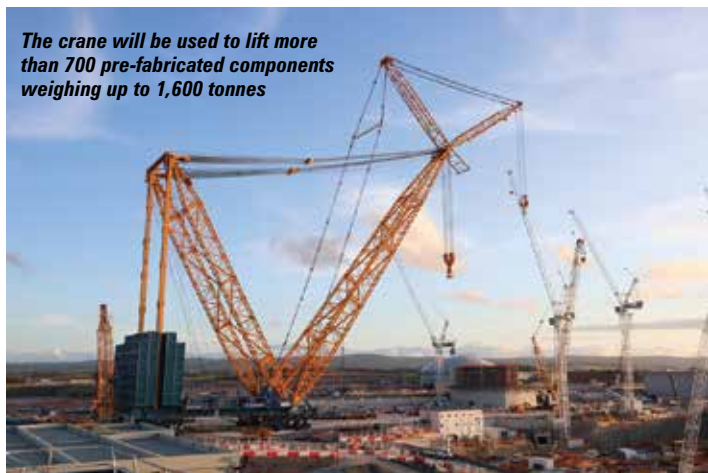
Following the launch and successful testing of Saren's 5,000 tonne SGC-250 - affectionately named Big Carl after the company's technical director Carl Sarens - the crane was immediately dismantled and shipped to the UK on more than 400 transport vehicles in order to assist with the construction of the Hinkley Point C project.

The site is one of the largest in Europe and the first nuclear power station to be built in the UK in more than 20 years. Upon arrival, the

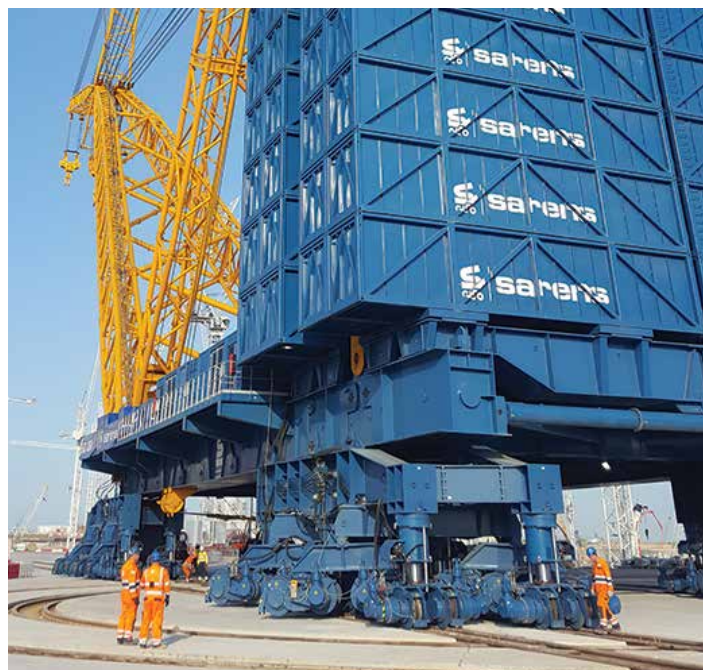
Key facts:

- One of the largest sites in Europe
- 5,000 tonne SGC-250 heavy lift crane
- Carried out its first ever lift

The crane will be used to lift more than 700 pre-fabricated components weighing up to 1,600 tonnes



'Big Carl' carrying out its first ever major lift earlier this year



SGC-250 the crane was rigged with 118 metres of main boom and 52.3 metre luffing jib ready for its first major lift. Fitted with a custom-built 700 tonne Sparspin spreader system, which allowed for six pieces to be individually controlled during a lift, the crane worked through the night to lift the 170 tonne prefabricated dome on the reactor's steel containment liner.

In its current configuration the crane can handle 4,250 tonnes at a radius of 40 metres, and take a staggering 883 tonnes out to its maximum 170 metre radius. In terms of counterweight, the crane uses its 52 specially reinforced shipping containers which are filled with 'locally sourced ballast material' such as sand, to provide a 100 tonnes of counterweight each - up to 5,200 tonnes in total.

The crane will be used throughout the construction of the power station, lifting more than 700 pre-fabricated components weighing up to 1,600 tonnes each over the next

four years. The loads will range from precast concrete elements to pipe sections, steel rings and machinery equipment.

In total, more than 6,000 metres of track has been laid on the site - which will allow the crane to travel fully rigged between three lift locations - using a similar rail system that it uses for slewing. This, coupled with its impressive lifting capacities, has allowed larger components to be manufactured in 'factory like conditions' onsite.

