

INTERNATIONAL CRANES AND SPECIALIZED TRANSPORT

Volume 25 ■ Number 3
DECEMBER 2016

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INTERNATIONAL CRANES AND SPECIALIZED TRANSPORT

VOLUME 25 ■ NUMBER 3 ■ DECEMBER 2016



Chosen as the official magazine of the SC&RA (Specialized Carriers & Rigging Association)

European partner:



Approved media partner for:



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MARKETPLACE

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Sany, XCMG and Zoomlion - had clearly made a huge effort with the show, as had the country's smaller crane makers.

While it might be unlikely that we will see again the likes of the 2012 Bauma China extravaganza, the 2016 show seemed to be healthy enough on the crane side and people were talking positively. How that translates into new business, of course, remains to be seen.

Similarly, in terms of heavy lifting, just when you thought it was safe to go back in the water or, more appropriate for onshore lifting, stick your head over the parapet, along came the announcement of the next biggest crane - but only by a huge margin. Just as we were getting used to the reality of a 5,000 tonne crane, from ALE based in the UK, along comes a mind-blowing 24,000 tonne capacity design from Mammoet Stoof in the Netherlands. See the feature on page 15 for more about heavy lifting on land. Admittedly, this 1,500,000 tonne-metre monster is languishing on the drawing board at the moment but Mammoet is confident it could become a reality.

The above topic and many others were discussed at our first Cranes and Transport Middle East (CATME) conference held in Dubai, United Arab Emirates, on 8 December. More than 200 attendees took their places to hear presenters from around the world talking about safety, operations and projects, among other things. Top level people from equipment rental companies, construction contractors, manufacturers and suppliers, gave overwhelmingly positive feedback for the one-day conference, saying that it was an interesting and worthwhile event and, crucially, that it should be held again and that they would come back.

For more on the CATME conference, see the story in News. As with other KHL crane events, presentations from CATME, photos and more information will be posted on khl.com in the events section.

A good way to round out the year then. With best wishes from me and the IC&ST team for a safe, happy and healthy holiday time, and the same for the New Year ahead.

ALEX DAHM

Editor



Towards the end of the year, just as it seemed as though things were winding down and drawing to a close for the holiday season, along came several events to dispel hopes of a quiet time. Bauma China in Shanghai in November saw significant new product development, from domestic and western manufacturers alike, despite the poor market situation in the country. It was great to see that the major domestic manufacturers -

Sany, XCMG and Zoomlion - had clearly made a huge effort with the show, as had the country's smaller crane makers.

While it might be unlikely that we will see again the likes of the 2012 Bauma China extravaganza, the 2016 show seemed to be healthy enough on the crane side and people were talking positively. How that translates into new business, of course, remains to be seen.

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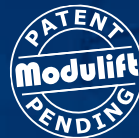
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IN THIS ISSUE

ON THE COVER



Belgium-based International heavy lifting and transport specialist Sarens at work in India with its SGC 120 super heavy lift crane. See page 15 for more on heavy lifting.

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International Cranes and Specialized Transport is a monthly publication with a worldwide circulation. The annual airmail subscription rate is £215, US\$345, £260. This issue of *International Cranes and Specialized Transport* is mailed on the 20th DECEMBER 2016.

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International Cranes and Specialized Transport (USPS 017 158) is published monthly by KHL Group and distributed in the US by DSW, 75 Aberdeen Road, Emigsville, PA 17318-0437. Periodicals postage paid at Emigsville, PA. Postmaster: Send address changes to *International Cranes and Specialized Transport*, c/o PO Box 437, Emigsville, PA 17318-0437.



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KHL Group 2016
ISSN: 1747-700X

Printed by: Warners Midlands PLC, UK

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HIGHLIGHTS

■ New cranes to be launched by Terex Cranes early in 2017 include a 300 tonne capacity wheeled mobile crane on six axles, a flat top tower crane and an SK series hammerhead tower crane. The company said it will also return to the City class wheeled mobile crane market. Look out for some of these at the March 2017 ConExpo construction equipment show in Las Vegas, USA.

■ PM Oil & Steel Asia Pte, the regional headquarters in Singapore, together with its recently-appointed partner, Beng Hock Mechanical Engineering, has launched a super heavy duty articulating or knuckle boom crane – the PM150. It also presented the crane to Ecobix Pte owner Ken Sim. The model delivered was a PM150029J2016.25.

■ Sin Heng Heavy Machinery in Singapore has taken delivery of its 500th Kobelco crawler crane. A ceremony was held at the Kobelco factory in Okubo, Japan, on 18 October. Kazuhide Naraki, Kobelco Construction Machinery president and CEO, said, "We would like to express our great gratitude to Sin Heng for the purchase of the 500th unit of our cranes. We look forward to stronger co-operation between our companies and a brighter future together."

■ All Erection and Crane Rental in the USA has ordered six units of Link-Belt's new 227 tonne capacity TCC-2500 telescopic boom crawler crane. The TCC-2500 expands the range upwards and, is the fifth model in the series which starts with a 50 tonner. Deliveries in this All Erection order will start in March 2017 and continue through to the middle of 2018, Link-Belt said.

Columbus McKinnon buys Stahl from Konecranes

Columbus McKinnon Corporation in the USA will acquire Stahl CraneSystems from Konecranes for around US\$240 million.

The European Commission will approve industrial and port crane manufacturer Konecranes' pending acquisition of Terex Corporation's Material Handling & Port Solutions (MHPS) business only if Konecranes divests its Stahl CraneSystems business.

Columbus McKinnon will also assume unfunded pension liabilities estimated at \$78.6

million as of 31 July 2016 during the divestment process. Finland-based Konecranes expects to book an after-tax capital gain of approximately \$201.7 million on completion of the deal.

Panu Routila, Konecranes president and CEO, said, "[This transaction] is an important milestone in making progress toward closing the MHPS Acquisition. We are satisfied that we could achieve this strategic milestone in a timely manner, thereby minimising the period

of uncertainty for the Stahl CraneSystems business and personnel."

Stahl is a leading manufacturer of explosion-protected hoists and crane components and is well known for its custom engineering of lifting solutions and hoisting technology.

In 2016 Stahl sales outside the Konecranes Group are estimated at \$143.4 million. Stahl has around 650 employees around the world.

Coşkun Vinç adds Demag ATs

Istanbul, Turkey, crane rental service company, Coşkun Vinç will expand its fleet in 2017 with the addition of two all terrain cranes – a Demag AC 500-8 and an AC 220-5.

Coşkun Vinç owners Servet and Sedat Coşkun selected the two Demag models after consulting with newly reappointed Terex Cranes president Steve Filipov and with Kerim Basakinci, owner of DAS, Terex Crane's Turkish distributor. "We were pleased when Terex brought back the Demag brand earlier this year,"



More Terex ATs for Coşkun Vinç

said Sedat Coşkun. "Demag products have been an important part of our success over the last 32 years, and we're excited to have the opportunity to add two new Demag all terrain cranes to our fleet. We know they will

perform well in the type of work we do for our customers, and the cranes' IC-1 Plus Control System will be a huge benefit on high capacity lifts."

CRANE AND PLATFORM NEW FROM GOMANLIFT

A dual-purpose track mounted crane and aerial work platform are new from Chinese manufacturer Gomanlift.

Launched at the Bauma China exhibition in November, The TC30 is a compact design, light and designed for maximum safety, the manufacturer said. It is targeted at construction, facility maintenance and tree service applications.

Lifting capacity as a crane is 500 kg at 8 metres outreach. Its maximum lifting height is 25 m and its working height as a platform is 29 m.

It has remote control for all movements and a liquid crystal display with double CPU. The control system automatically detects faults. Power can either be from a 220 Volt AC main or a diesel engine. There is an emergency lowering system and load moment sensors in each outrigger. The outriggers also self-level and offer wide or narrow positioning.

A 50 tonne capacity Sennebogen 653 chosen by Leduc TP for piling work in France



Hydraulic luffer new from Potain

Tower crane manufacturer Potain showed a new hydraulic luffing jib crane concept at the Bauma China exhibition in Shanghai last month.

The MCH 120 is a design collaboration between the

Foundation experts from Leduc TP put a new Sennebogen 653 to work on sheet pile installation on a site with limited space in France.

In a southern suburb of Paris, the 50 tonne capacity telescopic boom crawler crane went to work next to buildings, between sidewalk and pavement. Sheet piling was being put in to build an underground pit to house containers for waste and garbage collection. In addition to lifting the steel elements into position, the crane also carries a vibratory hammer on the hook to drive the piles.

Etienne Brenckmann, Leduc TP managing director, said, "Thanks to the robust design and strong full-power boom of the Sennebogen telescopic cranes, our foundation projects can be realised in a confined space and the machine can be manoeuvred safely under load."



French and Chinese engineering departments of Manitowoc's Potain division. The 120 tonne-metre rated crane is a flat top luffer with short counter jib and the possibility of a steep out of service position for use on congested sites. In addition, the concept is designed to offer faster and easier erection from a compact package.

A requirement for the design was to have the same performance and quick luffing as a rope luffing type and to save time in cost and operation. To do this needs a powerful hydraulic pump and smart hydraulic control. This new mechanism is named VVH.

It will lift 8 tonnes on four falls of rope and 2 tonnes at the maximum 50 metre radius. The counter jib is 7 m and the out of service radius is 13.5 m with



Manitowoc's Potain MCH 120 hydraulic luffing tower crane

the jib angle around 88 degrees. Mast sections are the same 1.6 m L48 type as for the MCR 160 and MCT 205 models or a 2 m mast can be used.

Target markets include Vietnam, Thailand and Philippines. More models in capacities either side of this one are likely to follow.

Cargo Lift to distribute Modulift

Modulift has signed Cargo Lift as its first distributor in Mexico. The rigging equipment supplier will stock spreader beams up to 110 tonnes capacity. Cargo Lift headquarters are in Mexico City and it has coastal sites in Cd del Carmen where customers are primarily in the oil and gas industry. Another facility in Veracruz serves the port for the arrival of European products. The company manufactures slings and tie downs. It is also a distributor for major manufacturers and supplies equipment for force measurement and radio-frequency identification (RFID).

Ricardo Barroso Couttolenc, Cargo Lift commercial director, founded the business with his father and CEO. Commenting on the appointment he said, "Our customers have welcomed the addition of Modulift equipment to our product range. We adhere

to a philosophy that every piece of equipment we supply must have at least one advantage over a competing product, and in Modulift's case we know its spreader beams offer a myriad of benefits over alternative solutions."

A major benefit for Cargo Lift was that Modulift provides documentation for its products in Spanish. Sarah Spivey, Modulift managing director, said, "We appreciated Cargo Lift's recognition of our multilingual strategy. As I've said before, it would be a mistake to assume English is always the language of business."

Spivey added, "We now have micro sites in seven languages – Portuguese, French, German, Italian, Dutch, Norwegian and Spanish – demonstrating our ongoing commitment to our global network of partners and customers."

HIGHLIGHTS

■ Industrial Training International in the USA has acquired American International Crane Bureau. It is a share merger where AICB founders, the Jordan family, will become a shareholder in the joint-company. AICB was founded in 2008 by Don Jordan. ITI was founded in 1986 by Mike and Darlene Parnell. With the addition of the AICB team in Houston, ITI will employ more than 35 people across North and South America.

■ Tadano America Corporation has opened a 21,000 square foot (2,000 square metre) facility for service, repair, warranty work and training in Canada. The expansion into Alberta allows Tadano to provide service through the gateway of the North, reaching existing and potential customers throughout the provinces of Canada, the company said.

HIGHLIGHT

Chicago, USA-based Alps Wire Rope Corporation has been appointed as a distributor for UK-based stainless steel shackle and wire rope fitting manufacturer Petersen Stainless Rigging Ltd. Products from Petersen include the high-strength 'PH' stainless steel lifting shackles. "We are thrilled to be working with Alps," said Kevin Bell, Peterson CEO.

Crane rental company Hüffmann Krandienst chose a 500 tonne capacity Liebherr LTM 1500-8.1 to help erect a refurbished gas flare at a height of around 100 metres at the ExxonMobil natural gas treatment plant in Grossenkneten, Germany. In addition to the large eight-axle wheeled mobile telescopic crane, two additional Liebherr mobile cranes were used for the setup and adjustment work. As for all ExxonMobil plants, the safety requirements for working on the site in Grossenkneten are very high. Gas detectors and protective filters are mandatory for everybody as are generous lifting capacity reserves for crane work.



First 250 tonne Grove in NSW

The first Grove GMK5250L all terrain crane in New South Wales (NSW), Australia, has been delivered to Turner and Central Crane Services. It is a construction equipment rental company serving the Central West area of NSW.

Graeme Jenkins, Turner and Central Crane Services director, said, "This new GMK5250L replaces an older 200 tonne capacity crane and is ideal for our needs. We were particularly attracted by the 70 metre main boom and the flexibility in

counterweight configuration, which works better for our transport operation than other solutions on the market."

The five axle GMK5250L is said to be better suited to the road regulations of NSW than the 200 tonner it replaces. Jenkins said, "The unit is lighter than others in its category, which means we can run it on the road carrying the fly jib and hook block. Many of our jobs involve lifting 50 tonne loads or placing concrete panels, and the GMK5250L gives us more flexibility for these types of tasks.



Grove GMK5250L at work in NSW

"We run it as a 160, 200 or 250 tonne crane, depending on the job, so it's spread across a number of different categories giving us better adaptability."

Tower crane rental in China helps Tat Hong

Leading Asian crane and equipment rental and distribution company Tat Hong Holdings reported group sales revenue for the three months to the end of September of S\$109.8 million (US\$ 77.6 million), a 20 percent decline on the S\$137.4 million (US\$ 97.0 million) for the same quarter a year ago.

In the crane rental division there was a 29 % decline in revenue to S\$34.0 million (US\$ 24.0 million) in the second quarter to the end of September 2016 from S\$47.9 million (US\$ 33.8 million) in the same period a year earlier. It was attributed to a lower utilisation rate in Singapore and the completion of projects and downward pressures on rental rates in Australia. The closure of a specialized transport business unit in Australia in April contributed to the decline.

The one bright spot in the crane rental business was the tower crane rental division in China which posted an increase of 11 % in the second quarter to S\$25.5 million (US\$ 18.0 million). Revenue in Chinese currency was up 21 % but "was

eroded by a translation loss due to the weaker RMB against the Singapore dollar," the company explained. Business was gained from new infrastructure, power gen, transport and commercial projects. Utilisation of the tower crane fleet was given as 83 %.

On the Group's performance, Roland Ng San Tiong, Tat Hong managing director and group CEO, said, "Market conditions in the past quarter continued to be challenging, particularly in Australia and Singapore, and the impact is evident in our second quarter results."

In outlook the company said, "the market weakness and the impending completion of projects in the ASEAN countries and in Australia will continue to impact the crane rental division. Efforts to reduce operating costs through fleet rationalisation and operational restructuring will continue."

*Tat Hong has also announced that it will undertake a rights issue to raise S\$ 41.1 million (US\$ 29 million) "to strengthen the Group's financial position and improve its financial flexibility."

