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Development for the better?

Without doubt the largest sector within the self-propelled powered access market is that of battery electric scissors and it is easy to see why. Designed for use on smooth solid floors - mostly indoors - the lifts are compact, inexpensive, clean, quiet and relatively cheap to run.

Dating back to the start of the powered access revolution in the early 1970's the 'bread and butter' slab scissor lift market has looked like a mature sector for the past few years, with models introduced 25 years ago looking pretty much the same as most of those on the market today.

In recent years major developments have been extremely rare, although regular 'updates' have actually changed most products substantially, at least under the skin. The basic structure has

remained largely the same with few companies seeing much opportunity to improve on the status quo.

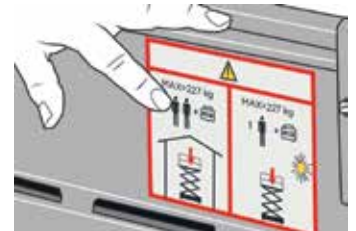
There are some who argue that many of the changes made have been detrimental, with machines becoming larger, heavier and more complicated. There is something to this as most 19ft 'elevator' scissor lifts, for example, will no longer fit into smaller elevators, having become longer and heavier. Some models now weigh more than 1,500kg, whereas most units back in 1994 were no more than 980kg! Changing standards and regulations have had a significant impact on the design and weight. The latest updated ANSI standards - aimed to bring North American platforms closer to European machines - will affect indoor/outdoor ratings,



stability calculations, entrance gates, guardrail heights and operation when off level, although this last point was already a feature of most scissor lifts. Many of these factors have an impact on the size and weight of the scissor lift.

The guardrail height change from around a metre to 1.1 metre will also mean that North American users will have to get used to the fact that some small scissor lifts will no longer pass through a standard doorway without folding the guardrails down. Chain type platform closures must also be replaced by gates or drop bars with toe boards, while taking wind loading into consideration will also have an impact. A current ANSI scissor lift may have a two person capacity with a 12.5 metres a second wind rating. Under the new A92.20 standard, it may be reduced to two people and zero wind - indoor use - with one person capacity possible for outdoor use? Narrow outdoor rated scissors are likely to weigh more which also affects loading and transport

and well as floor loadings and the ability to ride elevators.



Many slab scissor lifts will now have a different rating when working outside.

More choice

While major technical breakthroughs might have been thin on the ground since the mid 1990s, a buyer today has far more choice and features such as smooth operation, reliability and battery life are considered a given. Surprisingly purchase prices are not that much higher than they were back then, a result of more competition among component suppliers and higher volumes justifying the investment in more efficient production process and automation. An increasing number of machines are also now made in China, both by local producers and western companies such as Haulotte, JLG and Genie.

