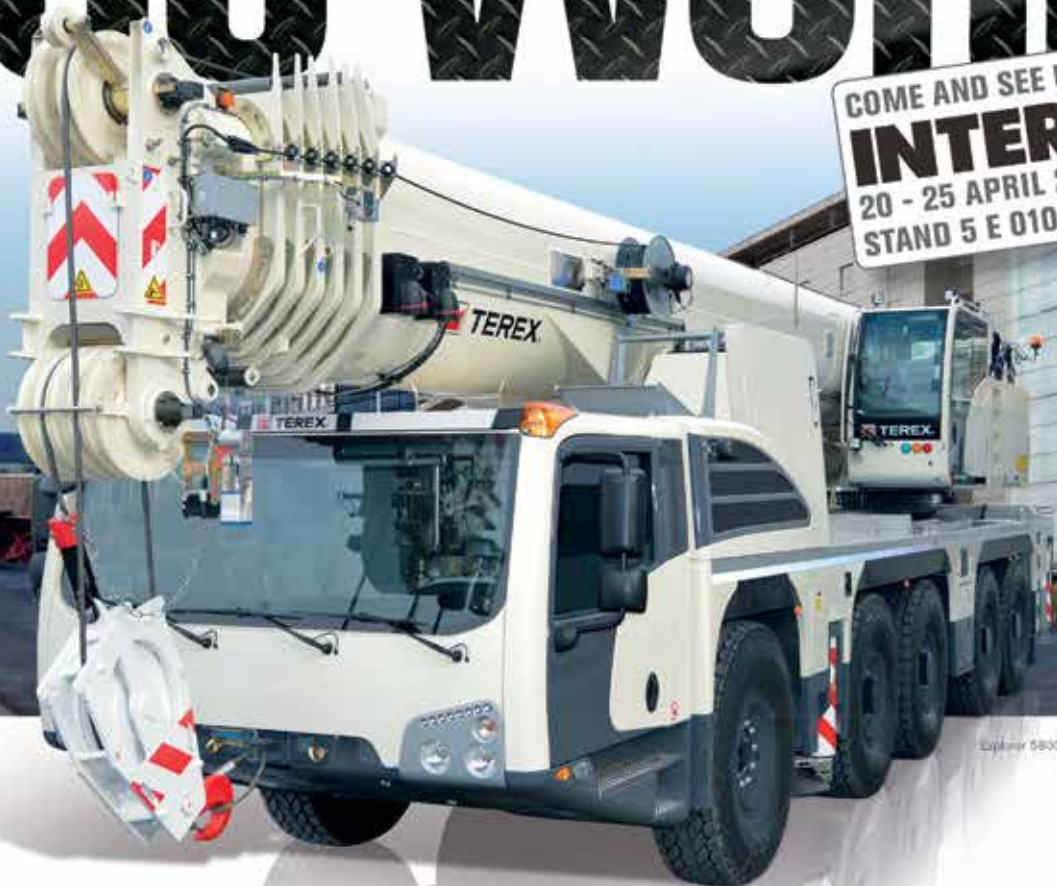


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# Little and not so large...

In our feature on All Terrain cranes a year ago the main debate in the mid-sized AT market was one engine or two? While the single engine theme has gathered a little pace with the launch of several more cranes of this type, it is still perhaps too early to tell if the concept that will become the norm on cranes in the 130 to 400 tonne range or not - Tadano in particular is totally against the single engine idea on anything but the smallest models. However as the major manufacturers have updated their ranges - some feature a single engine, some not - crane buyers now have even more choice.

First up is Terex which recently announced the Explorer 5500, the third in its 'single engine' range which includes the 130 tonne 'capacity class' 5500, the 160 tonne 5600 and the 220 tonne 5800 Explorer. Liebherr launched a new single engine 160 tonner at Conexpo last year, continuing its single engine theme started by the 300 tonner launched at the previous Bauma.

