Grove's Newest Crane - The RT540E

The RT540E is the latest addition to Grove's rough-terrain product line. Advantages include a maximum lift capacity of 35 t (40 USt), a four-section boom reaching 31 m (102 ft) in length, and a 13.7 m (45 ft) offsettable telescopic swing-away extension. Other features include an LMI with anti-two block system, dual-axis electronic joystick controllers, and an all-steel cab.

For more information about the Grove RT540E, go to: **www.mcgads.com/1139**

GROVE

Manitowoc Crane Group

Taking the strain

There is currently an insatiable demand for all types and sizes of cranes. Around the world, the lifting market is more buoyant than ever before with delivery dates for new cranes, particularly larger machines, now stretching into 2010 and beyond.

Driven by a bustling energy sector, a traditional favourite for larger cranes, manufacturers are not only building bigger and bigger units, but also tailoring machines to deal with the specific industry demands.

Big telescopics in short supply

Alternative energy sources such as wind power are now a major influence on the design and development of big cranes. It wasn't too many years ago that a 100 tonne capacity crane was considered a big machine. These days even a 250 tonner is fairly run of the mill, with many considering the big crane sector starting with a 500 tonne telescopic. Although when it comes to traditional lattice cranes, a 250 tonne crawler is still a very impressive and large piece of kit.

The UK/Ireland market currently has a shortage of large telescopic cranes for hire, with all but three 500 tonne cranes in the hands of one company, while only two companies can offer a 1,000 tonne telescopic. This is set to change however, as several UK hirers have ordered new 1,000 tonne plus cranes from Terex-Demag and Liebherr. This in itself is a sign of the times, when a regional rental company such as NMT feels able to order such a large and specialised machine.

When it comes to really big cranes though, the market is still dominated by big lattice boomed machines. Today most of these are in the hands of large international groups such as Mammoet and Sarens, although UK-based Alternative Lifting Engineers has an impressive line up of big lattice cranes. This business is very international with these big machines booked well in advance for projects from South America to Northern China.

Bespoke big cranes

On the manufacturing side both Liebherr and Demag have been busy introducing big crawler cranes that are largely targeted at the energy sector. In fact next month, Demag is set to premier the totally new, 3200 tonne capacity, twin boomed CC 8800-1 Twin which it claims is the most powerful mobile crane that has ever been built.

Currently the very top end of the big crane market is increasingly dominated by specially designed ringer type heavy lift devices commissioned by companies such as Mammoet. It operates a fleet of these twin boomed modular PTC and MSG models with lift capacities in excess of 3,000 tonnes and boom and jib combinations of up to 200 metres. This specialist 'modular' crane approach was pioneered by Lampson in the USA, which developed devices to double up large Manitowoc crawler cranes as well as developing big rigs such as the ill-fated Big Blue, which collapsed in 1999 while lifting a 450 tonne dome. Modern Computer Aided Design and testing software, high strength steels and sophisticated load monitoring devices almost make anything possible in this rarified end of the crane market as designs are scaled up as high as is needed to do the job. However the amount of available space, not to mention cost and shipping/erection expense will surely encourage further development of clever jacking systems at least for the less bulky heavy loads?

Hydrospex HSL2000 and HSL3000 strandjacks in action

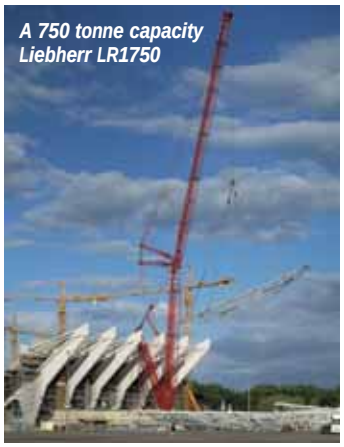
A CC12600 in action, currently the biggest Demag crawler crane.

Who needs a big crane?

As the highly-charged energy sector soaks up big crane capacity, an increasing number of contractors look to alternatives and the industry has responded with a wide range of jacking and skidding devices. In a way this harks back to earlier times. Skidding is an ancient technology that dates back to the Egyptians and Neolithic Britons neither of which had big cranes on hand to build the pyramids or Stonehenge.

Companies such as Dutch-based Hydrospex has brought jacking and skidding systems into the 20th century with sophisticated electric power packs, synchronised lap top controls and constant real time monitoring of the lift or the move. A single man can lift a 600 tonne vessel from the horizontal to the vertical in a quiet highly controlled manner with the equipment taking up very little space. The pace of development in this sector could see a new trend, shifting a wide range of heavy lifting work back towards these more traditional, albeit modernised, methods of lifting.

