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Sub compact versus skid steer?

Compact and sub or ultra-compact telescopic handlers are becoming increasingly popular, to the point where they are beginning to take over some work previously carried out by skid steer loaders, we take a look at how the two compare.

Cranes & Access has never covered skid steer loaders, considering them to be more suited to earth moving. With neither the ability to telescope loads or serve as a work platform they are on the fringe of the 'lifting' sectors that we regularly cover. However, the change in the telescopic handler market dynamics with the growth in the compact (less than two metres high by two metre wide) and more recently sub-compact sectors mean that there is now a very clear crossover between the two. So which is best and why?

The history of the skid steer loader dates back to around 1956 when two brothers - Cyril and Louis Keller at the small company Keller Manufacturing in Rothsay, Minnesota - came up with a new loader design for Eddie Velo, one of the pioneers in the turkey farming industry. The story goes that Velo was moving away from small flocks of birds to 'mass' production utilising large, two storey barns and was finding it more difficult to get the manure cleaned out. Standard loader tractors couldn't be used because of their limited manoeuvrability and because they were too heavy to operate on the upper floor.

The initial design was a start but was improved the following year when the brothers installed a new skid steer drive system and testing began in earnest. Various problems with the belt-drive led to a new, patented belt-less clutch system so that by the end of 1958 numerous Keller loaders had been sold to poultry farms and the brothers were looking for a way to mass produce the machines. Struggling to raise enough funds, their uncle introduced them to Les Melroe of Melroe Manufacturing Company of Gwinner, North Dakota, who was impressed enough to want to manufacture the loader.

An agreement was reached where Melroe would have exclusive manufacturing rights on a royalty basis and the Kellers were employed by Melroe to further develop the loader. The first Melroe loader was completed in 1959 and used the patented drive system that continued on various models up to 1982. The M440 Melroe Bobcat was the first model to carry the now eponymous name in 1962 - Bobcat being chosen to represent the animal's tough, quick and agile qualities.

Over the past 50 or so years, the skid steer market has developed substantially. However while it is massively popular in North America, it has never really caught on in the same way in Europe - in spite of the more cramped job sites. In the UK for example numbers have never really exceeded 1,000 units a year, recently dropping to around 600 a year. Only two countries in Europe - Italy and Spain - are they more popular.

A refurbished early Bobcat loader seen at Conexpo 2008

Compact telehandler

The recent growth and interest in the compact and sub-compact telehandler class disguises the fact that these machines have been around for at least 30 years.

Perhaps at this point we should try and define the two categories. The compact telehandler is generally accepted to be around two metres high and two metres wide and as the name suggests, the sub-compact telehandler is smaller again measuring about 1.5 metres wide and 1.8 metres high.

The M60 three wheeler was built about 1958/9 and was the first Melro self propelled loader featuring two wheel drive and rear caster wheel. Less than 20 were built.

Manitou and JCB are the two leading telehandler manufacturers with similar production levels. JCB has a wide range of both agricultural and construction fixed frame telehandlers and has expanded into the compact and sub-compact sector with its 515-40 and 520-40 machines. The company has also manufactured a range of skid steer loaders since 1993 but it is the launch of the 515-40 telehandler that is now causing direct comparison with its skid steer machines.


The Manitou Twisco is a three wheeled (one wheel at the rear two at the front) loader with telescopic boom


The demand for the JCB 515-40 has surprised even JCB

Manitou also has a wide range of telehandlers including 360 degree machines up to 30 metres, as well as two ranges of compact machines that were introduced at least 30 years ago and continue in production today. The first is the Buggiscopic - a traditional compact telehandler, of which two models are currently available, the BT 420 and BT425. More unusual is the Twisco - a three wheeled (one wheel at the rear two at the front) loader with telescopic boom which is wider than the BT machines but has a smaller turning circle and is much lighter.

Both model ranges may have suffered by being too far ahead of their time, and have never really sold in significant volumes. In recent years Manitou does not appear to have promoted these machines anywhere near that of its more traditional models. More recently it has added the more mainstream 'compact' MT625 to its range obviously to benefit from the growth in this sector.

"There are several disadvantages with a skid steer when used in the wrong hands"

JCB on the other hand has launched its small sub compact range - initially calling it the Miniscopic but then bringing it in line with the nomenclature of its other telehandlers i.e. the 515-40 (one and a half tonne lift to four metres). Since its introduction its success has surprised even its most avid supporters within the company, with the concept appealing to users looking for an adaptable small machine.

