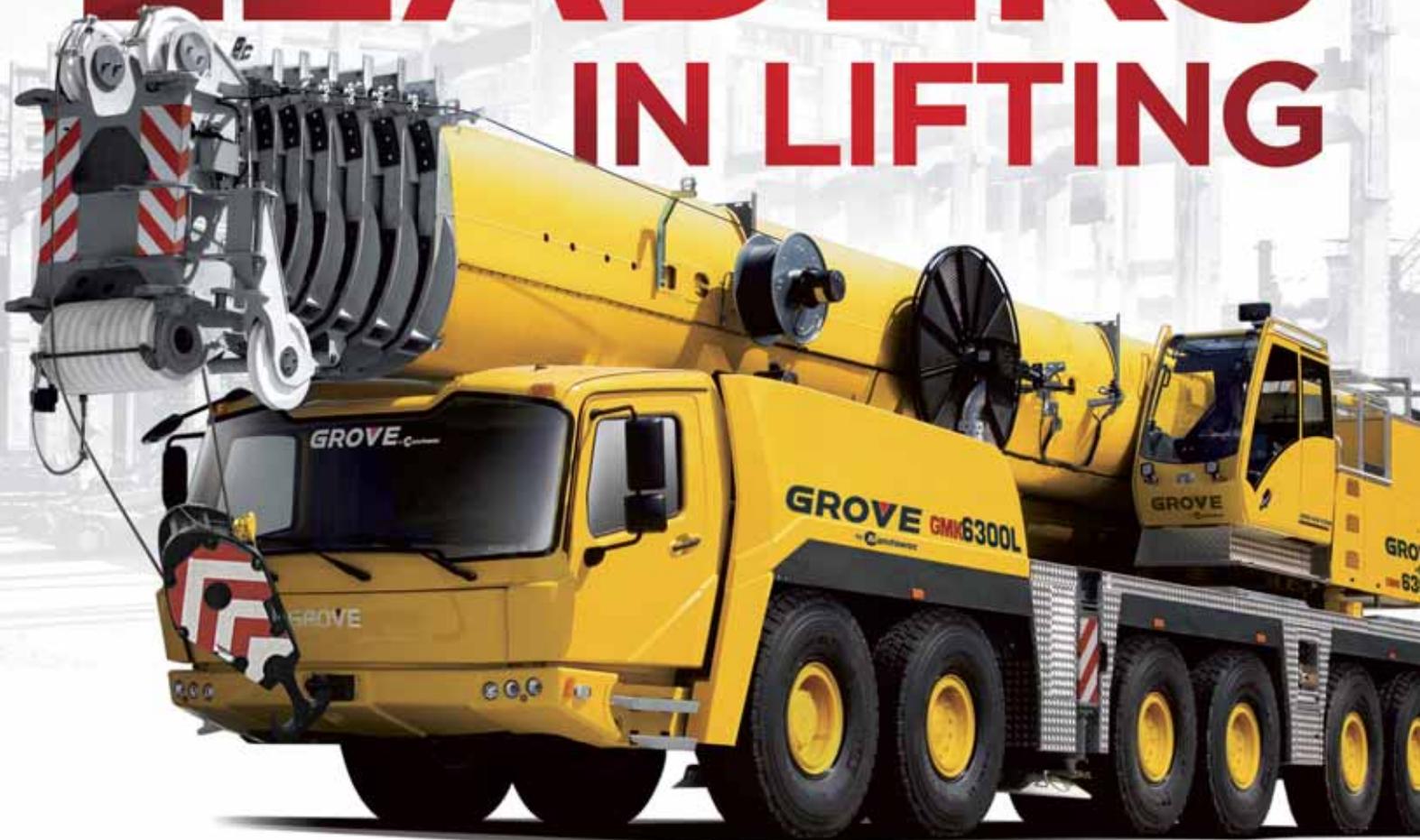


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So diverse

No crane sector is as diverse as the crawler crane. The tracked undercarriage has spawned many variations including the spider and mini crane, telescopic boom crawlers and lattice boom crawlers with lifting capacities from one to 3,600 tonnes and everything in between. Recent developments include new and improved models and boom systems to extract additional capacity for specific applications such as the wind sector. While there have been several very large crawler cranes from Liebherr and Manitowoc over the past year, a new 650 tonner from Terex, may be the most significant model launch this year. We take an in-depth look at the new Terex Superlift 3800 and cover some interesting applications.