Hinkley Point C construction director, Rob Jordan, said: "The crane is an impressive piece of kit and a world beater. It allows us to innovate in the way we build the power station, lifting complete pieces out of our factory bunkers and into place across the site. Prefabrication helps us boost quality, gives better conditions for skilled workers and saves time - that's good news for the project and an example of learning lessons from success at other projects."

Mammoet installs Ain Dubai

Back in 2014, Meraas placed a lifting contract with heavy lift company Mammoet to install Ain Dubai - the world's tallest observatory wheel - scheduled to be built on Bluewaters island in Dubai.

Although the first major lifts would not take place for a further two years, being involved in the planning stage of the project allowed Mammoet to propose that the largest components be installed directly from the barge using its 5,000 tonne PTC 200-DS ring and 3,000 tonne Liebherr LR 13000 crawler crane. In doing this, the company said, it would provide greater efficiencies, safety and cost savings by eliminating the need for temporary storage and multiple barge transports while dramatically reducing the amount of work at height required.

In 2016, Mammoet's first task was to install the observation wheel's four legs. Prefabricated in Abu-Dhabi and transported to Bluewaters island on a barge, each leg measured 126 metres

in length, 6.5 metres in diameter and weighed 890 tonnes.

In order to comfortably position the legs onto their foundations, the legs were lifted to a height of 137 metres with the PTC 200-DS, which took the top end, rigged with its 140 metre main boom and 36 metre jib, while the LR 13000 configured with a short main boom took the base.

With all four legs in place, the cranes then carried out - what the company claims - was the world's heaviest and highest land based tandem lift, placing the 1,900 tonne spindle on top of the four legs. For this lift the LR 13000 was configured with Liebherr's dual section Power Boom system and was required to track from the barge into position, while the PTC 200 was able slewed into place from the barge.

With the frame of the observation wheel complete, the LR 13000 remained on site to install the eight rim sections, each weighing 700 tonnes, as well as the 112 metre long temporary support spokes,

Key facts:

- World's tallest observation wheel
- 5,000 tonne PTC 200-DS ring crane
- 1,900 tonne spindle installed



Mammoet's PTC 200-DS and Liebherr LR 130000 cranes installing the wheel's 1,900 tonne spindle



'Smaller' 600 and 400 tonne crawlers were used to remove the temporary support spokes towards the end of the project

weighing 470 tonnes, to form the wheel. The crane was set up between the wheel and the barge in order to install each section in a single lift without needing to set them down or reconfigure the crane. Once the wheel was completed and all 192 spoke cables in place and secured, Mammoet supplied two

more modest crawler cranes, a 600 tonner and a 400 tonner, to remove the temporary spokes.

Standing at 250 metres, Ain Dubai is almost 85 metres higher than what is now the second highest observation wheel located in Las Vegas.