It is widely accepted in the industry that in the wrong hands, skid steers can churn up the ground badly, can be prone to punctures and rapid tyre wear. They also require a lot of engine power for their weight - which makes them more thirsty than the equivalent compact telehandler.

JCB was one of the first companies to openly acknowledge the problems and dangers of getting in and out of skid steer loaders, where operators have to climb in over the bucket or attachment.

"Statistics show that at least one person is killed in the USA each year getting in or out of a skid steer," says Rob White, JCB product manager compact equipment. "Because of this we introduced the single arm concept which allows operators easy access and solves the problem of climbing over the attachment to get into the cab."


The Buggiscopic is a traditional compact telehandler. Two models are currently available, the BT 420 and BT425

As well as the obvious 'skid' steering which allows the machine to turn within its own length (or the width of its bucket i.e. 2.0 metres) one of the main 'advantages' of the skid steer over the compact telehandler is its high hydraulic flow rate - about 90 litres per minute - which means it can easily power the more demanding attachments such as rock wheels, planers, snow blowers and vibratory rollers etc.


JCB was one of the first companies to openly acknowledge the problems and dangers of getting in and out of skid steer loaders

Given the increase in popularity in recent years of the compact telehandler it should not have been a surprise that the even more compact 515-40 would be a hit, being a niche success in a lot of different markets. JCB also has the Teletruk for those looking for more of an industrial option although it is significantly heavier (two tonnes) than the 515-40. "We thought the 515 would be a hit with builders merchants, replacing forklifts and skid steers," says White."Compared to a skid steer loader, it has better lift height and reach, is narrower, more comfortable and much easier to drive using a steering wheel rather than joystick controls, which makes it much more appealing for rental."

A skid steer is also designed to have perfect 50:50 balance between front and rear wheels when the bucket is full of material. When empty it is 70:30 in favour of the rear which is why the machine pitches and bounces when travelling without a load. "The skid steer is ideal at clearing out chicken sheds in a limited time frame - which is what it was originally designed for. In the right hands and in a tight spot, it is much quicker than a compact telehandler having more power and better bucket breakout force and being able to spin within its own length which makes the load cycle much quicker. The compact telehandler with its better travel speed would however have the advantage if the job requires travelling any distance.

However a glance at the machine comparison table shows speeds for all the equipment which is very similar (about 20 km per hour) apart from the Twisco's 14 km per hour.

With the JCB 515-40 now starting to take sales off skid steers it is interesting to directly compare the JCB 515-40 and one of its own skid steer loaders.

The 515-40's maximum lift capacity of 1,500kg is matched by the largest skid steer model, the JCB 330. The cost of these two machines is also similar so the skid's larger, more powerful engine

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Small but not a sub compact – the Mero P25.6

Measuring 1.95m high and 1.83m wide, the Bobcat T2250 has the Bob-Tach system, making it compatible with most Bobcat loader attachments

and faster hydraulics is countered by the lift height and forward reach of the much narrower sub-compact telehandler.

"The concept of the 515-40 has been adopted well," says White. "Apart from the diehard users and some extreme tasks mainly found in the USA, the compact telehandler appears to have the advantage. The skid steer will struggle to operate on wet grass whereas the 4x4x4 drive of the 515-40 means that it will limit damage to the ground."

Many operators are also unconvinced about the skid steer's uncomfortable driving position and noisy engine positioned right behind their ear - possibly contributing factors to the fall in skid steer sales, while the lack of forward reach is also a major consideration.

The 515-40 is still relatively new but is now being built and sold in good numbers. JCB says that it plans to expand the range of machines with both larger and smaller units building on the one and a half tonne capacity and four metre lift of the original.

For any new sector of machine to succeed, users have to change their mind-set and ask themselves do I really need the machine we have previously used – such as the 12 metre telehandler - when a four metre machine may suffice? Commercial nurseries have traditionally used three tonne capacity machines yet a sub-compact will usually handle all the normal duties, being able to get much closer to the pick up or drop off point. One specific nursery problem has been the unloading and moving of established large potted-trees. JCB has now developed an attachment that solves this problem.

When launched JCB thought the 515-40 would have a more construction bias but sales are apparently running about equal between agriculture and construction. As well as the standard forks and bucket the most popular attachments are the muck forks and grabs.

