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Full of innovation!

All those who thought that the aerial lift design had matured and that significant innovations were a thing of the past, think again. There is plenty happening with more on the way as we look at some different and innovative approaches to finding working at height solutions with outreach at around the 12 metre mark.

In a similar feature we published last year, a number of new model introductions had resulted in a plethora of small boom lifts in the 10 to 12 metre range with different concepts such as the mast boom, ultra-compact industrial booms, lightweight electric or compact Rough Terrain booms all with a variety of power units.

Over the past two years or so we have seen the Manitou Man'Go 12 Rough Terrain, and the slab AC electric Genie Z33/18 followed up last year by Skyjack's 30ft SJ30 articulating boom - often referred to dustbin booms - as the company re-entered a market it last contested in the late 1990s. This type of industrial articulating lift is preferred by some users over a mast boom primarily for its additional outreach - however the downside is a higher overall weight.

The mast boom, invented as a niche product in the USA moved towards the mainstream market in France when Delta brought the concept up to date and began marketing it as

a mainstream machine under the Toucan branding. In the 25 years or so since then it has steadily grown in popularity, converting users in an increasing number of markets thanks to its compact design, simple operation and light weight with enough outreach to complete most industrial maintenance-type tasks. In this sector the 10 metre working height models are by far the most popular with manufacturers including JLG, Haulotte, Manitou - also badged and sold by Genie - Snorkel, Dingli, Airo and ATN.

Since our last feature on mast booms a year ago, there have been relatively few new developments. However, several of these are at the top end of the market and certainly demonstrate innovative thinking, extending the working envelope without sacrificing too much of the original concept.

Most newsworthy is the launch of the 12 metre working height ATN Piaf 12E last year or a mast boom on steroids as we originally described it. At this year's Rental show in the USA the company



C&A boom lifts

Forever ODM Scissor Boom - a different way to tackle jobs that require outreach at height



Manitou's Man'Go 12 is now finding more takers.

ATN Piaf 12E

ATN's new electric drive mast boom - the Piaf 12E - is the company's biggest yet offering a working height of 11.83 metres and 5.1 metres of outreach at heights of over seven metres. It has zero tailswing allowing it to work safely and easily in tight spaces, while its

Forever ODM showed a different way to tackle jobs that require outreach at height without the cost and weight of a full size boom, with what it calls the 'Scissor Boom'. The 32/15 is a slightly longer scissor lift, with a multi-section cantilever platform, providing up to five metres of outreach from the front of the chassis. Just to ground this comparison we have thrown in Manitou's 12 metre Man'Go which is now finding more and more takers as well as the latest industrial boom from Skyjack.



Launched last year the 12 metre working height ATN Piaf 12E is a mast boom on steroids

30 percent gradeability covers most in plant ramps, while facilitating loading onto transport. The Piaf 12E comes with a full colour LCD diagnostic screen and hour meter to simplify operation, trouble shooting and maintenance. Like the rest of the ATN mast boom range it is sturdily built with long-lasting components and well-designed aesthetically attractive fibreglass covers - very important for machines that work or are stored in retail environments. The 12E is ideal for work in industrial environments, logistics warehouses, airports, distribution stores, aerospace, maintenance and the food industry.

The ATN Piaf 12E has a working height of 11.83 metres and 5.1 metres of outreach



Skyjack launched the 30ft SJ30 articulating boom - often referred to dustbin booms - last year.



The larger Forever 45/22 should be available next year

Forever 32/15

The Forever 32/15 is one of those items of equipment that combines the obvious - a scissor lift with huge extending cantilevered deck - but just doesn't look like it should work. The Seattle-based company is testing the market with two 'scissor boom' models - the 32/15 and 45/22 - and says it has created a third category of aerial work platform lifts outside the traditional scissor and boom lifts. This concept is however nothing new. UpRight had a similar, but larger machine in the 1980s for aircraft maintenance and continued offering smaller cantilever platforms on its slab scissor lifts, such as the XL19 and XL24, until 1994.

The company says the scissor boom 'combines the advantages of both types of lift allowing users to carry out jobs that traditionally need a boom lift, while paying scissor lift prices'. The platform also offers a larger working area, can be stored in narrower indoor spaces when fully retracted and has simple controls with just one joystick for both chassis and platform movements.

The nomenclature is simple to understand - 32ft platform height and 15ft outreach for the smaller and 45ft platform height and 22ft outreach for the larger which should be available next year. The down side of course is that the job requires enough space for the machine to work lengthwise, rather than laterally so it would be no good for working in an aisle, unless the aisle was at least three metres wide.

