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A new breed of smaller crane?

Rising fuel and labour costs and tightening legislation have resulted in some of the major crane manufacturers re-thinking the design concepts of smaller capacity mobile cranes. Two recent additions which offer users something slightly different are the Liebherr LTC 1045-3.1 and the Terex Challenger 3160 (3180 for the UK market). We take a closer look at the features and benefits of each for end users.

Grove GCK 3045-2

Both these cranes were unveiled in 2010 and deliveries of both began towards the end of last year. The Terex is a 'first' on several counts – it is the first Terex range to have a name - the Challenger - and also the first (at least since the Demag days) to use the load moment (160 tonne/metres) for its model designation, rather than maximum capacity. The new nomenclature is easy to understand - first digit is the number of axles and the rest the load moment - i.e. the 3160 is a three axle crane with 160 tonne/metre load moment.

The LTC 1045-3.1 something different

Liebherr unveiled its LTC 1045-3.1, now its smallest mobile crane, at Bauma 2010. The 55 tonne LTC 1055 City type crane was launched in 2004 but has never been a big seller a mixture of its design, capacity and unusual hydrostatic drive system resulting in only a small number being sold throughout Europe. When the LTC 1045-3.1 was unveiled at Bauma, Liebherr reported a large number or orders, but machines have only been delivered over the last few months. The first in the UK - purchased by Scotland-based crane rental company Bernard Hunter - was delivered in December (see box story).

The LTC 1045-3.1 has a conventional All Terrain crane drive train and a lower capacity (45 tonnes) than the LTC 1055, but has several unconventional features the most striking of which is its telescopic arm/boom mounted single cab. During road travel the cab is positioned and mechanically locked in the traditional AT position at the front of the chassis, giving optimal road visibility for the operator. In this position the problem of limited single cab visibility to the boom side of the crane is solved as the lower edge of the main boom is above the driver's line of sight. When on site and in lifting mode, the telescopic arm is retracted to position the cab on the superstructure in the traditional upper cab location. Liebherr also offers the option of elevating the arm/cab in order to provide the operator with an eye level height of 7.8 metres which is particularly useful when working close to obstructions or loading into a container or ship. Both these cranes have been designed with ease of operation in mind. The Liebherr features simple automatic levelling with an electronic level display and 580mm of outrigger jack travel to cope with uneven ground.

Its five section, 36 metre oval profile main boom uses Liebherr's proven Telematik system giving a 7.5 tonne capacity at 36 metres, while tail swing is just 3.2 metres. A 7.5 to 13 metre bi-fold swingaway boom extension can be used at 0, 20, 40 and 60 degree offsets and a stubby 1.5 metre long assembly jib is also available.

Liebherr LTC 1045-3.1 with cab elevated

A Terex Challenger 3160

The LTC 1045 can easily remove its tool box reducing its length

Although unveiled late in 2010 Terex said that it would not be rushed to market but would take the time necessary to fully develop and test the product, predicting a launch date during the first quarter 2012. Perhaps the on-going saga of its 1,000 tonne AC1000 - the first of which has still not been delivered some two years after its 'launch' - influenced this decision? However, the first Challenger was delivered to a customer in Holland at the end of last year and Terex says a further eight to 10 orders have been taken.

The LTC 1045 can carry the full swingaway, hook blocks and its full 6.5 tonnes of counterweight within 12 tonne axle weights. The crane features the manufacturer's second generation LICCON computer/load moment system, while its BTT Bluetooth terminal allows the operator to attach or detach the hook block while standing at the front of the crane as hoist winch and boom lift cylinder are remote controlled.

A wireless remote is also available for all crane operations.

The Challenger is a new breed of one-man taxi crane

Terex AC40 City

The Liebherr LTC gives the operator a great view

The Challenger – a new breed

The Challenger is a new breed of one-man taxi crane from Terex, carrying everything needed for one person to drive to the site, rig and set up the crane and then carry out the lift. Terex says that the 3160 is the first of a new range, with the next model likely to be slightly smaller and then further models with increasingly higher load moments. It also claims that the 3160 is the only crane with a 50 metre full powered boom currently available on three axles.