Spanish sub-compacts

Other companies which have introduced sub-compact telehandlers over the past year or two include Spanish-based RT fork truck producer Ausa, with its Taurulift T133H and T144H. The smaller T133H - available with two or four wheel drive - looks more like a skid steer loader, having a single, non extendible arm giving just 400mm of reach. The unit is even shorter than a skid steer loader but with similar lift and capacity. At two tonnes the unit is very light and is powered by a 22hp engine giving a decent 20km per hour travel speed. However with a hydraulic flow of just 20 litres per minute it can only power the less flow-hungry attachments.

The slightly larger T144H has a lift height more inline with other sub-compacts at 3.99 metres but lift capacity is just 1,350kg, however turning circle is good at 2,930mm. A canopy, semi or fully enclosed cab is also available.

Merlo - probably the most innovative telehandler manufacturer on the planet - has its own version of an ultra compact telehandler - but is more compact sized than sub compact. Although the P25.6 is the smallest in the Merlo range comparing its performance against the other 'sub-compact' machines it has class-leading maximum lift height, reach and travel speed. However it is physically larger than the smallest machines and is out powered by the skid steer loaders. However it does have the biggest cab at 995mm wide, compared to the JCB 515-40 at 870mm.

So which is best - the skid steer loader or sub-compact telehandler? The answer to that depends on the specific task. Unless you have a regular job in a very confined space, or need an attachment that requires high flow rates then the sub compact telehandler will probably be the best machine for the task. It has good capacity, lift height and reach as well as having a nicer cab and is easier to operate.

But where can you hire one?

As with all equipment, most rental companies only start reacting to new machines when customers start specifically asking for them - sometimes killing off good new products. Is this what happened to the Twisco? Achievable rental rates for the sub-compacts (like all micro machines) are very good when compared with their larger brethren, providing a better return on investment. UK based Fork Rent - one of Europe's leading telehandler rental companies – is now taking the JCB 515-40 in good numbers, while one of the first companies to take delivery of them - Rocket Rentals - also reports good utilisation. Manitou's Twisco and Buggiscopic have been around for years so it ought to be possible to hire one, but you may have to dig around a bit to find them.

The agriculture market was the main driver in the growth of the compact two metre by two metre telehandlers, however their adoption by contractors that previously dismissed telehandlers under 10 to 12 metres has been astonishing and they are becoming an increasingly popular unit within an increasing number of rental fleets. Is this down to more cost conscious users or the increase in sites with limited space?

Whatever the reason, the compact and sub-compact telehandlers are now firmly established product sectors that are growing in popularity.

Manitou MT625

The Ausa T133H is available with two or four wheel drive and looks more like a skid steer loader, having a single, non extendible arm giving just 400mm of reach

The Kramer Allrad compact

Genie GTH2506

How skid steers and compact telehandlers compare?

	JCB 515-40	JCB 520-40	JCB Teletruk TLT35D 4x4	Skid 225	Skid 330	Manitou Twisco SLT420B	Manitou Twisco SLT4215	Buggi scopic BT420	Buggi scopic BT425	Ausa T133	Ausa T133 4x4	Merlo P25.6
Width mm	1560	1560	1400	1820	1980	1662	1662	1436	1436	1347	1410	1800
Height mm	1800	1970	2200*	2090	2110	1900	1900	1980	1980	1924	1942	1920
Length to end of carriage	3230	3380	3200	2710	2760	3090	3008	3550	3381	2591	2591	3900
Max capacity kg	1500	2000	3500	1021	1495	2000	1500	2000	2500	1300	1300	2500
Max lift height mm	4000	4000	4350	3020	3050	4020	3980	3900	3900	2700	2700	5900
Max reach m	2.54	2.59	2.40	0.96	1.04	2.26	2.14	2.70	2.70	0.411	0.39	3.30
Turning circle mm	2800	3050	3500	2200	2200	2904	2831	3350	3350	2919	2982	3370
Weight kg	3480	4400	5500	3496	3959	3085	2520	4475	4435	2000	2200	4500
Power hp	50	50	62	85	92	50	50	51	51	22	22	75
Pump flow standard l/min	48	60	70	87	87	40	40	50	50	20	20	80
Pump high flow l/min	N/A	N/A	N/A	N/A	N/A	100	100	N/A	N/A	N/A	N/A	N/A
Ground clearance	240	270	175	238	248	258	258	235	235	363	370	270
Speed kph	20	20	18	20	22	12	13.5	20	20	20	20	36

**Low model*

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Telehandler sales on the upturn

The growth of the compact and sub-compact telehandler as seen in the previous article has bucked the trend of the larger machines where demand from rental companies has been slow over the past few years, thanks to the sluggish building market in both Europe and the USA. In the meantime sales of agricultural models have performed reasonably well as crop and food prices have escalated. However there appears to be light at the end of the tunnel now as rates and utilisation pick up and rental companies start to replace and expand again. Meanwhile manufacturers with strong agricultural distribution, such as Merlo and Manitou, have continued to do relatively well in comparison to those that are dependent on the construction rental market.

