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Where have all the mini crawlers gone?

In recent years, both small telescopic spider cranes and the increasingly popular larger articulated models have become a mainstream alternative to larger cranes for a growing range of applications. One closely associated crane type that seems to have suffered from this rise in popularity is the mini crawler crane.

Mini telescopic crawler cranes have been available for many years and at one time looked as if they might break into mainstream crane market. Perhaps in the absence of spider cranes, mini crawlers may have been more successful but over the years the volume of sales never quite justified the production costs, especially compared to the excavators on which they were often based. Manufacturers such as IHI and Hitachi Sumitomo (now

HSC Cranes) had some initial success but have since dropped out of the market, while Kobelco tends to limit sales to its home market where demand is steady. Other companies such as Kato, Sennebogen and Starlifter also dipped their toes in the market but have since moved on.

One rental company that has ridden the rise and fall first hand is UK crawler crane sales and rental company AGD Equipment. It purchased its first model - a five tonne IHI CCH50T - back in 1996 and over the next five years built up a 50 unit mini crawler crane rental fleet. Fast forward 20 years however its fleet totalled just a few units.

Sales manager Jon Phipps said:



A number of the leading mini crawler cranes have since discontinued their range

"Although spider cranes have replaced the mini crawler in the market, we decided not to go down that route and have stayed loyal to the crawler crane with our most popular models the 25 to 70 tonners. You can buy a 25 tonne crawler for nearly the same money as a six or eight tonne mini crawler crane yet it commands a much better rental rate so we plan to stick to this size of machine and above for now."

Signs of life?

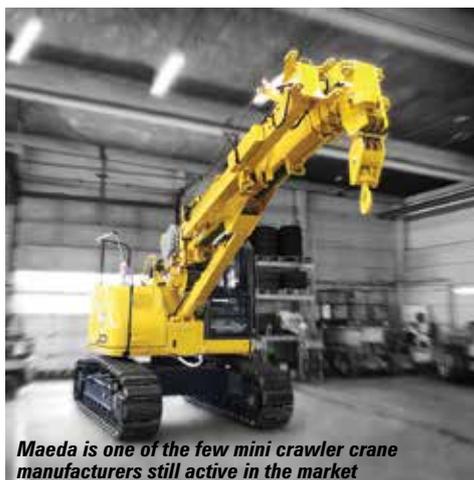
There are signs of life however, with Maeda one of a handful of manufacturers that have recently introduced new models. Andy Crane of Maeda's European master

distributor Kranlyft says: "The mini crawler crane has been overlooked by many hire companies, especially those using spider cranes. And while spider cranes have proved their worth and are a modern way of lifting today's building methods and materials, there is without a doubt a place for the mini crawler crane. There is without doubt a place for the mini crawler crane. They can be large and heavy to transport, but once on site they can offer several advantages over a spider crane, such as greater capacities with a smaller working footprint as well as 360 degree pick & carry duties and near zero tail swing."

The Maeda mini crawler range



One of AGD's few remaining IHI mini crawler cranes



Maeda is one of the few mini crawler crane manufacturers still active in the market



Jones Crawler Cranes has order a second Maeda CC1908-1 after ordering the UK's first earlier this year



GGR is now working with Sunward to get its 10 tonne SWTC10 market ready

includes the 2.93 tonne CC423S-1, 4.9 tonne CC985S-1, six tonne CC1485S-1 and its latest model the 8.1 tonne CC1908-1 - its largest capacity machine so far. Featuring the same five section main boom as its MC815 spider crane, it offers a 20.1 metre maximum tip height and a maximum radius of 19.2 metres. A 1.5 tonne fully hydraulic luffing jib takes the tip height to 26 metres. It can lift its maximum capacity at a radius of 2.7 metres and offers a 3.5 tonne pick & carry capacity. Features include a blade, a two tonne capacity searcher hook, almost zero tailswing, a fully enclosed air conditioned cab, a 360 degree view camera system with monitor and a 6/4/2 fall hook block. Power comes from a Yanmar EU Stage V diesel driving a hydrostatic transmission.

Since taking the first order at Bauma from France's ATM Leverage, sales have been relatively strong within Europe, with Jones Crawler Cranes taking the first in the UK. Owner Mark Jones said: "We like to be at the forefront when it comes to emissions standards and this machine has a Tier 5 engine meaning it can work anywhere. The build quality of the Maeda is superb and never lets you down. Furthermore, the boom length is greater than normal, coupled with

the telescopic luffing fly jib and zero tail swing, increasing its utilisation on any job." The company has since placed a second order for a CC1908, which is due to be delivered later this year.