ELLIOTT LAUNCHES 36 TONNER

USA-based Elliott Equipment Company has announced the 36142, a 36 US ton (32.7 tonne) capacity boom truck. The telescopic truck-mounted crane's 5-section 142 foot (43.28 metre) boom is the longest in its class, the manufacturer said. Adding the optional 32 to 49 ft (9.8 to 14.9 m) two-section jib gives the 36142 a maximum tip height of 201 feet (61.3 m).

The new model is designed to serve a range of customers, including those in the utility and power transmission construction industry who have ongoing needs for long-reach telescopic cranes on road legal chassis that can be used for both material handling and working at height using a detachable work platform.

Other features include a stand up ride-around lower control console, 9,060 pound (4.1 tonne) single line pull winch and 21 ft 2 inch (6.45 m) span out-down outriggers with full and mid-span charts. The new crane will be unveiled at the ConExpo show in Las Vegas, USA, early March 2017.

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MORE THAN 200
TURN OUT FOR CATME
CONFERENCE

The first Cranes and Transport Middle East (CATME) conference in Dubai on 8 December attracted more than 200 delegates. One of the key themes was the increased demands placed on heavy lift specialists by clients, both technical and commercial.

Maher Kabbani, manager of the heavy lift department at Contractor CCC, who was the conference's opening speaker at the Conrad Dubai hotel, said projects were being cancelled or delayed, there was pressure on costs, and clients were shifting more risk onto heavy lift contractors; "We have to get into the habit of doing more for less."

He said lean construction methods were reducing the cost of contracts by as much as 30 or 40 per cent and that this was forcing lifting specialists to work smarter; "People don't want to change, but we have to change."

The sector where there were most opportunities was in infrastructure projects, including jobs linked to the Qatar 2022 World Cup and the Expo 2020. "Companies have to realign their business strategy," Kabbani said.

The landscape may be challenging, but Matthias Herles, director consulting, Economic and Country Risk at consultant IHS Markit, presented a more positive economic outlook, with rising oil prices and the OPEC agreement on lower oil production helping growth.

The success of the event means that a second is very likely. Announcements will be made on www.khl.com and in International Cranes and Specialized Transport. A longer version of this story plus event presentations will also be on www.khl.com

Vario-Superlift helps on congested site

Sterett at work with its 400 tonne CC 2400-1

Kentucky, USA-based Sterett Crane and Rigging chose a 400 tonne capacity Terex CC 2400-1 lattice boom crawler crane to replace lids on eight anaerobic digester tanks at the East and West Evansville wastewater treatment plants.

"Having sufficient space alone to bring in and assemble the crane was challenging enough," said Matt Crisp, Sterett crawler crane fleet manager. "To remove the massive tank lids that weighed in excess of 250,000 pounds [113.4 tonnes] each, we needed to mobilise a crane that was small enough to fit into and manoeuvre in the tight area."

Sterett's CC 2400-1 has the Vario-Superlift feature which proved to be the deciding factor as the company needed to manoeuvre on site with full load.

The digester tank lids were being removed and relocated for sandblasting and refurbishment. Each lid weighed between



258,000 and 274,000 pounds (117 to 124.3 tonnes). Superlift configuration was necessary but, during slewing, the superlift tray had to get past site barriers.

"The lids alone were 75 feet (22.9 metres) in diameter, and we had to rig to them at 16 points," said Crisp. "The plan was to pick the lid at a 91 ft (27.7 m) radius, boom up, move the crane a short distance and then swing the ring into position for lowering it onto the cribbing. However, often a tank obstructed the path of the tray as we swung the load."

The Vario-Superlift configuration on the CC 2400-1 offers a variable radius from 36 to 49.2 ft (11 to 15 m), said Daiane Laidler, Terex Cranes regional business manager. The CC 2400-1 was configured with 137 ft (42 m) of boom. Crew added 264,500 lb (120 tonnes) of counterweight to the superstructure and additional 44,000 lbs (20 tonnes) of central ballast. The crane was rigged with the full 98.4 ft (30 m) of Superlift mast, and the tray was loaded with 352,700 lb (160 tonnes) of counterweight.

ESTA Awards 2017 call for entries

Next year's ESTA Users' Night and Awards is being expanded to include articulating (knuckle boom) cranes for the first time. ESTA is the European association for abnormal road transport and mobile cranes.

Articulating cranes will be part of the category for telescopic cranes, lifting capacity up to 120 tonnes. The category has been amended to include articulating cranes of any type and lifting capacity. Jobs can be carried out with one of these cranes or in combination with wheeled mobile types up to 120 tonnes.

Together with the new amended category is the fact that organisers are keen to encourage more small companies to enter and attend the event, with projects large or small.



The news comes as European specialized transport and mobile crane companies of all sizes are being reminded to celebrate their successes by entering the awards and support what has become one of the industry's biggest events.

Commenting on the extended category, Søren Jansen, ESTA director, said, "Knuckle boom cranes are increasing in size and increasingly are replacing smaller mobile cranes, so we wanted to include them in the

category below 120 tonnes. "We are also hoping that this will encourage smaller companies and projects to enter. We are very serious about wanting them to be part of this event."

The ESTA awards are every year in the Spring with the 2017 event held on Thursday, 6 April, at the Grand Hotel Krasnapolsky in Amsterdam, Netherlands.

A deadline for entries has been set as 20 January but, whenever possible, ESTA is asking companies to try and get their entries in early, to help ease the pressure on organisers.

The awards dinner is jointly run by ESTA - the European association for abnormal road transport and mobile cranes - and International Cranes and Specialized Transport magazine.

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**Major increases
for Manitowoc
Cranes, Tadano,
Kobe Steel and
Terex, while US
stock markets rise
following election
of Donald Trump to
the US presidency**

Holiday cheer

As the holiday season falls upon us, there has been reason for Christmas cheer for some major crane manufacturers, which saw their share prices rise considerably.

First, there was a big increase for Manitowoc Cranes, as the company saw its share price rise 48.48 percent (%) over the five-week period. Interestingly, the company announced last month its revenues were down 20 % for the third quarter of 2016 at US\$438.2 million. However, the company's share price fell around the same week it announced its third quarter results, and has since risen to its highest price since May.

Another equipment

manufacturer which saw a sharp increase was Tadano.

The company's share price rose 37.33 % between weeks 43 and 48. Tadano's American arm has opened a 21,000 square metre facility to offer service, repair and warranty work, plus training.

Kobe Steel's share price increased 33.64 % during the five-week period. Since announcing it had changed its share unit number from 1,000 shares to 100 shares – which saw the company's share price rise some 836.98 % - Kobe Steel's share price has risen week-on-week over the last four weeks. The company passed a resolution in June this year to carry out a consolidation of its shares,

meaning every ten shares would be consolidated into one.

On the move

Terex, meanwhile, saw its share price rise 32.27 % between weeks 43 and 48. Third quarter 2016 income was \$33.3 million, or \$0.31 per share, on net sales of \$1.1 billion. This compares with income from operations of \$30.3 million, or \$0.28 per share, on net sales of \$1.3 billion for the same period a year earlier. The company's crane sector has appointed Jörg Müller as senior sales manager, Middle East.

The stock markets produced a little more movement than usual during the five-week period. The Nikkei 225 rose 7.15 %, while the Dow Jones increased 6.54 %. On 10 November the Dow Jones closed at an all-time high, following businessman Donald Trump's success in the US presidential elections.

Adding to the buzz seen in the USA, the Dollar was up 10.52 % on the Japanese Yen, and 3.41 % on the Euro.

The future of US construction does look promising, if the incoming President of the United States, Donald Trump, follows on from his victory speech.

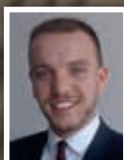
He said, "We are going to fix our inner cities and rebuild our highways, bridges, tunnels, airports, schools, hospitals. We're going to rebuild our infrastructure, which will become, by the way, second to none, and we will put millions of our people to work as we rebuild it."

NOVEMBER IC SHARE INDEX

STOCK	CURRENCY	PRICE AT START	PRICE AT END	PRICE CHANGE	% CHANGE	PRICE 12 MTHS AGO	12 MTH % CHANGE
IC Share Index*		44.88	49.28	4.39	9.79	96.29	-48.82
Legacy IC Share Index**		261.55	299.87	38.32	14.65	374.00	-19.82
Dow Jones Industrial Average		18037	19216	1179	6.54	18080	6.28
FTSE 100		6886	6753	-133	-1.94	7056	-4.30
Nikkei 225		17135	18361	1226	7.15	19983	-8.12
Hitachi Construction Machinery	YEN	2151	2467	316	14.69	2279	8.25
Konecranes	€	30.98	33.20	2.22	7.17	30.13	10.19
Kobe Steel	YEN	862	1152	290	33.64	236	388.14
Liugong	CNY	7.13	7.60	0.47	6.59	15.00	-49.33
Manitowoc Cranes	US\$	3.96	5.88	1.92	48.48	19.39	-69.68
Palfinger	€	27.06	26.94	-0.12	-0.44	25.79	4.46
Sany Heavy Industry	CNY	5.88	6.26	0.38	6.46	11.49	-45.52
Tadano	YEN	1077	1479	402	37.33	1650	-10.36
Terex	US\$	22.56	29.84	7.28	32.27	26.68	11.84
XCMG	CNY	3.24	3.62	0.38	11.73	15.94	-77.29
Yongmao Holding	SGD	0.25	0.25	0.00	0.00	0.20	25.00
Zoomlion	CNY	4.50	4.56	0.06	1.33	8.33	-45.26

* IC Share Index, 1 Jan 2011 = 100

**Legacy IC Share Index, end April 2002 (week 17) = 100



ABOUT THE AUTHOR

JOE MALONE is deputy editor on IC sister publications *International Construction* and *Construction Europe*

EXCHANGE RATES – VALUE OF US\$

CURRENCY	VALUE AT START	VALUE AT END	VALUE CHANGE	% CHANGE	VALUE 12 MTHS AGO	12 MTH % CHANGE
CNY	6.758	6.876	0.1184	1.75	6.06	13.45
€	0.9016	0.9323	0.0307	3.41	0.7376	26.40
Yen	103.13	113.98	10.85	10.52	102.51	11.19
UK£	0.8101	0.7841	-0.0259	-3.20	0.6119	28.16

Period: Weeks 43-48

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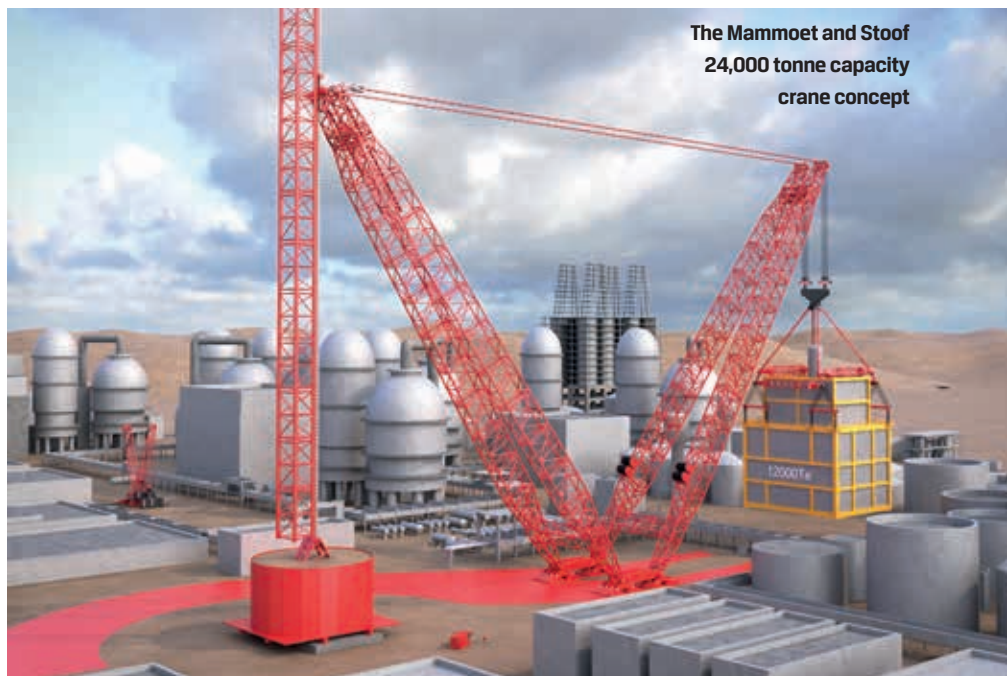
Weight watchers

Heavy lifting is changing as new technologies are developed and new applications are found. *IC* asked some of the largest companies in the sector to peep over the horizon and forecast future trends

All the numbers surrounding the onshore heavy lifting sector are staggeringly large. As an example, the strongest crane in the world – the Taisun gantry crane, albeit confined to a yard in Shandong Province, China – can raise a breath-taking 20,000 tonnes, equivalent to 2,850 elephants, 167 blue whales, or two Eiffel Towers.

If its impressive 24,000 tonne capacity crane design ever escapes the drawing board, however, Mammoet will take the ultra-heavy lifting crown. Proposed jointly by the Dutch lifting giant and Stoof Engineering and Innovation, also of the Netherlands, this monster will be called Focus and boast an remarkable maximum load moment rating of 1,500,000 tonne-metres.

Target applications include work in heavy industrial plants and refineries. It's ability to lift significantly bigger and heavier loads than



The Mammoet and Stoof
24,000 tonne capacity
crane concept

currently possible will, says Mammoet, make projects far more efficient, in particular by reducing construction time, a primary aim on these projects with super heavy lifters.

Focus can be assembled vertically on a minimal ground area and without support cranes. It is designed to be self-erecting, even with a boom 200 metres long.

More from less

If it gets built, Focus will be well placed to tackle a paradox that lies at the heart of the heavy lifting sector – the pressing need to lift larger and heavier loads versus the relentless demand for smaller lifting systems that can

operate in more confined spaces.

Enerpac claims to have solved this dilemma by developing multipoint, synchronised lifting systems such as its EVO-Series synchronous lifting systems, JS-Series jack-up systems and SHS – Series synchronous hoisting systems.

Yannick Sel, ALE senior sales manager – global projects division, agrees that size matters when it comes to working area: the more compact the better: “As ALE are increasingly working in smaller spaces, we are always looking for solutions to suit this set-up.”

For Sel, however, the biggest trend in the heavy lifting sector is an increase in the number of questions from customers about health, safety, quality and the environment, as well as maintenance: “Particularly in the nuclear industry, our clients are looking at the design of the crane – confirming it is safe and that we are maintaining it. They look at not just what equipment we are using, but also how we are mobilising and setting it up.”

Enerpac sees a trend towards modular construction methods which, it says, facilitates the need for specialized heavy lifting equipment. An example is accelerated bridge construction where the bridge is

»

Sarens transported a 103 tonne, 50 metre long flue component with a diameter of 9.4 metres inside the cooling tower at Elektrownia Opole power station in Poland





BUSIEST SECTORS IDENTIFIED

■ SARENS All sectors remain important.