With 385 cranes sold, the 600 tonne Terex CC 2800-1 claims to be the most popular large crawler crane ever produced. On page 26 we take a closer look at its successor, the new Superlift 3800, meanwhile the CC 2800-1 will continue in production for as long as customers continue to buy the simpler lower cost model. However, given that there will be no future upgrades - in particular to the engine - the CC 2800-1 has a finite shelf life, forcing customers to eventually adopt the new 650 tonne capacity 3800 whether they like it or not.

Since our crawler crane feature a year ago there have not been enormous developments in any area. In the mega capacity crawler cranes Liebherr has now sold its first 3,000 tonne capacity LR13000 to Mammoet and the second unit is on the test track. The first crane was supplied with the new 'P' or Power boom

which is capable of raising the maximum capacity to around 3,750 tonnes. Maximum boom/jib combination is 246 metres consisting of a 120 metre main boom and 126 metre luffing jib. The crane is now rigged for its first contract - the extension of a refinery in Whiting, Indiana near Chicago - with 78 metres of main boom plus 72 metre luffing jib.

The LR31000 also has a combination boom, which uses parts of the main boom and the luffing jib. With various inserts, the combination boom has a maximum length of 138 metres. The company says it is in advanced talks for its second 31000, possibly to a customer in North America. As well as its LR13000, Liebherr is planning a new crane for a Bauma launch that will slot in between the 800 tonne LR1750 and the 1,000 tonne LR11350.

Manitowoc is scheduled to deliver its largest crane to date - the 2,300 tonne 31000 - after tests were



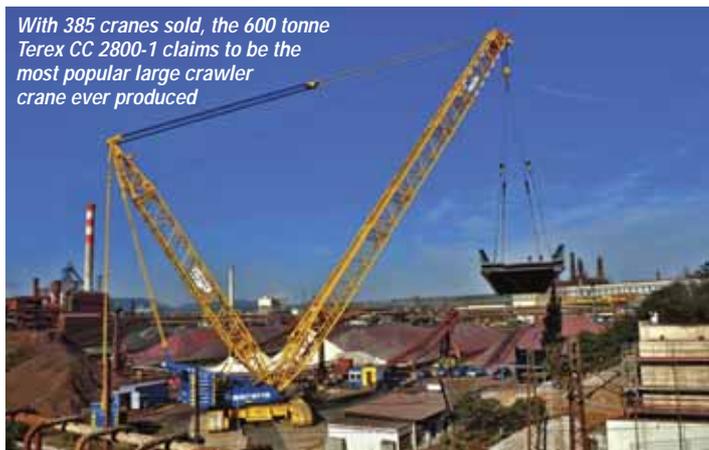
completed for the extensive boom and jib combinations, the longest ever designed for a Manitowoc crane. The 31000 comes standard with a heavy-lift main boom that can be extended to 110 metres. Optional boom configurations can also increase the crane's reach and lift height. The first attachment is a fixed jib with a basic rating of 1,400 tonnes and up to 42 metres length. A 114 metre luffing jib is also available with a maximum capacity of 1,100 tonnes.

Manitowoc also introduced a new Boom Raise system for its popular 400 tonne capacity Model 16000. The new system helps raise longer

boom lengths needed to install nacelles on 100 metre wind turbine towers without the aid of an assist crane.

Consisting of a boom mounted hydraulic cylinder housed in a special three metre boom insert that attaches to the boom butt section, the system allows Wind Attachment booms up to 107 metres to be raised rather than the previous 92 metres. Maximum capacity with 114.6 metres of boom and extended tip is 87.9 tonnes at 20 metres radius. The Wind Attachment increases the capacity of the crane by nearly 50 percent at short radii.