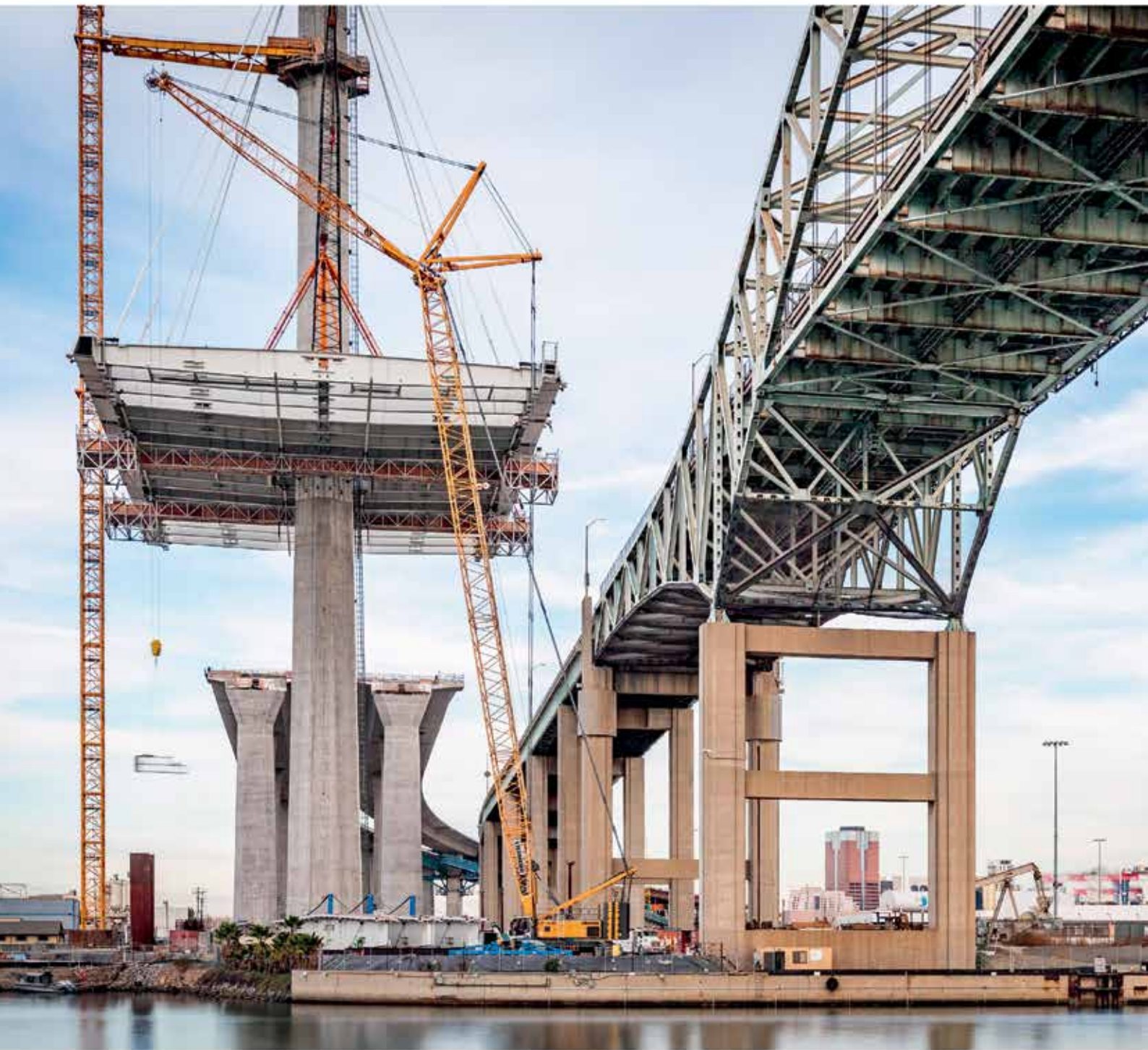


Temporary spokes were installed to support the heavy rim sections



Ain Dubai ready for Expo 2020

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Men from Marrs

Another big crane working on the Hinkley Point C project is the 330 tonne Favelle Favco M2480D luffing jib tower crane which - you guessed it - is the largest luffing tower crane in the world.

The crane belongs to Australian tower crane rental company Marr Contracting and was shipped to the UK last year in order to assist with the installation of 9.5km of tunnels required for the nuclear reactors' cooling system.

Set up with a 72 metre freestanding height, the M2480D has been configured with its main boom and luffing jib to offer a maximum radius of 102 metres, at which it can handle around 25 tonnes. One of the crane's first lifts was to install a tunnel boring machine as well as lifting tunnel sections into place.

As well as saving space on the site, the M2480D is fully rated to operate in wind speeds up to 20 metres a second.



The M2480D is being used to place tunnel sections and for other duties

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'V' for victory

Placing a large railway bridge over the river in Moudon, western Switzerland, presented crane company Emil Egger with a real challenge. The weight of the bridge - 380 tonnes - was further complicated by extremely restricted space on either side of the river, and the presence of a number of protected trees congesting the slewing area. The job involved lifting the bridge from its assembly point and slewing it 180 degrees in order to place it on the bridge abutments at a radius of 38 metres.

As such it required a large crane with a substantial suspended ballast radius but slewing past the trees made this impossible. However it proved a perfect job for the company's brand new Liebherr LR 11000 equipped with the first LR 11000 V-Frame variable counterweight system to be delivered. The V-Frame allows the suspended derrick counterweight radius to be dynamically varied from 13 to 30 metres.

In this case the crane was rigged with 440 tonnes of derrick ballast and once the bridge had been lifted, it was raised in closer to the crane, allowing the suspended counterweight radius to be reduced

Key facts:

- First LR 11000 V-frame counterweight system
- 1,100 tonne Liebherr LR 11000 crawler
- Lift 380 tonne railway bridge

to its 13 metre minimum, just enough to clear a small row of protected trees as the crane slewed the load. Once past the trees the counterweight radius was then extended to 28.5 metres, allowing the crane to place the bridge on its abutments at a radius of 38 metres.

