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# Still getting bigger

Although there has only been one relatively large capacity crane unveiled by the major crane manufacturers over the past year, there has been much more activity from the specialist heavy lift companies such as ALE, Mammoet and Sarens. All three already have their own big lift machines, and all three are in the process of launching new versions or building more of their largest cranes for contracts around the world.

The latest ultra-heavy lift crane design has only recently been announced by Mammoet and Stoof Engineering and Innovation, with plans to jointly develop a crane with a capacity of up to 24,000 tonnes. Named the Focus, the designers claim it will have a maximum load moment of 1.5 million tonne/metres and one of its main features will be the ability to self-erect vertically, without the need for additional assist cranes, even when the main boom is more than 200 metres long.

Details on the self-assembly procedure are still a little sketchy,

however it appears that the process begins by installing a vertical lattice tower with a davit crane on top. Once the tower has reached full height it hoists up the twin derrick boom/back mast section by section and then does the same with the twin boom assembly. The tower then serves a heavy-duty pendant/ link from the top of the back mast to the counterweight.

The designers say the crane will have a fast erection/dismantling time, as well as being manoeuvrable and containerised for easy international shipping. The distance between the foot of the boom and counterweight can be varied with







The Mammoet Focus can self-erect in the vertical plane.



The ballast radius can be varied during a lift.

a load on the hook and can also be done while the crane is slewing. Quite how it 'slews' - given that the boom back mast pivots appear fixed - is not yet clear. With a variable tower connecting the back mast to the ballast it is possible to increase the ballast radius without lowering the back mast angle, allowing the counterweight to be positioned behind sizeable obstacles or structures, allow it to carry out a lift in very tight guarters without having to increase the ballast weight. There are still many questions to be answered about how exactly it will all work, but it is in good hands with Piet Stoof, the founder of Stoof Engineering, and a former technical director of Mammoet and responsible for designing the MSG 50 (Mammoet Sliding Gantry) in 1996 which had a maximum load

moment of 50,000 tonne/metres.

The MSG-50 claimed to be the first machine with containerised masts and components and was the forerunner of the MSG 80 ring crane (80,000 tonne metres) followed by the containerised PTC ring cranes with load moments up to 200,000 tonne metres.

#### World record lift

ALE has been very busy in the heavy lift sector, its 5,000 tonne, 354,000 tonne/metre, AL.SK350 which currently claims to be the world's largest capacity land-based crane performed its inaugural lifts in Southern Brazil last month. It is installing 40 modules - each weighing up to 3,000 tonnes - onto a P-74 Floating Production, Storage and Offloading (FPS0) vessel.

The AL.SK350 has been rigged in







ORMIG S.p.A. PIAZZALE ORMIG 15076 OVADA (AL) ITALY TEL. (+39) 0143.80051 r.a. - FAX (+39) 0143.86568 E-mail: mktg@ormigspa.com - sales@ormigspa.com www.ormig.com - www.pickandcarry.com what is currently its biggest configuration, with 130 metres of twin A-frame main boom, an 18 metre wide base, 4,000 tonnes of counterweight and a 49 metre ballast radius. The crane has a 4,000 tonne main winch and 600 tonne auxiliary quick winch system. For heavier loads up to 5,000 tonnes a strand jack system can be installed.

The client apparently chose the AL.SK350 because it was the only crane capable of installing the modules complete and without additional relocation of the ship's hull, saving considerable time and money in the construction schedule. Before starting out the crane lifted a record test load of 3,300 tonnes. The AL.SK350 crane was announced in 2012 and designed and built for this contract.

Ronnie Adams, senior project manager on site said: "The crane is performing well and exceeding expectations with its high slew speed in combination with the 4,000 tonne winch system. Despite challenges faced by the weather, we have successfully completed the first set of lifts ahead of schedule."

#### An 8,000 tonne AL.SK

ALE offers various capacities of AL.SK cranes including the 4,300 tonne AL.SK190 and is currently working on the 8,000 tonne AL.SK700 with a load moment of 708,000 tonne/metres. It is essentially two AL.SK350s connected together with dual twin A-frame booms and a single control station.