With 385 cranes sold, the 600 tonne Terex CC 2800-1 claims to be the most popular large crawler crane ever produced



Manitowoc is scheduled to deliver its largest crane to date - the 2,300 tonne 31000 - after tests were completed



crawler cranes C&a

The boom raising cylinder works in conjunction with the boom hoist and once the boom angle is 38 degrees the hoist takes over. Boom raising and lowering operations are accomplished with minimal operator action. Manitowoc has also released a new fixed jib option for the 16000. The jib complements the existing luffing jib attachment and has a 93 tonne capacity and a maximum length of 42.7 metres.

Manitowoc says that it is working on more modern crawler designs and better features including using the variable positioning counterweight from the 31000 on other models. While the popular 16000 is probably not up for replacement it may well get a larger brother? The Manitowoc crawler crane brand lacks presence in Europe and needs to find the right product to address this. Watch out for new products at Bauma next year with possibly a couple of prototype crawlers in a year or so.

Other new crawler models have been launched by Link-Belt, Kobelco and Fuwa. Link-Belt recently unveiled its 181 tonne 248 HSL crawler crane to replace the 248 HYLAB 5 series, joining the 238 HSL and the newly upgraded 227 tonne 298 HSL in the new model line. The main boom length is 86.9 metres

and incorporates lifting sheaves in the boom base section for assembly and disassembly lifts. Fixed jib lengths are available from 9.1 to 30.5 metres for a maximum tip height of 105.7 metres.

Kobelco Cranes has started production of its new S series crawler cranes aimed at markets outside of Japan, Europe and North America. The 10 model line-up includes cranes from its CKS, BMS and 7000S series with maximum lift capacities ranging from 60 to 250 tonnes. For more 'regulated countries' the recently launched environmentally more efficient Kobelco G series machines are available. The main differences between the CKE G series and S series include the undercarriage design, engine and operator controls.

Chinese manufacturer Fuwa is set to launch its new 'Westernised' 5 series range next month. The cranes - the FWX55, 75, 85, 135, 185, 225 and 285 (the model number is also the machine capacity) - can be built with

international or local components to suit different markets. EN13000 models will be built to European quality standards but are said to retain the pricing levels expected of Chinese machines.

Last year Sany introduced the 3,600 tonne SCC86000TM crawler crane, designed at its development centre in Kunshan, Jiangsu province to be used in the construction of nuclear power projects in China. Recent developments include inaugurating a fully integrated crawler crane production line at its plant in Chakan near Pune, India. The plant will produce the company's most popular, higher volume, crawler crane models including the SCC500E, SCC800C, SCC1500D and SCC2500D to capitalise on the growing popularity of crawler cranes in the country.

It seems that crawlers are increasingly becoming the construction crane of choice in the developing world. It is possible that the Asian markets at least will



Last year Sany introduced the 3,600 tonne SCC86000TM crawler crane



Manitowoc's boom raise system for the Model 16000 helps raise longer boom lengths needed to install nacelles on 100 metre wind turbine towers without the aid of an assist crane

Link-Belt recently unveiled its 181 tonne 248 HSL crawler crane to replace the 248 HYLAB 5 series



gradually move away from small cheap truck mounted cranes towards more crawler cranes and All Terrains. If so this could well change the balance of the crawler market, currently dominated by German, Japanese and American manufacturers, with Chinese producers taking a large slice of the cake - at least for small to mid-sized models. Technology and investment risks are likely to retain the status quo on the larger cranes for a long time to come.

Terex Superlift 3800

In one of the most eagerly anticipated launches for some time, Terex Cranes unveiled its new 650 tonne capacity Superlift 3800 lattice boom crawler crane. Intended as a successor to the popular Terex CC 2800-1 - with 385 sold - there are high expectations for the new crane. Cranes & Access was at the launch.

The original 600 tonne capacity CC 2800 was launched in 1998 - however its DNA goes back to the original Demag CC 2000 of the 1980s. The improved 2800-1 followed five years later and the model quickly established itself as the benchmark in the crane industry. In 2006 the CC 2800-1 NT narrow track version was launched aimed specifically at wind turbine erection and capable of travelling on five metre wide access roads. There are now 30 narrow tracked

units in operation around the world. Customers that own a CC 2800 read like a who's who in the crane and heavy lifting industry with one crane company - Sarens - with more than 30 in its fleet.

