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# Bigger and bigger...

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**heavy lift**

*ALE's new heavy duty jib on a 5,000 tonne capacity AL.SK350 lifting a 1,276 tonne module on a FPSO in Lagos, Nigeria*

Earlier this year we looked at the specialist crane developments when erecting the new larger wind turbines. This month we see how heavier modules are being installed in sectors such as construction, civil engineering, industrial, petrochemical and power generation.

Construction sub-assemblies and components are getting heavier and bulkier as pressure rises to complete contracts quicker and more efficiently, while reducing the amount of work at height. This raises the challenge of moving and lifting these larger modules, a challenge that specialist moving and lifting companies are responding to.

As a result, an increasing number of the largest loads - particularly in the petrochemical and power generation sector - are now lifted with alternative methods such as jacking systems and custom build mega cranes/large lifting machines, rather than large cranes built by the leading crane manufacturers, as it becomes ever more difficult to design regular production cranes that appeal to a sufficient number of crane rental companies to justify the cost of development.

The last big crawler crane launch was Liebherr's 3,000 tonne LR 13000, the first of which was sold to Mammoet six years ago for power station and petrochemical work. Other crawler cranes such as Liebherr's LR 11350 and Terex's CC3800/6800/8800 are becoming quite dated, although they do tend to be upgraded each time a new order is received.

All Terrain crane capacity appears to have stalled at 1,350 tonnes - the latest two Liebherr units having been sold a few months ago to Russian rental company Topkran for work on industrial, petrochemical and infrastructure work. As a result the heaviest lifts are increasingly carried out by a small group of specialist heavy lift companies, such as ALE, Sarens and Mammoet. Although having said this, a large number medium to heavy lifts are still carried out by mobile cranes



- both wheeled and tracked. In an effort to extend the capability of their larger capacity mobile cranes both Liebherr and Terex offer upgraded boom configurations - the Power Boom and Boom Booster respectively - which provide up to 40 percent increases in capacity. Most 'large' mobile crane purchases

at the moment though appear to be in the 300 to 750 tonne range, as regular crane rental companies increasingly leave the heaviest lifts to the heavy duty specialists.

In the following pages we look at a few applications highlighting the equipment available for these heavy lifts.

## Innovative heavy duty jib

ALE's new heavy duty jib has been used with its AL.SK350 crane for the first time, lifting a 1,276 tonne module on a Floating Production Storage and Offloading Vessel (FPSO) in Lagos, Nigeria. Claiming to be the world's largest capacity land based crane, the 5,000 tonne, 354,000 tonne/metre AL.SK350 - launched in 2013 - was rigged in its largest configuration with a 124 metre A frame main boom, plus the 38 metre heavy duty jib for additional outreach, 4,000 tonnes of counterweight at a 49 metre ballast radius and heavy winch system.

The project requires six modules weighing between 335 and 3,000 tonnes to be lifted and installed from the fabrication yard to their final position on the vessel. The new modular jib, built in 2016, is designed with a wide strut top that can be assembled in different configurations.

Maximum lift is 3,400 tonnes with a maximum length of up to 100 metres.

ALE's senior design engineer Jan Oomen said: "Following successful test lifts up to 3,403 tonnes using the jib configured with 100 metres

outreach, we were happy with the results and rigged the crane with a mast more than 162 metres long and the strut jib to a length of 35 metres. This jib is designed like no other, using guylines from the wide strut top to the narrow jibhead to provide enormous side support which also boosts the lifting capacity of the overall crane and extends outreach. Because of the restricted space in Lagos, the AL.SK350 is the ideal solution as it can be strategically positioned to lift from one location and reduce the overall project costs and schedule." AL.SK cranes are also available in AL.SK190 and AL.SK700 configurations with capacities up to 4,300 tonnes and 8,000 tonnes respectively, both can be fitted with the 3,400 tonne heavy duty jib.

*The AL.SK350 was rigged in its largest configuration with a 124 metre A frame main boom, plus the 38 metre heavy duty jib for 100 metres of outreach*



# Largest Sarens crane for UK project

This year Sarens will use its new SGC 250 crane on the Hinkley Point nuclear power plant in Somerset, UK for joint venture clients Bouygues Travaux Publics and Laing O'Rourke Construction. The four year project is worth in excess of £20 million to Sarens. The 250,000 tonne metre SGC 250 is the largest SGC in the Sarens fleet and thanks to six kilometres of rail laid on site will be able to travel between three different lift locations without the need for disassembly and re-assembly.

