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A tale of two cranes

This month we look at two types of cranes which are designed for similar applications including challenging ground conditions - Rough Terrain cranes and telescopic crawlers. At first glance these two crane types appear quite diverse, but in reality they offer many similar attributes - apart from the obvious fact that one is on wheels and the other on tracks.

In recent years, the telescopic crawler crane has been one of the sales successes of the crane sector and is now on the verge of becoming a main stream rather than niche product.

Wheeled Rough Terrain cranes on the other hand are very much a well-established product sector - particularly in North America - although they are also popular in regions such as the Middle East, South America and Russia. In Europe they have never really caught on, although Italy and France have been decent markets in the past.

Rough Terrain doldrums

The Rough Terrain crane has been a construction site workhorse since the late 1960s thanks to its simple, rugged and reliable design. It also suits the North American

preference of having cranes on site throughout a contract. While in European markets - where the day to day crane rental market/concept developed early - roadable cranes such as truck and now All Terrains are the cranes of choice, being ideal for taxi crane type work, allowing contractors to call in operated cranes at short notice any time they need a lift. It is no surprise therefore that the majority of Rough Terrain crane manufacturers and half of the total global sales are in North America. However, due to the downturn in the oil & gas market sales have slumped to around half of its recent 700 units or so a year. This makes Liebherr's recent re-entry into the Rough Terrain crane sector after 20 odd years all the more interesting (see 'Liebherr's two new RTs' page 27).



Latest RT from Terex is the 80 tonne RT 90 with 47m boom



C&A

RT cranes

Sennebogen 673



Zoomlion RT35

Developed when the market for 80 to 100 tonne Rough Terrain cranes was particularly buoyant, Liebherr's new cranes were seen as a way of plugging a capacity shortfall caused by decreasing sales of its large - 750 tonners and above - All Terrain cranes. With a shrinking market, this may take some time to pay off, but Liebherr always has an eye on investing for the longer term and being ready when demand picks up.

Similarities

As can be seen from the simple table below there are many similarities between the RTs and telescopic crawlers with the All Terrain crane being the total antithesis of the crawler crane - travelling on the road, usually unable

to pick & carry and often having a larger footprint to achieve maximum performance.

As neither the RT or telescopic crawler are designed to be road legal, they have to be transported to site by low loader, which tends to rule out very short term rentals. This means they are generally dedicated to a specific site for a particular project or period, where they are available on a day to day basis to carry out all types of lifting work. Both are compact, rugged and have pick & carry duties - although the telescopic crawler crane can often pick & carry its full load chart - and despite its overall heavier weight, its tracks deliver lower ground pressures and greater go anywhere

Main features of an RT, telescopic crawler and AT crane

	Crawler telescopic	Rough Terrain	All Terrain
Pick & carry	Yes - full chart	Yes - but limited	No
Outriggers	No	Yes	Yes
Travel on road	No	Not really	Yes
Low ground pressure	Yes	No	No
Compact footprint	Yes	Yes	Wider outrigger spread
Wide capacity range	No	No	Yes



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Tadano
GR-750XL

capability, even though its stowed travel speed does not compare with that of the Rough Terrain.

In the early years, the telescopic crawler was adversely compared to the equivalent sized but stronger lattice crawler. For jobs where there was a compelling reason for a telescopic boom crane, the Rough Terrain crane moved faster, was lighter and less expensive. However boom design has come a long way since then and crawler cranes now have good performance, low ground bearing pressures and can handle more challenging terrain than most wheeled cranes. They are also more adept at travelling with their booms and jibs in place and are generally more stable. Add in a compact operating footprint and the absence of outriggers, or the

need for temporary access roads on many sites, and the economics begin to look good.

Unfortunately for the RT, economic conditions in the oil & gas sector mean that demand is currently falling. This is not a reflection of the crane type, far from it. Like the telescopic crawler it is quick to set up and ready to work with good travel speeds making it ideal on large sites and industrial complexes.

Side by side comparison

To illustrate the similarities and differences we have compared two 70 tonne cranes - the new Grove GHC75 telescopic crawler (built for Grove by Sennebogen) and the Tadano GR-750XL Rough Terrain.