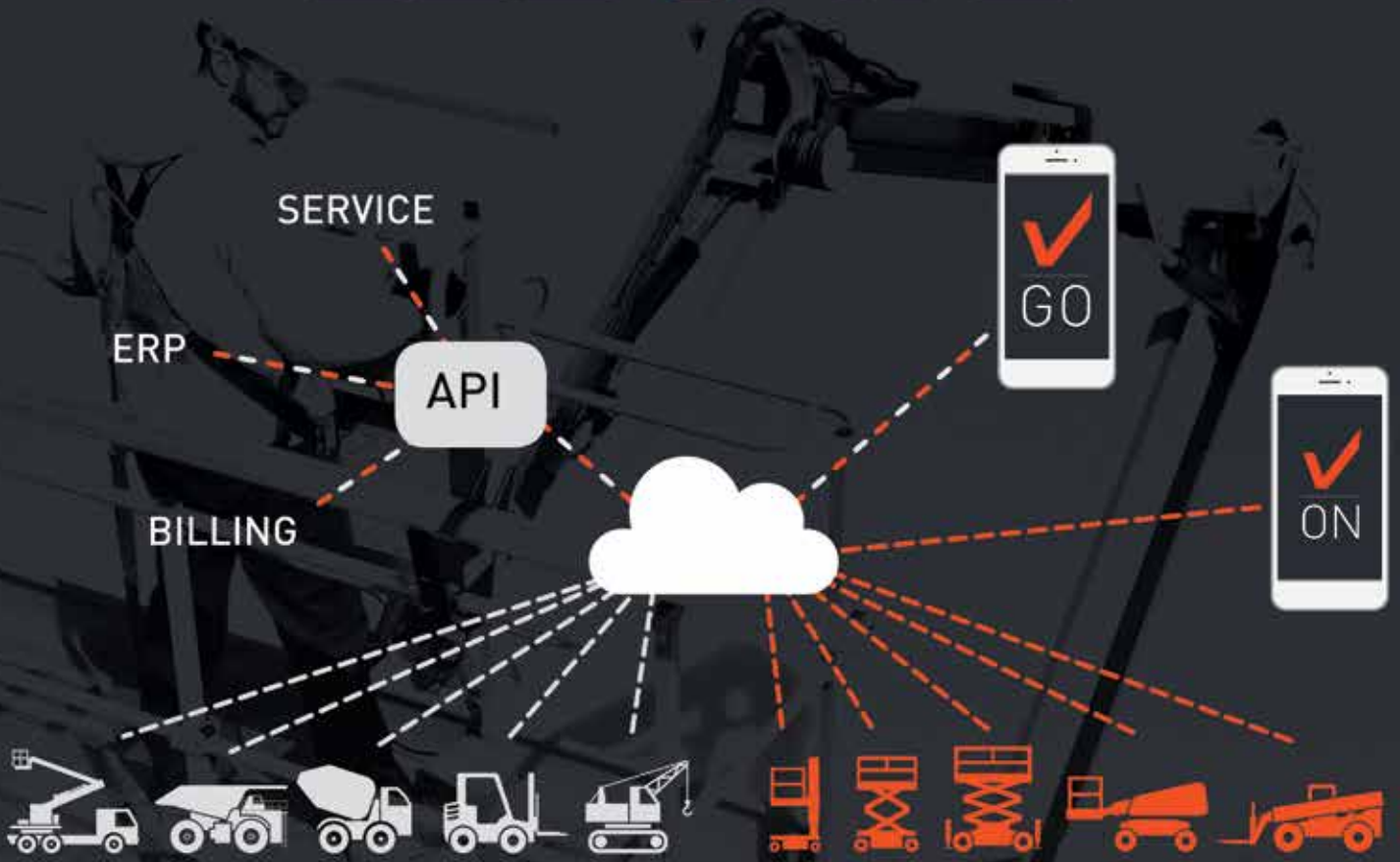


An Upright slab scissor lift from 1994



Slab scissor lifts have become heavier and longer

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Many small scissor lifts are now made in China.

However, in many markets the downside is that rental rates are lower now than they were back then! Low rates should result in more widespread use and greater market penetration, longer-term rental agreements and contractors renting more machines to carry out the same amount of work as each skilled tradesman gets a dedicated machine. That's the theory.

Product development

The impression that product development has been either detrimental - heavier, bigger or more complex - or non-existent does not bear closer scrutiny when you look at the improvements made in the past few years. Direct electric drive - in some cases with the latest highly efficient low maintenance AC motors - smooth power-saving motor control systems, onboard diagnostics with remote connectivity, smoother more efficient joystick controllers and greater platform heights within the same footprint have all improved the performance of the machines. And in the past few months we

have seen the rapid development of secondary guarding and overhead warning systems, along with the launch of new lighter weight 15 or 19ft scissor lifts. In the following pages we look at some of these developments and the latest new products.

Battery life

In the early days of electric powered scissor lifts, battery life, or the lack of it, was the bane of rental companies. Very few machines would manage to keep going for an eight hour shift unless they were used relatively lightly. Any applications that involved significant travel would barely make it to lunch time. Some manufacturers developed easy change battery packs but that never caught on, while others installed line-contactors which allowed machines to be used while plugged in, recharging the batteries when the lift or drive function was not in use.