The SGC 250 will begin performing various lifts ranging from 50 to 1,150 tonnes or more at radii of up to 165 metres. It will pick up and install prefabricated concrete elements, steel structures and reactor equipment directly from each prefabrication position. A 600 tonne Terex Demag CC 2800 will be used as a rigging and assist crane.

The crane will be moved, overland from Gent in Belgium to a yard in Somerset, before being shuttled to the project site. An estimated 280 trucks will be required to deliver the entire crane, although at the moment the narrow lanes leading to the site only allow 10 trucks a day. Plans are in place for a purpose built access road at the site, but a lot of planning will still be required just for the delivery.

With 52 large tower cranes also working on site, the SGC 250 will be equipped with an anti-collision system and will perform many of its lifts at night in order to minimise disruption to daytime lifting work. The light needed to operate at night will pose a challenge as it will disturb a protected species - a local bat population.



The SGC 250 will begin performing various lifts up to 1,150 tonnes or more at radii of up to 165 metres.



The bridge deck on the Victrol pontoon ready for the 50km journey to Antwerp

## Enerpac Jack-Up system smooths transport of Antwerp harbour bridge deck

As part of the Antwerp Noorderlijn transport initiative, the Londonburg bridge on the island of Eilandje in Antwerp's old harbour area had to be replaced with a wider bridge with two traffic lanes, foot and cycle paths in both directions and a tram line in the central reservation. Antwerp-based Roll-iT was charged with moving the new bridge to site and used an Enerpac JS-250 Jack-Up system to help negotiate the 300 tonne bridge deck through the Belgian canal network. Manufactured by steel construction company Aelterman, the structure was transported 50km from Gent to Antwerp on board a Victrol canal pontoon.

The biggest challenge facing Roll-iT was the need to lift the bridge deck over obstacles in the canal network, specifically the Kattendijkdok lock and the historic lock keeper's cottage/control tower of the existing bridge. Given the level of disruption to local traffic and services it was decided against using a crane. The multi-point Jack-Up lifting system consists of four jack-up towers, one positioned under each corner of a load. The lifting frame of each tower contains four hydraulic cylinders which lift and stack steel barrels. The load is lifted in increments as barrels are inserted via an automated system forming the lifting towers. The JS-250 has a lifting capacity of 1,000 tonne (250 tonnes per tower) and can raise the load to a height of 10 metres.

At the Aelterman steelworks, Roll-iT used a combination of two 12 axle SPMTs and the JS-250 to lift the bridge deck and then transport it onto the pontoon. Once the bridge deck was loaded, the jack-up towers were fully lowered and securely fastened to increase the pontoon's stability. The bridge deck was then raised to a height of 7.5 metres to avoid the various obstacles when entering and leaving the Kattendijkdok lock and the lock keepers cottage/control tower.

Roll-iT account and project manager Tom Van Runckelen said: "The Enerpac Jack-Up system increased our lifting options when we were considering how we might overcome the obstacles encountered using the canal network route. It was very stable and surprisingly quick. Raising and lowering the bridge deck was completed in a fraction of the time we had expected."



Raising the bridge deck ready for installation



# *Advanced lifting technology*



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# 'Grand Paris' TBM lift

'Grand Paris' is a project to transform the Paris metropolitan area into a major global metropolis. The massive plans involve modernising and extending its infrastructure with more than 200km of new Metro underground line, including 68 new stations. As a result the greater Paris area will become the largest construction site in Europe as the plans progress over the next two decades. While the infrastructure plans include numerous other projects, the extension to the public transport network alone will cost €35 billion. The growth in residential property builds, for example, will double to 70,000 new apartments a year resulting in the most densely populated capital city in Europe with 22,000 people per square kilometre.