Giovanni Alders, sales manager global projects division said: "We are receiving requests to lift up to 7,000 tonnes, particularly in the

The 5,000 tonne, 354,000 tonne, metre ALE AL.SK350 is currently installing 40 modules - each weighing up to 3,000 tonnes onto a P-74 FPSO vessel in Brazil

into a P-74 FPS0 reessel in Brazil

> shipbuilding and offshore sector with the integration of heavier FPSOs and LNG modules onto new build hulls. We are always looking for innovative ways to solve our clients' challenges and reduce project schedules and money spent. By joining two cranes together into the AL.SK700 we can lift loads weighing 8,000 tonnes, which has never been previously achievable. This highly mobile solution will give clients the opportunity to build super-heavy modules and structures in any fabrication yard around the world."

#### 3,400 tonne jib

The AL.SK cranes will also soon have a new modular design 3,400 tonne capacity heavy-duty jib with lengths of up to 100 metres. Built with S1100QL specialist high yield steel it is due to be tested later this year and will be used on the next FPSO module integration project in Nigeria during the first half of 2017.

#### AL.SK190 comes to London

Later this year the 'smaller' AL.SK190 will be set-up in the UK to remove several 500 tonne beams on the Earls Court demolition contract in London. The crane will

ALE is currently working on the 8,000 tonne AL.SK700 with a load moment of 708,000 tonne/metres essentially two AL.SK350s connected together with dual twin A-frame booms and a single control station



### heavy lift

slewing on a double ring track system

#### In summary

and place them on SPMT trailers for removal. The AL.SK190 with long main boom will be set-up on a special foundation within the triangular site without needing to relocate the crane. This, along with the ability to lift the beams out in one piece, saves the problems associated with cutting the massive concrete structures into smaller sections, saving up to two years over the original plan in which the pieces would have been lifted out with high capacity tower cranes. Sarens SGC to Newcastle

In the next month or so Sarens UK will also install one of its 3,250 tonne, 120,000 tonne/metre SGC 120 for a heavy lift contact in Newcastle. The crane can lift 600 tonnes at a 100 metre radius, and is a classic ringer design

lift the beams currently positioned

over two London Underground tunnels

As module sizes - particularly in the petro-chemical sector - increased, the major crane manufacturers developed larger versions of its cranes, such as the 3,000 tonne Liebherr LR 13000 crawler, the 2,300 tonne Manitowoc 31000 and 3,200 tonne Terex CC2800 Twin. With low sales volumes, manufacturers lost the appetite to follow this market particularly as the heavy-lift companies looked to gain a competitive advantage by developing their own heavy lift machines. As these super cranes improve with greater flexibility and faster set up times, they are increasingly finding work outside of the traditional oil and gas sector such as on general construction projects. This trend is likely to change the heavy lift market permanently.



ALE's new modular design 3,400

lengths of up to 100 metres

Sarens will send one of

SGC 120 to the UK in the

its 3,250 tonne

next month or so

tonne capacity heavy-duty jib has





Probably the only large All Terrain crane to launch this year was the Liebherr LTM 1450-8.1 unveiled at Bauma. We looked at this new 450 tonner in detail a few months ago, however to briefly recap, Liebherr has designed the crane not for maximum nominal capacity, but with 'maximum usability' in mind and has used a new long eight axle chassis, rather than modifying the LTM 1500 chassis to accommodate a longer 85 metre main boom which can handle 20 tonnes at full extension.

This is the longest boom available on a crane that can meet 12 tonne axle loads with the boom, outriggers and hoists on board. Add the seven to 35 metre swingaway extension and it ought to be ideal for erecting large tower cranes as well as wind turbines. Maximum system height is obtained with the 14 to 84 metre luffing jib.

One of the LTM 1450s distinctive features is its variable counterweight radius, it is able to adjust the ballast radius - or tail swing - from five to seven metres by simply pivoting the two counterweight side cheeks. The main benefit, according to Liebherr will be on sites with limited space, where even operating with the reduced five metre tail swing will give it long reach capacities as good as a strong 200 tonne crane.

The LTM 1450 has a maximum counterweight of 135 tonnes which is compatible with the LTM 1350-6.1, the LTM 1400-7.1 and Liebherr nine axle cranes. The second winch - with its block for luffing jib operation - can be installed quickly as it is secured direct to the counterweight frame. All the rear axles have active electrohydraulic steering, depending on the vehicle speed. This increases manoeuvrability while reducing tyre wear. Five steering programmes can be selected and there is no need to raise the centre axles in crab mode.