Working within the 12 tonnes per axle (36 tonne GVW) European road regulations, the 3160 has a capacity 35.6 tonnes at four metres. The 3160 can also conform to country-specific 10 tonne axle load requirements, using its counterweight self-rigging ability for a vehicle weight of less than 30 tonnes. For the UK market the Challenger 3180 comes with extra 5.3 tonnes of counterweight, all wheel drive - rather than 6x4x6 - and can carry the 16 metre bi-fold swingaway extension on board with 800kg of accessories such as outrigger pads, chains and hook block for a fully equipped GVW 46 tonnes or 15.5 tonnes an axle.

No need to work at height with the Terex Challenger

Perhaps the most innovative element of the Challenger is that it completely eliminates the need for people to work at height while on site. The boom can be lowered to five degrees below the horizontal, allowing quick and easy ground level assembly of the extension or re-reeving of the hook block. The three sheave Vario-Hook system with 18mm (six tonne single line pull) rope reduces rigging time and the weight of on-board equipment.

Performance-wise, the Challenger 3160 lifts 32.5 tonnes at five metres, hoist speed is 121 metres per minute maximum and the crane can telescope a load of up to 15 tonnes.

Other features include a 2.55 metre overall width, active all-wheel steering and the new Terex crane cab fitted with the IC-1 control system with integrated load moment indicator. If required the crane can be operated via an optional remote controller.

Challenger 3180

As the UK is the only country that can legally 'road' the Challenger 3180, most European crane companies contemplating the smaller 'city/taxi' crane will consider the 3160 or the Liebherr LTC 1045 of course. Given the differences in design it is surprising how the performance is very similar.

It should also be pointed out that in road going – 12 tonnes an axle – trim a crane such as the four axle 100 tonne Terex AC1004/L has similar performance to these smaller cranes. So for example the owner of a small crane fleet might opt for the more expensive (both in initial cost and operating costs) 100 tonner because of its ability to take on larger jobs using addional counterweight. However for larger fleet owners, or those looking for a smaller and more maneuverable city/taxi crane, both the Terex Challenger and Liebherr LTC 1045-3.1 have a lot to offer.

How the new cranes compare with the Grove GCK3045 and Terex AC40 City ?

	Challenger 3160	Challenger 3180	LTC 1045-3.1	Grove GCK3045	Terex AC40 City
Max capacity	55t	60t	45t	40t	40t
Main boom	10.3-50m	10.4-50m	8.2-36m	7.9-34m	31.2
Max under hook ht	51m *	66m	48m	44.5m	44.5m
Max reach	38m	46m	39m	36m	36m
Max system length	50m	66m	49m	45m	44.2m
Max counterweight	6.8t (12t axle)	12.1t	6.5t	N/A Fully integrated	5.4t
Max cap at 3 metres	35.6t	39.5t	45.0t	35.0t	34.3t
Number of axles	3	3	3	3	3
Full outrigger base	6.9 x 6.5m	6.9 x 6.5m	6.2 x 6.2m	6.9 x 6.5m	6.4 x 6.2m
Gross Vehicle weight	35,000kg	45,000kg	36,000kg	36,000kg	33,500kg
O/a length	11,496mm	11,658mm	10,360mm	9,070mm	8,791mm
O/a width	2.55m	2.55m	2.54m	2.55m	2.55m
O/a height	3.61m	3.61m	3.01m	3.09m	3.09
Carrier length inc c/wt	9.72m	9.72m	8.91m		7.58m
Turn radius inc boom	10.64m	11.39m	10.0m	8.33m	7.32m
Max travel speed	85kph	85kph	80kph	80kph	80kph
Max radius/capacity	38m/1,000kg	46m/700kg	39m/700kg	36m/700kg	36m/700kg
Drive	6x4x6	6x6x6	6x6x6	6x6x6	6x4x6
Wheel size	16.00R25	16.00R25	16.00R25	14.00 R 25	18.00 R22.5
Tyre size	395/95R25	385/95R25	445/95R25	385/95 R 25	445/65 R22.5
Tyre option	445/95R25	445 & 525			
Carrier engine	326hp/240kW	326hp/240kW	326hp/240kW	440/330kW	279hp/209kW
Gradeability max	75%	75%	39%	50%	60%

