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Mitas

# Pushed to the limit?

*The 1,000 tonne capacity Liebherr LR 11000 was launched at Bauma*

**Compared with 2012 which saw the launch of the Liebherr LR13000, Manitowoc 31000, Terex Supalift 3800 and Liebherr LTM 1750, this year has been a relatively quiet in terms of the development of large cranes from the major manufacturers. The 3,000 tonne Liebherr and 2,300 tonne Manitowoc have found customers - Mammoet and Chunjo Construction of South Korea respectively - but we are not exactly seeing buyers lining up to order them. Meanwhile the smaller units are selling like hot cakes.**

**There have been a few large cranes unveiled this year such as Liebherr's 1,000 tonne LR 11000 launched at Bauma and Mammoet's 600 tonne capacity MTC15 'terminal crane'.**

At first sight, the 15,000 tonne metre load moment unit - which can lift its maximum 600 tonnes at 25 metres - looks a versatile machine. It employs regular lifting winches, has a boom-up system, a ground bearing pressure of 10 tonnes per square metre, needs just one 80 tonne mobile to help with assembly, is operated by one person and can be erected in seven to 10 days. However its lack of slew means that it limits its use making it ideal for port operations. After all, a high lifting capacity and low operational and transport costs is a rare combination.

## Load modularisation

Designers of large infrastructure projects continue to push load modularisation to the limit - designing ever larger and heavier modules which then set new challenges for moving and lifting them. Yet the major crane manufacturers appear to have current lift requirements in hand with good selection of equipment able to cope with increasing greater lifting demands. This is primarily because the large infrastructure/ petrochemical plants currently being built were designed up to 10 years ago and lifting technology and capacities have increased significantly since then. However as newer designs reach the construction stage over the next five years demand for larger cranes or lifting devices will increase again, putting further strain on crane development and capacities. For example, it is rumoured that a new refinery in Saudi Arabia is currently being quoted that will require twin ringer cranes to cope with the super heavy lifts unable to be carried out with conventional cranes.

*A Grove GMK 5220 dismantling a bridge in Tasmania*

## Filling the gap

Our last look at the heavy lift sector identified a lack of cranes with capacities of between 700 and 1,200 tonnes. Terex has now finally started shipping its AC1000 All Terrain crane - originally a 1,000 tonner, the company now refers to it as a '1,200 tonne capacity class' cane. In the last month four have been delivered - two to Germany, one in the Middle East and one in the USA.

The smaller 750 tonne capacity Liebherr LTM 1750 and the 650 tonne capacity Terex Supalift 3800 crawler crane have also been selling in strong numbers indicating increased global demand for this size of crane. Liebherr has been pumping out the LTM1750 as if it was a taxi crane, while Terex claims to have taken orders for more than 20 units of its Supalift 3800 – mostly into the wind sector because of its efficient wind configuration.

The Supalift 3800 is able to handle the latest nacelles such as the Enercon E101 which weighs 67 tonnes, has a 100 metre rotor diameter and hub heights to 150 metres. The Supalift 3800 is able to handle this size of turbine while its predecessor - the Terex CC2800 - cannot.

Rumours that Terex was to update its 1,000 tonne CC5800 at Bauma did not materialise but an upgrade may be on the cards in the distant future. However the star of the Terex CC line up is the CC6800 which uses the same base as the 1,000 tonne CC5800 but has a different boom system giving its capacity of 1,250 tonnes. The gains in lift capacity over the CC5800 mean that most customers opt for the larger 6800 with about 10, CC 6800s sold for every CC5800.

The most popular Terex CC model is still the 2800 with more than 300 units sold. In comparison around 30 units of the 1,600 tonne CC8800 (or 3,200 tonne in Twin configuration) have been sold with the CC6800 somewhere in the middle. We have also heard that Terex is working on a new increased capacity boom system but no details are available yet.

*Two Liebherr LG 1750 lattice boom mobile cranes operated by H.N. Krane and Maxikraft on either side of the River Spree in Berlin installing a bridge.*

## Liebherr 1,000 tonner

Liebherr's new 1,000 tonne LR 11000 crawler launched at Bauma fills the gap between its 750 tonne LR 1750 and the 1,350 tonne LR 11350 and in order to respond to growing demand for cranes in the 1,000 tonne range for applications such as offshore wind turbines and handling their foundation structures in port. The crane is currently undergoing tests so is not yet available for delivery.