Today battery life is not an issue for many reasons. One surprisingly significant change simply occurred with tooling improvements and closer tolerances of hydraulic pumps and motors. In at least one example a manufacturer suddenly started receiving complaints that its small scissor lifts were driving dangerously fast, especially when elevated! The investigation focused on the controls and settings and the installation of the correct components, and it was only when compulsory third party inspections in Europe began rejected machines that the issue was taken more seriously. It transpired that the pump manufacturer had installed new tooling resulting in its pumps operating dramatically more efficiently and performing as the specification sheets claimed. The solution was the installation of a smaller pump or reducing its drive speed.

It was the move to motor controls



Motor control systems made scissor lifts smooth, quieter and much more efficient



Problems with wheels and covers on early JLG ES models overshadowed the direct electric drive breakthrough

however, which had the biggest impact. With motor control systems the joystick controls the speed of the electric motor, only drawing the power needed for the function and speed selected, rather than operating the pump at full speed, with the controller splitting the oil flow between that needed to operate the function, while dumping the rest back to tank. In addition to longer battery life, machines became much smoother and quieter too. Batteries have also improved as manufacturers such as Trojan, US Batteries and Crown competed for leadership of the now significant access market, fine tuning their designs to cope better with the application, also helped along by a move towards electric golf carts. These changes combined to solve the battery life issue... unless the application involved a fair bit of travel, such as within a large industrial facility or airport etc.

Direct electric drive

JLG was one of the first manufacturers to launch a small scissor lift with direct electric drive when it unveiled its ES series in 2002. The challenge of installing electric wheel drive motors was a problem on narrow slab electric scissors in that the almost 90 degree front axle steering obliged them to be front wheel drive, but electric motors with brakes were simply too long to fit two of them on a 780mm wide scissor chassis.

However, JLG worked with component suppliers to develop a motor and brake that was compact and robust enough for the application. While the new models - the 1932ES, 2632ES and 2646ES etc - offered a massive improvement in battery life, they

were not an immediate success. To start with they were quite a bit more expensive, while several other features, including aluminium platforms, easily damaged thin rimmed wheels and unusual fibreglass side covers that tilted rather than opening fully, combined to put many buyers off. Those who tried them quickly found that they were racking up high costs and downtime, replacing damaged side covers and wheels.

While JLG stepped up to the problem relatively quickly switching the covers to pressed steel and adding more robust wheels. The negativity at launch overshadowed the major advantages that their direct electric drive offered, especially for long shift or long drive applications. Some of the smarter rental companies not only added them to their fleets but ran them alongside regular hydraulic drive models, helping achieve decent rental rate premiums as end users became converts. Better still the slow take up, meant that customers were tied into the few rental companies that ran them at



JLG 1930ES front axle electric drive.

the time, keeping the rates for these machines strong.

Partly as a result of this major competitors largely ignored the direct drive development and carried on with traditional hydraulic drive. Iteco was the first to follow JLG, when it introduced its 24ft IT7380 - shown as a prototype at SAIE in October 2004. Since then several new entrants have added direct electric drive such as Dingli, while more recently new start-up GMG made it a key feature on its all new

models. Surprisingly the other new entrant JCB launched its new model range without the feature. More recently both Genie and JLG have added direct electric wheel drive to their four wheel drive hybrid boom lifts, perhaps signalling that this form of drive will soon become the norm?