However over the past few years its dominant position has been under threat from Liebherr's new model introductions, so a successor has been anticipated for some time. Given the success of the original CC 2800 this was always going to be a difficult task. The Superlift



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Counterweight wagon



ballast is the only shared component and is common with cranes from the CC 2000-1 to the CC 8800-1 Twin and the AC 1000

3800 is an entirely new crane which introduces improvements to performance, safety, transportation, efficiency and speed of erection. It is not a direct replacement for the CC 2800-1 which will continue in production alongside the 3800 for customers wanting a simpler, less expensive crane.

Capacities have been improved by around 20 percent throughout the load chart and wind turbine erection was a significant influence on the design of the new crane as well as incorporating changes to meet emissions and European regulations. Increasing turbine hub heights means that cranes must lift heavier loads to higher levels. A nacelle at 120 metres can produce 10 percent more output than one at 100 metres.

"When we started this project, we set ambitious goals which have been exceeded," said Hans-Peter Franzen, project director. "Boom system rigidity has been improved, for example the LF light fixed jib can now handle loads of up to 178 tonnes. The Superlift 3800 can be delivered with an integrated wind kit in a universal main boom system capable of erecting wind turbines to 117 metres without requiring the superlift boom configuration or an assist crane."

All aspects regarding erection and transportation have been designed with a close eye to reducing costs, in order to provide customers with a higher return on investment. In spite of the improved capacities Terex has managed to reduce the weight of the basic machine by 17 tonnes. Moreover the measurements and the weight of components have been tailored for ease of transport, including additional hoisting points and hydraulic motors positioned within the track frame, not only reducing track transport widths but also protecting them from being damaged during transportation.

Performance

The 3800 has a maximum capacity of 650 tonnes - 50 tonnes more than the CC 2800-1 - and a load moment

of 8,426 tonne metres compared to the CC 2800-1's 7,710 tonnes. It can self-erect with 114 metres of main boom and 12 metre LF jib, with superlift mast, long main boom and LF jib it has a hook height of 153 metres at which it can lift 72 tonnes.

The new modular hook block allows customers choose the required configuration, from 650 to 380 or 190 tonnes. Line pull has also been increased to 180kN reducing reeving times and increasing lift speeds.

The superlift back mast is available in Standard and Vario configuration with the counterweight wagon. The superlift mast radius adjusts from 11 to 19 metres, saving the amount of counterweight to be transported to site. The restraint-guided superlift counterweight - which reduces uncontrolled movements of the superlift tray - increases safety and efficiency especially when walking the crane with a load on the hook.

The front end of the tracks can be fitted with an idler wheel or a drive unit which makes it easier to retrofit quadro drive. Optional track mounted outriggers are equipped with load sensors to ease the raising or lowering long booms and monitor the ground pressures while doing so.

For customers erecting wind turbines, the LF light fixed jib can be installed on heavy main boom SH or on a stepped main boom LH. The optional special adapter head increases the lifting capacities on the LF to 178 tonnes. The runner is standard on the LF and allows it to lift light loads quickly.

Terex says the Superlift 3800 offers the most economic use of counterweight. For example in wind turbine erection with 138 metre main boom and 12 metre light fixed jib the 3800 requires 70 tonnes less counterweight than the CC 2800-1 and 115 tonnes less counterweight than some competitor's cranes, saving up to four truck loads each way and a €10,000 economy. The only component that is shared



Patented quick connect collar

with the CC 2800-1 is the counterweight units, both cranes use the standard counterweight components now fitted on all models from the CC 2000-1 up to the CC 8800-1 Twin and the AC 1000.

Ease of setup and transportation

All boom sections have stable blocks, tie down latches, lifting latches, access ladders and wide walkways. The pins for the pendant bars are located right beside where they are needed. All pendant bars rest in plastic bearings for transportation and are secured against horizontal movements. To minimize transportation costs the boom sections can be transported together with sections of the light fixed jib which travel inside the luffing jib which will fit inside the main boom sections.