The company says the LR 11000 is economical in terms of size and transport logistics and having a large number of boom variations means it is very versatile. The standard S main boom and W luffing jib allows various boom combinations including a PowerBoom system with a heavy luffing jib which requires only the P adapter for this purpose. Main S boom operation is possible with a 1,000 tonne or a 650 tonne boom nose. The standard LR 11000 is prepared for the P boom system, operation with a ballast trailer and all winches. Special equipment such as a fixed jib for assembling wind turbines with high hub heights is also planned.

Many of Liebherr's crawler crane innovations have been included in the LR 11000.

The design of the P boom has been taken from the 3,000 tonne LR 13000, the new crane cab was developed for the LR 1600/2 and the adjustable derrick ballast radius and lattice guide frame are taken from the 1,350 tonne LR 11350. The main carbody including slew ring and base section of the superstructure forms a transport unit which can be rapidly connected to the superstructure frame using just four bolts, with no need for a quick-release connection. The undercarriage features a 360 degree platform with guardrails with access ladders on both sides. The platform provides safe, easy access to the superstructure and cab.

A large number of details aimed at making transport and erection easier have also been taken from the 600 tonne LR 1600/2. These include the removable A-frame including reeving system, fall protection equipment and stacking supports for lattice sections.

## Easier transport

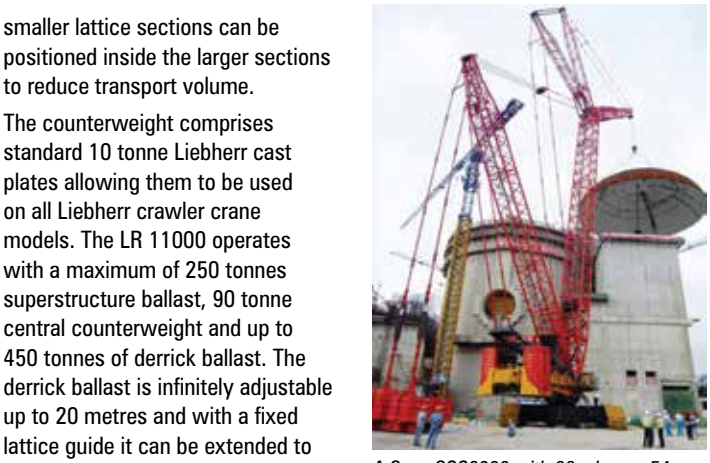
The new LR 11000 is designed with transport width of 3.5 metres and height of 3.2 metres. The crawler carrier and the carbody each weigh 60 tonnes and are the heaviest transport packages, although they can be reduced to 45 tonnes for regions with more stringent transport regulations. And as with other Liebherr crawler cranes, the smaller lattice sections can be positioned inside the larger sections to reduce transport volume.

The counterweight comprises standard 10 tonne Liebherr cast plates allowing them to be used on all Liebherr crawler crane models. The LR 11000 operates with a maximum of 250 tonnes superstructure ballast, 90 tonne central counterweight and up to 450 tonnes of derrick ballast. The derrick ballast is infinitely adjustable up to 20 metres and with a fixed lattice guide it can be extended to radii of 20, 25 or 30 metres. The LR 11000 has been designed for use in constricted areas such as refineries. The basic has an operational track width of just 9.2 metres and the suspended ballast can be reduced to a minimum of 12 metres on the basic machine.