From an engineering point of view the products should be well sorted. Company founder Don Shi started his career as a mechanical engineer and continued for four years specialised in construction equipment design after obtaining his Master's degree. For the next seven years he worked with Manitowoc Cranes Asia Pacific distributor as sales manager before joining Cummins Engines as global commodity manager in 2001. He then moved to Seattle to join Genie as global supply chain manager. Inspired by the 'crossover' concept between cars and SUVs/4x4s, he felt this idea could also be applied to aerial work platforms, combining the advantages of scissor lifts and boom lifts. Forever ODM was founded in 2015 to research and develop this new category. The company earns its keep as a fabricator, supplying steel fabrications and components such as fabricated counterweights, welded chassis, axles, stamped steel covers and an assortment of pins to the aerial lift and construction equipment industry.

Four alternative lift choices of platforms with around 12 metre working height and substantial outreach.

	ATN P1af 12E	Manitou Man'Go 12	Forever 32/15	Skyjack SJ30 ARJE
Type of boom	Mast boom	Articulated boom	Scissor with cantilever	Dustbin ind. boom
Platform height	9.83m	9.91m	9.75m	9.14
Outreach	5.1m	6.69m	5m	6.25m
Capacity	200kg	230kg	227kg/ 113kg ext	227kg
Up and over	7.3m	5m	9.65m	3.99m
Overall Length	3.66m	5.5m/4.5m folded	2.92	4.09m
Width	1.2m	1.8m	1.12m	1.19m
Stowed height	1.98m	2m/2.49m folded	2.49m top of rails	2.01m
Drive speed	6km/h	5.2 km/h	3.2km/h	4.8km/h
Weight	4,350kg	4,150kg	3,500kg	5,563kg
Power	Electric	Diesel 19.4kW	Electric	Electric
Ground clearance	100mm	320mm	95mm	102mm



Kreitzler makes some unusual equipment including this mast boom/scissor cross

German manufacturer Kreitzler, which tends to make specialised and custom built scissor lifts and booms has built some similar machines in the past, including its mast boom/scissor cross which uses a mast boom chassis with a scissor platform to give a huge working area and outreach of up to four metres. Unfortunately the largest - the KIB 12/075 T - only has a 7.5 metre working height, a capacity of 300kg and weighs 3,900kg so is too small for our comparison and most buyers preferred height. Mast booms with large roll out platforms in place of a jib are not new of course, but have never proved popular and most mast boom companies, have dropped them from their product lines.

How the 12 metre alternatives compare?

It is all too easy to dismiss the Forever concept as a designer's

dream which in reality is totally impractical. But when compared on paper with boom lifts it performs very well - even if the laws of physics mean that it can only have a capacity of 113kg when the platform is fully extended which in the world of higher capacities and heavier people could be a major issue. It does though offer some fantastic up and over reach, especially compared to the industrial narrow aisle booms like the Skyjack SJ30 which are a great deal heavier and expensive.

JCB enters boom sector

Moving up the articulated boom size slightly to new entrant JCB. Earlier in the year the company launched its new Access division with a range of nine slab scissor lifts, and then at Conexpo it unveiled its first articulated boom the 50ft AJ50D, the first and smallest of four diesel articulated booms it plans to launch this year, topped by the 80ft AJ80D.



JCB unveiled its first articulated boom at Conexpo - the 50ft AJ50D - the smallest of four diesel articulated booms

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Features include an automotive-type changeable digital lower control panel display, and a three joystick platform control panel. JCB claims that the new boom was designed in-house and it is made in China at the plant of a third party aerial lift manufacturer. The unit has four wheel drive, two wheel steer and power is supplied by a Tier 4 Final JCB Kohler diesel. Gradeability is 40 percent and platform capacity 227kg. Detail on the rest of the specification was noticeably absent, but the machine itself looked very well finished and technically up to date. A 13.7 metre electric model, the AJ45E, will be unveiled later this year, and the boom range which will eventually include telescopic all the way up to 135ft. They will initially be marketed in North America, the UK, France and Germany with the AJ50D available by the end of this year.

All terrain booms?

Last year Teupen launched perhaps the most interesting and radical piece of access equipment seen in recent years with the introduction of its 135ft Puma 42GTX - a combination of the extreme Menzi Muck walking excavator chassis, coupled with a Teupen aerial lift boom structure. The concept has proven to be popular - for a niche machine - providing a go-anywhere platform which offers extreme gradeability on almost any type of site conditions and terrain. Even on slope angles of up to 17 degrees the lift can find a safe working position to reach up to its 42.7 metre maximum working height, with a maximum platform capacity of 400kg. A combination of low weight at 17.6 tonnes, 16.7 metre outreach - with a reduced 300kg platform

capacity - will make this machine a popular product for certain specialist applications.