Track mounted outriggers with load sensors



Twin screen controls



Terex Superlift 3800.



The Superlift 3800 is entirely new with performance improved by 20% over the CC 2800-1

The superstructure can be equipped with the patented quick connection collar allowing it to be removed from the tracks in less than 30 minutes and weighs just 65.1 tonnes when stripped. None of the components exceed three metres wide by three metres high and all are less than 40 tonnes.

Safety

The Superlift 3800 is the first crawler crane to feature Terex's new cab

design developed from feedback gathered at customer workshops. It conforms to both, EN 13000 and the US standard ASME B30.5. The crane also features the Terex Cranes Fall Protection System and a protective railing has been installed around the superstructure.

Engine emission-wise the crane is equipped with a Euro 3b/Tier 4 interim engine and is prepared for the next level of Euro 4/Tier 4 final.

"This is a very important launch for Terex," said Kevin Bradley, president Terex Cranes. "Improving on an already great crane, we created a completely new one by leveraging our customer driven innovation process which combines our experience with a focus on solving the needs of the customer. And this illustrates perfectly what Terex Cranes is about."

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Quartet in perfect harmony

Chinese power and shipbuilding company Penglai Jutal recently used four large Terex crawler cranes working together to lift a 470 tonne steel framework - part of the assembly of an offshore oil platform - on the coast of Penglai in China. The cranes included two 1,250 tonne CC 6800s and two, 500 tonne CC 2500-1.

Lifting the steel framework was a straightforward procedure but the challenge was to butt joint the huge 75 by 22 metre structure to the platforms central supporting structure prior to welding. "We work to tolerance margins of less than a centimetre and the pipes of these frames are 75 metres long," said Penglai Jutal's chief project engineer.

Following a test run, the four cranes simultaneously lifted the framework to a height of eight metres and then steadily crawled forward 10 metres. To maintain the right angle of approach, the cranes then hoisted their respective sides of the load to different heights. The two CC 6800s

- sharing the heaviest part of the load - lifted their end of the framework to 57 metres. The cranes were configured with a superlift mast, 114 metre main boom elevated 81 degrees and 21 metres radius with 360 tonnes of total counterweight and central ballast. On the opposite side the two CC 2500-1s lifted their share of the load to a height of 41 metres. Both had a 74 metre main booms elevated to 83 degrees at 14 metres radius, and a total counterweight and central ballast of 180 tonnes.

Once all four cranes had the frame hoisted to the required height, they travelled 75 metres into position. It was then a question of finely tuning

and coordinating the cranes to join both sections together on a precisely calculated incline.

The Terex IC-1 touch screen control system helped the operators stay perfectly synchronized, by keeping track of the exact under hook weight during the entire process and keeping the cranes precisely coordinated. They were individually guided by the Penglai Jutal technicians via interphone, the company's four crane operators proceeded to make fine adjustments to their respective loads throughout the move. The whole process took two and a half hours.



Two CC 6800s and two CC 2500-1s lifted the 470 tonne steel framework

The frame was carried 75m into position...



...before the sections were brought together



Bridge building in Algeria

Specialist Algerian infrastructure contractor SAPTA is using a Sennebogen 2200 crawler crane on the construction of a 600 metre long bridge supplying a new industrial area in Algiers. As well as being used to lift the bridge steel support structure onto the foundations, the crane will also be used for general lifting duties on the site. The contractor says that the Sennebogen's fast winch line speeds is helping boost productivity on the site.