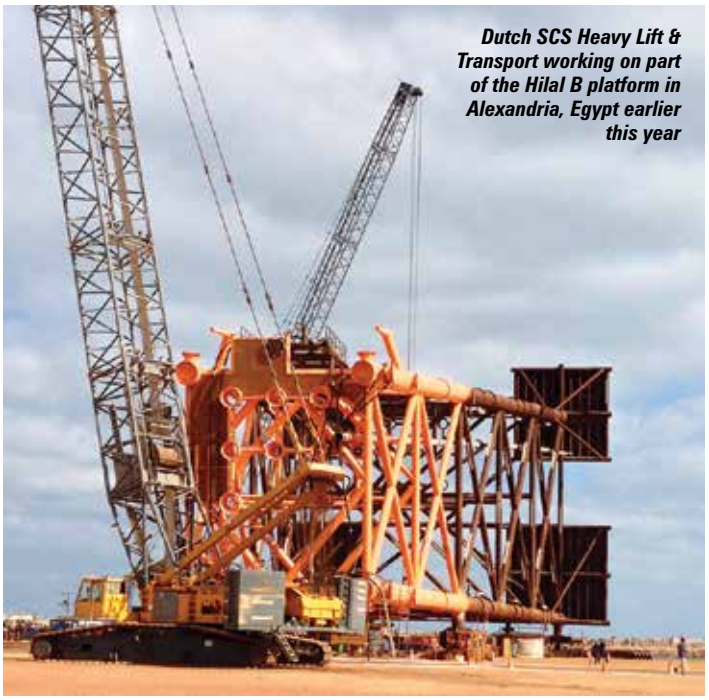
## Big Chinese crawlers

The large capacity crawler crane is one market sector that Chinese manufacturers are competing head-on - at least in terms of capacity. In 2011 Zoomlion launched the 3,200 tonne ZCC3200NP and Sany introduced the 3,600 tonne SCC8600TM. While most crane buyers are yet to be convinced about the design integrity and quality of these large Chinese crane, Sany says its 500 strong joint US and Chinese R&D team used the very latest design methods to address the problems of non-linear and large deformation inherent in designing such a large crane. It also applies the high-risk coefficient recommended by Chinese standards body Code of China used in the nuclear industry. As part of the crane's development, the firm also invested a substantial sum in a 'super-computing centre', to design analogue simulation hoisting software, processing equipment and detection instrumentation for the process. Sany has also applied for about 30 patents for elements of the crane's design such as the double main chord, single jib section as well as the double super cab and hopes that the end product will end the dominance of major European and American players in the Chinese domestic market for nuclear heavy lifting technology.

With a maximum load moment of 82,000 tonne/metres the 3,200 tonne Zoomlion ZCC3200 was developed for use on the third-generation nuclear power stations. The design rationale was to produce a large capacity travelling crane and used 3D design software to determine best practice assembly procedures. Zoomlion has applied



*A Sany SCC9000 with 66m boom, 54m jib and 51m superlift radius to hoist the dome of No3 generating set which weighs 155t, is 11m high and 37m in diameter.*



***Dutch SCS Heavy Lift & Transport working on part of the Hilal B platform in Alexandria, Egypt earlier this year***

*Two Terex AC500-1 in Rotterdam*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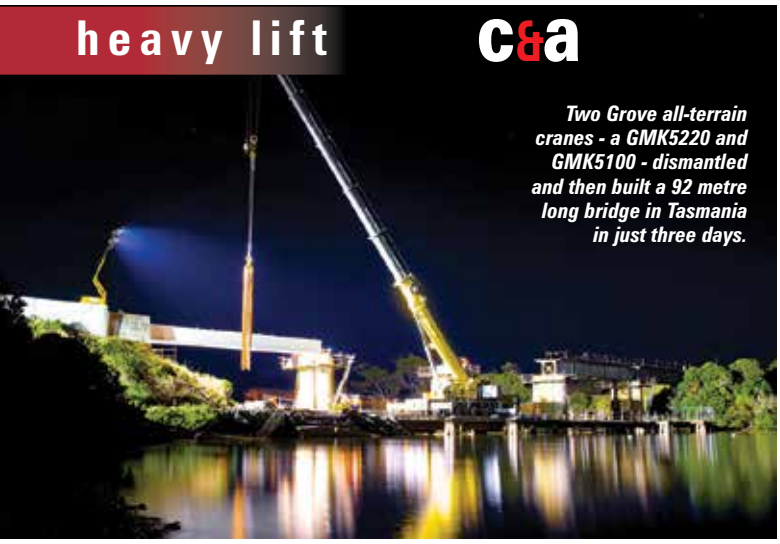


*Two Grove all-terrain cranes - a GMK5220 and GMK5100 - dismantled and then built a 92 metre long bridge in Tasmania in just three days.*

for more than 20 patents on the ZCC3200NP. These include the parallel double jib, a parallel closed control system and a multiple engine power unit.