In the following pages we take a look at a variety of large cranes and lifts, not to mention the skidding technology used to move two bridge structures weighing 3,200 tonnes and 5,800 tonnes.



A 750 tonne capacity Liebherr LR1750

The road to recovery

A 1,000 tonne crane from Ainscough Crane Hire was used to carry out the complicated operation of removing 11 freight wagons following their derailment at the end of June. Due to the marshy fenland location and the extensive damage to an access bridge, client Network Rail had to build a 1.3km temporary road from the A142 road, to allow the crane to reach the lift site.

The accident occurred on a rail bridge over the river Ouse between Ely and Soham closing the single-track line. Replacement bus services have been taking passengers between Ely and Bury St Edmunds although it is estimated that the line will not return to normal service for another four months.

Around 20,000 tonnes of stone and plastic mesh were brought in to build a stable and secure platform for the Liebherr LTM 11000 and two smaller 250 tonne cranes needed to remove the wagons.

Once lifted off the bridge, the wagons were taken away on low-loaders. The bridge, irreparably damaged in the crash, will be completely removed and replaced.

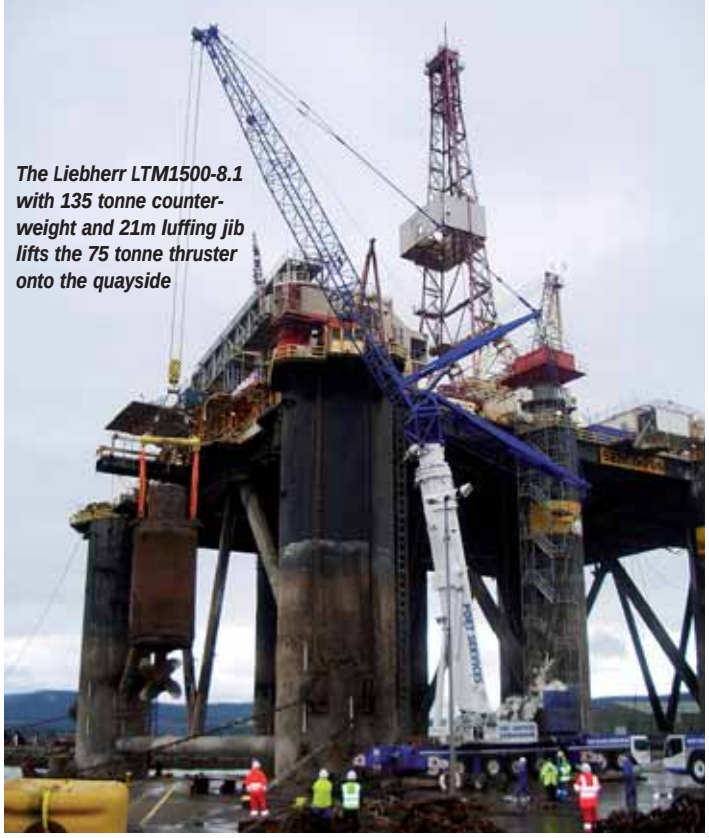
Network Rail Anglia route director Patrick Hallgate said: "Building a 1,000 tonne crane platform on deep boggy marshland is indicative of just what a tricky engineering problem the incident created. Our engineers have been working really hard to complete this key phase of the recovery programme. We can then get on with clearing the river, rebuilding the bridge and getting passenger and freight services back up and running as soon as possible."

Due to the marshy fenland location and the extensive damage to the bridge, client Network Rail had to build a 1.3km temporary road so the crane could gain access to perform the lifts.

"There is still a lot of work to do, and the complexity of the situation means we do not yet have a reopening date for the line. We share passengers' frustration at disruption to their service and we promise to keep all those involved informed of the progress of the recovery."

The wagons, which have been dangling precariously over the Great Ouse, dumped between 20,000 and 40,000 tonnes of building aggregate into the river. The Environment Agency closed the river to boats and put in place booms to stop the spread of oil and hydraulic fluid from the wagons.

Workmen try to free the tangled trucks.