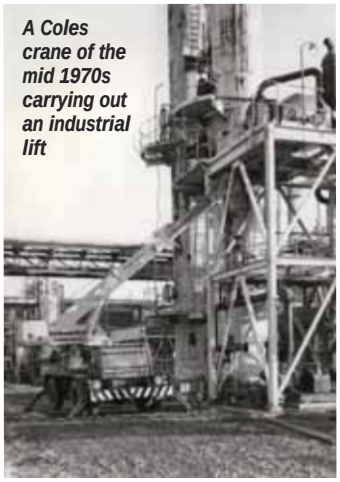
** 52m with MSV1 runner max lift 23.9 tonnes*

Edinburgh innovation

Walking around Bernard Hunter's facility a mile or two outside Edinburgh city centre and you are immediately struck by the huge variety of equipment. Mini cranes, scrap handling excavators, All Terrain cranes, mobile tower cranes, heavy-duty telehandlers, loader cranes, access platforms, trucks, trailers.... the list is almost endless. And hidden amongst all the equipment is the UK's first Liebherr LTC1045-3 and LTM 1100-4.2 as well as a 500 tonne LTM 1500-8.1 delivered last year.

Bernard Hunter has a modern fleet of Liebherr ATs including the latest LTC1045-3.1 and an LTM 1500-8.1

The main reason for the extensive range of equipment is its scope of work - machinery moving, metal processing, low loader and crane rental - all of which is carried out from its Gilmerton Road site which is both head office and base for all divisions of the business. What is also apparent is both the quality of the equipment and how well it is maintained, most of it resplendent in the company's blue and yellow livery.



A Coles crane of the mid 1970s carrying out an industrial lift

Small beginnings

The company, now in its 66th year, was formed in 1946 by Bernard Hunter senior who set up a motor agent's business in Seafield Road, Edinburgh. As well as buying and selling cars and trucks, he rapidly gained a name as a scrap merchant and in the post war years a dealer of army surplus vehicles. It came as a great shock to many when the Scottish entrepreneur died suddenly in 1971 at the age of just 48. However the reins were taken up by Bernard junior - who also unfortunately died in 2010 at a relatively young age of 62. His first major task was to move the company from its original site to current location on a large plot of land already owned by the family.

One of its early seven ton capacity Iron Fairy cranes

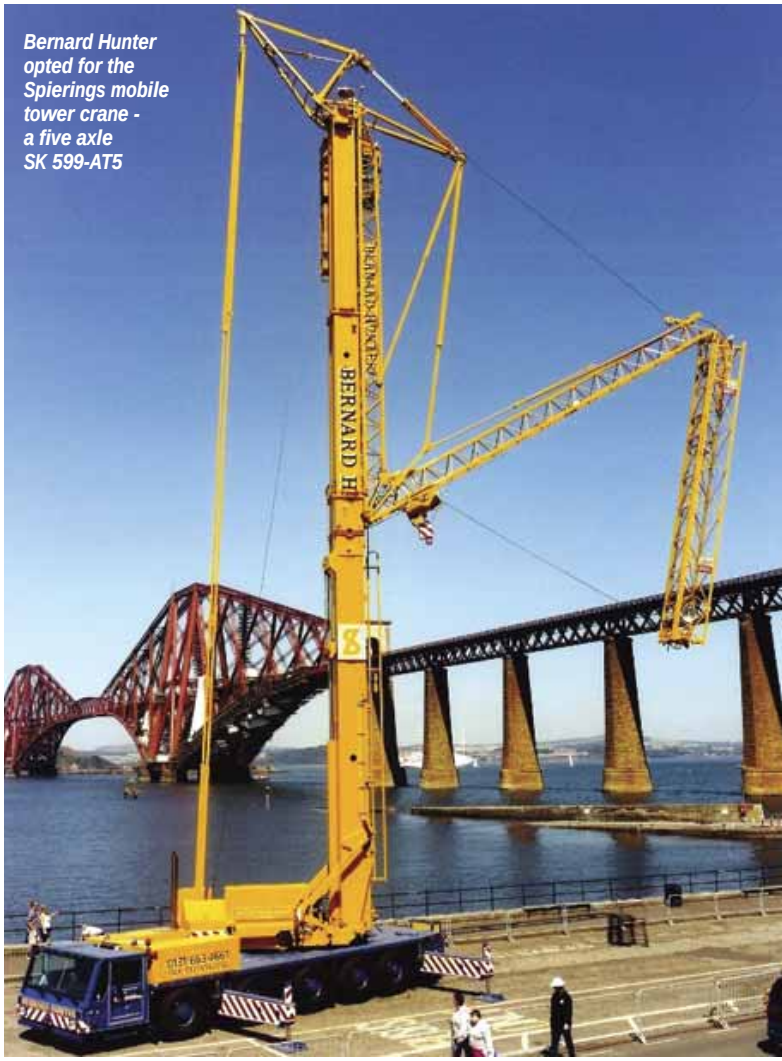
The company is now headed by managing director Jim Rafferty and his son Mark who is contracts director. Rafferty - Bernard junior's brother in law - joined the company in 1975 as a time served mechanic and was initially involved in the first hydraulic cranes from Smiths, Coles and Iron Fairy. Third generation Mark has taken a different approach. Although he has been totally immersed in the company for more than 10 years he took time out to study for a degree in business studies at Edinburgh University and brings a slightly different perspective to the business and its future development.