Here comes the sun

While Kranlyft introduced the spider crane concept to Europe when it took on the Maeda product line in 2002, UK sales and rental company GGR really fired things up when it CE marked the Unic range and became its master distributor. In 2013, it branched out into the mini crawler crane market and now runs 32 units - one of the largest fleets in Europe - offering them on both contract rental and day to day hire. Dan Ezzatvar of GGR, said: "In 2013 we added our first mini crawler cranes to the fleet. They were brought in to fill a gap in the market for a compact product capable of carrying out heavy duty lifting. With no outriggers they offer a smaller footprint, making them ideal for congested sites and rough terrain applications."

In 2015, the company partnered with Chinese manufacturer Sunward to develop a five tonne mini crawler crane - the SWCT5C - for the UK/European market, placing a six unit initial order as encouragement. Joining 10 and 16 tonne models,

How does the 10t Sunward stack up?

	Sunward SWTC10	Maeda CC1908S-1
Maximum capacity	10,000kg @ 2.5m	8,100kg @ 2.8m
Max radius/capacity	500kg @ 19m	340kg @ 19.23m
Max lift height/capacity	3,000kg @ 21.2m	2,390kg @ 19.4m
Max height with flyjib/kg	1,050kg @ 26.2m	1020kg @ 26m
Dimensions (LxWxH)	9.07 x 2.80 x 3.07	7.38 x 2.49 x 3.01
Weight (with blade)	20,500kg	20,350kg
Gradeability	21 degrees	20 degrees
Travel speed	2.76-4.1kmh	1.8-3.1kmh
Engine	Stage V Cummins	Stage V Yanmar
Max pick and carry	7,500kg	3,500kg
Pick & carry	1,592kg @ 8m	980kg @ 8m



Sunward 5t

the SWCT5C features a five section 16.5 metre hexagonal main boom and can handle its maximum capacity at 2.1 metres or 200kg at the maximum radius of 14.5 metres.

Ezzatvar explains: "We have built a whole business model around co-developing and co-creating products as an intermediary to develop products that match what the market requires long before offering it to our customers. The GGR technical team was heavily involved with the development of the five tonne Sunward, helping determine exactly what it was capable of and ensuring it met the company's standards. Once it passed this stage it was added to the GGR fleet for 'site testing'."

The company has said that it is currently on the fifth generation of the Sunward crane with various improvements including a new Rayco Wylie safe lifting indicator, improved boom control and the addition of a telescopic swingaway extension, as well as a bit of a face lift.

"The Sunward mini crawler is a very well-built product, but the first models weren't quite to our requirements. Given the stigma attached to Chinese equipment, we were cautious to rush straight to market claiming to have the complete solution. We have spent the past three or four years getting it right and happy that we have a special product which fills a gap in the market," adds Ezzatvar.

The company has also taken Sunward's 10 tonne SWTC10 into its

fleet. Featuring a 21.5 main boom plus a standard five metre lattice extension, it can handle three tonnes on the fully extended boom and take 500kg out to 19 metres. It offers a 7.5 tonne pick & carry capacity, while total weight is a little over 20 tonnes. Power comes from a Stage V diesel, while real time winch monitoring is standard.

"In the past few years demand for mini crawlers has increased and we have been a key player in keeping our foot on the gas and keeping them coming through. In the past there was always a problem with supply, but that has now changed and other hire companies are looking at this equipment as a viable solution."

With so few manufacturers in the market and low numbers in rental fleets, a market that looked like it was on the way out is showing plenty of new life, with work available for those that have stuck it out and can innovate.



The latest version of the five tonne Sunward SWTC10



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A spider crane from Preston Hire overlooking the city of Melbourne at a height of 318.7m from the second tallest building in Australia

Strength to strength

As with many 'mini' machines, the spider crane originated in Japan and was very much a domestic only product with a few units going into Australia in the 1990s. The big change came 20 years ago when Kranlyft - the Kato dealer at that time - worked with Maeda to CE mark its machines, resulting in the official European launch in 2002. Since then the concept has gone from strength to strength and has spread across Europe and now North America. Japanese manufacturers - mostly Maeda and Unic - still dominate the global market but a few Europeans such as Jekko and Hoeflon are beginning to challenge them.