Since the launch of these two super crawlers, a joint venture between XCMG and Sinopec Engineering has topped them both with the 4,000 tonne XCG 88000 which carried out its first commercial lift during this summer - installing a 118 metre high, 1,679 tonne propylene tower at an industrial park in Yantai City, in north east Shandong Province.

The lift follows a full test program in which XCMG claimed a world record lift when the 88,000 tonne/metre crane raised a 4,500 tonne test load on a 60 metre boom at a radius of just over 17 metres. The crane, which can also be configured as a 2,000 tonne class crane - similar in concept to the Terex CC8800 Twin - has previously lifted 2,500 tonnes on a 96 metre main boom.

Each of these cranes marks an important step in the development of the Chinese crawler crane industry looking at a global market. While very few Chinese cranes of 600 tonnes and more have been exported so far, they have had a major impact on the local market for big cranes, which for several years was lucrative market for the big three crane manufacturers. As Manitowoc, Terex and Liebherr struggled to cope with local joint ventures to compete with smaller cranes, they were gradually pushed into smaller and smaller niches, with the big crawler crane market looking like a final haven. The speed with which the local producers designed and built 1,000 and then 2500 tonne plus cranes was spectacular and at the same time frightening and is has almost cut off sales of imported units. However a number of high profile serious incidents with these large locally built units has reinforced any earlier concerns western buyers may have had.

*The XCMG 1,000 tonner XGC16000*

In the end it might be the slowing Chinese economy that curbs the gravity defying growth of local crane companies. Zoomlion whose finances have been at the centre of a Chinese media scandal has revealed third-quarter profits down by more than a third, while Sany reported profits down by half. Zoomlion has battled a string of questions about the reliability of financial reports and accusations of outright fraud over more than a year and has consistently denied any impropriety. A few weeks ago a Chinese reporter confessed to taking bribes to write damaging stories about the company, after being arrested by police in the atest set of accusations against the group.

The Chinese construction equipment industry has come under intense pressure since the huge government stimulus - which followed the financial crisis - began to run out and a boom in property building and physical infrastructure began to decline.

*Wagenborg Nedlift uses two Terex AC500-1 and a Terex CC2500-1 crawler crane to place the almost 200 metre-long bridge into position in Rotterdam*

Sales have been falling and inventories of unsold equipment have been building up at both local government-backed Zoomlion and the privately owned Sany Heavy. Will the Chinese companies producing these mega cranes cope with the real world?

## Wind power still driving

Wind power is still a big driver for manufacturers in the heavy lift sector particularly for crawler cranes up to 1,200 tonnes as can be seen with the number of specific wind power attachments now available. A few months ago we looked at the growing use of tower cranes for wind turbine erection and this is growing in popularity as hub heights and nacelle weights increase, giving designers a ready-made and cost effective lifting solution that can currently cope with nacelle weights up to 125 tonnes and hub heights over 120 metres. With the rising costs of larger capacity cranes this may be the answer to the next generation of turbines, with nacelles hub heights of over 150 metres.

However we are entering the next stage of large infrastructure projects with increased module sizes. With this in mind it will be interesting to see the next stage of development in the mega capacity crane.

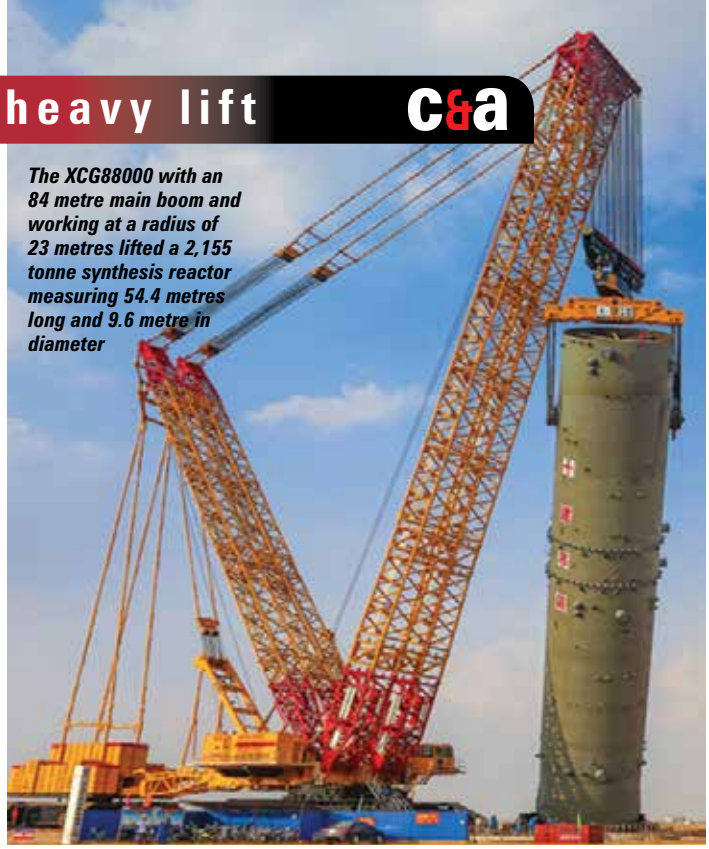
*ZOOMLION's largest crawler crane the 3,200t ZCC3200NP launched in 2011*