A Smith crane working in the centre of Edinburgh in the 1970s

Innovative equipment

Rafferty has always had an eye on technical developments and is perhaps the reason behind the wide range of quality equipment used by the company. The eight strong All Terrain fleet is predominantly Liebherr, ranging from 30 to 500 tonnes and including 45, 50, 70, 100 and 220 tonners. However, like many UK crane companies, it opted to add a five axle SK 599-AT5 Spierings mobile tower crane to its fleet. No mobile tower crane is simple to operate but with backup and support from the factory - often Leo Spierings himself - problems are quickly sorted. Rafferty says the Spierings is ideal for jobs in the narrow streets of Edinburgh, often completing a lift - such as installing air conditioning units on a multi storey building - before a conventional crane has set up. This helps in a city which suffers from major traffic flow issues.

For smaller jobs, or when space is limited, the company has two 10 tonne Kato CR10 City cranes which are always kept busy. "We don't



Bernard Hunter opted for the Spierings mobile tower crane - a five axle SK 599-AT5

believe in travelling cranes to jobs miles away, we tend to stick to work in and around the Edinburgh area. This can be very varied because of the Leith docks just a few miles from the City centre," says Mark Rafferty.

It is this variety of work that was the main reason for purchasing the first 45 tonne, three axle Liebherr LTC 1045-3.1 in the UK. This is not the only 'first' for the company, a year ago it took the first 100 tonne Liebherr LTM 1100-4.2.

Liebherr compact crane

Bernard Hunter specified the LTC 1045-3.1 with the optional elevating cab which has already proved itself while working in the docks and when placing a load over obstructions such as a wall, allowing the operator to see the load throughout the lift.

Elevating the cab on the LTC 1045 gives the operator a vastly improved view of the lift


The operator in the elevated cab

"This is an extremely versatile crane which has opened up a whole new range of capabilities for our crane hire operations," says Mark Rafferty. "It is particularly good in tight spaces and where there is low headroom. Although quite short in standard trim, the crane can quickly and easily remove its front storage box, reducing its overall length by another 825mm. We have already completed many dockside lifts and machinery installations where the elevating cab feature has saved time and improved safety."


Outrigger set-up on the LTC 1045

The four axle 100 tonne LTM 1100-4.2, arrived last January and boasts a 60 metre main boom, plus 19 metre swingaway extension with 20 and 40 degree manual offsets. In the UK it can also travel with its 17.2 tonnes of basic counterweight. The crane was also ordered with a further 11 tonnes of counterweight which is transported separately when required. "We chose this particular model because of its compactness and excellent main boom duties, which are ideal for the large amount of inner city work we undertake, where space restrictions are the norm and we need to complete lifts swiftly and with minimum site disruption," says Jim Rafferty.