The old economy of Europe remains stable and requires inventive crane engineering. This allows high level companies specializing in heavy lifting to distinguish themselves and fill up forward plans for 2017 reasonably well. New wind turbine designs with higher towers and heavier nacelles are a good opportunity to further develop in co-operation with wind engineering, procurement and construction management contracts.

■ **ALE** Over the last five years ALE has seen an increase in projects in the civils and the power generation sectors. The busiest sectors are power generation and infrastructure in Japan, Korea and Africa. In terms of the change in heavy lift requirements, everything is becoming more modularised, which requires more axle lines. The heavier modules also require heavier means of lifting. Projects are increasingly located in more remote areas, resulting in more costs to clients and thus an emphasis on finding cost-effective alternatives in sometimes challenging transport conditions.

■ **LAMPSON** The greatest demand for Lampson's Transi-Lift is in power plant construction and refinery work in the USA. For example, Lampson recently completed a project at a West Coast refinery where it deployed a Transi-Lift LTL-2600B. It was configured with 340 feet (104 metres) of boom and a 160 foot (48.8 m) jib for a reactor and regenerator replacement. The regenerator lift was 998,000 pounds (453 tonnes) at a 256 ft (78 m) radius and the reactor lift was 663,000 pounds (300 tonnes) at a 215 ft (66 m) radius.

■ **ENERPAC** The busiest sectors are power generation and infrastructure in Japan, Korea and Africa. Growth in infrastructure projects is expected to increase, "enabling Enerpac to fully utilise its lifting systems capability to meet the needs of accelerated bridge construction programmes, for example."

The Enerpac SPMT600 self-propelled modular transporter designed for in-plant operation is controlled by a wireless controller

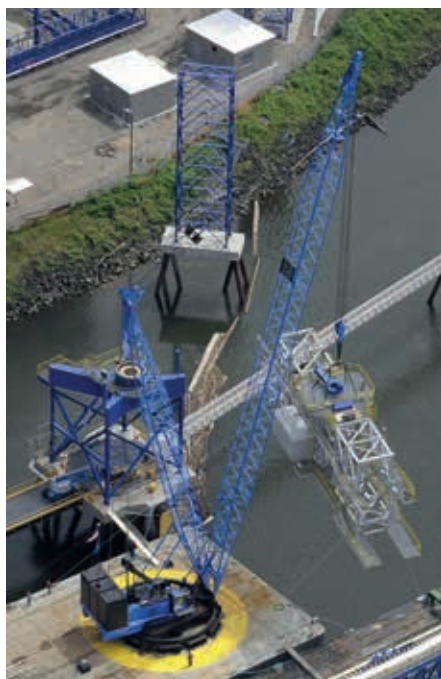
constructed off-site and then put in place. This 'prefabrication' approach minimises traffic disruption, means a safer work environment and improves efficiency in bridge construction.

"In a similar way," says the company, "we see modular construction of offshore platforms and power generation plants. For example, construction of a tension-leg platform for the Gulf of Mexico involved several modules weighing approximately 7,000 tonnes that needed to be slid into position. Enerpac strand jacks were used for loading out the utility, drilling and process modules, providing 1,500 tonnes of pulling force during the load-out procedure."

Price is king

Yannick Sel sees an increasing number of heavy lift projects becoming price-driven at subcontractor level. "Only by adding value with our expertise, global equipment fleet and bespoke engineering can we overcome this to continue the safety and quality of work within the heavy lifting industry."

Sarens, meanwhile, sees fewer new cranes being designed, but more crane auxiliaries and optimisation, "Increasing the capacity of cranes without changing the base crane design allows for optimised engineering, more creativity, less space and lower price for similar lift with other higher capacity cranes. Flexibility and optimisation is what crane suppliers and clients love to see."



Lampson Advanced American 100 Ringer Series 3 crane offers 200 ton (181 tonne) capacity at a 60 foot (18 metre) radius



The industry experts consulted for this feature broadly agreed on the main issues associated with planning a load sequence for a heavy lift. For Lampson, when planning for a heavy lift, the major categories that need to be considered are as follows:

- Potential hazards to people.
- Hazards in the proximity of the work area.
- Complexity of the load handling activity.
- Adverse impacts from environmental conditions.
- Lift equipment and rigging capacity and-or performance.
- Adverse commercial impact.
- Site requirements unique to the load handling activity.
- Federal, state and local safety requirements.

Kate Lampson adds, "These major categories will help determine if the lift is either standard or critical in nature, and each category has multiple related items ranging from determining accurate load information... [to] verifying the allowable ground conditions, establishing a communication plan and controlling site access."

Lampson relies on the ASME P30.1 Planning for Load Handling Activities Standard which helps identify the hazards and defines roles and responsibilities of persons involved in the planning and performance of the lift.

Sarens has a similar heavy lift planning list:

- Sales: well-defined scope and involving operations as soon as possible.
- Handover sales ops: limiting loss of information.
- Engineering – availability and quality of data (loads to be lifted – site – ground conditions – site specific engineering procedures and instructions).
- Lifting plans not limited to drawings (include also method statements and task risk assessments).
- Planning: many parameters, both internal and external, can have an impact on this.
- Site regulations: site introductions – follow up on site.



Specialist heavy lifting companies increasingly have to operate in congested areas with minimal space

- Dedicated project management team – leadership skills.
- Equipment condition – liability – reducing breakdown interventions on site.
- Operators – attitude and experience.
- Customer communication.

For Enerpac the main points to consider when developing a heavy lift system include site conditions and load geometry: "These can be completely different for a heavy lift conducted indoors versus outdoors, for example. Enerpac works closely with customers to ensure its lifting systems conform to site safety regulations. Ease of transportation is an area where Enerpac has taken a lead

LATEST HEAVY LIFTING DEVELOPMENTS

ALE's 5,000 tonne capacity AL.SK350 super heavy lift crane is being used for the first time in Brazil to lift and install approximately 40 modules weighing up to 3,000 tonnes onto the P-74 floating production, storage and offloading vessel (FPSO). The AL.SK crane fleet can reach all lifting positions without relocating the crane or the hull. ALE is also at the final stages of fabricating a new heavy jib that can fit onto the AL.SK190 and AL.SK350 cranes that will lift 3,400 tonnes up to 100 metres off the ground.

The latest models added to the Lampson fleet are the Millennium 4100 crawler crane and the Lampson Transi-Lift LTL-3000. The Millennium 4100 can accept Manitowoc ring and tower attachments and tandem drum operation for endless reeving. The LTL-3000 boasts hydraulic hoisting and an increased capacity exceeding 3,000 tonnes, Lampson said. The super heavy lift crane is also tested to Japanese Industrial Standards, to the European EN 13000 Standard and to US safety standards.

Sarens helped develop the Boom Booster for the 650 tonne capacity Demag CC 3800-1, previously called the SL3800, lattice boom crawler crane from Terex Cranes. The idea comes from the earlier development of a similar system for the larger CC 8800-1 crawler crane with Boom Booster, creating higher capacities at short radii. In the highest range of ring type cranes, building on the company's experience with its 120,000 tonne-metre SGC 120, is the Sarens SGC 250 which is on the drawing board. With a maximum load moment rating of 250,000 tonne-metres, this crane could be used in many applications, including the nuclear and FPSO construction sectors.

through its modular gantry, and bespoke handling systems shipped in multiple standard containers."

For ALE Yannick Sel says, "For us, the load sequence relies on the co-operation between us and the client's delivery schedule, which

we cannot control. However, by working closely and effectively, we can manage this alignment as best we can. Changing lifting arrangements can take time after each lift and if we use the same tackle, we can do a lift a day."

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New showing

**bauma
China 2016**

So there wasn't quite the same stunning array of new cranes as there was at the 2010 Bauma China in Shanghai but there was more than at the 2012 event.

Highlights this year included a good number of new tower cranes – flat tops, luffers and even something in-between. Wheeled mobile cranes were well represented with new all terrains in the four and five axle classes plus a couple of much larger models and several truck cranes. Crawler crane models with telescopic booms were new from Fuwa, Sany, XCMG and Zoomlion and, with lattice booms, from the latter three Chinese manufacturers.

Rough terrains were shown by the major domestic manufacturers and by some smaller ones, including XJCM, which had a couple of models on show. Also interesting from this Chinese manufacturer was a self erecting tower crane, somewhat of a first in China, and a pipe layer that was an interesting mix of tracked excavator and telescopic boom crane.

The next Bauma China is at the same venue from 27 to 30 November 2018. The following pictorial review reveals some highlights of what was on show from domestic manufacturers in November 2016.

While sales of new construction equipment in China remain depressed, it was impressive to see at Bauma China last month that product development remains alive and well.

ALEX DAHM was there



The 20 tonne capacity XAL6025-20 is described by manufacturer XCMG as a multi-functional dual purpose tower crane with a luffing and horizontal jib. XCMG says it is easy to switch modes between high capacity luffer and efficient horizontal jib tower crane



Top section of the new Yongmao STT3330, a 160 tonne capacity flat top tower crane with boom up to 90 metres long

More than 170,000 visitors from 149 countries descended on the 2016 Bauma China exhibition. In this view the Comansa Jie CML 160 luffing jib tower dominates the show's skyline

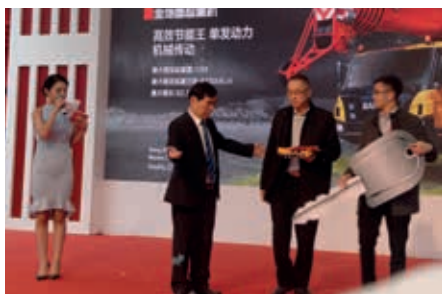


Capacity of Zoomlion's ZCC2600 lattice boom crawler is 260 tonnes at 5 metres radius and its maximum load moment rating is given as 1,400 tonne-metres. Maximum boom and fixed jib combination is 77 + 30 metres while for the luffing jib it is 62 + 60 m

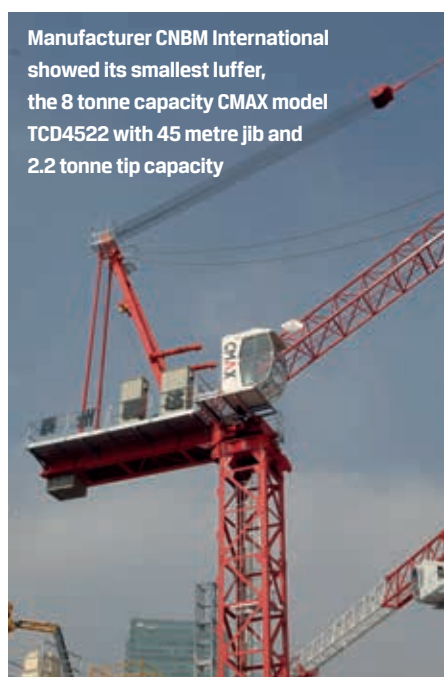




This multi-function pipelayer from XJCM is available in two models, with 12 and 24 tonnes lifting capacity on the telescopic boom, both at a 3 metre radius. Maximum lifting height is the same for both models at 11.8 m



Handover of the first unit of Sany's new SAC1000 to Asiagroup, a leading crane rental company in Southeast Asia. Pictured receiving the crane are Steven Poh, AsiaGroup CEO (centre) and Jeffrey Poh, business development director (right). Headquartered in Singapore, it also operates crane supply businesses in Malaysia and Myanmar. In the last two years Asiagroup has ordered 12 new cranes from Sany



Manufacturer CNBM International showed its smallest luffer, the 8 tonne capacity CMAX model TCD4522 with 45 metre jib and 2.2 tonne tip capacity



The 12 tonne Dahan BK 231 flat top tower crane has a maximum 70 metre jib at the end of which capacity is 2.1 tonnes. Maximum freestanding height of this range-topping model is 60 m



The self erecting tower crane is a new offering from China. XJCM has two models of this closed mast type with 1 and 2 tonnes capacity. The JFYT 2326-20 has a maximum lifting height of 23 metres and a maximum radius of 26 m where capacity is 800 kg. It weighs 28 tonnes and requires 23.1 kW to run, the manufacturer said



New from XCMG is the 1,200 tonne capacity, eight axle XCA1200 wheeled mobile telescopic crane that can travel with lattice jib, boom suspension system and all four outriggers on board, XCMG said. A primary application is for erection of wind turbines up to 2.5 MW. It has independent suspension and the option of six- or seven-axle drive



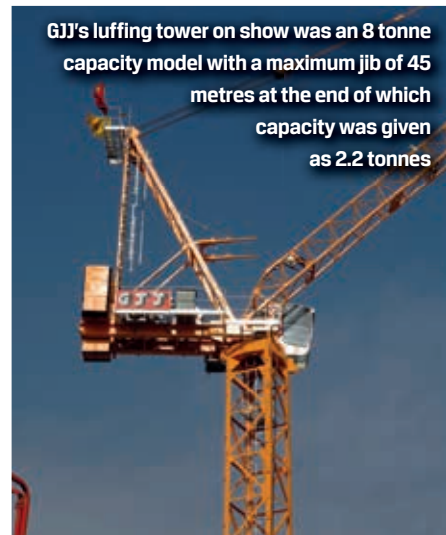
Hefei Zhenghao Mechanical Tech showed this ZH220PB heavy duty platform truck for specialized transport. Capacity is 220 tonnes and power is from a 140 kW Deutz engine. Among other things, the company also makes multi-axle hydraulic trailers, dollies and armoured riot vehicles



Zoomlion's 80 tonne capacity ZTC800V truck crane boasts a 49 metre U-shaped telescopic boom. It is on a four axle chassis and average fuel consumption for lifting is given as 4.5 litres per hour



From left to right, Daljit Singh and Gurvinder Singh, Amrik Singh & Sons Crane Services directors, and Ranvir Singh, family member, who attended a handover ceremony for their new Sany SCC6500A lattice boom crawler. It is one of a seven-unit order for the 650 tonne capacity lattice boom crawler. They are mainly used for wind turbine erection in India



GJJ's luffing tower on show was an 8 tonne capacity model with a maximum jib of 45 metres at the end of which capacity was given as 2.2 tonnes

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Fast and quiet

Hickory Group dramatically shortened the construction time at a luxury inner city condominium tower development in Australia.

HEINZ-GERT KESSEL reports

The 43-storey La Trobe Tower residential development in Melbourne being built by Australian construction company Hickory Group illustrates the challenge of making the right tower crane choice when using an innovative fast track construction method.

With its unusual glass façade inspired by a tuning fork and piano keys, the luxury 206-apartment building reflects the precinct's musical heritage.

The family-owned Hickory Group was established in 1991 and has become one of the leading high rise apartment construction companies in Australia. The company uses conventional building methods as well as 'Hickory Building Systems' (HBS). HBS describes an integrated structural methodology based on in-house prefabrication using proprietary façade systems and complete individually-designed bathroom pods to speed up construction. It also ensures the highest accuracy and quality, reducing on-site space requirements to a minimum and boosting safety by cutting noise and dust levels on site, the company says.