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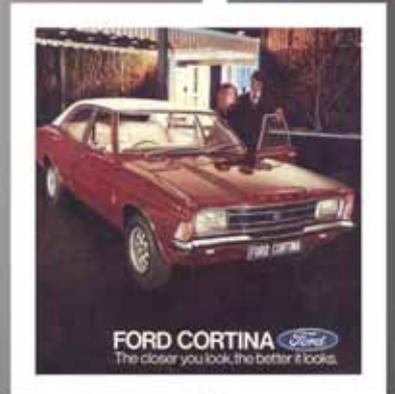
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Terminal lift

C&a crawler cranes

Two 750 tonne Liebherr crawler cranes recently carried out a complex tandem lift at the ABC-Halbinsel offshore terminal in Bremerhaven - lifting a 600 tonne upper section of a jacket and positioning it on top of a 900 tonne lower section. Lifting the load in tandem was not the problem but was complicated by having to move both cranes while 70 metres apart with the load on the hook.

Two Liebherr LR 1750 crawler cranes were with the same configuration - 42 metre main boom, 28 metre luffing jib and 31 metre derrick boom with 260 tonnes of suspended ballast.

All engineering work including crane planning was undertaken by crane and heavy load specialist Schmidbauer. A highly detailed crane study simulated all phases of the hoisting process with special attention paid to the projecting edges as well as the ground pressure and the hook height.

Once the cranes had been moved into position on a special bed of

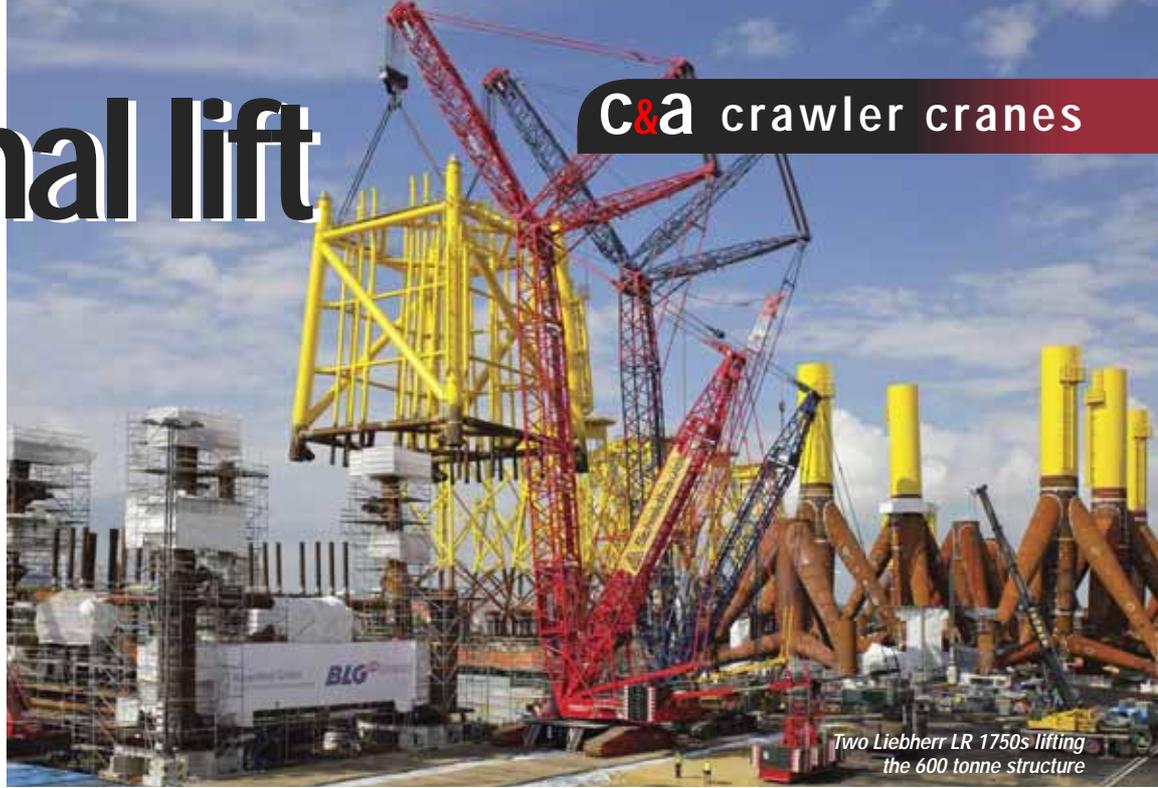
sand with load distribution mats, the load was fastened with the help of two further auxiliary cranes. Four 400 tonne shackles needed to be installed in a confined space, with the shackle pin alone weighing 75kg.