The Puma is a product of an obvious requirement - the need to work at height in remote or hard to reach places with the ability to travel over exceptionally rough terrain. The product has proved that the concept can and does work, the next stage is for the other aerial lift manufacturers to pick up the idea and run with it, perhaps creating an alternative that might appeal to the more mainstream market and on lower working heights.

The first of the major manufacturers to do so is JLG which showed a new Concept dynamic auto levelling boom at Conexpo last month. The platform uses a 460SJ boom superstructure mated to a new self-levelling chassis with oscillating axles capable of levelling up to 10 degrees side to side or end to end while travelling.

While the chassis layout is totally different to the 'walking individual leg per wheel of Teupen's Puma' the JLG with its traditional front and rear axles still allows the machine to cross very uneven terrain while remaining level with all four wheels in contact with the ground, as it constantly adjusts each wheel independently.



A model showing the capabilities of the new JLG Concept boom chassis



JLG showed a new Concept dynamic auto levelling boom at Conexpo last month



Last year Teupen launched perhaps the most interesting and radical piece of access equipment seen in recent years with the introduction of its 135ft Puma 42GTX

The self-levelling ability will also allow machines to travel smoothly over undulating ground with the boom elevated, for greater productivity. The chassis can also be lowered in order to reduce overall height for transport or to pass under low overhead obstructions. This comes at a time when new standards in the USA, Canada, Australia and Europe will require boom lifts to lock out when the slopes they are working on exceed the safe limit. With most booms stating that they are required to be on 'firm level ground' this will be a real challenge on most construction sites in the real world.

The extreme levelling concept will also appeal to a number of specialist applications in the utility, power and tree care sectors to name just three. In fact the success of the Almac dynamic levelling tracked scissor lift has surprised many, in that hundreds of companies around the world have been prepared to pay a

substantial premium for a scissor lift that can level on slopes without the need for jacks. And this on models with limited working heights - so expect this to be an increasingly popular feature on booms lifts of the future.

Go anywhere mast boom?

While talking go-anywhere lifts, last summer ATN launched a new 10 metre mast boom - the Piaf 1010 on rubber non-marking tracks - a bigger version of the Piaf 810. ATN began its manufacturing life in 2000 with tracked mast booms for the rental sector, only adding wheeled versions later on which now make up the majority of its range. It remains the only mast boom manufacturer producing a tracked machine.

But why a tracked mast boom when mast booms are generally used in industrial maintenance, finishing work on new builds or retail? The company says that tracked models are becoming increasingly popular

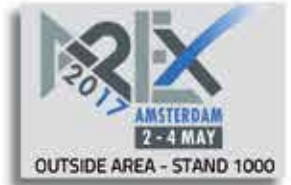


The JLG chassis can level up to 10 degrees

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ATN's new 10 metre mast boom - the Piaf 1010 on rubber non-marking tracks



- hence the launch of the Piaf 1010 - for applications such as work in large greenhouses in both France and the Netherlands, where soft ground is an issue. Tracked lifts are also very popular in Japan. They also provide lower ground pressures which can be a benefit on delicate hard floor surfaces.



The ATN Piaf 1010 is equally at home working indoors

The electric drive Piaf 1010 lift can also operate on grass, mud, gravel etc particularly with its low ground pressures. It boasts a zero turning radius thanks to counter rotating tracks and gets its power from a 24 volt 560 Ah battery pack, with centralised top up system and 85 amp battery charger and 80 percent discharge cut-off. The unit has two drive speeds, a tilt indicator with alarm, overload sensor with built-in system to prevent tipping. Options include an airline and AC power to the platform and automatic power cut-off if on a slope greater than its maximum of three degrees. With compact dimensions and weighing just 2,780kg, the machine is also relatively easy to transport.

New developments in secondary guarding

Safety is of course paramount whenever working at height and just as important on small articulated booms as with the largest telescopic booms. One of the most significant developments of recent years has been secondary guarding systems for boom lifts, and we are now seeing second and third generation systems come into play as the devices become standard equipment worldwide.



SkySiren PCS initially developed the idea of ultrasonics to warn the operator of potential hazards.

The most recent trend is a move to ultrasound or photoelectric systems. The idea was initially developed by two smaller UK rental companies in 2012, with Lavendon group company BlueSky unveiling its SkySiren PCS (Pre Crushing Sensor) system about 18 months ago. PCS uses three sensing units - one located near the control panel and two at the rear of the platform - which incorporate eight individual ultrasonic sensors to scan the area to detect and warn the operator of potential hazards. The system used a light on the control panel sensor box to alert the operator of the status of the system - red, amber and green etc - with the operator resetting via dead-man foot pedal.