When the contract was awarded, La Trobe Street was heavily congested with other residential tower construction sites. Even a potential loading zone in front of the project was already occupied by a construction site next door.

So, in addition to the small site footprint, Hickory also had to cope with extremely limited site access. Bicycle lanes, trams and four lanes of traffic and existing high-rise buildings nearby added

The Jaso J380PA delivered by Australian tower crane rental specialist Titan Cranes offers a capacity of 36 tonnes at 18.8 m radius with its 30 m boom in a three-fall rigging condition.

Tie-in support of the crane tower could only be carried out at chosen locations as there was limited room to install the climbing crane



Noise and traffic were identified as areas of concern by Melbourne City Council. Hickory therefore opted for an electric luffing jib crane that is quieter than a typical diesel-powered unit, especially with the night work on the construction site in mind

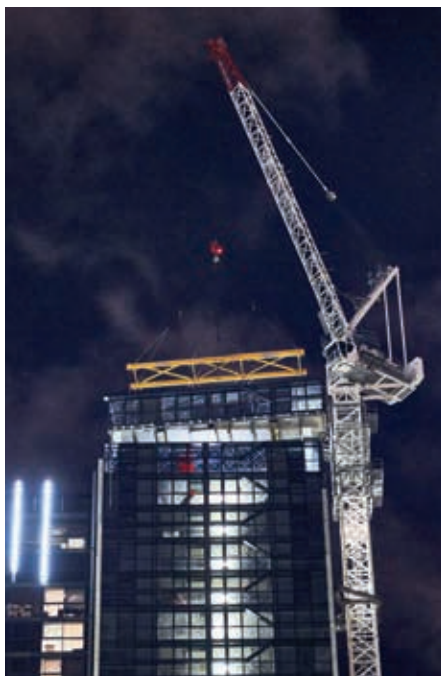
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Each level consists of seven or eight prefabricated structural units weighting around 26 tonnes being trucked to the site just in time after the trams cease operation in the evening

to the challenge. To reduce the impact on traffic and the neighbourhood, Hickory adapted its HBS method by delivering large prefabricated modules in the evening, when trams ceased operation between 19.00 hours and midnight.

Keeping quiet

Addressing community concerns about noise created by after-hours work, Hickory opted for an electrically-driven Jaso J-380PA tower crane. Before the 45 metre free-standing



luffer with 30 m jib could be installed, crane rental specialist Titan Cranes and Acoustic Logic engineers conducted extensive sound modelling to ensure that it would meet the council's strict noise limits.

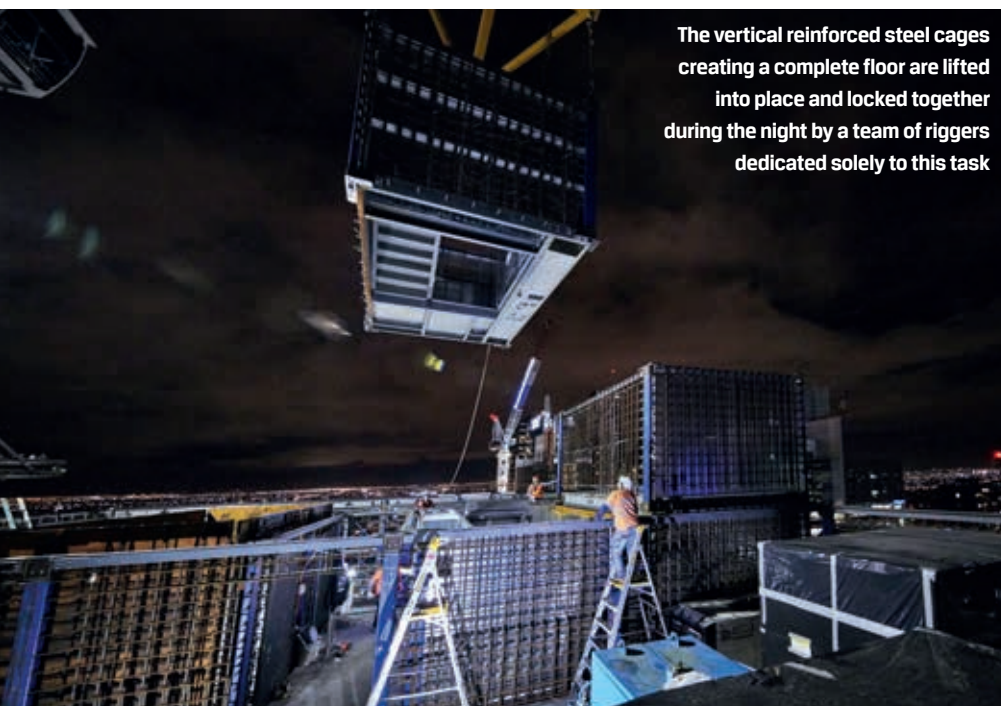
The original intention was to place the tower crane with an internal climbing system into the building core. However, an Alimak construction hoist had to be installed within the building envelope to meet noise regulations and internal works requirements. The tower crane therefore had to be moved as close as possible outside the precast concrete outer wall of the building.

One reason for the minimum distance to the building was that even the counterweight of the crane was not allowed to slew over

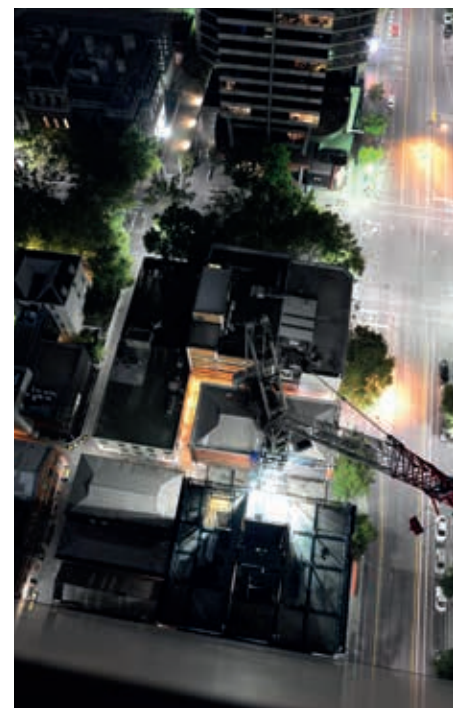
The patented interlocking pre-attached façade system enables fit-out progress immediately after installation without the need of any scaffold work. Placing such extensive glazed modules depends on tower cranes with smooth micro-move operation. For safe access at night, the crane tower is illuminated inside

neighbouring property. The other reason was to remain within the lifting chart for the 26 tonne modules to be lifted.

Four specially-designed tie collars had to be used on the 137 m tall building. Space restrictions meant the high freestanding capacity possible with the combination of the Jaso TSR20 standard tower system with large base tower sections could not be used. The proximity of surrounding buildings meant that, until the climbing crane reached a height of 75 m, the 30 m short jib had a steep out-of-service position which required



The vertical reinforced steel cages creating a complete floor are lifted into place and locked together during the night by a team of riggers dedicated solely to this task



A bird's-eye view show that there is no room for loading or storage zone to be found at street level surrounding the La Trobe Tower project. Hence, prefabricated modules and a high capacity tower crane are essential for construction



One building module with pre-attached curtain wall facade being unloaded using a special spreader beam

of the building, making the site safer for workers and pedestrians.

Speeding construction

While the exterior structure of the modules has precast concrete panels, the inner formwork is shot-creted during the day. Two complete floors are already being constructed each week so the project is moving 30 to 40 percent faster than it would by using conventional construction techniques (19 months instead of 29).

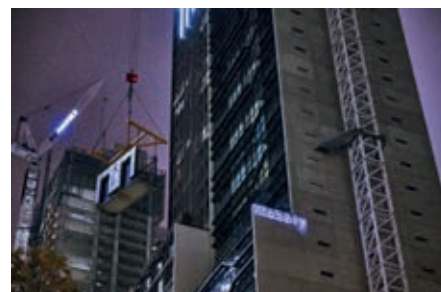
If the delivery allowance is raised by the authorities from three to five nights a week, five floors could be added each week.

So the Hickory construction methodology will allow the building to be handed over to the developer earlier. Consequently, it will dramatically reduce rental time for tower cranes. Underlining the potential of HBS, Hickory has already secured its next iconic residential tower project in Melbourne – the 200 m tall, super-slim extensively glazed Collins House.

The exterior structure has precast concrete panels and modules lifted into place using a Jaso J380PA tower crane at night. Thereafter, inner formwork can be shot-creted in between the units during the day



Evening operation starts. The Hickory construction methodology is reducing construction time – and therefore the time the tower crane will be required – by 30 percent



a specially designed weathervane sail at the end of the jib.

Each floor is made up of four oversized prefabricated units, four smaller units, modular bathroom pods and several precast concrete panels. As the elements arrive on site with windows and a patented interlocking façade system already attached, no work has to be carried out at the edge



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Fagioli transports biggest TBM

Italy-headquartered Fagioli has transported sections of the biggest tunnel boring machine (TBM) ever built in Europe. The TBM – called Santa Lucia (Saint Lucy) – will bore a huge tunnel that completes the route of the A1 Variante di Valico between Bologna and Florence in the north of the country.

The TBM was manufactured in Germany and loaded onto trailers destined for the river port of Kehl. Its components were then placed onto a barge on the River Rhine and taken to the port of Rotterdam. Once the sections arrived at Rotterdam, they were transhipped onto a dedicated heavy lift vessel. The main sections of the TBM, including its centre plate, cutting wheel centre, erector and main beam, were then shipped to the port of Ravenna and unloaded onto Fagioli trailers ready for the 165 kilometre journey to their final destination.

The journey was in three convoys with lengths between 68 and 28 metres, widths up to 9.3 m and weighing between 180 and 320 tonnes. Maximum speed was 20 kilometres/

hour, reduced to 5 km/h on viaducts. The transport included the biggest first sections of the tunnel boring machine, which, when completed, will have a final diameter of 15.87 m and a total weight of about 4,800 tonnes.

The biggest section – the drive with centre plate – weighed 320 tonnes and had a diameter of around 9 m. For the transport of this section, Fagioli used a 30 axle line modular trailer moved by two trucks on the 68 m long combination.



Part of Europe's largest tunnel boring machine on its way from Germany to Italy



ALE used its new widening trailers to complete a transformer move from Stafford to Ellesmere Port, UK, in November 2016.

The transformer, weighing 231 tonnes, was moved in three stages over three days from Stafford to Congleton, then to Kelsall and, finally, to Ellesmere Port ready for its onward shipment.

The transformer was transported using 24 axle lines of the new widening trailers, narrowed in, with an AL34 girder frame. The trailers can be narrowed in or widened to 4.3 metres while loaded and they are the only trailers of their kind in the UK.

Tom Irvine, senior project manager, said, "The trailers can be used in two different ways, narrowed in and widened out. By keeping them narrowed in and using these under a girder frame, it showcases their flexibility and usability with different transport options."

CABLE DRUM TRANSPORTERS FOR WASSERMANN GROUP

To upgrade its service offer, Wassermann Group in Germany has added two Scheuerle InterCombi vehicle combinations complete with frame decks for the transport of cable drums.

The vehicles were part of an expansion project involving a high-pressure pumped storage power station of the Vorarlberg Illwerke power company at Lake Vermunt (Vermuntsee) in the Austrian state of Vorarlberg.

The cables, which were installed in the Austrian Alps with the help of the Scheuerle InterCombi cable drum transporters, are up to 1,100 metres long.

Zeljko Paripovic, Wassermann Group managing director, said, "When it came to shifting cable reels weighing from 30 to around 100 tonnes, we looked for a manufacturer that not only incorporates our experience into the development but also adapts to us as a customer would. The result of this collaboration has convinced us time and time again – the vehicles have proved to be outstanding in all operations."

Scheuerle InterCombi modular platform trailers can be coupled in longitudinal and transverse directions. Their technical axle load is 45 tonnes. They can be used as a towed or self-propelled vehicle.

Record order from Sarens for Tii

Leading international heavy transport and lifting specialist Sarens has ordered self-propelled modular vehicles for a total of €63 million (US\$ 67 million) from Kamag (Tii Group). It is the Tii Group's biggest order to date. The equipment will be used to fulfil Sarens' contract for the transport and installation of pre-assembled units and racks plus related oversized equipment for the

US\$ 36.8 billion Future Growth and Wellhead Pressure Management Project (FGP-WPMP) for Kazakhstan-based oil company Tengizchevroil (TCO).

The Sarens order includes Kamag K25 self-propelled modular trailers with 1,060 hp power output, plus Kamag K24 modular trailers. The additions will increase Sarens' self-propelled fleet to more than 2,000 axle lines from Tii Group.

Commenting on the deal Axel Müller, Tii Group president, said, "With the new double power packs, we can supply sufficient drive performance for the job; furthermore, Sarens will be able to re-integrate the equipment into its regular standard fleet afterwards by splitting them up into four single units."



Higher reach

KATHERINE WEIR investigates how the increasing size of wind turbines is affecting the way in which erection and transport projects are carried out – as well as the effect on equipment design

Capturing wind energy at greater heights is the driving force of the energy industry, prompting turbine designs that are bigger in all dimensions. It is therefore up to the lifting and specialized transport sector to keep up with adapting designs with equipment that can lift and transport these longer and heavier components.

The current low oil prices show a decline in new construction projects within the oil sector so, for many companies, the attention is firmly focused on wind energy; creating new wind farms on and offshore to keep revenue up.

International heavy lift and transport company ALE uses cranes from manufacturer Liebherr for the erection of wind turbine components.

Fabio Garcia, business development manager, renewable energy at ALE, says, "The LG1750 combines the benefits of a crawler crane - it is high capacity and has the possibility to change configurations - with those of a truck mounted crane. This crane can lift heavy nacelles on top of tall towers, but with a reduced relocation time, as the superstructure and back mast (when present) don't need to be disassembled.

"We also use the LR11350, a large crawler crane with 1,350 tonne capacity, which can comfortably lift any kind of wind turbine generator [WTG] component at any height. This crane can be relocated, fully erected, straight to the next hardstand if the site roads are wide enough and compacted."

Garcia says that with components getting heavier and towers higher, the company must adapt itself to the new generation of wind turbines. He adds, "Execution time is also a critical issue in any project and, besides the pure technical challenge, there is a project management challenge where all the pieces have to fit to deliver a good performance.

"On the other hand, we are seeing an increase of new wind developing markets/ countries, where the sector is not mature at all and the challenge is therefore even higher."

China-based crane manufacturer Zoomlion has five crawler crane models that are used for lifting wind turbine components: ZCC2600, QUY350, ZCC5000, QUY650, and QUY800.

Ken Zhou, product manager of mobile cranes at Zoomlion, describes the main characteristics that make these cranes an ideal fit for wind projects. He says, "They are equipped with a long boom that can cope with the slight swing of wind turbine components, as well as the continuous hoisting of various wind turbines in different terrains. Excellent lifting capacity can be expected along with convenient assembly, disassembly and transshipment."