Managing director Michael Egger said: "Without the hydraulically adjustable ballast radius, hoisting the bridge would have been significantly more expensive. Firstly, it would have required much more expensive work on the embankment to get closer to the abutments with a crawler crane. And then we would also have required a much longer crane track to complete the bridge immediately in front of the abutment."

"Another benefit of using the V-Frame for jobs, is that the derrick ballast pallet has a maximum ground pressure of 150 kN/square metre thanks to the integral load distributor plates. The ground

pressure from a ballast trailer is at least three times higher than that and often requires expensive ground preparation."

"A clever feature that helped us complete the job quickly was the VarioTray detachable ballast system. The facility to simply unbolt the central section eliminates the need for a mobile crane to stack and de-stack the ballast slabs. Because of the situation on the site, we would have needed a large crane and would have lost an enormous amount of time and required a great deal of space," says Egger. "In most cases, our LR 11000 can position the derrick ballast pallet - or at

least the outer section - itself since the central section of the ballast remains on the crane and therefore only around 300 to 350 tonnes have to be moved."

Liebherr monitored and supervised the whole process from setting up the crane to positioning the bridge. It even carried out a live simulated lift at the factory with Liebherr's Dominik Gemeinder from the crawler crane test site at Echingen, saying: "We used an identical crane on our test site with the same set-up configuration, the same parameters as the Swiss site and a load of the same weight to simulate this lift."

Egger's Liebherr LR 11000 places the bridge on its abutments



The bridge is lifted from its assembly point

C&A

heavy lifting



The counterweight distance is reduced to 13 metres in order to squeeze past the protected trees



Floating giants

When it comes to ultra-heavy offshore cranes they don't come more powerful than the giant Sleipnir semi-submersible crane vessel named after Sleipnir, the eight legged horse ridden by Odin in Norse mythology. Ordered in 2015 and built in Singapore by Sembcorp Marine for offshore oil & gas installation specialist Heerema Marine Contractors it completed its sea trials and crane load testing last July, replacing Hereema's SSCV Thialf as the largest crane vessel in the world. With an overall length of 220 metres and a width of 97.5 metres, the vessel has been equipped with two identical 10,000 tonne Huisman revolving tub cranes which can carry out tandem lifts up to 20,000 tonnes.

Designed to work on large offshore projects such as jacket installations, topsides, deep water foundations, moorings and other such structures, the cranes feature a 144 metre boom including the final offset section, and can handle their maximum capacity at a radius of 48 metres, and a mind boggling 4,000 tonnes at 82 metres radius. Maximum lifting height on the tip, which uses the whip hoist is 181 metres above the waterline with 32 metres of draft or 153 metres radius where it can handle 200 tonnes in either configuration.

Key facts:

- World's largest crane vessel
- Two 10,000 tonne Huisman tub cranes
- 15,300 tonne offshore platform

Mounted on the stern of the vessel, the cranes revolve on the world's largest slew rings with an overall diameter of 30 metres, dual fuel engines are powered by Liquefied Natural Gas and low sulphur marine gas oil. And you will notice that the vessel has a third crane, at the front of the vessel, a little pedestal crane



Heerema's Sleipnir features two 10,000 tonne Huisman tub cranes



The cranes slew rings have a 30 metre diameter - the world's largest

which can handle 70 tonnes at a mere 12 metres radius, or 25 tonnes at 60 metres!

On completing its commissioning and entering service, Heerema's Sleipnir went directly to work

on Noble Energy's Leviathan development in the Mediterranean where the two cranes combined to carry out a tandem 15,300 tonne lift on an offshore platform, and this completing the world's heaviest lift ever by a crane vessel. This was followed by a second project installing the lifting of two offshore platforms weighing a combined 24,500 tonnes, all of which was completed in less than 20 hours.

The fact that the new vessel can handle such large modules, makes it a very cost effective and safer solution, in that it can significantly reduce the offshore installation process and time. Heerema chief executive Koos-Jan van Brouwershagen said: "We are very proud of this achievement. Sleipnir is a unique vessel, it is also LNG powered and thus climate friendly. And our client enjoys the benefits because lifting larger modules means less time involved and therefore a smaller budget will suffice for a job."



Both cranes carrying out the record 15,300 tonne tandem lift

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