Terex, Manitowoc and Liebherr now all have larger single engine models, but while there are more single engine models available,

twin engine ATs still account for the majority of sales in the 130 to 400 tonne sector. Grove was the first manufacturer to adopt a modern single engine crane, unveiling its 400 tonne GMK6400 in 2010 although it did take some time to reach production and go into service.

Tadano is adamant that there are more benefits for customers in using the traditional two engine design. The company maintains that a smaller superstructure engine is much more efficient than powering the crane from the larger carrier engine which is grossly oversized for the job in hand. It would appear that a good number of customers agree with Tadano's philosophy,



Terex Explorer 5500



A Grove GMK 6300L lifting a four axle Tadano from the moat of the Tower of London



The new Tadano ATF 300G-6 spotted working in Japan

as the company is enjoying strong sales which, following the introduction of its largest crane at Bauma in 2013 now extends from 40 to 400 tonnes. The Japanese manufacturer is also busy adding to its larger capacity range, with a new 300 tonner spotted in Japan recently, while its long-rumoured and long-awaited bigger brother has been seen by a few select customers, and photographed on test at its German facility. Its final nominal capacity appears to be up for debate, but will almost certainly be in the 600 to 700 tonne range.

#### New Tadanos

Meanwhile Tadano has also launched two new mid-range cranes - the 70 tonne ATF 70G-4 and the ATF 100G-4 - both of course using dual engines which it says will 'save considerable amounts of fuel, as well as increasing the engine's

service life and improve resale values'.

The ATF 70G-4 is basically the same as the existing ATF 70G-4, apart from its longer 52.1 metre main boom. An additional 1.5 tonne of counterweight has also been added giving a total of 16.5 tonnes, improving its capacities throughout the chart. The counterweight has been designed so that the crane can operate in both 10 and 12 tonnes per axle configurations, unlike the previous 70G-4 which needed additional counterweights.

Both the 100G-4 and the long boom 70G-4 use Euromot 4 engines in the carrier and superstructure, reducing particle emissions by 90 percent compared with 3a engines. Toxic nitrogen oxides are also reduced by about 80 percent.

The new ATF 100G-4 is the updated successor of the ATF 90G-4 and

has many features in common with the new ATF 70G-4, such as counterweight segmentation giving more flexibility with axle loads. It also features asymmetric outrigger configurations as standard, which controls lifting capacity based on the individual outrigger extensions. Engine-wise the new ATF 100G-4 is the first Tadano AT with the new Tier 4f engines in both the upper structure and chassis.

Tadano has also been playing catch-up in the big All Terrain market, the six axle 400 tonne ATF 400G-6 was launched in 2013 with a 'Heavy Duty Power System' and range of extensions including a 76 metre luffing jib. With a maximum tip height of more than 120 metres, the ATF 400 has a maximum radius of 86 metres with some impressive duties, such as 54.6 tonnes at 20 metres. However the crane seems to have been slow to take off, but that now seems to be gaining some momentum, with a good number of machines shipped in the past 12 months.

Slotting between its previous largest crane - the 220 tonne ATF 220G-5 - and the 400G-6 is a new six axle 300 tonne ATF 300G-6. Spied in Japan but not officially launched, the crane looks like a lighter weight version of the 400 tonner with the same or very similar chassis and 60 metre main boom with a new more

compact 78 tonne counterweight configuration, compared to the 138 tonnes on the 400G-6. A range of boom extensions, including the luffing and offset swingaways with additional inserts to 52 metres, will definitely be available, but we are unclear on whether the full luffing jib will be an option or not.

### New flagship

As we have already said the company is also working on a new range topper, which is most likely to be a 600 or 650 tonner, mounted on a new eight axle chassis with swing out cruciform-type outriggers with curved profiles for 'over deck' storage, similar to several other large modern cranes. The most remarkable feature though is a radical new boom design, with a relatively small boom section profile supported by two massive external multi-stage telescope cylinders, one either side of the six or seven section boom. The cylinders stand well clear of the boom, to provide better lateral support, possibly replacing the need for cable supported superlift? The cylinders also appear to feature pin locking systems, on the lower four sections. A long heavy duty luffing jib option is also on test. The counterweight looks very much like that on the Tadano ATF 400G, with side weights stacked high on either side of the boom pivot point.