The LTM 1450-8.1 is also the fourth and largest Liebherr All Terrain to feature its single engine concept. The lack of Y-guy boom support system, means duties will not be as good as the 500 tonne LTM 1500 rigged with Y-guy. However in areas with limited set-up and working space it may have the advantage. It will also appeal to most European iurisdictions where 12 tonne axle loads are the maximum permitted. Liebherr's LTM 1500 can only meet his requirement with its 50 metre boom, the 84 metre option, has to be removed for transport. The concept appears popular as Liebherr says that it booked orders for 30 units at the launch.

# heavy lift Cfa Styrian wind farm

Austrian crane rental company Prangl used its nine axle Terex AC 1000 for the first time to erect 14 wind turbines on the ridge of the Pretul mountain in Styria at an altitude of 1,600 metres. The Enercon-operated wind farm was accessible only up narrow and mostly unpaved winding roads and slopes with gradients of up to 18 percent. The drive up to the site took the big crane more than two hours.





The Enercon-operated wind farm was accessible only up narrow and mostly unpaved winding roads and slopes with gradients of up to 18 percent.

The winding roads proved to be a challenge with two of the passes so narrow that it was only possible to tackle them in reverse - a trick Prangl site manager Peter Glier has used several times when dealing with difficult uphill drives with big cranes.

The last stretch in the route was so steep that the Prangl team used a tractor at the front of the crane to

help in case the wheels of the AC 1000 started spinning and slipping due to the gradient and ground surface. Once on site the two man Prangl team took two days to set up the crane and start lifting the steel base sections, nacelles and rotor blades weighing up to 58 tonnes to a maximum height of 78 metres and radius of 21 metres. All 14 wind turbines were erected over a three month period.

# **Boom Booster** on mega turbine

German crane company Hofmann Kran-Vermietung used its 650 tonne Terex Superlift 3800 crawler crane with full Boom Booster attachment to erect a 227 metre Nordex wind turbine near Bickenbach in the Hunsrück mountain range for client KS **Regenerative Energie.** 

With a hub height of 164 metres and lifts weighing up to 80 tonnes, Hofmann configured the crane with all seven, 12 metre by 3.5 metre wide Boom Booster sections which increases lifting capacities by up to 30 percent. Main boom was 165 metres long topped with a 12 metre jib.

The Flex Frame and split tray options also proved useful in that they allowed the Superlift radius to be increased from 13 to 21 metres so that it could raise the 3800's 177 metres of boom and jib, without the need for an assist crane and then once the boom was up the additional counterweight was removed, leaving just 25 tonnes of suspended counterweight and the superlift radius was reduced to 13 metres, making the machine more compact.

Hofmann had already used the crane to carry out several standard wind turbine lifts with hub heights up to 144 metres, but the Bickenbach project was the first time it had erected a turbine with a 164 metre hub height.

Setting up on the steep gradient was also a problem with the erection engineers constructing a level support platform the same length as the boom.

Crane operator Christoph Bergmaier said: "We used the Flex Frame to move the working counterweight closer to 13 metres, which enabled us to comfortably manoeuvre the crane in the tight conditions. Once installed the Boom Booster worked with the same precision and smooth response of the standard main boom - you can't tell the difference at all."



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### <mark>heavy lift</mark>

#### The 40 year old bridge on the hook of the Liebherr LG175

# **Covered bridge lift**

As part of the Stuttgart 21 infrastructure project in Southern Germany, crane rental company Wiesbauer used its Liebherr LG 1750 mobile lattice boom crane to remove the western half of a covered wooden pedestrian bridge over the River Neckar and replace it with a new railway bridge. The project is a part of the new and upgraded Stuttgart to Augsburg railway system which includes a new main railway station in Stuttgart as well as 57km of new lines and 30km of tunnels.

The LG 1750 - Wiesbauer's largest crane - was assembled alongside the 72 metre long pedestrian bridge on the banks of the river. The total weight of the bridge - which was installed in 1977 - was calculated to be 110 tonnes, however due to a number of gusset plates and other additional reinforcement the bridge was found to actually weigh 142 tonnes once the crane had it fully on the hook.