The two sensors on MEC's new PPSS system

Simple obstacle detection

More recently manufacturers have begun to introduce simpler alternatives, with MEC showing its Proactive Protection Safety System (PPSS) at the Rental show, while JLG introduced its No Touch Enhanced Detection System (EDS) proximity device at Conexpo and a simple single beam SkyGuard version for secondary guarding applications.

MEC PPSS

MEC's PPSS uses two simple sensors mounted to the top of the platform's rear handrail, each of which emits a vertical expanding cone shaped beam to a height of around 1.5 metres creating a virtual curtain behind and above the operator. Once the beams detect an object the operator is alerted with an audible beeping alarm which gets quicker as the platform moves closer to the obstacle - just like a reversing system on a car.

It then cuts the platform speed and finally cuts all movement. A finger override button on the control panel allows the operator to deliberately inch closer to the obstacle and the work position. He can also lower the boom out of harms way. Development work by MEC continues, mostly field testing and optimisation of the rail mounted sensors. Overall it looks to be a simple, effective system that avoids using the operator becoming part of the system.

JLG 'No Touch EDS' and SkyGuard

No Touch EDS is a development of JLG's existing Soft Touch System which uses two dual beam infra-red sensors to stop the platform before it makes contact with an object or structure. It senses if an object or structure is nearby, first slowing then stopping the machine before it makes contact. A visual and audible warning alerts the operator as the platform approaches. The system then stops the machine, while the operator can override the system to inch closer to the work at hand. The system is easily reset from the platform.

The more basic version creates an alternative to the company's



JLG's SkyGuard is now standard on all booms worldwide



Secondary guarding systems for boom lifts is one of the most significant developments in recent years



ITI Virtual Reality in use

SkyGuard which is now standard on all booms worldwide. It simply runs a single beam over the top of the control panel. If the operator slumps over the controls he breaks the beam and the machine stops and reverses the last function. Once the beam is unbroken and the foot pedal cycled, the machine is reset.

User comments at the show were relatively positive, apart from the fact that the beam is invisible. JLG says that it has more testing to do in order to optimise the location for the sender and reflector. It is then likely to offer the system as an option to the standard SkyGuard system.

A new cable system from Genie

Genie has also announced a new secondary guarding system for boom lifts that will be available as standard equipment or for a quick and easy retrofit. The new 'Lift Guard' Contact Alarm system features an activation cable connected to one side of the control panel protection rails and running above the front edge of the control box to a heavy duty magnet on the other side. When working normally the operator places his hands/arms under the cable and operates the machine. However if pressure is applied to the cable the magnet will pull out of its socket, immediately stopping all functions, activating an audible alarm and a flashing beacon to notify those in the proximity that an incident



Genie's new 'Lift Guard' Contact Alarm system features an activation cable connected to one side of the control panel with heavy duty magnet.

may have occurred and that the operator may require assistance. In most cases the operator will simply pop the magnet back in place, recycle the foot pedal and move away from any danger. There is no need to restart the engine or cycle the emergency stop button to resume normal functionality. During an emergency the machine can be operated from the ground if necessary.

The Lift Guard Contact Alarm system is available as standard from the factory or as an aftermarket kit which Genie claims can be installed in less than 30 minutes with just a few fasteners and electrical harness connectors. It fits Genie Z and S-boom platforms and can be retrofitted on units going back as far as 2003. It is not yet available on the Z-33/18, mast booms or trailer mounted lifts.

Virtual reality training platform

Of course a platform is generally only as safe as its operator - so the better trained and skilled the safer they should be. US-based ITI VR is a Virtual Reality simulator training company with a specific boom lift programme, designed for use with new operator training or re-certification, while also enabling the learner to experience situations that would not be practical or safe to demonstrate in the real world. One of the unusual features of this system is the platform with simulated motion which allows the operator to experience the actual feeling of being in an elevated platform.

It can be fitted out with replicated control panels from various machines for accurate muscle memory development.

The hardware features a full immersion VR Oculus Rift CV1 headset, and the small footprint platform simulator, which accurately recreates the layout and feel of the real platform. The universal motion base with its four high speed electric actuators precisely recreates the feel and sensations of the real machine. The immersion is so complete that the fact that you cannot see your hands on the controls creates a very strange sensation. The company is working on adding electronic gloves that will overcome this issue. More on this amazing device in an upcoming magazine.



US-based ITI VR Virtual Reality simulator has simulated motion allowing the operator to experience the actual feeling of being in an elevated platform

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