### Liebherr

Liebherr is of course the leading producer of All Terrains, having produced its 30,000th unit mid-way through last year, the last 10,000 of them built in the past eight years. Currently it claims a 48 percent share of the worldwide All Terrain market, although the reality might be slightly lower, as it is almost certainly based on German All Terrain shipments, is almost the entire market, but not quite 100 percent of it. Last year it built 1,416 cranes at its plant in Ehingen, most of them All Terrains.

### 300 tonne single engine

Production units of Liebherr's 300 tonne, six axle single-engine LTM1300-6.2, launched at Bauma in 2013, began to go into service last year, with the company still working on its launch orders, including a unit delivered in January to King Lifting, in the UK. At Conexpo last year the manufacturer added the five axle, 160 tonne LTM1160-5.2 which also uses the carrier's

Crowland Cranes took the UK's first Tadano ATF 100G-4



six cylinder engine to power the superstructure via mechanical shafts. The superstructure on the older LTM 1160-5.1 was powered by its own smaller four cylinder engine. Liebherr claims that a single engine reduces the weight of the crane by 700kg, and makes it significantly easier to update power units to meet changing emissions regulations (probably the main reason why manufacturers are adopting single engines), while reducing maintenance. Customer feedback from the single engine LTM 1300-6.2 that have already been delivered is very positive. "The main concern of our customers using only one engine was higher fuel consumption during crane work," says Liebherr. "However by using a mechanical shaft, Ecomode and engine management systems, the new crane needs even less fuel than a comparable two engine crane of the same class."

King Lifting's LTM1300-6.2 includes the full 70 metre luffing jib, with adapter to utilise the sections to make up a 42 metre fixed jib, along with hydraulically offset 22 metre bi-fold swingaway extension with, two seven metre extension sections. All of which adds to the crane's 78 metre main boom. The crane has four main outrigger positions, fully retracted, half extended, three quarters and fully extended, but is fitted with Liebherr's Variobase system which we have covered in depth before, but in a nutshell assesses the extended position and support force of each outrigger and calculates the load chart available for that particular set up.

All Liebherr cranes on show at this year's Intermat exhibition will be fitted with the Variobase system, including the LTM 1160-5.2 which makes its European debut. The crane is said to offer a 20 to 25 percent increase in capacities, the same 62 metre boom length, and is narrower at 2.75 metres wide.

With its 10.8 to 19 metre bi-fold swingaway extension and additional extensions, the LTM 1160-5.2 can achieve a 99 metres lift height, and work at a 78 metre radius. Maximum counterweight is 54 tonnes and it can achieve 12 tonnes an axle with its swingaway, three sheave hook block and storage box.

### Terex Explorers

Another single-engined mid-range AT launched at Conexpo and now being delivered to customers is Terex 5600 Explorer, although the latest and smallest model in the range is the 130 'tonne class' 5500 Explorer, featuring a 60 metre main boom with an 11 to 21 metre bi-fold offsetable swingaway, that can be extended to 33 metres with an extension between boom nose and swingaway. Maximum tip height with extension and folded swingaway is just over 86 metres and it can telescope up to

King Lifting's single-engine LTM1300-6.2 has a 70m boom



The 160 tonne Liebherr LTM 1160-5.2 at its Conexpo launch



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24.5 tonnes. Outrigger extension positions include fully retracted, half and full seven metre extension.

Terex claims that the five axle carrier is the most compact in its class, being just 12.1 metres long, while the crane has an overall length of 14.3 metres and a width of 2.75 metres. In driving mode the Explorer 5500 has a dynamic launch control function, which prevents it from rolling backwards when moving on sloping ground. The crane also has many configurable features, allowing it to comply with various road regulations, including a removable main boom and a maximum front overhang of 1.52 metres.