The Liebherr LG 1750 was configured with 84 metres of main boom and 31.5 metres of derrick boom, 170 tonnes of on-board counterweight and 360 tonnes of suspended ballast at an 18 metre radius on a 12 metre square support base. The configuration provided more than enough capacity to lift the 142 tonne bridge at a radius of 52 metres. The wooden bridge was slowly swung over the river and positioned on the bank for dismantling. When it was installed for the Federal Garden Show it was one of the longest covered wooden bridges in the world. The eastern section of the structure is to be removed over the next few months.



## Turnkey installation saves time and money

Mammoet Wind has carried out the complete turnkey installation of nine Siemens wind turbines at the Juktan wind farm in Blaiksjön, Sweden for client Vattenfall. By managing the whole project - including shipping, onshore transportation, crane operations and both mechanical and electrical installation - Mammoet was able to complete the contract two weeks ahead of schedule, saving the client time and money.

Denmark's Siemens Wind Power manufactured the SWT 3.2 Direct-Drive turbines, which together with the blades and other components were picked up by Mammoet at four different production facilities and then transported to the Danish port of Aarhus before shipping to





Skelleftehamn in Sweden. They were then taken by truck and conventional trailers to Juktan, after organising the road surveys along the transport route and providing engineering support for road layouts and hardstands on site.

Located in a forest area, Juktan wind farm has very limited space for manoeuvring, particularly for three of the nine turbines. The other

> six turbines were to be erected using full rotor installation but limited space around three turbines meant using the more time consuming individual blade installation method. However Mammoet found a way to install all nine turbines as full-rotor installations, despite the restricted space which saved almost two days of installation per turbine and two weeks in total.

> Brian Bech Hansen, project manager for Mammoet Wind said: "By carrying out the entire project Mammoet Wind has demonstrated the benefits of one contractor taking on the full responsibility for executing a project."

### **First PowerBoom in South East Asia**

Indonesian company Guna Teguh Abadi (GTA) Construction has ordered a second 1,350 tonne capacity Liebherr LR 11350 which will arrive at the end of the year complete with Liebherr's PowerBoom - the first in Southeast Asia. The PowerBoom comprises two parallel booms in the lower section of the main boom joining into a regular single boom and according to Liebherr, can achieve lifting capacities of an 1,800 tonne class crane making this one of the most powerful crawler cranes in the region.

GTA Construction will use both units for major projects in Indonesia in petrochemicals refineries and gas processing plants as well as fertiliser facilities and raw material smelters. In addition to major plant construction, GTA also carries out expansion work to existing production plants.

"Since we estimate increasing demand for lifting work over 1,000 tonnes, the decision to buy a second crane of this type was a natural one," said GTA president Kaoru Hirota."With its minimal derrick radius of 15 metres, the LR 11350 is a great solution for constricted sites. The fact that the LR 11350 can also be operated in a main boom only configuration - without the additional derrick boom - is of utmost importance to us compared to other cranes in this class.



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### heavy lift Cta

# Tallest turbines in North America?

New England-based general contractor and wind power specialist Reed & Reed of Woolwich, Maine, is using a 700 tonne Manitowoc MLC650 crawler crane with VPC-MAX attachment to erect 17 large wind turbines in challenging terrain in the mountains of eastern Maine.

The project required a crane that not only had sufficient reach and capacity, but that could also be easily erected and disassembled and have a compact footprint to navigate the narrow mountain roads, which could not be widened because of surrounding wetlands and soft soil. The crane will need to be taken apart and moved seven times during the full contract.

The MLC650 is rigged with 128 metres of boom and a 7.6 metre offset upper boom point, providing an overall tip height of 137 metres. It first installs the 116 metre tower sections, followed by the 86 tonne nacelles which need to be lifted to a height of 126.5 metres and a radius of around 24 metres. The crane had plenty in reserve being able to handle over 113 tonnes in this configuration. "We have had to break the crane down and move it four times so far - it's a big job when you consider that the MLC650 takes 45 tractor/ trailer loads to move," said Gardiner Parker of Reed & Reed. "It would be an even bigger endeavour with a more traditional, cart-equipped crane. With fewer components to consider, the MLC650 is an easy crane to transport compared to other crawlers in the same class."