The upper jacket section was then freed of its assembly platform and thanks to good weather conditions it was possible to start the hoisting process immediately. The cranes

needed to lift the jacket out of the support framework in perfect harmony before the moving process which was carried out with two guides ensuring that the distance between the two crawler cranes remained the same at all times.

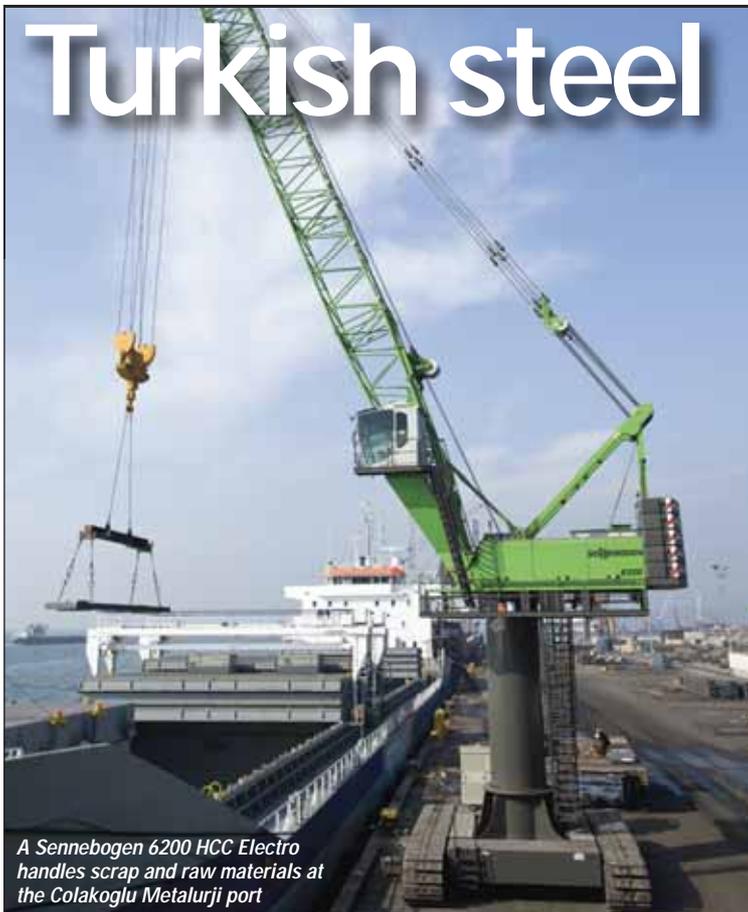
The load was successfully set down in the specified position for welding on the first attempt and it was possible to start the process of connecting the upper and lower

sections straight away. The load still needed to be held in place for two full days until the welding work was complete. The shackles and ropes were then removed at a height of 50 metres using a 450 tonne telescopic crane with luffing jib. Due to the utilisation level of Schmidbauer's own equipment, the two 750 tonne Liebherr cranes were cross hired from another company.



Two Liebherr LR 1750s lifting the 600 tonne structure

Turkish steel



A Sennebogen 6200 HCC Electro handles scrap and raw materials at the Colakoglu Metalurji port

One of the largest steel producers in Turkey, Colakoglu Metalurji, has acquired a Sennebogen special 6200 HCC crawler crane for handling scrap and finished steel products at the Çolako lu port in the city of Gebze to the east of Istanbul on the northern shore of the Sea of Marmara.

The large steel plant has its own port which takes in scrap as a raw material which is then delivered to the steel plant, while a large proportion of the finished steel then passes back through the port for onward transportation by ship.

Construction steel and slabs come in 30 tonne bundles which the crane lifts and places on board. In order to ensure maximum efficiency the crane was specified with a 60 metre main boom, pedestal mounting and AC electric power so it never needs to stop for refuelling, while offering longer service intervals. It is also quiet, environmentally-friendly and economical to run.