The Liebherr LTM1500-8.1 with 135 tonne counter-weight and 21m luffing jib lifts the 75 tonne thruster onto the quayside

Big lift refit

When the offshore drilling rig Sedco 706 came in for a refit recently, Port Services (Invergordon) was called in to carry out the heavy lifting. The 500 tonne Liebherr and 1,200 tonne Gottwald AK912 that the company used were dwarfed by the 2,500 tonne, 40 metre high rig.

Port Services' 500 tonne Liebherr LTM1500-8.1 telescopic crane was rigged with its full 135 tonnes of counterweight and set up the 'Lastdragger 25' barge to replace the rig's propulsion thrusters.

The Liebherr was placed on a barge to get in close to the thrusters.

Sedco 706 uses four 2,200 hp Baylor thrusters - powered by three massive EMD diesel engines - both for manoeuvring and normal propulsion. Each thruster weighs 75 tonnes and was lifted at a radius of between 18 and 20 metres and placed on the deck of the barge.

The Liebherr was then rigged with 21 metres of luffing jib to achieve the height and radius required to lift each thruster from the barge to the transport on the quayside. Once loaded the thrusters were taken off for scrap.

The 1,200 tonne truck mounted Gottwald AK912 GT, was hired from ALE and was rigged with 200 tonnes of counterweight, 41.7 metres of main boom and 77 metres of luffing jib in order to remove the rigs central derrick in one piece.

Sedco 706 was built in 1976 at the Kaiser yard in Oakland and had its last refit in 1994. It can handle waves up to 30 metres and drill to a depth of 25,000ft/7,500 metres.

The 1,200 Gottwald AK912 was brought in principally to handle the rigs mast.

A Model lift

Spanish rental company Aguado chose its Manitowoc Model 18000 crawler crane for all the heavy lift work on a new offshore platform under construction for client Dragados Offshore in Cabezuela Bay, Cadiz, Spain. The crane carried out 10 major operations, the largest being a 350 tonne lift of three turbo-generators.

The 18000 was rigged with 61 metres of main boom, 48 metres of luffing jib and the Max-Er superlift attachment, with 210 tonnes of counterweight on the tray. The crane was equipped with a 450 tonne hook block.

Juan Aguado Sr, general manager of Aguado, said planning was meticulous. "Safety was a very important factor for our customer on this job," he said. "The lift was planned for the day when the lowest wind speeds were expected and two surveyors monitored the whole four and a half hour lift using laser guidance systems. The factors of safety were extremely high, but they proved no problem for the 18000, even the heaviest 350 tonne lift used less than 65 percent of the crane's capacity at a 22 metre radius."

The new offshore platform involved 10 major lift operations including a 350 tonne lift of three turbo-generators.

For lifting work the 18000 was rigged with 61 metres of main boom and 48 metres of luffing jib

In addition to the Model 18000, Dragados used its own Manitowoc 7000 as well as two 4100W cranes for other lifting work. According to Aguado, Dragados chose to rent the 18000 because Manitowoc is a brand they have been familiar with for many years. "They still have their own Manitowoc crawler cranes at the Cadiz facility and they know the quality, strength and reliability of the marquee," he said.

The crane work in Cadiz formed part of the construction work for the liquid natural gas plant Adriatic LNG. Owners ExxonMobil (with 45 percent share), Qatar Terminals (45 percent) and Edison SpA (10 percent) will put the platform into operation in the Adriatic Sea, 15 km off the coast of Italy. Aker Kvaerner is running the engineering work, employing Dragados Offshore to handle the construction.

After the equipment was unloaded it was moved to its foundations using SPMT's.

Mammoet motors on

The construction of a new polyethylene (LDPE) plant within the Wilton Petrochemical site in Middlesborough involved the installation of several sizeable items of equipment including three compressors and two motors, the heaviest of which weighed 165.5 tonnes.

The contract also involved constructing two foundations, one for the primary compressor and motor and a secondary for two compressors and a motor.

Two, 100 tonne capacity Grove All Terrain cranes were used in a 17.6 metre radius tandem lift to load the first compressor onto a Self Propelled Modular Transporters (SPMT).

Two Grove 100 tonne all terrains tandem lift a compressor to place it on an SPMT.

As the SPMT transported this compressor to its foundation approximately 800 metres away, the two cranes were relocated and lifted the compressor from the transporter, placing it onto the foundation 3.7 metres above ground level.

This process was then repeated for the primary motor which weighed 49 tonnes.

A Liebherr LTM 1250 and a Liebherr LTM 1400 were used in tandem to lift the 121 tonne secondary compressor from its temporary set down supports onto the transporter. As the second foundation had no room around it for a crane, a skid system had to be used. The load spreaders and skid track were pre-installed on a trailer to allow for transition onto the waiting skid system at the foundation.