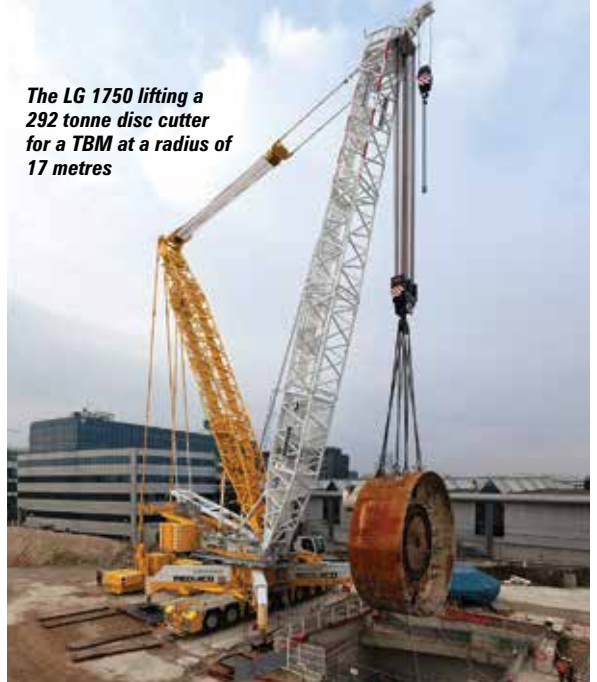
Patrick Meublat, technical director for crane rental company Mediaco, which has a depot in Thieux in the north-east of the capital, said: "The jobs for our cranes around Paris over the next few years will be dominated by assembling and dismantling tunnel drilling machines and hoisting railway and road bridges."

With a view to such future work Mediaco purchased a new Liebherr LG 1750 truck

mounted lattice boom crane, which has already completed a couple of 300 tonne TBM lifts for the 'Grand Paris' project. The crane has worked in compact configuration, with a 35 metre main boom and derrick boom.



The disc cutter with hydraulic drive measures almost eight metres in diameter



The LG 1750 lifting a 292 tonne disc cutter for a TBM at a radius of 17 metres



The 150 tonne derrick ballast with a variable radius (shown suspended) was only required for the first phase of the lift



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## Mega Jack 800 STS crane jack-ups in Barcelona

ALE used its Mega Jack 800 system at the Barcelona Europe South Terminal (BEST) in Spain, to lift three ship to shore container cranes - each weighing 1,390 tonnes - by six metres in order to extend them. On site disruption needed to be minimised as port activities were ongoing and the solution needed a high capacity yet small footprint.

The Mega Jack 800 - which has 800 tonnes capacity in each of the four towers - performed the jacking in 12 stages. A jacking frame was also deployed to support the crane structure. The project was made more challenging because of low ground bearing pressures and a congested site. The project took two months and was completed at the end of last year.



The Mega Jack 800 has 800 tonnes capacity in each of the four towers and performed the jacking in 12 stages.

## Biggest Goliath crane in the Nordics

C&a

heavy lift

Mammoet recently used two cranes - a Demag CC6800 and a Liebherr LR11000 - to erect a new Goliath crane at Meyer Turku shipyard in Finland. It is the biggest Goliath crane in Northern Europe with a capacity of 1,200 tonnes, a span of 154 metres and a height of 120 metres. The installation will help the shipyard fulfil new orders for increasingly larger cruise ships.

The Demag CC6800 and a Liebherr LR11000 erecting one of the gantry legs



Limited working space on site was one of the main concerns since the Goliath crane needed to be erected alongside ongoing construction work on the cruise ships. The most space efficient method devised was using the legs of the Goliath crane as part of the installation equipment. By erecting the 540 and 700 tonne legs of the crane first these could then be used as a gantry to raise the main girder without the need for additional equipment.

Mammoet used the two cranes to erect the legs with two additional 500 tonne crawler cranes positioned each side of the legs to install the strand jacks for lifting the 2,500 tonne main girder. To increase safety and efficiency, Mammoet fully preassembled the strand jacks at ground level enabling them to be lifted to the top of the legs in one go. The company also designed various custom lifting tools to make the installation and removal work safer and more efficient.

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## Mammoet hits record height

Mammoet has set a new record lifting height for its PTC 200 DS heavy lift crane at the Lotte Chemical's Mono-Ethylene Glycol project in Louisiana, USA, lifting a variety of heavy loads in 62 scheduled lifts to a height of 217 metres. Expected to open next year, the MEG plant will be the largest facility of its kind.