The company also says that its crawler fleet has a stable and reliable boom and pulling plate system, strong wind load resistance and the ability to cope in harsh environments.

Zhou continues, "The land installation height of the new generation of wind turbines is expected to continue to increase, up to 140 m or so. The cabin and the wheel hub will be



hoisted integrally, which leads to the increase in the lifting weight. The requirements on the crane will be stricter, which is mainly reflected in the following aspects:

1. Higher demand on the hoisting capacity - the lifting performance is expected to reach up to 160 tonnes and the hoisting height to 140 m.
2. Due to the limited space on the site, the requirements for on-site assembly and disassembly, and the transferring of the whole machine will be stricter.
3. Higher demand on the safety monitoring and control of the crane."

A crane for every job

Other manufacturers that provide crawler cranes for wind energy projects include Manitowoc, whose 650 tonne capacity MLC650 crawler crane with variable position counterweight (VPC) is a popular option for wind turbine erection. The manufacturer has also had demand for its 400 tonne capacity Grove GMK6400 – straying away from the conventionally-used crawlers – for a cost-efficient option for erecting individual wind turbines.

Fitted with both a MegaWingLift and luffing jib, the all terrain was used to replace a wind turbine assembly at "an unusually tall height" of 131 metres recently in Germany. Using a crawler crane for a single turbine replacement would not have made financial sense, therefore the Germany-based rental company, Sommer, used the 6400 during a project at a wind farm near Bremen, Germany.

Tower cranes are also highly effective for wind turbine erection, as shown by Liebherr with the introduction of its 1000 EC-B 125 Litronic flat-top tower crane designed



ALE preparing for a job on the Noblesfontein wind farm in South Africa using a Liebherr LG 1750 lattice boom mobile crane



ALE preparing for a job on the Noblesfontein wind farm in South Africa using the LG1750 lattice boom mobile crane



A Zoomlion crawler at work in a remote location

specifically for assembling wind turbines. The manufacturer lists the crane's features as economical for transport and having a "low area requirement for erection and precision operation even in high wind speeds."

Earlier this year, Germany-based wind energy company Enercon used a Liebherr 1000 EC-B 125 Litronic tower crane to erect a wind turbine with a hub height of 149 metres – the largest turbine erection ever for this crane, the company said. The turbine – with a rotor diameter of 115 m – was erected at an altitude of around 800 m in the Prechtaler Schanze Wind Farm in the Black Forest, Germany, on the hills between the towns of Gutach and Mühlenbach.

For Terex, the Demag CC 3800-1 crawler crane with Boom Booster kit provides the extra capacity required for the latest and heaviest wind turbine components to be placed at ever-increasing heights.

Helder Carvalheiro, head of onshore wind at Sarens, says, "Initially, WTGs were installed by non-specific small capacity hydraulic and crawler cranes. Suddenly, crane manufacturers reacting to this 'new' market began to release wind-specific cranes with higher capacity hydraulic booms and narrow track crawler cranes. Today, reaching the limits for crawler cranes, booms lengths and capacities are extended with boom boosters."

"All these changes – less than typical in the lifetime of a crane – impact significantly on the multi-million investment plans of any crane company."

Sarens says that it is working on close to 30 wind projects simultaneously across the world. One of these projects is the wind farm in Weeze, Germany where the company is installing two 3 megawatt (MW) turbines with a hub height of 149 m. This WTG has a hybrid tower of 101 m in concrete and 46 m in steel, receiving a 64 tonne generator. The crane used for this job is a boosted Demag CC3800-1 with 153 m main boom and 12 m jib.

In the offshore lifting sector business is strong, especially for Netherlands-based crane manufacturer Huisman. The company says that it has "a strategic focus on the offshore wind turbine installation industry."

One of the manufacturer's recent deliveries is a 1,540 tonne leg encircling crane for the Seajacks Scylla, built to "install the world's next generation of offshore wind turbines." Huisman also has the world's largest offshore crane under construction for Heerema of two 10,000 tonne cranes for Sleipnir.

Transport developments

As important as the lifting equipment is for the wind energy sector, they would have nothing to lift if the specialized transport industry didn't meet the challenge of transporting these huge wind turbine components to their locations. Manufacturers are continually challenged in creating trailers that can carry extremely long turbine blades, heavy nacelles, hubs and tower sections across differing terrains.

Christopher Rimmele at Tii Group

(Scheuerle, Nicolas, Kamag and Tratec) explains how the company has adapted by expanding its range of trailers. "The increase in blade length has fuelled systems like the rotor blade adapters, as standard telescopic trailers tend to be very hard to operate in difficult terrain with turns and slopes. The increase in tower diameters (and weights) also led to an increased use of self-propelled solutions, especially for handling them during the production process. The increase of nacelle weights also enhances the use of ultra-heavy equipment."

Scheuerle recently provided Mammoet with InterCombi self-propelled modular transporter (SPMT) to move the "world's largest monopile" weighing 1,300 tonnes and with a diameter of 7.8 m and a length of 84.5 m.

Belgium-based specialized transport company Faymonville has a wide selection of trailers that are used for the transport of wind turbine components. Its TeleMax flatbed semi-trailers have an extending loading platform suited for the transport of long or bulky loads. CombiMax low loader trailers can handle loads of 50 to 250 tonnes and can be "tailored individually" to meet every transport requirement including wind power plants (tower segments, generators, rotor or turbine blades).

The company's MultiMax trailers is based on 2 to 10 axles and is extendable up to 50 m and more (telescopic central beam) with a high payload.

Andres Marco at Faymonville adds, "Our latest product is the PA-X – our low pendle axle. It is available for CombiMax combinations as well as MultiMax low loaders. It was designed to be as low as possible with a loading height of 790 millimetres (mm) and has an unbeatable stroke of 600 mm."

Specialized transport manufacturers such as Netherlands-based Nootboom and Germany-based Goldhofer have several transport options for wind turbine components. Nootboom has the Super Wing Carrier with adjustable gooseneck, pendular axles and moveable load supports, as well as the Mega Windmill Transporter designed

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A TeleMax platform trailer with pendle axles from Faymonville used in Baudin, France to transport a rotor blade

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A self-propelled modular transporter – the Nicholas MHD G2 with hybrid drive – used at the new Alstom wind turbine manufacturing facility in St Nazaire, France

for turbines and tower sections. New models include the Manoovr MPL semi low-loader with 10 axle lines (3 + 7) and a multidolly, and the Pendel-X Euro low-loader with the latest generation IF fixed interdolly.

Among other trailer solutions for the wind energy sector, Goldhofer has also found a way to transport extra-long rotor blades through mountainous ranges as well as small towns. The FTV 300 is a rotor blade adaptor that can be tilted upwards to an angle of 60 degrees – ideal for the horizontal barriers encountered through transport.

For the company's transportation needs, ALE uses a range of manufacturers to meet customer demands. Garcia says, "We mainly use a 4 axle extendable trailer for blades, an 8 axle extendable trailer for tower sections and a 6 axle Goldhofer for nacelles. For other components, we normally use step deck trailers. This combination gives us flexibility and a very good performance ratio."

What's next?

Development within wind turbine erection and transport is steady, with most manufacturers expanding their product range regularly. New

for Tii Group is its latest brand offering in India named Tiiger, which has compact telescopic and non-telescopic trailers. The company offers a wind blade trailer (extendable) that has made quite an impact in the Indian market, the company explains.

High maximum payloads are possible due to a lightweight design, a greater steering angle and "excellent manoeuvrability". The extender can have either hydraulic or pneumatic suspension.

Although specifics weren't mentioned,

ALE says that it will be updating its main crane equipment to be in line with the new challenges in the wind energy market.

For Zoomlion, the new product in development for wind turbine lifting is the ZCC 12500 crawler able to hoist wind turbines of 5 megawatts (MW) or below.

Zhou says, "This type of crane integrates the four major technical advantages of stability, high efficiency, economy and intelligence. The single maximum shipping weight is not more than 48 tonnes, equipped with dedicated wind turbine auxiliary boom. The maximum wind turbine lifting capacity is 400 tonnes and the maximum hoisting height reaches 120 m."

The crawler also has safety equipment to provide early warning and automatic shut-off in high risk situations.

A Sarens spokesperson says that, considering the 'sky-high future' of wind turbines in the onshore wind market, it will be developing its own tower crane specifically for use in wind projects.



The Faymonville Combimax combination is used in Brazil to transport wind turbine components



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Working together

A campaign to improve safety and co-operation in wind turbine transport and erection has been launched by ESTA and FEM. *IC* reports

Many industries, including cranes and heavy transport, have long realised the essential link between a strong safety record and a successful company.

In short, good safety means good business. To be blunt, you avoid the human tragedies and business costs involved in serious accidents. A professional safety culture usually means that a company as a whole is efficient and well run, to the benefit of clients, partners and the workforce.

Safe working is also a product of good communication, both within a company and along the supply chain, allowing different participants in a project to propose solutions. New industries, however, or industries facing rapid technological change, often face major challenges. Many in the crane and heavy transport sectors believe that is exactly the situation being faced by the on-shore wind industry today.

Industry experts estimate that there are currently two accidents a month. Hard data is hard to come by, in part due to the remote location of many wind farms, but many in the industry fear that the situation is



Most wind turbine erection and transport projects are carried out safely, like this one

getting worse. As a result, leading industry figures are calling on developers and turbine manufacturers to join them in discussions about how standards can be raised and major incidents avoided. They add that such debates and better supply chain communication can lead to benefits not just in safety, but in the quality of management, productivity and efficiency on whole projects.

A step in this direction is the experts summit being organised in Hamburg, Germany, on 23 February 2017. It is the work of ESTA (the European Association for Abnormal Road Transport and Mobile Cranes) and the FEM (Fédération Européenne de la Manutention) Cranes and Lifting Equipment Product Group, representing the crane manufacturers.



Søren Jansen,
ESTA director

Land-based growth

Onshore wind has been a major element in the rapidly expanding renewable energy sector for some years. Its growth has been remarkable. In Europe alone, the total installed capacity rose from 13 gigawatts (GW) in 2000, to 85 GW in 2010, to 142 GW in 2015, the latest year for which figures are available, of which a startling 131 GW is onshore.

In part at least, the growing demand has been driven by the falling price of wind power but, in turn, that has also meant great downward pressure on costs. In addition, in the more mature markets, the most accessible sites have been developed, which has meant new projects can be on difficult to access sites, often with difficult ground conditions.

Finally, there is the trend towards taller and bigger – and, for the developer, more efficient – wind turbines.

Taken together, many experienced voices in the crane and heavy transport sectors fear that those factors are causing many accidents – and that the situation is going to get worse unless action is taken soon. Søren Jansen, ESTA director, has been warning of the dangers for some time. “This is an issue because in Europe the height of the turbines is increasing and with the cranes we have now, we are using them to their limit.

SAFETY PRINCIPLES

There are seven safety principles of the Wind Industry Safety Culture Working Group of VDMA Power Systems.

1. Health and safety of people is valued above all else
2. All injuries can be prevented – we plan for safety
3. Management at all levels is accountable for safety and leads by example
4. Everyone looks out for each other no matter who they work for
5. Safe behaviour is recognised, acknowledged and praised
6. Zero tolerance for safety breaches
7. Everyone has the authority to stop any unsafe work.

"As the tower heights increase further, we will see even bigger cranes having to be used, which will in turn affect the requirements for the hard stands, which will have to withstand higher ground pressures and increase in size. In addition, the access roads will also have to be stronger."

Jansen continued, "The greater heights mean there is more wind pressure on the boom and the load. This means the time window in which the lift can safely be carried out is further reduced. And that has both safety and cost implications."

The importance of improving communication in the industry was stressed by Jansen, "There needs to be much better communication between the developers, the contractors, the turbine manufacturers and the crane and transport companies, including the crane and trailer manufacturers. At present, many firms feel that this communication is simply not taking place, but if our conference can initiate closer, better communication between the stakeholders, it would be fantastic."

It is also a point stressed strongly by ESTA president David Collett, managing director at UK specialized transport company, Collett & Sons. "The road infrastructure is in many cases inadequate – sometimes the problem is the quality, sometimes the dimensions, sometimes the gradients. It is not the sites themselves that are the issue, all sites are appropriate. It is the quality of the project planning. Companies really need to talk to people earlier in the site development process."

Collett continued, "Many ESTA firms have experienced the situation where the site design has been fixed without proper consideration given to the requirements of the crane and transport companies involved. And several of our members feel that some sites are inherently dangerous with, for example, steep inclines that could have been reduced or avoided. In my view, a lot of these issues can be resolved with earlier and better



Safely delivering wind turbine components depends on the quality of the pre-planning and the quality of communication between all stakeholders

communication and planning. And that can often lead to greater efficiency in the project as a whole."

Designing safety

Safety has to be designed into sites from the very beginning. Collett said, "As an industry, we are challenged to deliver a safe solution, and we have to comply with all the relevant health and safety regulations, but the problem is that the site might have been designed dangerously in the first place, before the crane or transport company became involved."

Collett continued, "Quite simply, the quality of the pre-planning and the quality of communication between all the stakeholders is the key issue – that is what we have to improve, and that is why we are so keen to develop better relationships with the developers and turbine manufacturers and their contractors."

Of course, ESTA and FEM are not the only organisations concerned about safety, and the news of the conference has so far also been welcomed by Wind Europe and the German engineering federation, VDMA. The VDMA has a wind industry safety culture working group which has in membership eight major turbine manufacturers – Vestas, GE, Nordex, Acciona, Siemens, Enercon, Senvion and Adwen – plus subcontractors and suppliers.

The group has confirmed that it will attend and talk at the Hamburg conference and ESTA hopes that Wind Europe – formerly the European Wind Energy Association – will follow suit. Earlier in 2016 VDMA published a booklet titled Wind Industry Safety Culture which set out seven safety principles (see box).

Andreas von Bobart, GE Renewable Energy Germany general manager and member of the board of VDMA Power Systems, said, "Our common goal is to further minimise the number of accidents... there should be no compromise when it comes to day-to-day business safety."

David Collett, managing director at UK specialized transport company Collett & Sons, and ESTA president

ESTA and FEM's members will hope that with better communication and co-operation between the different industry stakeholders, those principles can be turned into effective action on site.

INDUSTRY INVITED TO DEBATE ISSUES IN HAMBURG

The ESTA and FEM Experts Summit will be at the Bucerius Law School in Hamburg, Germany, on 23 February 2017.

Called "New challenges in on-shore wind farm construction – safety, productivity and the supply chain", it will be a one day conference and reception, with leading industry speakers from across the sector.

Full details of the programme and speakers will be published soon. They are expected to include the following:

- Prospects and issues in the on-shore wind industry
- Problems observed during lifts on wind farms – a review of accidents and their causes
- New challenges for mobile cranes due to increasing wind turbine hub heights
- On-site delivery; achieving best practice in access road design, layout and construction
- Thinking out of the box; crane design, longer booms and tower crane solutions
- Dealing with bigger turbines; trailer innovation and client co-operation
- Port handling, authority requirements and permitting
- Risk management, co-operation and an effective supply chain
- Experts round table discussions.