Ivor Binns, chief executive of Manitou UK speaking to Cranes & Access said: "All through the 'credit crunch' the demand for telehandlers in the agricultural sector has resisted the downward trend experienced in construction and industry. However, there are encouraging signs from the rental market now with a steady increase in demand for new telehandlers. This demand has been created by the large depletion of equipment from rental fleets as companies downsized their fleets and took advantage of beneficial currency rates to export them into the Euro zone and beyond."

Manitou claims that its high residual values and global brand awareness makes it easier for those who own its machines to convert excess

machinery into 'cash in the bank' which can be critical for the cash flow and sometimes the very existence of the rental companies.

"A perfect illustration of this re-investment strategy is the recent orders we have received from significant players in the rental market including Charles Wilson Engineers and Chippindale Plant," says Binns. "Most rental companies are currently running at 90 percent utilisation and the need to order new machinery is gathering pace. At the same time housebuilders are adapting to a challenging economic situation by using a variety of cost management programmes. The increase in demand for the mid range telehandlers - from seven to 10 metres - reflects this trend as customers demand value for money and return on investment for procuring the right machine for the job in hand."

Equipment flexibility is also a key advantage and for the larger scale commercial and public works projects the 360 degree telehandler - with its selection of attachments, including substantial work platforms - continues to have an appeal where the customer want a genuine 'three in one' machine for handling, lifting and access work. This is reflected in the fact that sales of 360 degree telehandlers held up well during the recession, as more buyers discovered its benefits or looked towards niche products to replace the standard fixed frame models that form the backbone of many rental fleets.

Legislation is also playing a significant role in the design of European telehandlers. European Standard EN15000:2008 calls for the introduction of a more sophisticated load moment limiter on all machines produced since September 2010. A key change is the requirement that all such safety devices now lock out the machine controls when a load reaches the outer limit of its operating envelope - previous designs provided a warning which then relied on the operator going no further. The new systems should prevent machines from tipping forward however, it does nothing to prevent the telehandler tipping sideways - a common accident when carrying a suspended load - or from tipping over backwards when operating with no load and short boom on a slope. Looking at the accidents reported on Vertikal.net very few are due to telescoping a heavy load out too far - the fixed frame telehandler is very forgiving in that direction unless it occurs at height.

On top of the world...

When Swiss rental company Airnace was asked to supply a lifting machine to help build the head station for a new cable car installation at La Videmanette, Rougemont, Switzerland at an altitude of 2,151 metres it faced several major challenges, including gaining access to the work site and working within the confined area.

After considering the challenges the company selected its Giraf Track telehandler for the job. In order to reach the site, the Giraf Track had to be driven 10km up very steep - sometimes more than 45° - narrow, winding gravel surfaced mountain tracks. All other materials and personnel were brought to site by helicopter..

The Giraf Track's compact dimensions allowed it to move in very close to the lift.

The Giraf Track travelled 10km up exceptionally steep mountain tracks to reach the job site.

Using its interchangeable attachments the Giraf first helped anchor rock walls using steel netting. The fact that it could work without outriggers and yet offer 360 degree slew was a major benefit in the restricted space available. It also allowed the machine move in close to heavy loads, which would otherwise have required a much larger and more expensive crane.

In this specific case, there was no room for a tower crane and even if a telescopic crane could have reached the site it would have needed far more space than was available and would have been less versatile.

Based on a Caterpillar excavator undercarriage the telehandler makes clever use of its weight distribution and a low centre of gravity to achieve a high level of stability without outriggers. This together with its specifically designed boom, allows it to travel with loads of up to 5,000kg.

The original plan called for the replacement of the cable car installation in 2016. However following an incident in January 2010 it was decided to bring this forward, rather than spend a substantial amount repairing the old system. The new cable car is capable of transporting 900 people an hour, more than doubling the previous capacity.

A wide range of attachments from regular forks to work platforms, jibs and this handy three section telescopic top boom/luffing jib are available.