All components for the Explorer 5500 can be transported on a single support vehicle, and a new rapid counterweight installation system makes it quick to set up. Like its two larger brothers, the 5500 uses just one engine a Euromot 4 and Tier 4 (final) diesel. The engine control system automatically recognises demand and switches from high power for travel, to energy-saving mode during crane operation. Moreover, the system also has an

energy-saving start/stop function. A smaller Euromot 3a/Tier 3 engine is also available for some export markets.

The operators cab has improved visibility and can be tilted up to 16 degrees with touch screen displays providing data such as tyre pressures, brake system and suspension system status. And for easier maintenance the service points are more accessible - for example the diesel and DEF tanks can be conveniently reached from the ground.

### Explorer 5600

The Terex Explorer 5600 has many of the features seen on the smaller Explorer 5500. The five axle crane has a 68 metre main boom with a 95 metre maximum tip height and can telescope with 35 tonnes. The crane's outrigger base is one of the largest, at 8.14 x 7.5 metres. The 5600 uses a single 405/265 KW (road travel/operation) Euromot IV/Tier 4 final compliant diesel and a new electrical braking system, which the company says offers improved braking performance with reduced brake pad wear compared to cranes without the system, and

Largest of the Terex Explorer range is the 220 tonne class Explorer 5800



dynamic launch control supporting the driver when starting upwards on a hill.

Numerous safety features include improved work at height protection, an optional xenon working lights package and cameras covering the load, tail swing, hoist and off-side for all round visibility from the cab, which includes 20 degrees of tilt.

### Grove successes

Over the past year or so, Grove has been very quiet on the new crane front, however what it has been doing is selling rather a lot of its 300 and 400 tonne All

Terrains - the GMK6300L and the GMK6400 - built at its facility in Wilhelmshaven, Germany. The two cranes are said to be the best selling cranes in their class, with more than 200 GMK6300Ls and 50 GMK6400s sold by last summer after entering production in 2011 and 2013 respectively.

Why so popular? Well the GMK6300L has the longest boom in its class, at 80 metres and the GMK6400 has a 60 metre boom that can be extended to 134 metres with a luffing jib. Both cranes have proved a big hit with customers around the world, encouraging

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many crane companies to buy Grove for the first time, or in most cases, the first time for a very long time. The GMK6300L has been sold in 27 countries on four continents, while the GMK6400 can be found working in France, Germany, Switzerland, the Netherlands, Denmark, Russia, New Zealand and the USA.

As well as the cranes' performance, quality is also being mentioned by customers, this may well be down to the delay on putting the machines into production, and perhaps the fruits of the company's new component test laboratory in Shady Grove? The facility in Wilhelmshaven has also made a significant investment

in new welding technology for the GMK booms.

According to Michael Hüneke, welding director for Manitowoc in the region, the new laser-hybrid welding and cutting machine which replaces the previous submerged-arc unit, offers a level of precision that delivers noticeable improvements for customers using the cranes on site. "To our knowledge, this factory is the only one in the mobile crane industry to use this cutting-edge welding technology," he says. "The advantages include less manipulation of the steel prior to forming the boom, which helps maintain and prolong the structural integrity of the steel we use. It also



The Terex Explorer 5600 has the longest boom (68m) in its class

**How the new Liebherr and Terex 160 tonners compare**

	Liebherr LTM 1160-5.2	Terex Explorer 5600	Grove GMK 5170-1	Tadano ATF180G-5
Max capacity t @m	160t @ 3m	111t @ 3m	125t @3m	180t @ 2.7m
Main boom	62m	68m	64m	60m
Max capacity/radius	1.5t @62m 3.0t @ 56m	1.8t @ 58m 2.7t @ 54m	2.0t @ 60m 3.1t @ 56m	3.1t @ 56m
Overall LxW	15.67 x 2.75	14.37 x 2.75	15.79 x 2.99	15.13 x 3.0
Max tip height	99m	95m	100m	99m
Axles	5	5	5	5
Gradeability	55.7%*	53%	50%	61%*