The organisers also hope that the summit will lead to the development of a new best practice guide that will help raise standards, boost productivity and reduce the number of accidents.

The conference will be followed by a networking drinks reception.

■ For further information see: www.estaeurope.eu/summit





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Under pressure

This month is a second look at pressure, force and area, here with particular reference to hydraulics in specialized transport equipment. MARCO VAN DAAL reports

Every hydraulic cylinder or jack (see Figure 1) follows the principle of Pascal, not because they want to but because it is a law of Nature. The principle of Pascal can be expressed in a formula:

$$F = p * A$$

Where: F is a force in Newton (N)

p is a pressure in Pascal (Pa or N/m²)

A is an area in square metres (m²)

NOTE: Blaise Pascal was a French mathematician and physicist who lived from 1623 to 1662. Pascal's impact on the world of science should not be underestimated. Apart from the hydrostatic principle he delivered contributions binomial calculations, he invented the syringe and a computer programming language is named after him.

If we consider a few average numbers a simple calculation can be performed. Let's assume that a given hydraulic cylinder has a 13 cm diameter (5.1 inch) and needs to lift a 15 metric ton load.

A diameter of 13 cm equates to an area "A" of 132.7 cm² or 0.01327 m².

A load of 15 metric tons equated to a force of approximately 147,000 Newton following $F=m*g$.

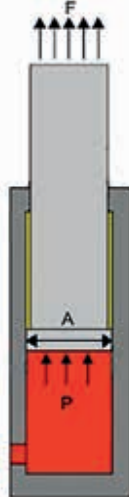


FIGURE 1

$$F = p * A \text{ or } p = \frac{F}{A} = \frac{147,000}{0.01327} = 11,077,618 \text{ Pa} = 110.7 \text{ bar} = 1,607 \text{ PSI}$$

NOTE: 1 bar = 100,000 Pa

The hydraulic cylinder in the axle of a transporter is no different. As a matter of fact many hydraulic cylinders in transporter axles are close to 13 cm in diameter and many hydraulic transporters have an axle capacity close to 15 metric ton/axle. Therefore, the above sample calculation could have been for a hydraulic axle cylinder.

NOTE: 15 metric ton/axle = 30 metric ton/axle line. There are two axles in each axle line.

There is, however, a question that arises now. If the axle capacity is indeed close to 15 tons and if the pressure in a hydraulic cylinder with a 13 cm diameter is indeed 110 bar, why do the pressure gauges on a transporter show pressures of (sometimes) 400 bar, see Figure 2. At first glance this seems like quite a bit of overkill.

In reality it is not overkill, the geometry of the hydraulic axle and the angle of the hydraulic cylinder inside the axle cause the pressure in the hydraulic cylinder to increase.

Component arrangement

First let's review the geometry of the hydraulic axle. See Figure 3. The first thing we see is that the upper connection of the hydraulic cylinder is not situated at the centre of the turntable (on the underside of the transporter), it is offset towards the knee joint. Similarly, the lower connection of the cylinder is also not connected to the lower arm at the centre of the axle, again, it is offset towards the knee joint. This offset distance at the top and bottom of the hydraulic cylinder makes the hydraulic axle a "type 2 or class 2 lever". In popular terms, the hydraulic cylinder is squeezed between the upper and lower arm of the axle.

The second thing we see is that the offset distances (towards the knee joint) are not equal, causing the cylinder to sit not perfectly at 90 degrees from horizontal but slightly less.



FIGURE 2

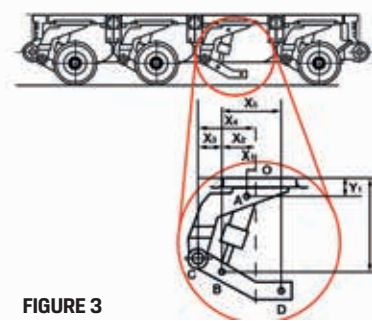


FIGURE 3

NOTE: As the transporter deck raises the angle of the hydraulic cylinder changes because of the circular motion that the lower arm makes about the knee joint.

Levers (see Figure 4)

Every lever consists of three components:

- an input force or effort that is applied
- an output force or load that is exercised on an object
- a fulcrum that determines if the lever is of class 1, 2 or 3.

CLASS 1 LEVER is a lever in which the fulcrum is situated between the input force (or effort) and the output force (or load). Examples are scissors, pliers, claw hammer, crowbar, seesaw, crane boom, etc.

CLASS 2 LEVER is a lever in which the output force (or load) is situated between the input force (or effort) and the fulcrum. Examples are staplers, nut crackers, wheel barrow, bottle opener and the hydraulic axle.

CLASS 3 LEVER is a lever in which the input force (or effort) is situated between the fulcrum and output force (or load). Examples are sugar or ice cube tongs, staple remover, tweezers.

For all lever classes the distance from the effort to the fulcrum is called the "effort arm" and the distance from the load to the fulcrum is called the "load arm".

Figure 3 shows the geometry of a typical hydraulic axle where the following points can be identified on the sketch:

- O centre of the turntable at transporter deck level (let's call this the origin "O")
- A upper connection of the hydraulic cylinder
- B lower connection of the hydraulic cylinder

ABOUT THE AUTHOR



MARCO VAN DAAL has been in the heavy lift and transport industry since 1993. He started at Mammoet and later with Fagioli from Italy, both leading companies in the industry. His 20-year-plus experience extends to five continents and more than 55 countries. His book *The Art of Heavy Transport*, available at: www.khl-infostore.com/books Van Daal has a real passion for sharing knowledge and experience and holds training seminars around the world.

- C knee or axle pivot point (class 2 fulcrum)
- D center of the tyre.

In addition, with the following X and Y dimensions are indicated on the sketch:

$$\begin{aligned} X_1 &= 109 \text{ mm} & Y_1 &= 74 \text{ mm} \\ X_2 &= 245 \text{ mm} & Y_2 &= 643 \text{ mm} \\ X_3 &= 290 \text{ mm} \\ X_4 &= 535 \text{ mm} \\ X_5 &= 225 \text{ mm} \end{aligned}$$

The horizontal distances X3 and X5 change as the hydraulic cylinder extends and retracts. The ratio, however, remains the same and therefore the mechanical advantage (MA) also remains the same.

$$\begin{aligned} \text{Mechanical advantage} &= \text{MA} \\ &= \text{effort arm} / \text{load arm} = (X_3 + X_5) / X_3 \\ &= (290 + 225) / 290 = 1.776 \end{aligned}$$

With the above dimensional information we can write the upper and lower connection points of the hydraulic cylinder as (X, Y) co-ordinates;

$$\begin{aligned} \text{Upper co-ordinate} & (X_1, Y_1) \text{ or } (109, 74) \\ \text{Lower co-ordinate} & (X_2, Y_2) \text{ or } (245, 643) \end{aligned}$$

These two co-ordinates allow us to calculate the angle (alpha or at which the cylinder is acting (compared to horizontal).

$$\tan \alpha = \frac{(Y_2 - Y_1)}{(X_2 - X_1)} \quad \alpha = \tan^{-1} \frac{(Y_2 - Y_1)}{(X_2 - X_1)}$$

$$\alpha = \tan^{-1} \frac{(643 - 74)}{(245 - 109)} = \tan^{-1} \frac{569}{136} = 76.5 \text{ deg}$$

The load placed on the axle in the centre of the turntable is 15 metric tons, as mentioned before. This means that the loads onto the soil or road surface is also 15 metric tons. As shown earlier, a 15 metric ton load (m) equals a 147,000 Newton force (F_L) following $F_L = m \cdot g$. The force that the cylinder experiences can now be determined as follows:

$$\begin{aligned} F_{\text{cyl}} &= \frac{F_L \cdot \text{M.A.}}{\sin \alpha} = \frac{147,000 \cdot 1.776}{\sin(76.5)} \\ &= 268,490 \text{ N} = 268.5 \text{ kN} \end{aligned}$$

Again, following $F = m \cdot g$, we can state that 268.5 kN roughly equals 27.4 metric tons.

From this force F_{cyl} we can, using the principle of Pascal, calculate the pressure inside the hydraulic cylinder.

An axle load of 15 metric tons causes a pressure of 202 bar inside the hydraulic axle cylinder.

$$F = p \cdot A \quad \text{or} \quad p = \frac{F}{A} = \frac{268,490}{0.01327}$$

$$= 20,232,856 \text{ Pa} = 202 \text{ bar}$$

In this case the cylinder angle was 76.5 degrees but could be as little as 60 degrees on some brands and models. Also, the self weight of the transporter which can easily be 3 to 4 ton per axle line or 2 ton per axle has not been taken into account in the above approach. And, last but not least, a 15 to 20 % margin for impact loads and overload testing. The formula now look like this:

A load of 15 metric tons + a self weight of 2 metric tons + 20 % impact/overload = 20.4 metric tons. Following $F_L = m \cdot g$ this equals 199,920 Newton (F_L).

The force on the hydraulic cylinder is now:

$$F_{\text{cyl}} = \frac{F_L \cdot \text{M.A.}}{\sin \alpha} = \frac{199,920 \cdot 1.776}{\sin(60)}$$

$$= 409,985 \text{ N} = 410 \text{ kN}$$

The pressure in the hydraulic cylinder is now:

$$F = p \cdot A \quad \text{or} \quad p = \frac{F}{A} = \frac{409,985}{0.01327}$$

$$= 30,895,672 \text{ Pa} = 309 \text{ bar}$$

Hydraulic pressure gauges as installed on hydraulic transporters are subject to all kinds of environmental issues such as extreme heat and cold, constant vibration, shock loads, etc. The accuracy of such gauges at best is 5 % but can be as little as 10 %.

Taking this into account, a calculated pressure of 309 bar can show up on the gauge as 325 bar.

Hence the gauges have a full scale reading of 400 bar.



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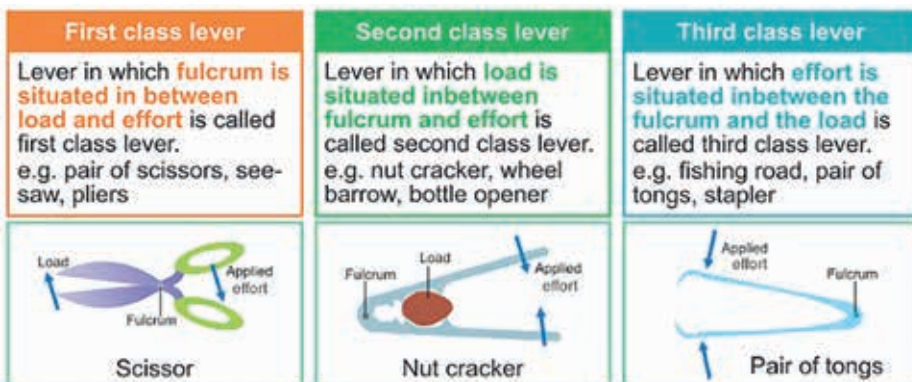


FIGURE 4


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- A new SC&RA/IUOE Operating Engineers Agreement
- Substantive OS/OW permitting enhancements in 6 states
- Support in combating MSHA's definition of "load" when using rigging equipment



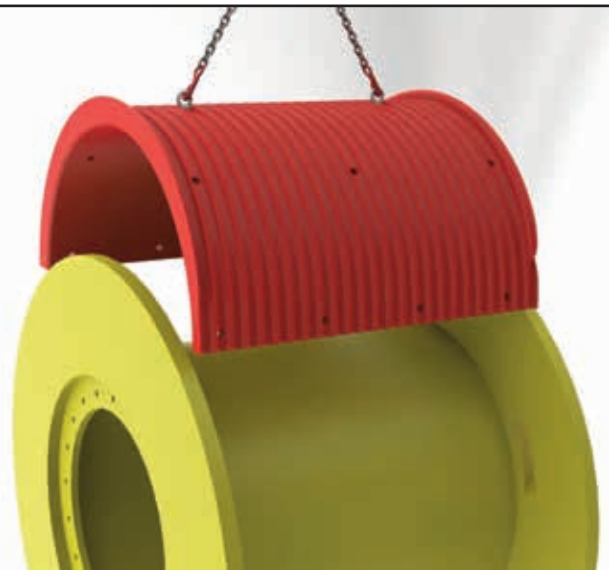
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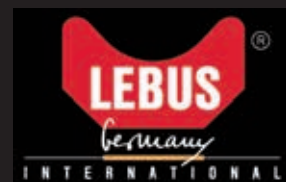


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Poll positions



Over the last few months, votes have been cast for the 2016 TopLift contest to determine readers' favourite lifting jobs.

IC reveals the results



WINNER

ENTRY 10

Tandem hoist

EQUIPMENT USER: Guindastes Tatuapé

LIFTING EQUIPMENT USED: mobile cranes

LOCATION: São Paulo, Brazil

Contractor Guindastes Tatuapé used two Liebherr mobile cranes - LTM 1500-8.1 and LTM 1750-9.1 - in the tandem hoist of the metallic structure of the bell tower of the National Sanctuary of Nossa Senhora Aparecida, in São Paulo, Brazil. The bell tower had a height of 36 metres and a weight of approximately 97 tonnes. It was first positioned horizontally, and one of the sides of its base was fixed with two rods that would articulate as the structure was raised.

SECOND PLACE

ENTRY 2

Team strength

EQUIPMENT USER: MHPSA

LIFTING EQUIPMENT USED: tower cranes

LOCATION: Kusile, South Africa

To help with the construction of the Kusile Power Plant project in Mpumalanga province, South Africa, Mitsubishi Hitachi Power Systems Americas (MHPSA) has put seven Wolff tower cranes on site, including four 1250 Bs and three 355 Bs. Work includes moving steel and concrete elements weighing up to 60 tonnes.



In the September issue of *International Cranes and Specialized Transport* readers were asked to pick their favourite job from 10 outstanding lifting projects. Entries for the IC TopLift 2016 competition included a selection of complex and spectacular lifts completed in the last 12 months.

Readers were asked to pick their favourite from the selection and return their votes by November. IC would like to congratulate the winners and thank all those of you that took the time to vote – your efforts are appreciated.

This competition is only possible because of the exceptional lifting projects taking place around the world and the people who share them with us by sending brilliant pictures and information in to us here at the magazine.

If your company has completed an interesting job in the last couple of months, or if you do one before mid-August 2017 that you think merits entry into next year's TopLift competition, and-or it would make an interesting site report in this magazine, please send details to the editor, Alex Dahm, at alex.dahm@khl.com, or by post to: KHL Group, Southfields, Southview Road, Wadhurst, East Sussex TN5 6TP, United Kingdom.