"Working on the side of a mountain, it's hard to make a level area for the crane's crawlers. But the MLC650's smaller footprint helped us to erect the crane in a relatively small area. The VPC not needing a cart behind the crane, makes the pad construction a lot easier. With an older crawler crane, there's no guarantee that we would have been able to set it up."



The MLC650 is rigged with 128 metres of boom and a 7.6 metre offset upper boom point, providing an overall tip height of 137 metres



A 250 tonne Manitowoc 999 and 90 tonne Manitowoc 10000 are also assisting operations, erecting base and mid-tower sections as well as assisting with assembly and disassembly of the MLC650. Construction on the project began in May, and the wind farm is expected to become operational later this year. The turbines will be among the tallest in North America, with each turbine capable of generating 3.3 MW.

# **Innovative solution at Yorkshire EfW development**

Ainscough Crane Hire came up with an innovative solution on the development of the new 320,000tpa EfW (Energy from Waste) plant at Allerton Waste Recovery Park in North Yorkshire. The solution to use a mobile tower crane from the Ainscough fleet was a simple but positioning it at the bottom of a 28.5 metre deep concrete waste bunker was more of a problem.

With an Ainscough 600 tonne Terex CC 2800-1 crawler crane already on-site lifting items such as the plant's 160 tonne boiler, it was decided to use the crawler crane to lift and lower the mobile tower crane into the base of the bunker. Once inside the tower crane would unfold into its operating position and carry out the necessary lifts to complete the construction before being lifted out again.

After numerous CAD drawings, method statements and the centre of gravity calculations had all been completed, the Liebherr MK110 mobile tower crane was lowered down into the bunker with limited rigging space and just 1.5 metres of clearance at either side. From start to finish the lift took around five hours and passed off exactly as we had planned. The crane spent around ten weeks in the bunker before being removed.

Construction work began in 2014 and is expected to be completed next year with the new facility becoming fully operational in early 2018. As well as reducing the amount of waste going to landfill by 90 percent, it will also generate enough energy to power the equivalent of 40,000 homes.



# Bigger than yo think!

Sarens is one of the world's leading heavy lift and transportation companies operating in 60 countries with a fleet of around 1,400 cranes topped by its 3,200 tonne SGC-120. Mark Darwin visited its UK headquarters in Middlesbrough to chat with country manager, Grant Mitchell.

Sarens in the UK - just like the Sarens Group - prefers to keep a low profile, but is a lot bigger than many think. Whilst the family company goes back four generations to the 1930s, the UK division was formed when it bought the heavy crane fleet of Initial GWS, around the same time (2001) that Ainscough acquired the GWS depot network and smaller crane fleet.

The UK operation currently has a fleet of around 50 cranes, but over the next few years, has plans to increase this to between 70





Sarens provided its biggest UK mobile crane - the Gottwald AK680-3 - to load 24, 200 tonne ballast blocks onto a specialist vessel - the Olympic Orion



The 200 tonne ballast blocks were loaded in sets of four per shipment

and 80, while adding to its depot network with a second London location. What is surprising about the company is not only the amount of cranes in the group, but also the number of large capacity cranes - enough to carry out almost any lifting contract whatever its size.

Almost to emphasise this point the day after my visit with Grant Mitchell, the company announced winning its biggest contract ever the \$36.8 billion Future Growth and Wellhead Pressure Management Project for the Tengiz oil field on the North Eastern shores of the Caspian Sea for Tengizchevroil. Sarens in the UK will be particularly involved in this project as Tengizchevroil is based in Farnborough, UK but it will also be supported by Sarens specialists in Kazakhstan, Belgium, Poland, Finland and Bulgaria.

Sarens is contracted to develop and operate two Trans-Shipment Bases - one in Finland and one in Bulgaria - where cargo will be offloaded from ocean-going vessels and reloaded onto smaller Russian inland waterway vessels for onward delivery into the region. At the Kazakhstan site, the modules will be off-loaded, stored, stacked and transported to their final installation points. The project will start next year and run through 2020.