What is immediately obvious between the two is that the Tadano has a significantly longer boom -

Spec comparison between a 70 tonne RT and telescopic crawler

	Grove GHC75	Tadano GR-750XL
Max capacity	70 tonnes @ 2m	68 tonnes @ 2.4m
Boom length	11-36 metres	11-43 metres
Max pick & carry	100% chart	limited chart
Boom	4 section full power	5 section full power
Maximum tip height	52.7metres	63 metres
Mid range lift @ 20m	6.2t @ 20m	5.9t @ 20m
Pick & carry @ 5m radius 11m boom	44.9 tonnes	15.2 tonnes
Pick & carry @ 10m radius	17.6 tonnes	6.7 tonnes
Max jib/extensions	8 -15 metres	10.1 - 17.7 metres
Transport size L x W x H	12.96 x 3.2 x 3.2	13.38 x 3.32 x 3.79
Maximum track/outrigger spread	5.0 metres	7.3 metres
Engine	Cummins Tier 4 168kW	Cummins Tier 4 201kW
Travel speed	2.7km/h	36km/h
Transport weight	46.32 tonnes*	
Gradeability**	64%	57%
Operating weight	71.76 tonnes	44.28 tonnes

*Transport weight: approximately 46 320 kg with 8 m boom extension, 2 hoists, without counterweight or carbody counterweight.

** Subject to manufacturers engine specifications.



The 70t Grove GHC75 has far superior lifting capabilities than the Tadano GR-750XL

seven metres longer - which combined with boom extensions and jib give a maximum tip height more than 10 metres more than the Grove which still has a very respectable 52.7 metre tip height. As a general site crane, it would be rare that such a lift height would be a problem.

In transport mode, the Tadano is slightly longer and higher, but at 44 tonnes it is almost half the weight of the tracked machine. Obviously, the wheeled machine has a much faster travel speed of 36km/h and a similar but more powerful engine.

However if you need a pick & carry capability the crawler telescopic wins hands-down. Both lift a maximum of about 70 tonnes - the Rough Terrain with outriggers fully extended - yet

the crawler can pick & carry its full chart. For example it can pick & carry 44.9 tonnes at five metres radius, while the Rough Terrain can manage just 15.2 tonnes at creep speed. With outriggers fully deployed the Rough Terrain becomes more competitive, but still loses out - for example at 20 metres radius the crawler handles up to 6.2 tonnes compared to 5.9 for the RT, while even with its tracked undercarriage fully extended to five metres, the Grove has a 2.3 metre narrower footprint than the Rough Terrain. It also exerts far less ground pressure and has greater gradeability - although both are restricted by the engine capabilities rather than the chassis.

Tadano dominance

Given that almost half of the RT sales are in North America where the vast majority of manufacturers are also based, it is somewhat surprising that in recent years the market leader in this sector has been Japanese manufacturer Tadano, which has at times claims to have come close to achieving a market share approaching 50 percent. The company has eight models available for the North American market, ranging from 15 to 160 tons, in Europe it sells four models from 30 to 80 tonnes. The two major capacity sectors for Rough Terrains are now 60 to 70 tonnes and 80 to 100 tonnes - with the American influenced Middle East the second biggest market.

One of most popular models is the 80 tonne/100 ton GR-1000XL/GR800EX. In the first four years following its launch in 2011, more than 1,000 units were delivered. Speaking at the ceremony to mark the production of the 1,000th unit in May 2015, Tadano chief executive Koichi Tadano said: "This crane has gained a reputation for reliable, high quality and environmentally friendly performance and has been particularly popular in places where harsh environmental circumstances make it difficult to replace cranes experiencing down time, such as energy development jobsites in North America, the Middle East and Russia as



One of the most popular RTs is the 80 tonne Tadano GR-1000XL.



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The 1,000th Tadano GR-1000 XL crane is handed over to Scott Equipment of Monroe, Louisiana

well as mining in South America, Australia and South Africa.”

The Rough Terrain product sector tends to be slow in terms of new product development. However earlier this year Grove launched two all new models with a revised GRT nomenclature - Grove Rough Terrain - the larger being seen at Bauma and the smaller due to be unveiled at Conexpo next year. Also Terex introduced its 80 tonne RT90, and Sany (Palfinger Sany) its 55 tonne SRC550 which features a 43 metre U shaped boom and 16 metre jib.

New Grove RTs

The 90 tonne Grove GRT8100 and 80 tonne GRT880 are updates to the RT890E and RT880E models but incorporate many more sophisticated crane features from the All Terrain market such as longer booms, better cabs and in some case boom pinning.

The GRT8100 has a new lighter and stronger 47 metre main boom plus a full range of bi-fold swingaway extensions, with optional additional inserts to achieve a maxim system length of 77 metres. The extensions



The GRT8100 has a new lighter and stronger 47 metre main boom and a 77 metre system length

include both hydraulic luffing or manually offsettable options, with offsets of 0, 20 and 40 degrees and a heavy-duty three metre jib.