Lithium power

The question of battery life recently raised its head with the arrival of a new Dutch rental company, Hoogwerkt, which is aiming to be a market 'disrupter' and has ordered



JCB now offers a lithium battery pack option



The Iteco IT7380 was the first to follow JLG with direct electric drive.

all of its new platforms with lithium ion battery packs. It chose JCB as its slab scissor lift supplier, which having struggled to get a foothold in the access market, was probably more than happy to install lithium batteries for a 420 unit order. However, its scissor lifts have traditional hydraulic wheel drive motors, so while the lithium battery pack may well offer a longer life between recharges, it is entirely likely a machine with direct electric drive and regular lead acid batteries will outperform them? Now if you were to add the lithium battery pack to a direct electric drive... you might have something really spectacular.

But to put it into perspective one comment on the Vertikal.net website said: "Conventional lead acid

technology is already sufficient for the application and easy to recycle, no need for a 'green' alternative and using this for marketing as a USP is withholding all the facts." It also highlights the fact that battery life is no longer an issue with scissor lifts.

Slimmed down scissiors

At this years' Rental Show in New Orleans three companies introduced new models that offered substantially reduced ground bearing pressures, aiming to build a 15ft or 19ft scissor lift that weighs less than 1,000kg.

Snorkel showed a prototype of a 15ft full length scissor lift, the S3215L which weighs just 952kg and boasts floor loadings as low as 774kg per square metre with one person, or 948kg with a maximum 304kg in the platform. The machine



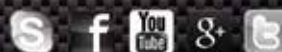
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The Snorkel 3215L

specification causing most customers to go for the larger of the two machines. GMG's all-new 1530-ED is a full specification model and includes direct electric drive, but is shorter - with an overall length of 1.69 metres - than most 15 or 19ft models. It also features a roll-out deck extension that provides an extended platform of 1.8 metres compared to the 1.9 metres of the new lightweight Snorkel. The other benefit is that it weighs just 860kg. It does have the disadvantage of being just over two metres high when stowed, but as with most of these machines the guardrails can be lowered to pass through a doorway. The Snorkel in comparison has an overall stowed height of 1.9 metres, benefiting from its longer, lower scissor stack.

looks like something from a racing shop, with fabrications made lighter through cutaways and perforations, while the platform is longer than the chassis, in effect providing an extending deck length without the ability to retract it. The downside is that the unit is 2.1 metres long when stowed with the access steps in place, while Snorkel's regular model, the S3215E, is just 1.78 metres long, but weighs 1,238kg. GMG had a similar aim but took a different approach to solving the issue. Like Snorkel it concluded that many 19ft scissor lifts rarely get used above 15ft and that there is a market for a lighter weight 15ft model. Most 15ft scissor lifts are simply 19ft models with one set of scissor arms removed, as a result they carry a very similar price and

19. It weighs 1,220kg - which is excellent for a 19ft unit with 1,350 to 1,700kg being more typical - although suggestions were made that it can be reduced to less than a tonne, perhaps without platform extension and steps? It also has an overall stowed height of two metres, so it might just squeak through a door without lowering the guardrails. It features direct electric drive, an



MEC Micro 19



GMG 1530-ED

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overall length of just 1.5 metres with steps in place making it ideal for riding many small elevators, as long as they have the lift capacity and boasts a surprisingly long two metre extended platform length.

It is easy to overlook the fact that if these light weight compact 15ft machines will do most of the work of 19ft scissor lifts, what about a 14ft scissor? Custom Equipment has long led the low floor loading/ground bearing pressure market - particularly in North America - with its Hy-Brid models. Putting the other recent entrants into perspective, Custom's highest self-propelled model the 14ft HB-1430 weighs just 746kg and yet has a 304kg platform capacity and 760mm deck extension for a 2.3 metre extended platform.



Custom Hy-Brid HB 1430

Other alternatives are the 16 or 20ft mast type lifts offered by Skyjack, Snorkel, and Haulotte. The 16ft Skyjack TM16E for example has an overall length of just 1.3 metres, weighs 966kg and features an extending or rather traversing deck. The 20ft Haulotte Star 8S weighs 1,170kg but is only 1.4 metres long. At a push it has a separate counterweight that could be removed to allow it to ride a 1,000kg elevator. The Snorkel 16E is also due to start shipping this year and has similar specifications to the Skyjack. And finally, of course there are several self-propelled one person lifts that reach these heights and more, but these will be covered in the industrial access feature in the next issue.