THIRD PLACE

ENTRY 6

Crane installation

EQUIPMENT USER: Whiting Corporation

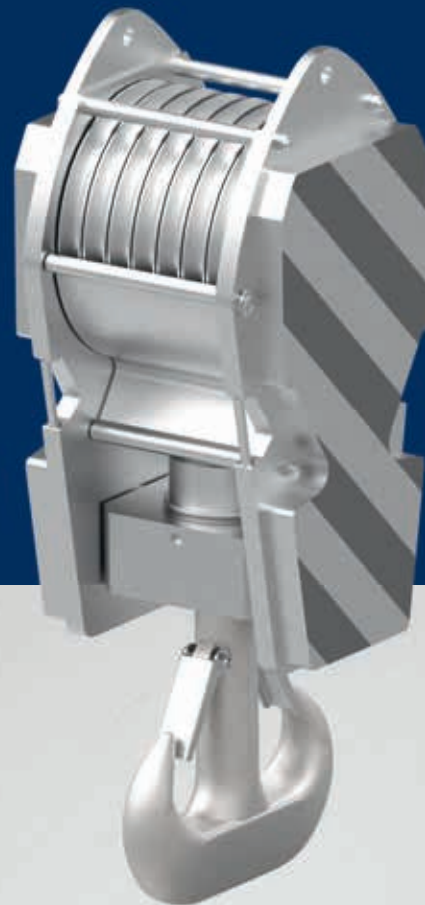
LIFTING EQUIPMENT USED: Overhead crane

LOCATION: Michigan, USA

Overhead crane operator Whiting Corporation installed and commissioned a 250 tonne turbine bridge crane while adjacent turbine generators ran at full power with no down time. More than 2,268 tonnes were rigged and lifted while adding the second overhead crane. The installation saved US\$ 18 million and also cut the retrofit outage by a week.

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Friend or foe

With 2017 coming into focus, new trends and strategies across enterprise logistics operations, combined with a new generation of logistics technology, will change the way leading companies pursue supply-chain management.

As Dan Gilmore, of McHugh Software, recently pointed out in a piece for *Supply Chain Market*, logistics professionals have a powerful array of new digital logistics weapons that can be strategically deployed to unlock significant value and create customer-focused systems that build long-term competitive advantages.

Companies that recognise this changing landscape and invest prudently in process change and supporting digital logistics technologies will reap vast benefits. Hesitators may find themselves at a competitive disadvantage in the next two or three years.

Global transportation and logistics (T&L) faces "dramatic realignment" from technology, customer expectation and collaborative operating models, says Dale Benton at *Supply Chain Digital*.

All of this speaks to shifting patterns. A recent report compiled by PwC said that 90 percent of T&L companies see data and analytics as the key drivers in redefining the industry over the next five years. Supporting this are numbers: 50 % of companies acknowledge that the absence of a digital culture in their own organisation is the biggest challenge they face.



Whether our industry realises it or not, we should all be aware that, in the last five years, nearly US\$200 million was invested in digital logistics alone. PwC UK partner and head of transport, Coolin Desai, said, "Technology is changing the face of the industry, and for T&L companies, wherever they might be, digital fitness and clear market focus will be essential prerequisites for success."

"It is important that companies remain alert to how new technologies, from data analytics to automation and platform solutions, are transforming the wider markets," he added. "In this market, early adopters may win early advantages."

Gilmore pointed out that digital logistics is different from traditional logistics in that:

Digital logistics recognises the growing convergence of logistics operation and technology strategy.

Digital logistics is driven by a new generation of web-based, enterprise logistics applications that enable collaboration and optimisation, leveraging a central logistics information backbone that provides visibility across the enterprise and extended supply chain.

Tight integration

These new enterprise and supply chain logistics applications are tightly integrated with core warehouse, transportation and labour management systems to enable new process models and ensure fulfilment excellence. With these notations in mind, Gilmore emphasised that digital logistics breaks down operational silos. It impacts not only the cost side of the value equation but also fuels growth through the ability to deliver personalised, customer-focused logistics, with faster cycle times and exceptional customer satisfaction.

"We are entering a period of dynamic and fundamental change to logistics operations and strategy," Gilmore said. "While the 1990s saw rapid advances in the logistics competencies of most companies, a number of forces, especially the communication and collaboration potential of the internet, are dramatically changing the way companies craft logistics strategies, processes and systems. As a result, companies embracing this new paradigm will be able to strip out millions of dollars of operating costs, achieve better supply chain integration and increase market power through customer-focused fulfilment."

Gilmore is describing an era where the internet is ushering in a new age of tremendous increases in supply chain velocity and cost reduction by information sharing and logistics synchronisation between trading partners and service providers. "The logistics opportunities created are driving a market transformation from traditional logistics concepts to a new era of digital logistics," he stressed.

Ask yourself: where is your T&L – and is it contributing to your success or your stagnation?

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Supporting the industry throughout 2016, SC&RA continued to serve its more than 1,300 member companies around the world by providing the essential information they need to run their businesses safely, legally and profitably. MIKE CHALMERS reports



Growth and opportunity

The association's January Board & Committee meetings set a productive tone to kick off 2016 in Cabo San Lucas, Mexico, from 3 to 6 January. Members discussed Association and Foundation goals, objectives and initiatives for the coming year.

The Specialized Transportation Symposium followed from 1 to 4 March and, though spring weather temperatures may have been just beyond reach in Memphis, Tennessee, USA, the climate was just right inside the illustrious Peabody Memphis hotel for a productive range of committee meetings, educational sessions and networking opportunities.

The Symposium saw nearly 500 attendees, 42 of whom represented six countries, as well as 106 first-timers, join the annual gathering in an effort to network with the industry's top executives, safety

directors, safety managers, state and federal transportation officials and related trade officials. Of note: this year's meeting was distinguished by the attendance of nearly 40 state officials.

From 26 to 30 April the Annual Conference hosted 750 of the industry's top owners and executives from eight countries at the Hilton Orlando Bonnet Creek in Orlando, Florida, USA.

Attendees (75 of them first-timers) enjoyed perfect weather for golf, tennis and the NCCC 5K run/walk. Once inside, it was down to the business of committee meetings, education sessions and the Products Fair – bustling with 90 exhibitors this year. In addition, two evening receptions, the 1950s-themed SC&R Foundation Gala (attended by 254) and the Closing Night Awards & Recognition Reception & Dinner,

were cherished highlights. The SC&R Foundation raised US\$ 23,720 from raffle ticket sales throughout the conference.

Jobs of the year

This year's Job of the Year winners led an impressive cadre of 21 exceptionally strong entries: 13 hauling jobs and 8 rigging jobs.

Hauling winners included: Moving – Berard Transportation, Inc.; Over 160,000 pounds (net) – IRH (Intermountain Rigging and HeavyHaul); and Under 160,000 pounds (net) – Emmert International.

Rigging winners included: Over \$2 million – Mammoet; \$750,000 to \$2 million – Barnhart; \$150,000 to \$750,000 – Able Rigging Contractors; and Under \$150,000 – Barnhart.

Topping off the night Bruce Forster, outgoing SC&RA president, handed over the gavel to John McTyre, incoming president.

As part of the Association's ongoing Advocacy efforts Joel Dandrea, SC&RA executive vice president, and Scott Bragg, Bragg Companies vice president, participated at the International Union of Operating Engineers (IUOE) Executive Council meeting in Maui, Hawaii, at the request of James Callahan, IUOE general president.

Bragg was a member of the SC&RA Crane & Rigging Group's Labor Committee task force that worked to establish an Operating Engineers Agreement between the Association and IUOE, which was signed the previous month. The historic, far-reaching agreement, which SC&RA had pursued for more than 10 years, addresses the changing environment of industry businesses and seeks to increase competitiveness, market share for signatory employers and work opportunities for union members.

Exhibit centres at SC&RA meetings were spilling over throughout the year





SC&RA enjoyed multiple transportation victories in 2016

Hours of service

In 2016 SC&RA also requested a limited exemption for crane operators from the FMCSA's hours-of-service regulation for commercial drivers. The Association requested exemption "on behalf of individuals who operate cranes with a rated lifting capacity of greater than 30 tons who engage in specialized training and certification."

In addition, in support of Sims Crane's dispute of the MSHA (Mine Safety and Health Administration) ruling, the Association asked members to file an Amicus Curiae (commonly known as "Friend of the Court") Notice concerning the 3 May ruling against Sims. The ruling, which regarded workers walking below a spreader bar to connect rigging to the load, stated, "The citation at issue alleges that Sims' crane operator and helper did not stay clear of a suspended load, violating MSHA standard 30 C.F.R., section 56.16009."

SC&RA believes this ruling is contrary to OSHA's (Occupational Safety and Health Administration) standards, and could essentially prevent the attachment of

rigging to loads, which would be extremely detrimental to the industry and crane operations across the USA.

Victories on the transportation side in the USA this year were found in Iowa and Tennessee with the addition of 46,000 pounds (20.9 tonnes) on a tandem. Tennessee, Maryland and New Mexico found success in allowing night-time permits. These successes continue to reduce permit turnaround time, resulting in cost savings to members.

Earlier this year, the US state of Massachusetts went to an online automated permit system. In 2017, the following states are expected to follow: New York, Pennsylvania, Alabama, South Carolina and Idaho. In addition, SC&RA was a part of an initiative for states to increase the "auto-issue" thresholds. The following states found success in state automated permitting: Montana, Illinois, Maryland, New Mexico and Minnesota.

Parking coalition

SC&RA continues to serve on the Federal Department of Transportation's National Coalition on Truck Parking to resolve unique parking challenges of specialized transportation due to size of loads, restricted permitting hours of movement and lack of uniform permit policies between states.

The Phase II Harmonization Resolution was successfully advocated by SC&RA for the American Association of State Highway Transportation Officials (AASHTO) to adopt calling on states to harmonise permit procedures involving permit amendments, holiday restrictions, escort requirements for over-height loads, number of valid days of a

permit, and type and size of escort vehicles.

Finally, SC&RA contributed in the development of the National Pilot Car Training Curriculum, which will be released by the Federal Highway Administration (FHWA) in 2017. With long-established connections with the highway industry, FHWA often looks to SC&RA for input and expertise on these issues. In addition, FHWA selected SC&RA to produce a best practices manual for state automated permit systems – with a projected release date of 2017.

The 2016 Crane & Rigging Workshop landed in beautiful National Harbor, Maryland, USA, from 21 to 23 September, at the Gaylord National Harbor hotel.

More than 600 members attended this year's workshop, 33 of them internationals from nine countries, and 151 first-timers. Many of them were keen on catching the opening session – OSHA's Agenda – presented by Dean McKenzie, deputy director, Directorate of Construction, at OSHA. The workshop also saw a sold-out product fair with 90 exhibitors, and closed out the week with a Manitowoc Cranes factory tour that drew 150.

Building on its mission to educate the next generation about the industry and the many opportunities within, Lift & Move USA (L&M) had a big 2016. The February event saw 750 high school and college students, as well as military veterans, descend on the headquarters of host TNT Crane & Rigging in Houston, Texas. The next event followed in May, hosted by Buckner Companies in Graham, North Carolina, and saw 300 high school and vocational school students in attendance. In November more than 750 students, veterans, teachers and parents attended the third L&M event of the year, and fourth overall, in Long Beach, California, hosted by Bragg Companies.

As further commitment to the cause, the Association announced in August that it has pledged up to \$300,000 as the anchor sponsor for eight Lift & Move USA events to be held throughout 2017 and 2018.

The Association encourages member companies around the world to thoroughly explore the L&M format by attending an event – in the hopes that similar events will pop up around the world to help address the labour shortage throughout the industry. Find out more at www.liftandmoveusa.com.

As the year closes, SC&RA looks ahead to a productive 2017 by continuing to serve a healthy membership that reached a record high number of 1,345 members in 2016. ■

SC&RA membership reached an all-time high in 2016



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Straightpoint load tests knuckle boom deck crane

Batam, Indonesia-based PT. Xtra Solusindo Sukses used 5 tonne water bags and a 50 tonne load cell from Straightpoint to complete a load test on a knuckle boom deck crane on a ship docked at a local shipyard owned by the Jan de Nul Group.

The company, a specialist in load testing, is responsible for the annual inspection of the crane, which has a safe working load of 11.6 tonnes at a radius of 6.27 metres and 5.3 tonnes at 12.04 m. It was manufactured by Italy's Heila.

PT. Xtra, which services oil

and gas, construction and marine customers, stocks load cells up to 200 tonnes capacity but, in this case, it chose UK-based Straightpoint's Radiolink Plus.

Heru Gunawan, director at PT. Xtra, said, "Load testing is not only a legal requirement in all provinces, states and most countries, but it is also an essential part of any accredited inspection, repair, or maintenance programme for lifting equipment. We cannot fulfil our role in these important processes without load cells."

PT. Xtra does around four load tests a month. It uses Straightpoint's force measurement, load monitoring and suspended weighing load cell equipment in many applications, including load tests on an overhead crane in a Batam warehouse and a davit crane used for releasing rescue boats.



Straightpoint Loadlink Plus and SW-HHP

The latest Radiolink Plus is made of aircraft grade aluminium. Internally it is designed for a good strength to weight ratio and has a separate internal sealed enclosure. Electronic components are afforded IP67 environmental protection even with the battery cover plate missing, the manufacturer said. It is aimed at demanding applications, including the oil and gas, construction and marine sectors.

■ For more information see: www.straightpoint.com

INTO THE VORTEX



CM Labs Simulations has launched the Vortex Advantage simulator, said to provide a complete training platform for operators of crane and heavy equipment.

The Vortex Advantage comes with one, three, or five screens, a motion platform, an instructor station, and hot-swappable OEM-grade control sets and pedals. The user can add any of the equipment modules from CM Labs' construction crane and heavy equipment operator training suite, ranging from modules for tower crane and rough terrain crane operator training, to excavator, loader, and backhoe training.

Training modules, controls, and pedals are designed to be easy and quick to change. Design features include embedded computer rack, 'plug and play' set-up, and no exposed wires or moving parts. The three-screen configuration can simply be rotated according to equipment type and trainer preference.

■ For more information see: www.cm-labs.com

CAPITAL SAFETY KNOWS THE ROPES

Capital Safety has expanded its range of safety lanyards with the launch of its trigger positioning lanyard series. Trigger positioning lanyards are designed for use in harsh environments as they can be adjusted in wet or dirty conditions when the rope is damp or greasy. There are two versions, both with a capacity of 140 kilogrammes.

■ The DBI-Sala positioning lanyard system has a double action carabiner with an aluminium snaphook. The rope is also available in different lengths and has a protective blue cover to protect against poor conditions.

■ The Protecta positioning lanyard range has a triple action carabiner and a zinc plated steel snaphook, improving safety standards by protecting against rust.

■ For more information see: www.capitalsafety.com



Technician training expanded by Manitowoc

Manitowoc Cranes has expanded its crane technician training programme in Mexico and countries in Central America and the Caribbean.

The latest training session to be developed, on National Crane boom truck features and systems, has seen its first trainees become Manitowoc Crane Care-certified service technicians. The training was held at Manitowoc dealer AMECO's facilities in Mexico City, with 12 graduates completing

the courses. Over the course of two weeks, classes involved hands-on sessions that used several National Cranes and two Grove rough terrain cranes: an RT530E-2 and an RT650E.