A new boom extension stowing system for both the hydraulic and manual versions, are said to offer faster erection and stowage times, up to 60 percent quicker than previous generation models. The cranes also feature the company’s CCS crane control system which is now being rolled out across all Grove, Potain and Manitowoc cranes. An updated full-vision

cab tilts to 20 degrees and also features a new ergonomic control arrangement, including a tilting steering column, electronic joysticks and a jog dial for simple CCS menu navigation.

The smaller 80 tonne GRT880 - launched next spring - features a shorter 41 metre boom, which is lighter and longer than its predecessor, but also said to be able to lift more throughout its load chart. Grove says it is aimed at customers in mining, equipment maintenance and infrastructure sectors.



The new Grove GRTs at Bauma



Sany unveiled its new 55 tonne SRC550 with 43 metre boom at Bauma



The 80 tonne GRT880 will be launched next spring and features a shorter 41 metre boom

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Again it has a full complement of swingaway extensions with insert options and a maximum tip height of 68 metres.

Terex RT 90

The new 80 tonne capacity Terex RT 90 features a five section, 47 metre boom and features an enhanced control system with integrated diagnostics, a redesigned cab with 18 degrees tilt, an easy access flat deck for improved visibility, central lubrication and multi-stage, multi-position outriggers. Width is three metres.

The first order for the RT 90 announced at Bauma was for 12 units from its authorised distributor Bigge Crane & Rigging. Bigge played a significant part of the product development process, providing customer feedback input on design concepts. Brian Noga, Bigge sales manager said: "Being involved in the process, we see the potential for this crane to be a solid workhorse addition to our fleet."

Link-Belt

Another new Rough Terrain crane launch last September featured Link-Belt's new 90 tonne 100RT. The new crane features a six section, 50 metre pinned boom, plus a three-piece

bi-fold swingaway extension that takes the maximum tip height to almost 80 metres. The new boom has just four extension modes and can telescope under load. The extension offers three, 10.6 or 17.6 metre lengths, and can be offset by up to 45 degrees. Two additional 4.8 metre lattice inserts can be added to achieve the maximum tip height.

The new cab tilts up to 20 degrees for improved visibility, has air conditioning as standard and a five-way adjustable seat helping provide a comfortable work environment for the operator. The new machine incorporates the latest Link-Belt Pulse crane operating and telematics system that utilises the in-cab display as a readout and operator interface, with on-board diagnostics including the rated capacity limiter, wireless wind speed, boom length and angle, radius of load and crane configuration. Fully equipped less its modular counterweights the crane has a transport weight of 42.4 tonnes and an overall height of 3.91 metres. Once on site, it can drive itself off the

The new 80 tonne capacity Terex RT 90 features a five section, 47 metre boom.



Launched last September the 90 tonne Link-Belt 100RT features a six section, 50 metre pinned boom.



The new Liebherr LRT

telescopic crawler sales between 60 and 120 tonnes, larger capacity models are rare. Since Liebherr ceased production of its monstrous 1,200 tonne LTR 11200 18 months ago, its 220 tonne capacity LTR 1220 has been the largest telescopic crawler on the market, so the launch of the Link Belt TCC-2500 at Conexpo next Spring is big news indeed.

Since entering the tele crawler market a dozen years or so ago, Link-Belt has expanded its TCC range to include five models from 51 to 250 tonnes. When first introduced in 2005, the product was a niche market solution aimed at powerline utility applications. However sales of Link-Belt TCCs have grown steadily into rental

low loader, install its counterweight and be available for work.

World's biggest crawler telescopic

However, Link-Belt's latest news is the launch of a new 227 tonne crawler telescopic crane - the largest currently available. With most



Link-Belt's latest news is the launch of a new 227 tonne crawler telescopic crane - the largest telescopic crawler crane currently available.

The TCC-2500 boasts a seven section, 67.9 metre boom which can be further extended with a three piece - 3.6, 12.1, and 20.4 metre - bi-fold swingaway extension





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and general construction fleets both, domestically and overseas, including Australia, Europe, South America and Singapore.

Only basic details on the new TCC-2500 have been released so far, but it boasts a seven section, 67.9 metre boom which can be further extended with a three piece - 3.6, 12.1, and 20.4 metre - bi-fold swingaway extension with up to 45 degrees of offset, that can be further extended with two 7.62 metre inserts for a maximum tip height of 105.5 metres. Power comes from a Tier 4 Final Cummins diesel. The matching main and auxiliary winches feature extra-wide drums that allow the TC-2500 to handle its maximum permissible line pull through the fourth layer of rope and the rear mounted auxiliary winch can be quickly removed to reduce transport weight.

