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Sarens new super heavy-lift crane

Belgium-based crane and heavy lift specialist Sarens has launched its largest crane to date, the SGC-140 ring crane, which handles 2,820 tonne at 50 metres radius. The crane has been erected and is currently undergoing tests at the Port of Ghent, before being dismantled and shipped to Kazakhstan where it will used on the Tengizchevroil (TCO) project on the north eastern shores of the Caspian Sea, lifting modules weighing up to 2,500 tonnes at a radius of 50 metres. The crane is truly European venture with parts and components coming from all over Europe.

The SGC cranes are designed in house by Sarens following its 2009 acquisition of Rigging International. There are currently two models - the SGC-120 and the new SGC-140 - but additions will include the 90,000 tonne/metre SGC-90 to be launched next year and the 250,000 tonne/metre SGC-250 due in 2019.

The SGC-140 is an updated, improved and stronger version of the SGC-120 which was launched in 2010, with boom lengths of 89, 118 or 130 metres and four different jib lengths - 40.5 metres, 64.1 metres, 87.7 metres and 99.5 metres. Improvements include more counterweight - now 4,000 tonnes - a reinforced boom and back mast, upgraded boom hoist and lift winches with more rope storage, improved power packs and a new ring and bogie design.

In addition to its impressive, useable maximum capacity, the crane and 118 metre boom can take 770 tonnes to a radius of 118 metres, while the double rams-horn hook block weighs 104 tonne and has a capacity of 3,200 tonnes. Sarens initially named the new crane the SGC-120-1, however there were so many changes while it also became bigger - with 45 percent more capacity at 120 metres radius - that it made sense to rename it the SGC-140.

40 counterweight containers each weigh 100 tonnes

Installation process and components

The crane uses a 44 metre diameter ring made up of 64 steel mat sections topped by a dual beam and rail track. The machinery deck houses eight massive winches, six power packs a machinery/electronics room, and a large operators cab plus 40 counterweight containers - each weighing 100 tonnes when filled with sand.

The size of this crane should not be underestimated - it is huge. However the company claims that it can be erected on site in six to eight weeks. The process begins by preparing the ground for the 44 metre diameter ring - ground bearing pressure of the fully erected crane is 25 tonnes/square metre . The 64 steel mats are then placed on the prepared ground, two heavy 'I'-beam rail supports are bolted on top and connected with lattice braces. The inner and outer

The crane uses a 44 metre diameter ring made up of 64 steel mat sections topped by a dual beam and rail track

The hook block wighs 104 tonnes and has a 3,200 tonne capacity

The rail tracks are bolted onto two heavy I beam supports.

rail tracks are then clamped on top. The bogies are assembled on the rails and the machinery deck then installed on top with winches and power packs lifted into place. Next up the installation of the twin back mast using two cranes, one side at a time.

Counterweight containers are then filled with sand and stacked in place, the boom pinned to the main pivot point and boom hoist winches connected, ready to raise the boom.

There are four main lift winches and two boom hoist winches - all 40 tonne Zollern ZHP 4.36. The lift winches store 1,300 metres of 50mm rope, while the boom hoist winches have 2,100 metres. Maximum single line pull is 67.4

The crane has four main winches, two boom hoist winches and six power packs

tonnes. Each of the six power packs have two Caterpillar diesels - one operating and one for emergency backup - providing hydraulic and electrical power throughout the crane.

The crane can operate in wind speeds of up to 22.4 metres a second - that's 50 miles an hour! and handle out of service winds of 56 metres/second or 125 miles an hour. The crane is EN13000 compliant and it has been static and dynamic tested with 125 percent overloads.

Major changes over the SGC-120 include the ring which uses an ISO profile rail, (rather than a specially machined one), making it simpler to replace any damaged sections. The bogies are also to a new design and built locally in Belgium. The frame is similar but reinforced to cope with the higher capacities and larger counterweight. So while the overall profile of the crane is similar it is significantly different. Another major improvement is the reduction in the number of pin connections and hydraulic couplings, making erection/disassembly quicker and easier. The deck now includes built in service channels for hoses and wiring, making it safer to walk around.

For shipping the emptied ballast containers carry the smaller crane parts, while the largest component - part of the main frame - is eight metres wide, but weighs just 18 tonnes. The frame side beams weigh 24 tonnes. Given the size of some of the components and the reach required, the ideal assist crane is a 600 tonne Demag CC2800.

It took two gangs of 10 to15 people three months to build the crane for the first time, with parts arriving from all over Europe. However with many components now remaining connected it will be far quicker to assemble on site in Kazakhstan.

Fully erected with 118 metres of main boom at the Port of Ghent

The larger more modern cab.