\*445/95 R 25 16.00 R 25

**How the new 130 tonners compare with Grove and Tadano**

	Liebherr LTM 1130-5.1	Terex Explorer 5500	Grove GMK 5130-2	Tadano ATF130G-5
Max capacity	130t @3m over rear	91.8t @3m	130t @3m	99.7@ 3.5m
Main boom	60m	60m	60m	60m
Max capacity / radius	1.8t@56m	1.6t@ 54m	2.0t @ 60m (3.1t @ 56m)	3.1t @ 56m
Overall LxW	15.48 x 2.75	14.3 x 2.75	15.79 x 2.99	14.85 x 2.75
Max tip height	86m	86m	85m	99m
Axles	5	5	5	5
Gradeability	Over 60%	64%	50%	61%



Manitowoc engineers celebrate major Grove milestones

uses less material than before and is much faster with less preparation before starting to weld."

Previously, the Grove GMK5095's boom shells were welded manually or semi-automatically. Today, Manitowoc's new laser-hybrid welding process joins the upper and lower shell of the boom robotically. While maintaining the same strength, this process reduces the need for filler material by up to 120kg on a 60 metre boom. With the laser-hybrid welding and cutting system there is no tack welding of backing strips, submerged arc welding or straightening required, which improves the production rate and requires lower heat input.

**One or two?**

It would appear that most new mid-range All Terrains - apart from Tadano - will now adopt the single engine concept. Those manufacturers that have introduced single engine models stand to gain from reduced design and manufacturing costs. It will though be interesting to keep an eye on Tadano, and see if it sticks to its guns in the face of increasing development and production costs, or if it gains a wider following from customers who like its philosophy. With the other major AT manufacturers pushing this concept it can only be a matter of time before the end users accept and buy-in to the concept and actively start asking for just one engine?



Greiner Industries' Grove GMK6400, has been able to work on job sites where seven-axle cranes can't fit



Manitowoc's new laser hybrid welding cutting machine

# World's largest bronze sculpture

The world's largest bronze horse sculpture - in the form of Pegasus and a dragon - which measures 33 metres high and 63 metres long was erected in Gulfstream Park, between Miami and Fort Lauderdale, Florida, last year. When the project is completed this summer, the sculpture will include a four-dimensional experience theatre in its lower section.

Strassacker, a specialist art foundry based in Süssen, Southern Germany was commissioned to make the statue, with the help of several other companies including Stark Ingenieure - an engineering agency based in Ludwigsburg and Miami - which specialises in special support structures and one-off engineering projects. Stark developed the technical design, planned the erection work and produced the complex engineering solutions required for the statue.

Equipment used on the the project, included a wide range of large boom lifts, telehandlers and a number of All Terrain cranes, topped by a seven axle, 400 tonne Liebherr LTM

1400-7.1 operated by local crane rental company Allegiance Crane of Pompano Beach. The LTM1400 was rigged with Y-Guy superlift system and full 140 tonnes of counterweight. The heaviest single component was Pegasus' left wing, weighing 58 tonnes, which had to be lifted and placed at radius of 22.3 metres. The team was able to simulate all the lifts in advance with Liebherr's 3D lift planner for the LTM 1400-7.1.

The new statue is intended as an eye-catching symbol for a new theme park which will provide a range of entertainment and leisure facilities.

Heaviest component - weighing 58 tonnes - was Pegasus' left wing



The world's largest bronze horse sculpture - in the form of Pegasus and a dragon - was erected in Gulfstream Park, Florida.



A seven axle, 400 tonne Liebherr LTM 1400-7.1 AT crane operated by Allegiance Crane of Pompano Beach was used.