The TCC-2500 can self-unload and self-install its tracks and counterweight thanks to its standard jacking system with wireless remote controls. Working track width is 6.21 metres while twin bar grouser track pads have standard nylatron pad inserts for working on more sensitive surfaces. The new crane can pick & carry its entire load chart, and comes with charts for slopes of one, two three and four degrees.

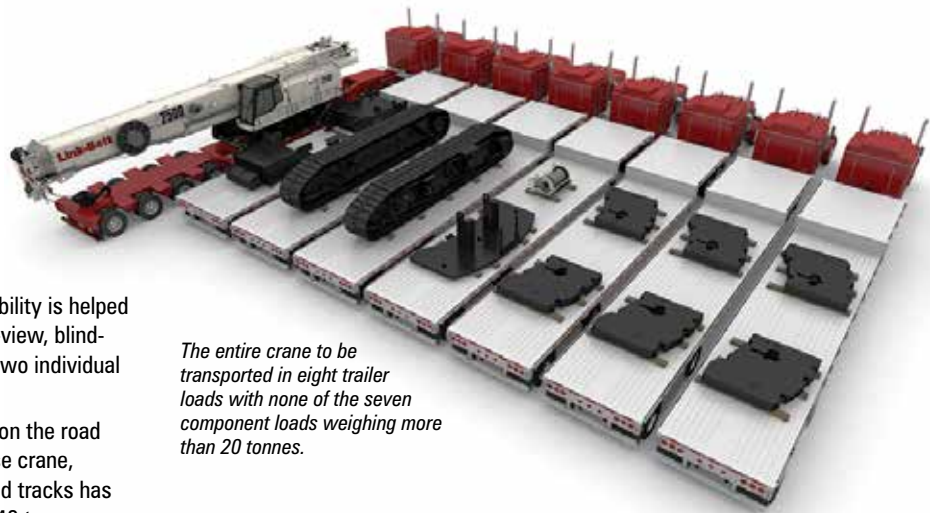
The operator cab tilts up to 20 degrees and features a new 10 inch full colour touch screen crane interface which incorporates both rated capacity limiter, telematics system, ground bearing calculator

and engine data. The display is designed to be used with gloves and be seen in direct sunlight. Operator visibility is helped by four cameras: rear-view, blind-side swing-view and two individual winch-view cameras.

For moving the crane on the road between jobs, the base crane, less counterweight and tracks has a transport weight of 48 tonnes, while the nine piece superstructure counterweight weighs 69.9 tonnes, allowing the entire crane to be transported in eight trailer loads with none of the seven component loads weighing more than 20 tonnes.

Crawler crane product manager Scott Knight said: "The TCC-2500 is well positioned to lead the tele crawlers into a whole new arena of jobsite opportunities. We identified early on that our customers needed a tele crawler with higher capacity and greater reach. The TCC-2500's job site flexibility is a huge benefit. It can lift, reach and travel like a large fixed boom lattice crawler, while having the ability to retract the boom and reduce its overall profile as job site conditions and environment require. Our goal from the beginning was to supply a simplified design, that is quick and easy to assemble and operator friendly."

From the limited information available it would appear that Link-Belt has looked at its opposition and made sure that it at least matched or just beat it in all areas. It has



The entire crane to be transported in eight trailer loads with none of the seven component loads weighing more than 20 tonnes.

slightly more capacity and engine power together with an eight metre longer boom although maximum lift height and counterweight is about the same. It will be interesting

to see if this launch spurs the development of larger telescopic crawlers, particularly in the 120-220 tonne capacity range.

How the TCC-2500 compares with the Liebherr LTR 1220

	Link Belt TCC-2500	Liebherr LTR 1220
Max capacity	227 tonnes @	220 tonnes @ 3m
Main boom length	13.3 - 68 metres	13.3 - 60 metres
Max system height	105.4m tip height	101m height
Counterweight	69.9 tonnes	50t standard 70t max
Engine	Cummins Tier 4 239kW	Mercedes 230kW
Load chart slopes	0-4 degrees	0-4 degrees



Sennebogen 6113E



Liebherr LTR1220



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Liebherr back in the RT game

C&A

RT cranes



During a press tour of Liebherr facilities last month the company officially confirmed - as we had reported back in April - that it was launching a new Rough Terrain range at Conexpo. It also revealed much of the detail on the first two models and showed us the first two units before they were shipped off to the USA for the exhibition.