As with everything else the focus is shifting towards more 'eco' products, with manufacturers now offering either hybrid or fully electric models. GGR/Unic kicked this off in 2013 with the introduction of its 2.9 tonne ECO 295 wheeled spider crane, followed by a tracked version in 2018. Surprisingly Maeda only introduced its first model last month when it unveiled the 2.82 tonne MC285CB-3 spider crane. As with the regular 285, the new MC285CB-3 is rated at 1.4 metres radius and features a five section, 8.6 metre full power pentagonal shaped boom. It can manage 150kg at its maximum 8.2 metre radius and lift 550kg on full boom to a height of nine metres or four metre radius. The lithium-ion battery pack provides up to nine hours of continuous operation and can be fully charged in just

3.5 hours. White rubber tracks are standard with black tracks optional.



Maeda's newly unveiled all-electric MC285CB-3 spider crane.



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Hoeftlon's nine tonne C30e claims to be the world's largest all-electric spider crane

If size is a factor then Hoeftlon claims that its new nine tonne C30e is the largest battery powered compact crane in the world. Using the same lithium phosphate batteries as the rest of its range it is said to run at 60 percent utilisation for up to eight hours. Charging time is six hours and it can also operate on 110/240v mains power whilst charging.

Hoeftlon says that battery powered units now account for more than 50 percent of sales. With this in mind the company has been discussing

dropping its diesel models, but demand in some markets has persuaded it to continue with them - at least for now.

The new Jekko SPX650

Last month Jekko launched the new battery powered five tonne SPX650 telescopic spider crane - which incidentally was also the 2,000th crane off the line having built its first mini crane 20 years ago. The new crane fits into the Jekko range between the recently launched 3.2 tonne SPX532 and eight tonne

SPX1280. It is powered by a custom designed, 48 volt lithium-ion battery pack with onboard charger, which takes nine hours to recharge on a domestic 230 volt plug. Charging with a remote 400 volt high power charger takes three hours from empty to full and the machine can also work while being recharged.

The SPX650 features a five section telescopic synchronised full power main boom and is equipped with a four section 1.2 tonne capacity hydraulic luffing jib. A new short two tonne jib is also available. The maximum tip height with the jib is 23.5 metres at which it can handle 800kg. The maximum radius is 20 metres with a capacity of 150kg. The crane can also pick & carry smaller loads. The jib stows on board below the boom within the superstructure frame with the hook already rigged. When needed, the jib slides out and can easily be pinned to the boom and hydraulics connected or it can be removed from the machine completely.

The SPX650 also includes the same variable outrigger set up system with automatic sensing and load chart calculation that was launched

Jekko's new battery powered five tonne SPX650 telescopic spider crane



with the SPX1280. The beam and jack outriggers are operated from the remote controller with the three section beams swinging out from the chassis into an 'X' configuration. The maximum outrigger footprint is 4.5 by 4.5 metres, while the most compact set up is 2.9 by 2.9 metres. The angle of the beams and the beam extension is completely variable to maximise the footprint

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The angle of the beams and the amount of beam extension is completely variable.

within the space available. Once set the configuration is automatically fed into the system and a load chart calculated.

Overall stowed width is 980mm extending hydraulically to 1.38 metres for a more stable base on site. The crane uses the new Danfoss hydraulic system from the SPX1280 with fully simultaneous operation of up to four functions.

Alberto Franceschini, Jekko export sales manager said: "Our customers were looking for a medium size mini crane with a boom length of more than 20 metres and with very good



The SPX650's four section 1.2 tonne capacity hydraulic luffing jib

Comparison chart - SPX 650

Make Model	Jekko SPX650	Maeda MC405C-3	Unic URW-547	Hoefflon C10	Kegiom 5000 Cobra
Max capacity	5,000kg	3,830kg	4,000kg	4,000kg	5,000kg
Main boom	17.5m	16.8m	18.2m	16.3m	10.5m
Capacity at max height	2,000kg	1130kg	300kg	2,000kg	2,750kg
Flyjib	Y	Y	N	Y	Y
Max height with flyjib	23.5m	20.7m	18.2m	22m	16m
Max radius	20m	16m	17.83m	19.8	14.9m
O/A Length	4,460mm	4,980mm	4,955mm	3,835mm	4,076mm
O/A Height	2,020mm	1,980mm	1,980mm	1,920mm	1,914mm
Stowed Width	980mm	1,380mm	1,400mm	800mm	1,100mm
Min. weight	5,700kg	5,600kg	5,010kg	4,400kg	2,550kg
Max outrigger spread	4.5x4.5	5.8x6.0	5.9x5.9	4.5.x4.5	5.0x5.0
Pick & carry	800kg	500kg	N	N	N
Fully Electric	Y	N	N	Y	N

capacity that can work indoors and outdoors for jobs such as glazing, curtain wall installation, steel erection and industrial maintenance.