## Explorer moves bridge

Eslohe, the German-based crane rental company Blüggel used its new Terex Explorer 5600 to move a footbridge over the Ruhr river in Olsberg, 60 metres upstream to avoid the chance of flooding. Working for contractor Eickmann, this was the first time an Explorer 5600 was used in Germany.

"This project was our chance to put our new Explorer 5600 to the test," said owner Friedrich Blüggel, who also took the opportunity to operate the new machine himself.

In order to make the lift quick and cost-effective for the customer, the Explorer was fully equipped and driven to the job site allowing it to make a rapid start. However, the team still had a number of challenges on site. The first was access to the bridge with the crane using plastic trackway to protect the edge of the footpath path from damage. Additionally the ground at the lift site, on the Ruhr's banks was too soft to support the crane with regular outrigger mats, so large steel mats were employed.

The crane was configured with 33.4 metres of main boom and 46 tonnes counterweight to lift the 29 metre long, 17 tonne bridge at a radius of 20 metres. The crane's

compact design enabled it to get fairly close to the bridge, allowing it to be loaded directly onto a heavy transport vehicle without a problem. From there, the bridge was taken to its new location, followed by the Explorer which then placed the bridge in its new position on top of a new concrete piled foundation.

"One of the main reasons I purchased the Explorer 5600 was the fact that it could work in tight spaces," said Blüggel. "It is only 2.75 metres wide, which makes it as compact as the AC 120 we already have, but it also delivers much greater performance."