Liebherr has been working on its return to the Rough Terrain market since 2013 following a customer survey at the Bauma exhibition that year. The results highlighted the top five customer requirements in a Rough Terrain which in reverse order are:

5. A long telescopic boom
4. High lifting capacities throughout the chart
3. Ease of transportation with low individual transport load weights

And in equal first place:

1. Maximum safety
1. Be easy to operate according to the KISS principle (Keep It Simple Stupid)

Changing market conditions

When the company took the decision to go ahead designing the new range of cranes, the market

for Rough Terrains was far more buoyant than it is today. Annual sales of 90 to 100 tonners were running at between 300 and 350 units but now is said to be around half of that level.

Liebherr says that it had hoped that by taking a decent share of the RT market - around 30 percent - it would top-up falling sales of its largest All Terrain cranes. It claims that the market for telescopic cranes over 750 tonnes is currently almost saturated. If this is the case then it leaves a substantial hole in the Echingen production schedule, although sales of 150 to 300 tonne All Terrain cranes are currently making up some of that shortfall.

However with the RT market now depressed - coupled with the fact that two or three of the Chinese crane manufacturers are getting to the point where their Rough Terrains

An older LTL 1080 dating back to 1994



are gaining some serious credibility internationally - an attempt to muscle in on this hard fought market with two all-new models is unlikely remedy its looming production shortfall. It did say however that while this was the initial aim, it is in this market for the long term believing that eventually it will make a solid recovery, and when it does it will have the range and the experience to satisfy demand.

Attempt number two

This is not the first time that the company has attempted to break into the Rough Terrain market. In 1982 it launched the LTL 1080 and added further models throughout the 1980s and 1990s including the 30 tonne LTL1030 in 1997 as well as some large specialist four-axle models for open cast mining applications. To say that these machines 'failed to take the market by storm' is a gross understatement with only around 330 units built throughout those years. While the LTL cranes did not gain a viable market share, those customers that did buy them reported that they were excellent machines - in particular the LTL1080 - and many of them are still at work including

a good handful at the company's Echingen crane plant.

The new Liebherr LRTs

The first two models in Liebherr's new Rough Terrain crane line will be the 90 tonne LRT 1090-2.1 with a five section, 47 metre full power boom - using a two stage telescope cylinder and rope extension system - and the 100 tonne LRT 1100-2.1 with a five section 50 metre Telematik pinned boom with single cylinder telescope.

The simplified Telematik system has been designed with 'less well-trained operators' in mind and has just two telescopic modes, 'Strong' or 'Long', which the operator can preselect with a single button. By moving the joystick forward the boom telescopes according to the mode selected. This strong or long telescope configuration has also been incorporated into the LRT 1090 full power boom, which controls section number two - the heaviest telescoping section - keeping it retracted when the boom length or load does not require it, thus enhancing its long-reach capacities. Both cranes have an optional 10.5 to 19 metre bi-fold swingaway extension with up to 40 degrees of offset.



The survey revealed maximum safety and easy to operate were the top customer requirements

The LRT 1090 has a five section, 47 metre full power boom



Multi standards - classic configuration

The LRTs have been designed and will be built to comply with the latest worldwide crane standards allowing a single model to operate in the Americas, Europe, Russia and Australia and elsewhere with minimal local modifications. Liebherr stated that the new LRT cranes have been designed to be 'simple and safe' as requested by its customers. As such they feature a classic drive train layout with Cummins engines - Tier 4 for USA and Europe and Tier 3 for less developed markets - Dana six speed Powershift transmissions, Kessler fixed front and oscillating