The company has also recently added a new 500 tonne LTM 1500-8.1 selling its 250 tonner to part fund the purchase. "We have a five axle 220 tonne LTM 1220-5.2 with 16 tonnes of ballast which can also go out as a 130 tonner so the LTM 1250 is not missed. Our five to six year crane replacement policy meant the 250 tonner was coming up for renewal, however it was surprising to see that with prices having risen so much over the past few years - coupled with the way we look after the equipment - we sold the LTM 1250 for a very good return! We also have an LTM 1045 due for replacement but will probably replace it with a 50 or 55 tonne, three axle Liebherr LTM 1050 or 1055."

The new LTC 1045-3.1 at Leith Docks


One of its 10 tonne capacity Kato CR10 City crane reaches parts others cannot reach


(L-R) Willie Wylie of Liebherr hands the keys of the LTM 1100-4.2 to Bernard Hunter's managing director Jim Rafferty and contracts director Mark Rafferty

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Sent packing

Whilst the company is keen to have the latest equipment it is not keen on being manufacturers' guinea-pigs and expects local dealers to be fully committed to back up their products. Mark Rafferty remembers several occasions where Bernard Hunter - not happy with the performance of a new machine or the local service and back-up - either sent the machine back to the manufacturer or sold it on in the first month.

Other cranes include three Maeda mini cranes - an MC 385 and MC 405 spider cranes and a six tonne LC1385 crawler - which are available for external hire. There are also four Manitou telehandlers, ranging from a Buggiscopic to a 16 tonne capacity heavy duty MHT 10160 - probably the only one of its type in the UK?

Because of its work with scrap metal and vehicles, it also has a wide range of DAF and Mercedes trucks, some with Palfinger loader cranes and one specific vehicle removal crane and truck.

"As a company we do like to run the very latest, best quality equipment which benefits both the company and customers through improved performance, safety and reliability," says Jim Rafferty. "What we are now seeing in crane development is the big cranes being available in a physically smaller package - perfect for us working predominantly in Edinburgh city centre."

"Rental rates overall are improving but the smaller capacity cranes are still poor. We try to offer the best equipment and service which means we are not the cheapest. However working in several business sectors means we are never totally exposed if the economy is weak in one area."

This double drive XF105 was the first of its type in the UK and hauls crane ballast weights and additional lifting equipment

Vernazza helps complete Juventus stadium

The Grove working with three other mobiles prepares to lift the stadium's 350 tonne 90 metre masts

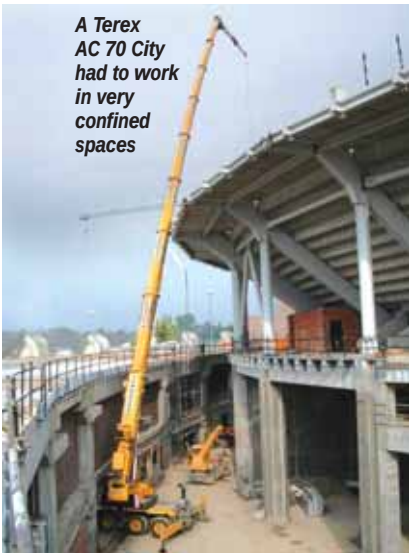
Up to 12 All Terrain cranes - four Grove and eight Terex - from specialist lifting company Vernazza Autorgru were involved in the demolition of the old stadium and building the new €120 million, 41,000 seat arena for Italian football club Juventus in Turin.

Possibly the most technically advanced stadium in Europe, it covers about 360,000 square metres, including a 35,000 square metre shopping mall, museum, eight restaurant areas, 24 bars, up to 500 press boxes and luxury lounges and 4,000 seats for corporate hospitality.

The company began work on the project early in 2009 which features a British-style design for seating, bringing the crowd closer to the playing field than is usual in Italy. Completing the new stadium in time for the first match of the new season, was the ultimate goal.

The new arena replaces the old Stadio delle Alpi - built for the 1990 World Cup. "With press updates on this project occurring almost daily, our planning had to be perfect," said Diego Vernazza, owner and director of Vernazza Autogru. "Ensuring both the demolition and construction were handled professionally and efficiently meant using the right equipment. Juventus is a huge name in Italy and this is one of the most prestigious projects we have ever been involved in."