The company used the PTC 200 DS - its largest crane - to handle the lifts which ranged from 30 tonnes to a 1,450 tonne wash tower. Having lifted the top of the wash tower to a height of 100 metres during the tilt up, the PTC 200 DS was rigged with an additional 67 metres of boom/jib, bringing the total lift height to 217 metres. The additional height allowed the crane to carry out all of the remaining lifts from one location, including

modules located outside of the original lifting radius. The crane managed to complete its part of the project two weeks ahead of schedule.



The PTC 200 DS at record height.



The Mammoet PTC 200 DS executing the wash tower lift

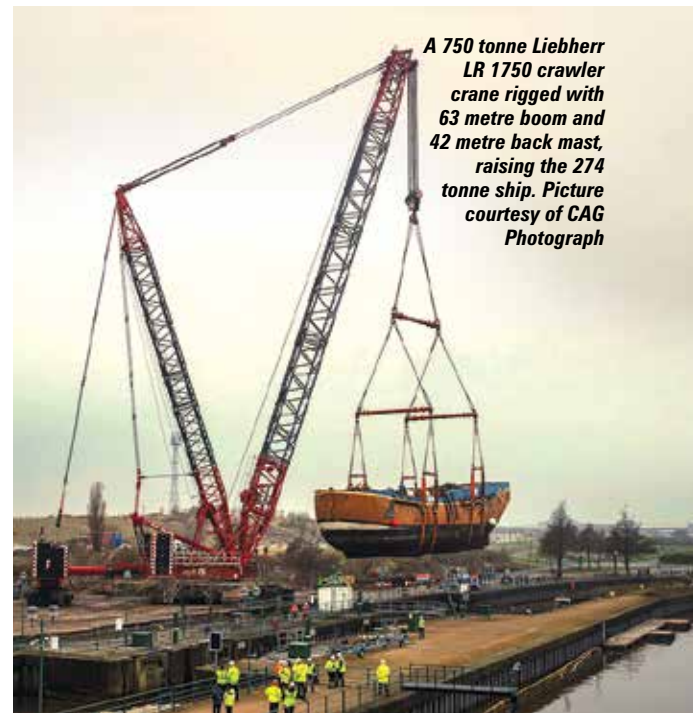
## HM Bark Endeavour

ALE helped move the historic HM Bark Endeavour - one of two full size replicas of the vessel which was commanded by explorer Captain James Cook for his voyage to Australia and New Zealand - from its current berth at Stockton-on-Tees to the Tees Barrage in Whitby.

ALE was contracted for the full contract involving the ballasting and engineering designs and dedicated project manager to oversee the specialist towing to and from the Barrage, including lifting the ship over the Tees Barrage gates.

The first leg of the vessel's voyage involved the Endeavour being towed by two tugs along the River Tees from Riverside in Stockton to the Tees Barrage. Measuring nine metres wide, the major challenge was getting the vessel past the six metre wide Tees Barrage lock gates. To overcome this a team of contractors and engineers led by ALE worked closely with the Canal and River Trust - owners of the Tees Barrage - to lift it over the lock gates. A team of divers fitting lifting equipment and heavy straps below the hull before a 750 tonne Liebherr LR 1750 crawler crane rigged with 63 metre boom and 42 metre back mast, raised the 274 tonne ship to a height of five metres to clear the top of the lock.

The vessel was then lowered on the seaward side of the river and towed downstream to a dry dock for a six week refurbishment and refit. After its 40 mile tow along the North Yorkshire Moors National Park coastline southwards, it will arrive at its spiritual home of Whitby. This is where the original HM Bark Endeavour was built in 1764 and 250 years since its made its famous voyage. It is scheduled to re-open as a visitor attraction and centre of learning for schools later this summer.



A 750 tonne Liebherr LR 1750 crawler crane rigged with 63 metre boom and 42 metre back mast, raising the 274 tonne ship. Picture courtesy of CAG Photograph

## Mammoet Oman 1180t lift

Mammoet has successfully completed the transport and installation of four 1180 tonne NGL bullet tanks for Oman's biggest petrochemical project, the Liwa Plastics Industries Complex (LPIC) project, owned by Orpic. The bullets - each 60 metres long and 7.8 metres in diameter - were positioned on sand beds in a tandem lift using a 1,600 tonne PTC 35 DS ring crane and a 1,200 tonne crawler crane.







# Showcasing the Maeda MC815 Mini Crane

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