"This is the largest crane and lifting contract ever let in the world," said Mitchell. "Our largest crane will be onsite for three years. The group's resources are huge, for example it has about 80 cranes with capacities between 600 and 1,000 tonnes, eight CC8800-1 and two boom booster kits. Even in the UK we had 10 crawler cranes above 600 tonnes for many years."

Mitchell took over as UK sales director in 2011 and as managing director in 2013, after joining from Ainscough. Prior to that he worked with Baldwins Industrial Services and started his crane career with Sparrows Crane Hire.

"When I took over, Sarens in the UK was very much a lattice boom crane company. Between 2010 and 2015 the company had won several large contracts which meant having 10, 600 tonne plus crawler cranes based in the UK. The advantage of this was that we could

### heavy lift

offer our equipment against lowest mobilisation rates whereas other companies had to bring them in from mainland Europe."

The fluctuating economy does not perhaps have as much effect on Sarens in the UK as other companies, in that it buys very little equipment itself, using the majority from its parent company.

"When work for the large cranes slowed we were fortunate that Sarens could use them around the world. Apart from our fleet of crawlers we have invested heavily over the past five years - spending more than £18 million in the UK last year - on mobile cranes.

The company already has numerous larger All Terrains, including an 800 tonne Liebherr LTM 1800, and 550 tonne LG 1550, a 700 tonne Terex AC700 and two Liebherr 500 tonners and recently added two 750 tonne LTM 1750s, another LG 1550 and three more 500 tonne Liebherrs. It also has a 400 tonne Faun, two 300 tonne Groves and a new 220/160 tonne Terex along with a 160 tonne and a couple 100 tonne Liebherrs.



"We still have a policy of keeping to cranes of 100 tonnes and above" he said. "We may keep a low profile but our heavy crane fleet is second to none."

Mitchell would also like to expand the business for cranes between 100 to 250 tonnes. "We have a couple of 100 tonne LTRs and 160 tonne Liebherr LR 1160s but would like to expand as there are only a couple of UK companies in this sector."

The cranes are usually purchased by Sarens headquarters in Belgium and then leased to subsidiaries. "Sarens is still a family business and the owners love buying cranes," says Mitchell. "Together we decide the required type of cranes and specification we need for each specific market. This gives us maximum flexibility and a wellbalanced fleet."

#### **Brexit?**

For Sarens in the UK the only problem relating to the Brexit vote is the volatility of Sterling. The exchange rate has both pluses and minuses. The company does a lot of work in the wind sector and these contracts are priced in Euros. Foreign-based competitors who



work solely in Euros would also be less interested in working in the UK resulting in more work for UK-based companies.

#### **Rental rates**

Currently workload in the UK is holding up but the rates could be a lot better. Mitchell has been in the crane business since 1975 and can remember the 'good times'.

"In 1987/88 Grayston White and Sparrow owned a Gottwald AK680 and carried out a contract over the Easter bank holiday lifting a chiller unit for one of the banks. The crane started to set-up on the Thursday carrying out the lift Saturday then de-rigging and leaving site on the Monday. The charge for the lift was £100,000. Now move on 20 years and we did exactly the same lift in reverse, taking out the chiller unit with a 500 tonner and we charged £12,000! So has the industry progressed? You will only make money with cranes if you have something no one else has. At Baldwins we were the first to get the 400 tonne Liebherr and made very good returns for two years then others entered the market and the rates come down."



#### **Favourite crane?**

Being in the industry 41 years, Mitchell has come across many cranes - but which is his favourite? "In the early to mid-1980s there was the ground-breaking 200 tonne capacity Demag HC510 but only a few were sold in the UK. It was unheard of to have a 200 tonne crane on six axles - they were usually eight or 10 axles - and with its 45 metre main boom and 48 metre luffing jib and 5.2 metre outrigger spread, it was great working in London erecting tower cranes that other cranes couldn't do."

#### The future?

"One aim in the UK is to expand the crane fleet and add a couple of depots. However the main drive over the next few years will be to increase the work of the engineering solutions division, which deals with projects using gantries, jacking, skidding and SPMTs," he says. "Instead of the odd engineering job we want to build up the engineering equipment permanently based in the UK. Eventually growth in this area may account for about 40 percent of the UK turnover."



# EXTREMELY POWERFUL AND AGILE