A Terex AC 700 prepares to raise roof elements


A Terex AC 70 City had to work in very confined spaces

Dismantling and removing individual components of the existing building's framework meant moving in close and handling high lifts repeatedly day after day for long hours. "Our lighter capacity class cranes' excellent manoeuvrability and long, rapidly deployable telescopic booms were a great asset," said Vernazza. "They helped our crew gain valuable time and made it easier to access tight areas easily and safely. The Terex AC 80-2 and AC 100's narrow width and low chassis worked out to be perfect in lifting prefabricated components at short radius even in some very tight areas."

The largest Grove on the project was the 450 tonne, 60 metre boom GMK7450. The crane also has a 79 metre luffing jib and Grove's Mega Wing Lift attachment, giving improved lifting duties especially when working with high boom angles.

Other Grove cranes on the project included a 300 tonne GMK6300, a 220 tonne GMK5220 and a 100 tonne GMK4100L.

The much larger 700 tonne capacity Terex AC 700 was used to lift heavier prefabricated steel and concrete structural components and notably to hoist the stadium's roof elements into place, including four gigantic 90 metre curved steel masts - two at each end of the stadium and each weighing 350 tonnes - that provide support for the roof and form an integral part of the design.

"The AC 700 provided the lifting power and manoeuvrability needed to handle this heavy yet delicate task," he said. "By lifting the masts using supporting spars like derricks, we were able to raise them to the exact angle before hoisting them into their final position."

For the Vernazza Autogru team, this marked one of the final lifts of a successfully completed long, high-pressure three year long contract. "All our cranes served us reliably from start to finish," he added.

Juventus inaugurated the new stadium with an exhibition match officially opened by Juventus president, Andrea Agnelli and the Mayor of Turin, Sergio Chiamparino at the beginning of the 2011-2012 football season.

Founded in 1946 Vernazza has depots in Liguria, Tuscany and Piedmont and runs a fleet of more than 150 mobile cranes, aerial work platforms and trucks.


The new Juventus Arena

Tandem City lift

Two Terex AC 40 City cranes supplied by Bruns Schwerlast of Germany carried out a tricky tandem lift in Hannover positioning the main beam of an 8.5 tonne overhead crane on top of the rails under the factory roof with just inches to spare.

The only alternative to this lift would have been installing the beam from the outside, after removing the roof. This would have meant significantly higher costs and longer downtime for the customer. "We equipped the two cranes with runners or assembly jibs, which enabled us to perform the lift without hoisting rope," said operator Dirk Lichter. "This allowed us to lift the load to within inches of the ceiling, something that we could not have done with any other crane model."

The tandem lift was completed with the required accuracy by synchronising both crane movements and placing the overhead crane bridge on the running rails. Both operators had to first lift the beam at an angle so that it would fit through the opening and then carefully turn it until it was perpendicular to the rails and fully aligned.

The 40 tonne AC 40 is Terex's most compact City crane making it particularly suited for operations in confined spaces. The crane can access clearance heights as low as 2.99 metres, while a total length of only 8.57 metres and a carrier length of 7.34 metres provides a high level of manoeuvrability helped by its independent rear-axle steering. Main boom length is 31.2 metres.

With locations in Magdeburg and Hildesheim, Bruns Schwerlast runs a fleet of mobile cranes up to 500 tonnes, providing crane and heavy load transportation services throughout Germany.

Europe's largest salt dome

Schweizer Rheinsalinen is currently building an enormous de-icing salt storage facility in Rheinfelden, near Basel, Switzerland. The dome has a floor area of 11,300 square metres and will be used to store more than 100,000 tonnes of road salt for next winter. Worben-based crane company Leu Pneukranbetrieb supplied two Liebherr All Terrains - an LTM 1055-3.2 and an LTM 1030/2 - from its fleet of mobiles which extends up 90 tonnes and includes an MK 80 and brand new LTC 1045-3.1 city type crane.

The dome's wooden lattice frame has a 120 metre diameter and is 32 metres high. The lower supporting rings of the structure were erected using the two Liebherr cranes along with a larger capacity crane used to place the upper dome segments. By building the rings from base to top in a clockwise direction, the whole cantilevered frame construction was possible without scaffolding. Around 900 prefabricated composite lumber sections were used - roughly 500 fully grown spruce trees. A large part of the dome planking was carried out by the LTM 1055-3.2 placing 640, 12 metre long coated wooden sheets.

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