When the transporter reached the foundation it was jacked to a height of four metres, allowing the compressor to be slid 20 metres across the foundation to its final position. However an eight metre gap in the foundation had to be filled with supports and load spreaders to allow the skid track to be placed across the top. The compressor was then jacked down into its final resting place. A similar procedure was used for the remaining equipment.

When fully operational, the £200 million project should result in an LDPE output of 400,000 tonnes - a sizeable proportion of the UK's 500,000 tonne annual consumption.

A bit of push and pull

Mammoet has also completed two rail underpasses - weighing 3,200 tonnes and 5,800 tonnes - on the new Rugeley bypass. The structures allow the road to travel under two existing railway lines - one serving a nearby power station and the other a commuter line linking Rugeley with the surrounding area.

The 3,200 tonne structure under the power station railway line was installed using 16, 600 tonne skid shoes, four skid tracks (each measuring approx 90 metres), four, 64 tonne push/pull units and low level bracing system.

The larger 5,800 tonnes structure to carry the commuter line above the new road consisted of three individual pieces - two concrete abutments weighing 2,600 tonnes each, and a steel bridge deck weighing 600 tonnes.

As this railway line was operated by Network Rail, the time allowed to complete the project was much more limited compared to the other structure the operations during the possession period were much more intense.

Using 28, 600 tonne skid shoes, four skid tracks (each measuring 132.5 meters long), twelve, 64 tonne push/pull cylinders and a low-level bracing system which was installed between the skid shoes, the equipment was assembled over a ten-day period, culminating in a trial slide operation which was performed prior to the commencement of the railway possession.

During the possession, Mammoet had to complete the installation of the remaining skid tracks, slide the structure over a distance of 89 metres, and then remove the equipment all within a 36-hour period.

The larger structure was made up of three pieces and weighs 5,800 tonnes.

600 tonne skid shoes and 64 tonne push/pull cylinders were used to move the structure up to 89 metres.

A breath of fresh air

The world's biggest deepwater offshore wind turbine has recently been towed to Talisman Energy (UK) Limited's £45 million Beatrice Wind Farm Demonstration Project, 25 kilometres off the east coast of Scotland in the North Sea.

The placing of the huge turbine blade assembly and nacelle in the build up to the Demonstrator Project was carried out by heavy-lift specialist Weldex, using one of its two recently delivered, 550 tonne capacity Kobelco SL6000 crawler cranes.

Weldex's initial contract involved erecting two 5MW REpower units - each with a 125 tonne hub and three-blade assemblies to a height of 65 metres, the height of the main generator mounting flange. Each blade alone is more than 61.5 metres long and weighs 17.5 tonnes resulting in a massive 126 metre total blade swept diameter.

"The scope of the SL6000's onshore work was to assemble and install the two units and off-load and store various 40 -125 tonne assemblies," said Brian Hyde of Weldex. "The crane was then put on a barge deck for some of the offshore lifting activities."

Existing offshore wind farm developments are normally in waters close to shore in depths of less than 10 metres. Being 25km off the east coast of Scotland , these wind turbines are situated in about 45 metres of water which creates its own challenges that have to be overcome. Combining oil and gas technology with that of renewables, the operation involved sailing out the fully assembled turbine onboard the heavy lift barge 'Rambiz', installing it on the 70 metre subsea jacket, and then connecting it up to the Beatrice A platform.

An impressive sight, the turbines' overall height from sub sea level to the top of the rotor blade tip is almost 235 metres.

Other impressive statistics include the 305 tonne turbine and the 225 tonne tower. The subsea jacket and associated equipment weigh in at 760 tonnes, whilst the supporting piles are 120 tonnes each.

The 5MW REpower turbine is currently the largest deepwater offshore generator in the world and if the project proves successful, it could lead to a large scale wind farm off the cost of Scotland.

When installed, the overall height from sub sea level to the top of the rotor blade is almost 235 metres.

Experience the Progress.

Experience the Progress with Liebherr:
The crawler cranes are convincing by their manoeuvrability, performance and safety.
Advanced Technologies are our Business.

Liebherr-Great Britain Ltd.
Normandy Lane, Stratton Business Park
Biggleswade, SG18 8QB
Phone: (01767) 60 21 00
Fax: (01767) 60 21 10
www.liebherr.com

LIEBHERR
The Group