# Thank you for your support

We would like to thank all of our readers, sponsors and contributors, for the fantastic support that we have received this year, all of which helps to make this and our other publications what they are.

Wishing you all a very happy Holiday season and a happy, healthy and prosperous year in 2014.

From all of us at the Vertikal Press



*The XCG88000 with an 84 metre main boom and working at a radius of 23 metres lifted a 2,155 tonne synthesis reactor measuring 54.4 metres long and 9.6 metre in diameter*

# Largest crawler claims record

**The world's largest capacity crawler crane - the 4,000 tonne XCG88000 - has completed a record breaking lift working in China on a project for Shenhua Ningxia Coal.**

Helping construct an indirect coal liquefaction project, the XCG88000 lifted a 2,155 tonne synthesis reactor measuring 54.4 metres long and 9.6 metre in diameter. The crane was rigged with 84 metres of main boom and was working at a radius of 23 metres (rated load 3,300 tonnes). The lift took just two and a half hours, saving a whole week when compared with the previous installation schedule. The XCG88000 will lift seven other reactors of the same size and weight during the project.

Earlier this year the crane completed its first heavy lift at a Sinopec site at an industrial park in Yantai - a 1,680 tonne propane tower was lifted at a radius of 30 metres, the total load was 1,790 tonnes. The crane was then disassembled and transported half way across China - more than 1,600km - to the Shenhua Ningxia project. When completed it is expected to produce four million tonnes of oil and olefin supporting synthesis gas per year, including 2.7 million tonnes of blended diesel, 983,000 tonnes of naphtha and 333,000 tonnes of LPG.

# Big crane will travel

**A 1,600 tonne capacity Terex CC8800-1 crawler crane was transported 1,250 km from Kuwait to Yanbu in Saudi Arabia to lift a 771 tonne, 67 metre high hydro treating reactor, at the Yanbu Export Refinery.**

The Daelim Industrial Company of Saudi Arabia, contracted heavy lifting specialists Integrated Logistics of Ahmadi, Kuwait to carry out the lift and it selected the CC 8800-1 as the main crane, with a Manitowoc 18000 as the tailing-in crane. The CC8800-1 required 20 low loaders, 67 flatbed and two hydraulic trailers to make the 1,250 km trip, which took about seven days.

Once the crane's components arrived on site, Integrated Logistics' nine crew members - two operators, six riggers and one supervisor - began assembly of the crane and supporting equipment. The crane was configured with a 78 metre main boom and the maximum 640 tonnes of Superlift counterweight, with 295 tonnes of counterweight on the superstructure and 60 tonnes of central ballast. The counterweight radius for the superlift tray was set at 25 metres. Two 800 tonne hook blocks and one 1,000 tonne Crosby shackle were required to lift the massive reactor, bringing the total lift weight to 810 tonnes.

After six days, Integrated Logistics crews were ready to hoist the reactor into position. Lift conditions were ideal with favourable weather and wind speeds of less than seven metres a second, well within the crane's rating of 9.8 metres per second. Working radius during the lift ranged from three to 24 metres, with the lift competed in a day. The crane was then dismantled for shipment back to Kuwait.

"Using the CC8800-1 as the main crane, we maintained a lifting speed of about two metres a minute and the accuracy of the crane's control system helped with the lift," said Manoj Kumar, general manager operations for Integrated Logistics.