New JLG R series CE

Another new slab scissor lift is the European version of JLG's new R series. R - for Rental - first appeared at the 2016 Rental Show in the form of prototype ANSI spec 19ft



Skyjack SJ16



Snorkel TM16E



Haulotte Star 8S

ES models. While rental companies say that they want lower cost, simpler machines, few end users are prepared to accept a lower specification, such as passive pothole protection which reduces ground clearance etc. When we pressed JLG at the launch, it said that the RS models would be around 10 percent cheaper, barely much more than a month's rental revenue at the time, and sure enough the price gap has proved insufficient, especially when it is possible to buy other brands with active pothole protection and other features at a similar or even lower price.

In comparison the R model could be a winner, with active pothole protection, thicker rubber tyres, all-steel chequer plate platform and heavy steel covers. Its specification puts it into closer contention with the likes of Skyjack, Genie and Haulotte than the RS range and consists of three models - the 15ft 1532R, the 19ft 1932R and the 39ft 40445R.

The latest model, the 1532R weighs in at 1,357kg, so a tad heavy compared to the slimmed down models seen at the Rental



JLG 1532R

show this year. However, it does boast a 2.45 metre long extended deck, an overall stowed length of 1.74 metres, plus both indoor and outdoor ratings - albeit a one person lift when outside.

Overhead obstacle warning and protection

Secondary guarding systems for scissor lifts were first mooted in 2015, when UK rental company Kimberly announced its 'Skysecure' system with a switch activated wrist rest. This was taken a step further a year later when Lavendon company BlueSky showed its SkySiren PCS (Pre-Crush Sensing) for scissor lifts which used ultrasonic technology and a traffic light warning system coupled with a pressure sensor device to provide a double protection to warn the operator of overhead obstacles and protect against entrapment.

How the new 15/19ft scissors compare

Make	GMG	JLG	MEC	Snorkel
Model	1530-ED	1532R	Micro 19	S3215L
Work height	6.5m	6.57m	7.6m	6.6m
Platform capacity	240kg	275kg	226kg	304kg
Roll out extension	520mm	860mm	600mm	No
Extend platform size	1.8m x 760mm	2.45m x 650mm	2.0m	1.9m x 680mm
o/a Width	760mm	810mm	810mm	810mm
o/a Length	1.69m	1.74m	1.50m	2.1m
o/a Length w/o steps	1.49m	1.67m	1.40m	2.0m
Stowed height	2.03m	2.07m	2.0m	1.91m
-with G-Rails lowered	1.59m	1.61m	1.0m	910mm
GVW	860kg	1,357kg	1,220kg	952kg
Drive system	Direct electric	Hydraulic	Direct electric	Hydraulic
Gradeability	30%	25%	25%	25%

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scissor lifts



Several new products were unveiled at the Rental show in February and at Vertikal Days last month. The following examples have been announced but most are still in the prototype and test stage and likely to be initially available as optional equipment.

JLG

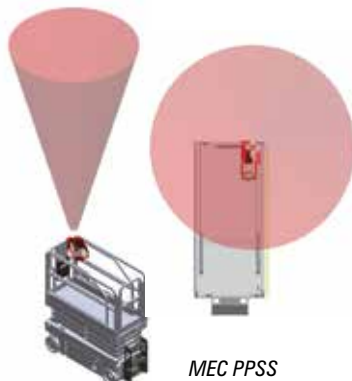
JLG previewed its new 'No Touch-EDS' proximity technology at Conexpo last year, initially aimed at the airline market to detect platform proximity to an aircraft fuselage before actually touching it. The beam emitter/receivers were mounted on the platform toe boards and can either point upwards, when working below, to detect overhead obstacles or downwards when working from above. The system has evolved into the Enhanced Detection System or EDS for short. The new sensor technology will be phased in across the JLG boom and scissor lifts from early 2019.