Mains electric supply boxes are located every 50 to 80 metres allows the crane to cover the entire dock with the minimum of movements of the supply cable which is managed by a special powered cable reel.

In order to ensure the very best view into the ship's hold the crane's superstructure is pedestal mounted elevating the slew ring height to around eight metres above the ground. In addition to this the unit is equipped with a standard elevating cab taking the operator to a total eye level height of between 14 and 15 metres.

The operators can switch easily between the orange peel grab for scrap to the load hook or C-grab depending on the goods to be handled.

The machine was designed in consultation with Sennebogen's sales and service partner Forsen Machinery Services & Trading which also delivered the machine and provides regular on-site service.



Four LRs build new 49ers stadium

Four Liebherr LR 1300 crawler cranes are currently involved in the construction of the new Santa Clara Stadium in California - the future home ground of San Francisco 49ers football team.

The \$1.2 billion stadium, which will have a capacity of 68,500 spectators and cover 42 acres (17 hectares) has been designed to house a wide range of events including football, motocross, concerts and various civic events. A joint venture project of Turner Construction and Devcon Construction, the stadium is expected to be one of the best outdoor sports and entertainment venues worldwide and will be completed in time for the opening day of the 2014 NFL football season.

Bigge Crane and Rigging supplied the four 300 tonne Liebherr LR 1300 crawler cranes to erect the steel structure. All four are fitted with a 47 metre main booms and 50 metre luffing jibs. In total more than 14,000 pieces of steel with a total weight of more than 32,000 tonnes will be positioned. The LR 1300 can take 13,608kg of steel beams to a radius of 62 metres. To complete the frame, the cranes worked double shifts with each crane lifting 50 steel sections a day. "High output, full power and multi-functionality make the LR 1300 the perfect crane for this job," said Joe Nelms of Bigge.



Upgrades to Lambeau Field

Lambeau Field - the home of the Green Bay Packers football team - is getting a \$143 million face lift. Two Manitowoc crawler cranes are being used to lift structural steel and precast panels for the stadium's new scoreboards, as well as placing modules for seating, escalators and elevators.

The 200 tonne Manitowoc 14000 and 91 tonne 11000 crawler cranes are owned by Wisconsin-based general contractor Miron Construction, along with a number of Grove All-Terrain and Rough-Terrain cranes on the site. "This is an ever-changing project that requires many different cranes and configurations," said Royce Alsbach, vice president of project management for Miron. "We chose

the Manitowoc cranes because of their quick setup times, high-reach luffing jibs and overall manoeuvrability. Considering there are additions to both ends of Lambeau Field, multiple completion milestones, towering scoreboard heights and a large working radius, we need cranes that can handle a variety of work."

The Manitowoc 14000 is configured with a 44 metre boom and 46 metre luffing jib, while the 11000 has a 52 metre boom and 18 metre jib. When finished in 2013, the revamped Lambeau Field will have 6,700 more seats, two new gates, a rooftop viewing platform, new escalators and elevators, two new HD video boards and a new sound system.

Tennessee bridge span replaced

Kentucky-based Sterett Crane and Rigging used two barge-mounted crawler cranes - a 600 tonne Terex CC 2800-1 and its new 450 tonne capacity Kobelco SL4500R - for a tricky tandem lift to replace a bridge span section on the Eggness Ferry Bridge over the River Tennessee.

The bridge was damaged in accident earlier in the year when a cargo boat carrying components to the Florida coast for NASA, slammed into the bridge wiping out a complete 98 metre section between piers. The new 300 tonne, 98 metre long prefabricated section was floated into position on a flat-top barge, alongside two other barges with the cranes on board. A large water pump was used to pump water in and out of the ballast tanks to keep the barges level as the weight of the load was transferred. The section was lifted at a radius of 22 metres and positioned into the gap at a height of 16 metres with the whole lift completed within six hours.



Sterett Crane & Rigging's new 450 tonne capacity Kobelco SL4500R crawler crane mounted on a barge takes its share of the load in replacing a 300t bridge section on the Eggness Ferry Bridge on the River Tennessee



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