	Liebherr* LRT1090-2.1	Grove GRT 8100	Terex RT100	Tadano GR1000XL	Link Belt 100RT
Max capacity	90 tonnes	90 tonnes	90 tonnes	90.7 tonnes	90 tonnes
Radius	2.5m	2.5m	3.0m	2.4m	2.5m
Main boom	47m	47m	53m	47m	50m
Telescope	Full Power	Full Power	Dual mode	Full Power	Pinned
Max tip height	68m	72.9m	70.5m	67m	79.8m
Gross working weight	52 tonnes	56 tonnes ⁴	57 tonnes	51.6 tonnes	53.1 tonnes ⁴
Transport weight ¹	40 tonnes	43.8 tonnes	47 tonnes	41.7 tonnes	40 tonnes
Counterweight	12,000kg	12,248kg ⁴	10,000kg	10,000kg	13,200kg ⁴
Overall width	3.3m	3.33m	3.3m	3.32m	3.33m
Overall length	14.5m	14.5m	13.85m	14.38m	14.52m
Overall height	3.8m	3.75m	3.95m	3.8m	3.94m
Brakes	Hyd disk	Hyd Disk	N/A	Pneumatic	Hyd disk
Engine	Cummins T4	Cummins T4	Cummins T4	Cummins T4	Cummins
Transmission	Dana Powershift	Rangeshift	Powershift	Powershift	Powershift
Tyres	29.5 x 25	29.5 x 25	29.5 x 25	29.5 x 25	29.5 x 25
Axle front	Fixed	Fixed	Fixed	Suspension	Fixed
Axle rear	Oscillating	Oscillating	Oscillating	Suspension	Oscillating ³
Max speed	33kph	32kph	30kph	36kph	28.9kph
Cab	20° tilting	20° tilting	fixed ²	fixed	fixed
Outriggers	Variobase	3 position	3 position	3 position	3 position
Hoists	twin	twin	twin	twin	twin

* provisional ¹ Counterweight off ² The alternative Terex RT100US has a tilt cab - and 47m boom
³ Optional suspension available for rear axle ⁴ Optional heavy counterweight

rear axles with 29.5 Yokohama high volume tyres. The simplicity only goes so far however - this is after all Liebherr - so the cranes also feature hydraulic disc brakes, the

company's Variobase outrigger set-up system with single button auto-levelling, the Liccon control and load limiter system, a tilting operators cab, along with standard auxiliary

hoists and auxiliary boom nose. The LRT 1100 will have a single 12 tonne counterweight slab with standard hydraulic counterweight removal system - built into the

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Weighing 54 tonnes the crane can easily be transported in Europe within 12 tonne axle loadings

chassis, pads remain connected and there are stowage racks for mats or cribbing.

The new machines will of course be built solely at the Liebherr mobile crane plant in Ehingen, Germany, with the first production units expected to ship during the second half of next year. Ten prototypes have been built this summer, eight of which have been on test both at the plant and externally on road trials, while the other two are destined for Conexpo.

The company also stated quite firmly that the new machines will be very price competitive and carry enough of a margin to cover any likely strengthening of the Euro against the dollar - the currency in which most Rough Terrain cranes are sold. So what will be the starting price?

Somewhere around €700,000.

What next?

So why start with the 90 and 100 tonne sector? According to Liebherr this is quickly becoming the main Rough Terrain market sector in North America, at least in dollar terms. It also believes that it is the class with the strongest growth potential. The market for larger models between 110 and 160 tonnes quickly splits between two and three axle alternatives with relatively low volumes and some well entrenched, relatively recently introduced products. Therefore, once these two cranes are established, it will turn its attention to a smaller model or two - whether that will be in the 25 to 45 tonne or the 50 to 70 tonne range the company did not say. Most likely it will be a family of 65 and 75 tonne models?

front deck of the chassis - for North America and optional elsewhere. Removing the counterweight reduces the overall weight of the LRT1090 to less than 40 tonnes making it relatively easy to move in most, if not all States in the USA. The fully assembled cranes weigh 54 tonnes and have an overall height of 3.8 metres, so in Europe can be transported relatively easily within 12 tonne axle loadings. The company demonstrated this with a six-axle Goldhofer trailer

Check the cab!

While this is a 'simple' crane Liebherr has gone to great pains to make the operator as comfortable as possible and claims that its new cab is a good 220mm wider than any on the market. It also features an electrically extendible side platform to help with easy access along with four access ladders to the chassis - two on the right side, one on the left side and one at the front - with hand rails all round and a flat deck area to help avoid trips and slips. Other cab features include an opening windscreen, integrated air conditioning and Webasto auxiliary heating with newly designed climate control unit. It also features built-in cool box connected to the air conditioning unit and a USB charging socket all as standard equipment. The outriggers can be controlled from the cab or either side of the



The electrically extendible side platform helps with easy access along with four access ladders to the chassis.



Liebherr has gone to great pains to make the operator as comfortable as possible.



The new RTs have plenty of on-board storage



We reach for the sky.



Alu Truck Crane AK 46/6000

- ▶ Extension length max. 46 m
- ▶ Payload max. 6.000 kg
- ▶ Lateral range 1.000 kg / 26 m
- ▶ Fully variable outriggers

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