So we analysed what the competition was offering and our own range and the result is SPX650. Moreover, the standardisation of

hydraulic, electronic and software components with the SPX532 and SPX180 models will make after sales service definitely easier."

Spiders in the UAE

UAE rental company Johnson Arabia - seeing the growing demand for spider cranes and vacuum lifters from both construction and oil & gas industries, UAE rental company Johnson Arabia has responded with the purchase of several Maeda spider cranes. The initial order includes one of every model in the Maeda range including the 995kg MC104C, 2.83 tonne MC285C, 2.98 tonne MC305C, 3.83 tonne MC405C and 8.09 tonne MC815C. The cranes have lift heights ranging from 5.5 to 25 metres and have the ability to lower loads to 21 metres below ground level.

Executive manager for cranes Mohammad Fareed Naser said: "The market's awareness of this mini crane is increasing and all our spider cranes are currently

rented out. We often get direct enquiries for them however in some cases the client isn't sure of what they need. In these instances our trained sales team

demonstrate the benefits of each product leading to more clients using them because they see the benefits."

The company added that the range of applications for spider cranes is also growing rapidly ranging from indoor pavilions at the Expo to refurbishing shopping centres and indoor entertainment spaces.

More recently, the company supplied an MC285C to erect the VOX outdoor theatre in the Mall of

the Emirates, with the spider crane used to unload and place lighting poles and the large screen.



Johnson Arabia has taken delivery of every model of Maeda's spider cranes



A spider crane was recently used to construct the VOX outdoor theatre in the Mall of the Emirates

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Max. Lifting Height: 8.7m
Max. Working Radius: 8.205m x 0.15t
Machine Weight: 2000kg



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A game changer

Among the latest developments the most significant by far has to be the arrival of the high capacity articulated spider cranes. Although one-off, custom-built models have been around for some time, loader crane manufacturers recently have teamed up with spider lift manufacturers to develop products suited to series production. This has seen BG and Effer cooperate while Fassi bought into Jekko and Palfinger has developed its own range. While sales are growing, the concept is still new and few end users have yet to discover and appreciate their true capabilities.



Palfinger's PCC 57.002 removing two escalators in Austria

Shift and lift

Launched in 2018, Palfinger's 18.2 tonne PCC 57.002 articulated spider crane was recently used to remove two, five tonne escalators within a large shopping mall in Austria. After dismissing the idea of disassembling the elevators in situ due to dust and disruption concerns, it was decided to lift them out in one piece with a crane.

With the entrances measuring three metres wide and only 2.2 metres



The crane's tracks are removed to reduce overall height from 2.8 to 2.1 metres



The ability to shift along on its outriggers allows it to move without its chassis

in height, finding a crane with sufficient capacity and reach that could pass through the door was a major challenge. Although too high at 2.8 metres, the Palfinger's undercarriage is designed to quickly detach reducing its overall height to 2.1 metres.

It can then move under its own steam by fully extending its outriggers longitudinally to 1.2 metres in front of the crane, then retracting them as the rear outriggers are extended thus 'shifting' the crane forward by more than a metre. This process was repeated until the crane was clear of the entrance, at which point it was able to jack itself back up and onto the chassis.

Once inside, the machine switched from diesel to AC electric mode with the use of a 400V, 32A cable. The job involved a lift height of 12 metres and a radius of seven metres, while the PCC 57.002 can handle 5.5 tonnes at 8.5 metres radius with a height of more than 15 metres.

Strabag construction technician Michael Eisshofer said: "In construction, you are constantly faced with new challenges where you reach your limits and have to develop new concepts and solutions. We opted for the Palfinger crawler crane because the very tight doorway, made it the only solution."

BG lifting in confined spaces

UK crane rental and machinery installation company County Lifting was one of the first in the country to take delivery of BG Lift's 52 tonne/metre CWE 525 spider crane. The crane features a 14.5 tonne Effer articulated crane mounted on a



The CWE 525 provides an outreach of almost 30 metres

special tracked chassis and can lift its maximum capacity at three metres. Maximum tip height is almost 33 metres and maximum radius 29.37 metres at which it can handle 580kg. Overall stowed width is 1.85 metres, extending to 2.1 metres where space allows. Overall length is just over five metres, while the fully extended outrigger base is more than 6.8 metres and features the company's fully variable asymmetric set up system, Sense.