JLG Enhanced Detection System

MEC

MEC has added a similar system to its scissors that it introduced on its boom lifts last year. Dubbed 'Proactive Platform Safety System' or PPSS, it alerts the operator to the proximity of any overhead obstacles or hazards by emitting an ultrasonic 'cone of safety' around the operator to detect objects up to four metres above the platform floor. The frequency of the beeps increases as the object becomes closer and then cuts out lift and drive functions when a pre-set safe distance is reached. An override button allows the operator to deliberately move closer to the object to carry out the work.



MEC PPSS



GMG overhead warning

GMG

GMG showed a very similar system to that of MEC at the Rental Show, based on radar technology with the beam emitter built into the control box, so that the operator is always protected, as such the system only requires a single transmitter/receiver. The unit on the stand featured a separate box for the device, but production units will be integrated into the control box.

Skyjack

Skyjack also demonstrated a prototype of a similar system to MEC's at the Rental Show - the Skyjack PPA system uses four ultra sound emitters located on the guardrails - one on each corner, in order to protect the entire platform. This latest device adds to the Lift Enabler, that it launched earlier in the year, which uses a 'live' enable button located on the right hand side of the controller that requires two hand operation and helps prevent users from operating the machine while leaning over the guardrails, and therefore being unaware of overhead obstacles. It also helps prevent inadvertent ongoing operation should the operator be pressed against a live controller. The company has also introduced a new, virtually indestructible control box with improved shroud over the joystick, which also helps prevent this happening.



Skyjack PPA emitter

Scissor lift anti-entrapment/overhead obstacle warning systems

Company	Product name	Type
JLG	Enhanced Detection System	Beam
MEC	Proactive Platform Safety System	Ultrasound
GMG	Overhead Warning System	beam
Skyjack	Skyjack PPA/Lift Enabler	Ultrasound /button
Snorkel	Snorkel Guard	Switched shroud
Genie	Lift Guard Contact Alarm	Mechanical



Snorkel Guard secondary guarding system covers the lift control box which when pressed stops the machine rising.

Snorkel

At Vertikal Days Snorkel unveiled an entirely different approach with its 'Snorkel Guard', a simple pressure activated safety frame/shroud around its controller that simply cuts the lift function when depressed.

Genie

Also unveiled at Vertikal Days was a prototype system from Genie dubbed the Genie Lift Guard Contact Alarm. The system employs two or four activation whiskers mounted on the platform guardrails, which stops lift and drive when they come into contact with an overhead obstruction.

The standard configuration for slab electric scissors and vertical mast lifts includes two activation whiskers - one mounted on the front of the platform and one on the rear - although up to six whiskers can be installed. When the system is activated, all machine motions stop automatically, an alarm sounds and beacons flash. The operator will be able to continue driving or elevating the platform into the desired working position after acknowledging the activation of the system and machine stopped condition with an override. The whiskers are of a length that leaves sufficient space between the obstacle and guardrails, to allow occupants to move after the system is activated. Feedback at the show was mixed as you might expect,

but positive overall. The fact that the system can integrate with the machines height limit software was seen as a good additional feature, while others liked the fact that the system made no noise until it is activated.

Others

Finally, a third party system from US based Bailey Cranes and aerials which works along similar lines to the JLG No Touch system was demonstrated at Conexpo last year.

In summary

Given the number of scissor lifts at work every day of the year, the number of serious overhead crushing/entrapment incidents are relatively few. Most of the above systems are rugged and unobtrusive and will certainly make the machines safer. However, the addition of more beeps and alarms will not endear them to many operators. Having said that we think that as with boom lifts, these systems will become standard equipment over the next few years. And thankfully, with this in mind, most of them can be retrofitted to existing machines.



A Genie 'whisker'



Genie with anti collision whiskers.



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