The Explorer 5600 is compact at just 2.75 metres wide



The 29 metre long bridge weighed 17 tonnes and was lifted at a 20 metre radius

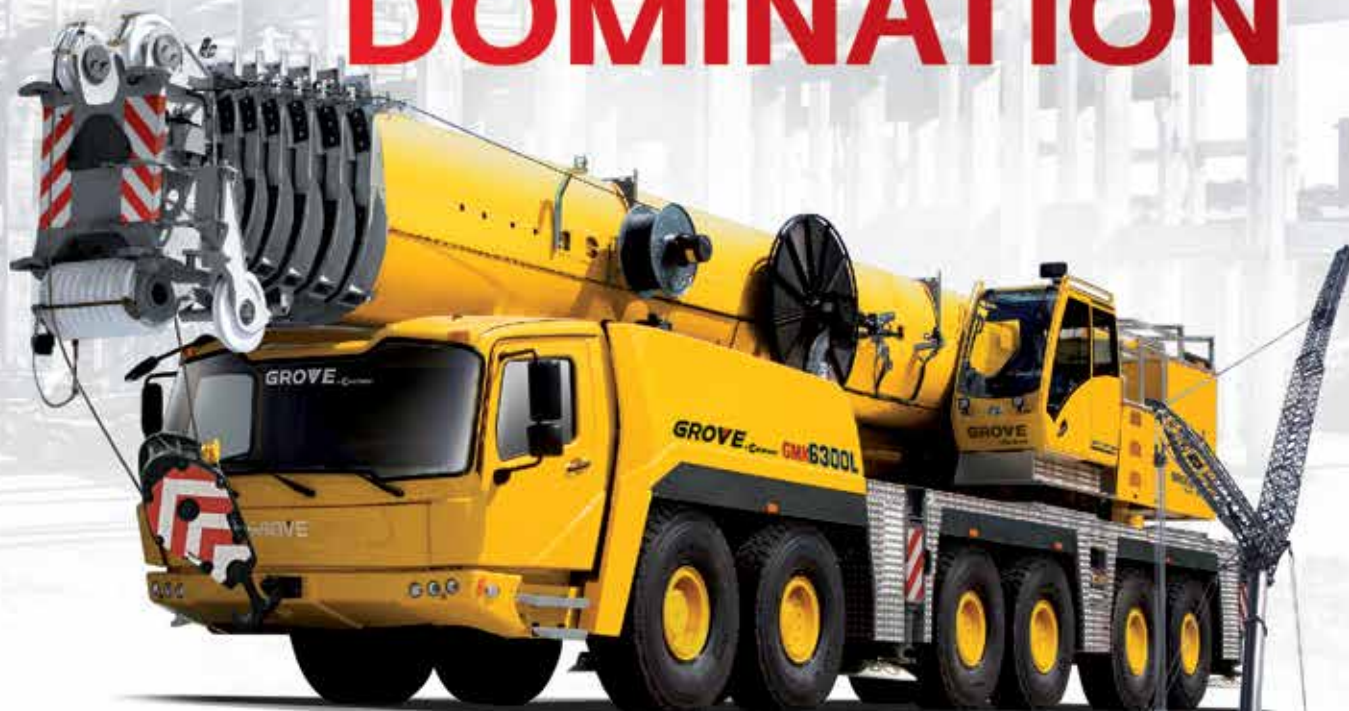


The Explorer had to negotiate tight spaces to set up near the bridge

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# Australian first for Fleurieu

Adelaide-based Fleurieu Cranes has purchased the first Grove GMK6400 in Australia. The company had originally intended adding a luffing jib to its existing 350 tonne AT crane, but decided to buy the 400 tonne Grove with full luffing jib instead.

"By adding another AT crane in this capacity class with luffing jib - which provides impressive reach and capacity - we are now able to work in new markets including wind farm maintenance and tower crane erection," said Philip Allen, who together with friends John Elliot and Nick Berry founded Fleurieu Cranes in 2005. "We are still getting significant work with our older 350 tonner while the GMK6400 gives the opportunity to pursue new markets."

The inaugural job for the GMK6400 was at the new Royal Adelaide Hospital, dismantling a tower crane belonging to Select Plant. The GMK6400 was configured with 44.79 metres of main boom

topped by a 43 metre luffing jib and 115 tonnes of counterweight. The crane made all the required lifts comfortably, including the removal of the top section of the tower crane, with its jib angle set to 80 degrees and at a radius of 46 metres. The heaviest component weighed 13.7 tonnes.

Fleurieu Cranes has three other Grove All Terrain cranes in its fleet, two 55 tonne Grove GMK3055s and a 100 tonne GMK4100. The hospital is the single largest infrastructure project ever undertaken in South Australia and is being built for the South Australian state government for the SA Health Partnership Consortium.

The inaugural job for the GMK6400 was at the new Royal Adelaide Hospital



## Raising the roof

Limited space and oversized loads were the main challenges that Czech crane rental company Autojeřáby Malina had to overcome when lifting steel roof structures for the new multi-purpose arena in the town of Frydek-Místek in the Czech Republic. The solution involved a tandem lift using its Terex Explorer 5800 and AC 250-1.

"Jointly lifting a weight of around 28 tonnes is actually a relatively easy task for the two cranes. But if the load is 30 metres wide and it has to be lifted from within a structure of the sports arena, precision was most critical," said company president Radek Malina.

The job required cranes compact enough to manoeuvre into the tight areas on site, while having the capacity and boom length to complete the task. To carry out the lift, the AC 250-1 was rigged with 41 metres of main boom working at a radius of 21 metres, while the Explorer 5800 was rigged with 42 metres main boom working at a 24 metre radius, to lift the bulky load to a height of 18 metres.

"We were very eager to see how efficient the Explorer's single-engine concept would prove to be in practice and whether fuel consumption would be low as promised," said Malina. "Now that we have seen the crane working we can say that the single engine was in fact significantly more fuel-efficient. Another benefit of this design was the ability to switch off the engine during the job, without switching off the IC-1 crane control system. This also contributes to lower fuel consumption and improved efficiency."

Founded 16 years ago, Malina Crane is based in Ostrava and runs a fleet of cranes with capacities from 20 to 250 tonnes, as well as offering special transport services.



A tandem lift using the Terex Explorer 5800 and AC 250-1 solved the problem

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