Since it was delivered in late 2018 the crane has been used on a wide range of jobs - usually involving areas with severe access restrictions - which range from working inside warehouses and around production machinery, as well as on off-road/ greenfield sites or on more general construction related applications. It has also been used in conjunction with a truck mounted loader crane to carry out tandem lifts.

Its first job involved the installation of a conveyor system at Ellesmere port. This involved placing the large sections within the mezzanine structure, while also overcoming restricted site conditions and lifting through the existing steel framework. The crane's compact dimensions and versatility of the articulated boom allowed it to set up and raise its boom between elements of the structure, as well as set up either end of the structure and telescope out in order to reach the various placement points. County Lifting project manager Daniel Drury said: "This job couldn't have been done with any other type of plant as safely or as efficiently as our CWE. We now have three Effer cranes operating within our fleet with plans to add further in the near future."



County Lifting's CWE 525's was recently used to assist with the installation of flooring



The compact dimensions and variable outriggers allow the CWE 525 to set up within the steel work

The Power Cube

Last year, Unic Cranes Europe/GGR launched a new type of spider crane dubbed the Cube Crane, with the first unit going to Swiss crane rental company Senn. It differs from standard spider cranes in that its three section, nine metre main boom which can be elevated to 85, 90 or even passed the vertical at 95 degrees. The boom is topped by a 13 metre five section telescopic upper boom. With 360 degrees continuous slew it is essentially a mini telescopic tracked tower crane and offers 980kg capacity and a tip height of 28 metres. It can handle 320kg at a maximum radius of 13.2 metres with a hook height of nine metres.

Designed for lifting projects with restricted space and access, the crane is 3.89 metres long and has an overall width of 1.5 metres and height of 2.39 metres. Features include multi-position outriggers, radio remote controls with dual

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Telescopic boom lifts

Electric	Height	Load
BT30ERT	30m	454KG
BT28ERT	28m	454KG
BT26ERT	26m	454KG
BT26SERT	26m	454KG
BT24ERT	24m	454KG

Articulating boom lifts

Electric	Height	Load
BA28ERT	28m	250KG
BA24ERT	24m	300KG
BA22ERT	22m	230KG
BA20ERT	20m	230KG
GTBZ18AE	18m	230KG
GTBZ16AE	16m	230KG





Swiss crane rental company Senn has taken delivery of the first Cube

axis joysticks and a full information readout. Total weight is 8,650kg.

Graeme Riley of Unic cranes Europe says: "The Cube Crane is an innovative addition to our fleet. The introduction of the three-section derricking boom gives it even more versatility in unique and compact lifting operations. We see it being used widely by our existing customer base in a variety of restricted access environments, including narrow spaces in between buildings and inner urban environments."

Custom-built solutions

Another UK rental company Cadman Cranes has two 12 tonne Amco Veba loader cranes mounted on excavator chassis. Managing director Matt Waddingham, said:



Cadman combined a Amco Veba loader crane with an excavator chassis

"In 2016 we noticed we were spending a lot of money on larger cranes because sites - particular utilities sites - were poorly designed and inaccessible. We already had the mini crawlers, but their lifting capacity was restrictive. What we needed was a small tracked machine that could access tight spaces, across unsuitable ground. At the time nothing existed that was both compact and strong enough."

"Geoff Cadman, the company's owner at the time, was 'a bit of a schemer' and decided to marry a loader crane with a 13 tonne excavator with the company calling on the expertise of bodybuilder Kocurek Excavator and loader crane installer Tip n Lift. The first unit we commissioned featured a 16 metre main boom plus 10 metre hydraulic luffing jib. It could handle 8.73

tonnes at a radius of 4.6 metres and up to 650kg at 26 metres. Overall dimensions were 2.5 metres wide by five metres long, and features included a six tonne pick & carry capacity, fully enclosed cab, steel reinforced rubber tracks and remote controls."

"After a bit of R&D we purchased the components and commissioned the manufacture. Despite the slightly cobbled together nature of the unit we were able to get a CE mark and since it went into service it has done some amazing work and we have a unique tool which is ideal for many applications."

Following the success

of the first unit, the company commissioned a second with a 22 metre main boom which could handle one tonne at 22.8 metres radius. Both cranes have two fall hoist ropes and rotating re-handling grabs to cater for the demand to clear tanks and ditches of grit, silt, sewage, anaerobic digestion waste and other bulk materials within the waste industry.

"They are exceptional machines and we always get amazing feedback from our customers. There are similar, proprietary machines available now, but ours are unique and show the ingenuity that still exists in this industry."

The crane's hydraulic luffing jib can be used to overcome obstacles on restricted sites



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