■ For more information see: www.manitowoccranes.com



Manitowoc has expanded technician training in Mexico



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Marco Gentilini,
Vice president,
Terex Cranes

Quotes from the 2015 ITC event

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EVENTS DIARY

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California, USA
www.scranet.org

SC&RA SPECIALIZED TRANSPORTATION SYMPOSIUM
14 to 17 February 2017
Florida, USA
www.scranet.org

CONEXPO-CON/AGG 2017
7 to 11 March 2017
Las Vegas, USA
www.conexpoconagg.com

ESTA AWARDS OF EXCELLENCE
6 April 2017
Amsterdam, Netherlands
www.khl.com/esta

SC&RA ANNUAL CONFERENCE
18 to 22 April 2017
Arizona, USA
www.scranet.org

AWRF SPRING CONFERENCE
23 to 26 April 2017
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www.awrf.org

SMOPYC 2017
25 to 29 April 2017
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www.vertikaldays.net

PLANTWORX 2017
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www.plantworx.co.uk

CRAC ANNUAL CONFERENCE
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www.crac-Canada.com

INTERMAT ASEAN
8 to 10 June 2017
Bangkok, Thailand
www.intermatconstruction.com

SC&RA CRANE & RIGGING WORKSHOP
20 to 23 September 2017
Missouri, USA
www.scranet.org



PICTURE OF THE MONTH

Gatwood Crane Service of Arlington Heights in Illinois, USA, is pictured working at EcoGrove Wind Farm in Lena, Illinois. The crane is a 400 tonne capacity Liebherr LTM 1400-7.1 telescopic wheeled mobile working with 101 feet (30.8 metres) of main boom and 207 feet (63.1 m) of luffer. EcoGrove Wind Farm is Acciona's first renewable energy project in the state of Illinois, although the company is headquartered in nearby Chicago. Well known for its 'Windy City', Illinois ranks in the top 20 US states for wind energy potential.

PEOPLE NEWS



■ Terex Cranes has appointed **JÖRG MÜLLER** as senior sales manager, Middle

East. He joins the company from Aurubis Middle East, a company specialising in flat-rolled products, where he was general manager and senior sales manager. Before that, he was Middle East sales manager for Liebherr tower cranes. Carsten von der Geest, VP sales and service, Cranes, **EMEAR** said, "Jörg joins us with a wealth of experience in the cranes industry and thorough knowledge of the business in this key market. He will be focused on our customers and make sure we are responsive to their requests."

■ Magna Tyres Group has appointed **VIJAY NAMBIAR** as general manager at the new Magna Tyres Middle East &



Africa office. Nambiar has more than 30 years of experience in the tyre industry and has worked for various tyre companies, including Bridgestone and Michelin.

OBITUARY

■ **MARK KULYK**, former president of Rogers Brothers Corporation, died on Friday 25 November 2016, after a battle with brain cancer.

Born in 1956, Mark attended the University of Notre Dame where he met Joyce Ravnikar, the love of his life. After graduating with honours Mark attained two Masters Degrees.

In 1984 Mark started at Rogers Brothers Corporation where he worked until retirement in 2013. He was vice

president from 1984 to 1992 and president from 1993 onwards. He was also on the board of directors for most of that time.

Mark was involved in the development of new products, including the NoFoot and CobraNeck non-ground bearing detachable goosenecks and the incorporation of fabricated main beams to replace rolled structural beams in the trailer frames. Mark was also the driving force for the company's expansion into the mining and export markets for their trailers.

For many years, Mark was Rogers' representative with the Truck Trailer Manufacturing Association. He was also active with the Western Pennsylvania District Export Council and the Manufacturer & Business Association Pennsylvania.

He is survived by his wife Joyce, by his sons Nathaniel and Anthony, and by a large extended family.



■ Send picture of the month entries and all other back page-related information to *International Cranes and Specialized Transport*, KHL Group, Southfields, Southview Road, Wadhurst, East Sussex TN5 6TP, United Kingdom, or by e-mail to alex.dahm@khl.com. Picture caption entries should include: the month and year taken, the place, type of crane, owner and project, plus any other relevant information.

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3 ORGANISATION TYPE

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Operational aids, communication systems, components, controls, software, crane mats and outrigger pads, crane repair, hydraulics, jacks, attachments, personnel baskets, rigging hardware, rollers, slings and chains, tires, winches, wire rope, batteries, braking systems, and new, used and refurbished parts.

SAFETY, TRAINING & INDUSTRY SERVICES

Training, insurance, inspections, financing, consulting and safety equipment.

SPECIALIZED TRANSPORT

51

Transportation permits, freight forwarding, heavy haul, pilot car services, trailers, wheels and tyres.

CRANES AND EQUIPMENT FOR SALE OR RENT

52

Crane, rigging and lifting equipment for sale or rent, new or used.

CAREER OPPORTUNITIES

Employee recruitment and job postings.

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1x	200 t	Liebherr LTM 1200-5.1	2009
1x	250 t	Liebherr LTM 1250-5.1	NEW!
1x	300 t	Liebherr LTM 1300-6.2	2015
1x	350 t	Demag AC350-6	2010

CRAWLER CRANES

1x	250 t	Kobelco CKE 2500-2	2008
1x	250 t	Kobelco CKE 2500-2	2010
1x	400 t	Liebherr LR 1400-2	2002
1x	400 t	Demag CC 2400 SL	2009
1x	500 t	Liebherr LR 1500	NEW!
1x	600 t	Liebherr LR 1600-2	NEW!
1x	650 t	Demag CC 3800 SL	NEW!
1x	650 t	Demag CC 3800 SL	2013
1x	1250 t	Demag CC 6800 SL	2014

ROUGH TERRAIN CRANES

2x	55 t	Terex RT 555	NEW!
1x	65 t	Grove RT 765E	NEW!
2x	75 t	Tadano GR 750XL-2	2013
2x	80 t	Terex RT 780	NEW!
1x	90 t	Grove RT 890E	2012
4x	100 t	Tadano GR 1000XL-2	2013
1x	110 t	Terex Quadstar 1100	NEW!
1x	160 t	Tadano GR 1600XL-2	2016

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ALL TERRAIN-CRANES

Make / Type	y. o. m.	Drive	Boom / Fly Jib
20 t Gottwald AMK 31-21	1984	4x4x4	20,50m
25 t Demag AC 25 City	1998	4x4x4	25,00m + 13,00m
30 t Terex-Demag AC 30 City	2006	4x4x4	25,00m + 13,00m + 1,20m
35 t Liebherr LTM 1030-2.1	2005	4x4x4	30,00m + 15,00m
35 t Liebherr LTM 1030-2.1	2006	4x4x4	30,00m + 15,00m
45 t Faun ATF 45-3	2006	6x6x6	34,00m + 15,20m
50 t Terex Demag AC 50-1	2006	6x6x6	40,00m + 17,60m
50 t Terex Demag AC 50-1	2006	6x6x6	40,00m + 17,60m
50 t Terex Demag AC 50-1	2006	6x6x6	40,00m + 17,60m
65 t Tadano Faun ATF 65G-4	2007	8x6x8	44,00m + 16,00m
70 t Tadano Faun ATF 70G-4	2013	8x6x8	44,00m + 16,00m
80 t Faun ATF 80-4	2005	8x6x8	48,50m+16,00m+1,60m+Runner
80 t Faun ATF 80-4	2005	8x8x8	48,50m + 16,00m + Runner
80 t Grove GMK 4075-1	2005	8x8x8	43,00m + 17,00m + 10,00m
80 t Terex-Demag AC 80-2	2004	8x8x8	50,00m + 17,60m
80 t Terex-Demag AC 80-2	2003	8x6x6	50,00m + 17,60m + Runner
80 t Terex-Demag AC 80-2	2003	8x6x6	50,00m + 17,60m + Runner
100 t Grove GMK 5100	2005	10x6x10	51,00m+18,00m+2,50m+Runner
160 t Tadano Faun ATF 160G-5	2009	10x8x8	60,00m + 37,00m
200 t Terex-Demag AC 200-1	2004	10x8x8	68,00m + 33,00m
200 t Liebherr LTM 1200-5.1	2009	10x8x10	72,00m + 22,00m
250 t Demag AC 665 SL	1997	12x6x8	58,00m+41,00m+65,00m+2,00m
400 t Liebherr LTM 1400-7.1	2007	14x8x12	60,00m + 56,00m + 84,00m

RT-TELESCOPIC-MOBILE CRANES

25 t Kato KR 250	1997	4x4x4	26,70m + 7,00 m
70 t Tadano GR 700 EX	2008	4x4x4	44,00m + 17,70m
80 t Grove RT 800 E	2008	4x4x4	43,00m

LATTICE-BOOM-TRUCK CRANES

140 t Demag TC 650	1982	10x8x6	36,00m
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2014 Manitowoc MLC165

185 Ton, 177' Boom, 3rd drum,
Series 2 counterweight, Tier IV



Multiple Units
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2014 Manitowoc 11000-1

110 Ton, 150' Boom, 3rd drum,
50 Ton block, Ball



2014 Manitowoc 8500-1

85 Ton, 160' Boom, 2 Drums,
60 Ton block, Ball



2014 American HC230

230 Ton, 250' Boom, 3rd drum, Tier III



Multiple Units
Available

2013 Mantis 20010

100 Ton, 128' Boom, Tier III



Multiple Units
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2015 American HC110

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2015 Grove GHC75

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Liebherr LTM 1050/1



Grove GMK 4080/1



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Hitachi-Sumitomo SCX900-2	90t	2008
Hitachi-Sumitomo SCX800-2HD	80t	2009



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35 t

50 t

65 t



2x Liebherr LTM 1030-2,
1998 / 2004



Tadano Faun ATF 50G-3,
2010



2x Tadano Faun ATF 65G-4,
2007 / 2010

80 t

100 t

130 t



Terex Demag AC 80-2,
2005



Liebherr LTM 1100-2,
2002

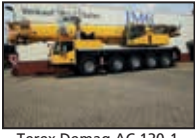


Grove GMK 5130-2,
2008

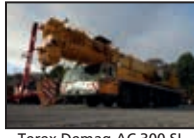
140 t

300 t

ALL CRANES



Terex Demag AC 120-1,
2007



Terex Demag AC 300 SL,
1999



ON OUR WEBSITE

Further cranes / Coming soon

500 t, Terex Demag AC 1600, 1994
100 t, Demag AC 100, 2007
100 t, Grove GMK 4100L, 2007
95 t, Liebherr LTM 1095-5.1, 2006
90 t, Tadano Faun ATF 90-4, 1994
70 t, Liebherr LTM 1070-4.1, 2006
70 t, Tadano Faun ATF 70-4, 2001
70 t, Demag AC 70, 2005
60 t, Tadano Faun ATF 60-4, 2002
55 t, Liebherr LTM 1055-3.1, 2007
40 t, Terex Demag AC 40-1, 2009
25 t, Krupp KMK 2025, 1990

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TELESCOPIC AT-CRANES

Capacity	Manufacturer	Type	Year	Drive/Steering	Boom/jib (m)	Delivery
450 t	Liebherr	LTM 1450	1992	16 x 8 x 12	50 / 61 / 84	direct ex Dubai
400 t	Liebherr	LTM 1400-7.1	2007	14 x 8 x 14	60/56/84	direct
400 t	Liebherr	LTM 1400	1988	16 x 8 x 12	50 / 61 / 84	direct ex Dubai
300 t	Liebherr	LTM 1300/1	2000	12 x 8 x 10	60 / 21/42/70	direct
250 t	Demag	AC 665 SL	1997	12 x 6 x 8	58 / 41 / 65	direct
200 t	Liebherr	LTM 1200-5.1	2009	10 x 8 x 10	72 / 22	direct
160 t	Faun	ATF 160 G-5	2009	10 x 8 x 8	60 / 37	direct
120 t	Grove	AT 9120 E	1995	10 x 8 x 8	48 / 17	direct
100 t	Liebherr	LTM 1100-5.1	2005	10 x 8 x 8	52 / 19	direct
100 t	Grove	GMK 5100	2005	10 x 6 x 10	51/18/2, 5/run.	direct
100 t	Grove	GMK 5100	2005	10 x 6 x 10	51 / 18	direct
100 t	Liebherr	LTM 1100/2	2001	10 x 8 x 8	52 / 19	direct
80 t	Faun	ATF 80-4	2005	8 x 6 x 8	48,5/16/1,6/run	direct
80 t	Faun	ATF 80-4	2005	8 x 6 x 8	48,5/16-run	direct
80 t	Terex-Demag	AC 80-2	2004	8 x 6 x 8	50 / 17	direct
80 t	Terex-Demag	AC 80-2 (2x)	2003	8 x 6 x 6	50 / 17+1,5	direct
80 t	Grove	GMK 4080	1996	8 x 6 x 8	43 / 13	direct
55 t	Grove	GMK 3055	2005	6 x 6 x 6	43 / 15+runner	direct
50 t	Terex-Demag	AC 50-1 (2x)	2006	6 x 6 x 6	40 / 17,6	direct
50 t	Grove	GMK 3050	2003	6 x 6 x 6	38 / 15	direct
45 t	Faun	ATF 45-3	2006	6 x 6 x 6	34 / 15,2	direct
40 t	Demag	AC 40-1 City	1999	6 x 6 x 6	31,2	direct
35 t	Liebherr	LTM 1030-2.1	2006	4 x 4 x 4	30 / 15	direct
35 t	Liebherr	LTM 1030-2.1	2005	4 x 4 x 4	30 / 15	direct
35 t	Terex-Demag	AC 35 L	2004	4 x 4 x 4	37 / 8	direct
30 t	Luna	AT 30/27	1989	4 x 4 x 4	27 / 7	direct
30 t	Luna	AT 30/27	1989	4 x 4 x 4	27 / -	direct
25 t	Demag	AC 25 City	1998	4 x 4 x 4	25 / 13	direct

ROUGH TERRAIN CRANES

80 t	Grove	RT 890 E	2008	4 x 4 x 4	43,2 / -	direct
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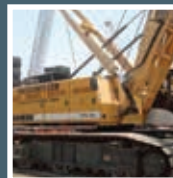


LTM 1750-9.1 fully equipped, year 04/2013

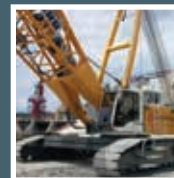


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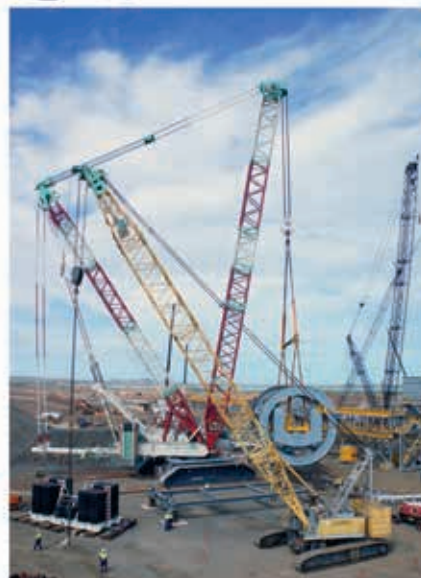
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