*The CC8800-1 was configured with a 78 metre main boom and the maximum 640 tonnes of Superlift counterweight, with 295 tonnes of counterweight on the superstructure and 60 tonnes of central ballast*

*The CC8800-1 was transported 1,250 km from Kuwait to Yanbu in Saudi Arabia to lift a 771 tonne, 67 metre high hydro treating reactor, at the Yanbu Export Refinery.*

# Wiesbauer places precast concrete elements

**A project to modernise the Bad Kreuznach railway station in Germany included a brand new pedestrian underpass. The underpass was made up of two large precast concrete box elements, each weighing 240 tonnes. In order to keep disruption at the busy junction to a minimum, the elements were precast in a dedicated area of the site and then had to me lifted into position alongside the tracks.**

Crane rental company Wiesbauer was given the task, for which it selected a 750 tonne Liebherr LR 1750 crawler crane. The crane was rigged with a 49 metre main boom and derrick system, it then lifted the two sections to the track area during a pause in the train services. The challenge was made more difficult due to the limited space available and obstacles such as an electricity substation and a signal box within the tail swing area of the crane. Because the precast elements were so heavy, it was essential to distribute the weight evenly between the four wire rope lifting straps embedded into the concrete. To do this, a heavy duty spreader beam with compensators was used. The four heavy looped wire rope slings were then attached to the lifting straps via 120 tonne heavy duty shackles and specially made sheaves. The total load with rigging was 262 tonnes which was then lifted to a radius of 32 metres.

*A 750 tonne Liebherr LR 1750 crawler crane with 49 metre main boom and derrick system lifted in the two, 240 tonne concrete sections.*

*Owned by South Korea's Chunjo Construction Co the crane is scheduled to carry out a 900 tonne lift this month and two 1,000 tonne lifts in December and February*

*Manitowoc's largest crane the 2,300 tonne capacity 31000 crawler crane has completed its largest lift to date picking and carrying a 650 tonne cold box*

# Manitowoc 31000 completes its biggest lift

**Manitowoc's largest crawler crane the 2,300 tonne capacity 31000 has completed its largest lift to date, picking & carrying a 650 tonne cold box at a liquefied natural gas plant in Gwangyang, South Korea.**

The lift at the Posco E&C plant was carried out by the 31000 owned by South Korea's Chunjo Construction, the first to be delivered. It has been working on site since March and is scheduled to carry out a 900 tonne lift this month and two 1,000 tonne lifts in December and February.

"It is great to see this flagship crane performing, making an awkward lift look easy," said Chunjo chairmanChang Hwan Jang. "The 31000 has a minimal footprint thanks to its Variable Position Counterweight but also offers a huge capacity, so it fits our needs perfectly. We are delighted with how well the crane is performing and look forward to seeing the next challenging lift it tackles."

The 31000 lifted the 55 metre tall cold box measuring nine metres square off a flat-bed trailer in tandem with a 600 tonne capacity Manitowoc 18000, also owned by Chunjo. Once airborne and upright, the 31000 carried the load to its final location. The entire operation took less than two hours. The tight lift was hindered by a high wall to one side of the crane that restricted its movement. To avoid this, the crane's 55 metre boom was raised to its highest angle, bringing the load closer in and minimising potential swing.

The 31000's VPC system minimises the crane's footprint and ground preparation by suspending the counterweight in mid-air, rather than using a wheeled counterweight trolley. The VPC automatically positions the 31000's counterweight to fit the required lift and ranges from eight metres fully retracted to 29 metres fully extended. Since arriving at the plant, the Manitowoc 31000 has completed several large lifts including placing reactors that weighed 250 tonnes and 450 tonnes each.

Based in South Korea, Chunjo operates a fleet of more than 120 Manitowoc crawler cranes, Grove mobile cranes and Potain tower cranes. It owns more Manitowoc 18000s than any other company in the world.

# Superlift 3800 erects Enercon E 101 wind turbine

*German heavy lift specialist Franz Bracht Kranvermietung used Terex's new 650 tonne capacity Superlift 3800 to erect an Enercon E-101 wind turbine to hub height of 149 metres.*

**Developed with lifting large wind turbines in mind German heavy lift specialist Franz Bracht Kranvermietung used Terex's new 650 tonne capacity Superlift 3800 to erect an Enercon E-101 wind turbine to hub height of 149 metres. The Scharrel community wind farm at Saterland's Ostermoor bog in Germany is built with a focus on big wind turbines in order to generate "green" electrical power.**

Thanks to the crane's lateral outriggers, the Bracht team erected the 3800 with much less ballast than is usually required for a crane of this size and without an assist crane, reducing transport costs and set up times.

Thanks to its design to make assembly easy, the crane was fully set up with 153 metres of main boom and 12 metre LF superlift configuration in just two days. Terex claims the Superlift 3800 is the only crane in its capacity class (599 to 699 tonnes) that can erect Enercon E-101 wind turbines at hub heights of up to 150 metres.

The Terex Superlift 3800 first erected the concrete tower sections with a mobile tailing-in crane. Once the concrete tower was completed, the 67 tonne nacelle was lifted to a height of 150 metres and placed on the tower. The final portion of the lift involved positioning and connecting three 50 metre long rotor blades to the nacelle.

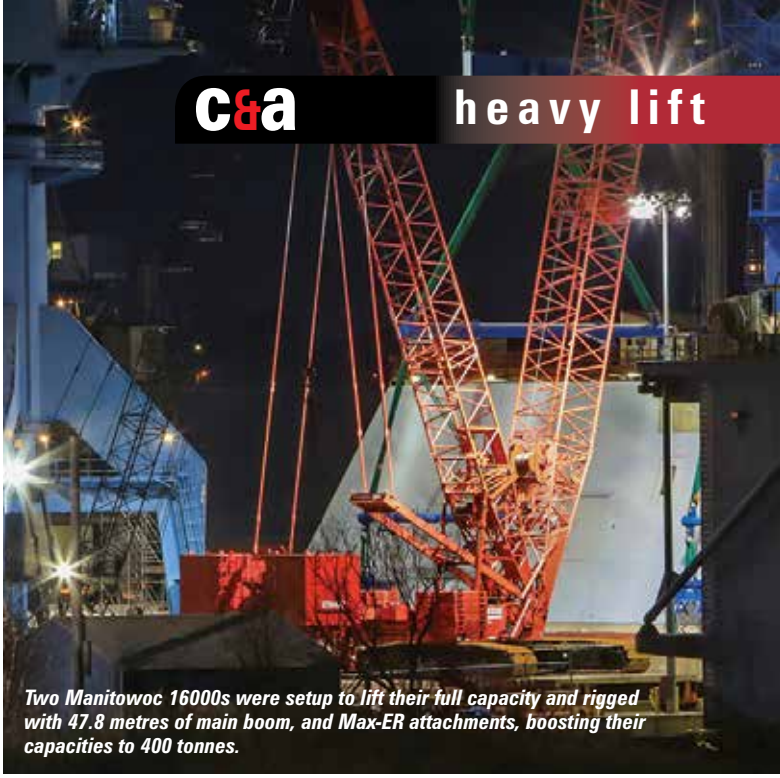
# Record lift in Bath

**Bath Iron Works of Bath, Maine which has been building ships for the US Navy for 128 years, has broken its heaviest lift record, lifting nearly 907 tonnes with two Manitowoc 16000 crawler cranes, almost doubling the shipyard's previous record.**

The lift was part of a project to construct the Navy's next-generation DDG 1000 Zumwalt-class destroyer. Along with two of the company's 300 tonne capacity gantry cranes, the two Manitowoc crawlers lifted the 900 tonne deckhouse from a barge and set it on the hull of the ship. The deckhouse contains the ship's bridge, command center and battle room.

The two Manitowoc 16000s were setup to lift their full capacity and rigged with 47.8 metres of main boom, and Max-ER attachments, boosting their capacities to 400 tonnes. The deckhouse was rigged with 12 nylon straps and then lifted from the barge to a height of 27 metres and held in place for three hours, while the barge was moved out from underneath and the 12,000 tonne ship was moved into place underneath, allowing the deckhouse to be lowered onto the ship's hull.

Contractor Reed & Reed provided the cranes and oversaw the lift, it has been working with Bath Iron Works since 1928. The Manitowoc 16000s - the largest capacity cranes in Reed & Reed's fleet - were chosen because the lift required two matching cranes simplicity. Pre-planning work involved reinforcing the pier beneath the 16000s with steel bridge girders to support the high point loadings.



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