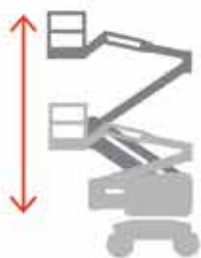


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It's a booming market



C&A

booms

The boom lift market looks set to change rapidly over the next few years with new developments led by electrification - the equipment market's hottest development - highlighted at Bauma last month. Battery electric and hybrid booms have been around for many years, but it has been a niche market for all but the smallest models. The big change is the rapid move of the large, full range producers into all-electric or hybrid Rough Terrain booms due entirely to the tremendous growth of customer demand. This is partly due to the availability of new componentry such as sealed wheel motors and lithium battery packs.

Another development is the demand for higher platform capacities, driven by users wanting to take more material and people to the job, but also spurred on by an increase in the average weight of users, especially with the PPE equipment they are now required to use. Also the new ANSI rules in the USA which require overload cut-out devices preventing any previous overloading. And alongside this is a growing variety of manufacturer designed attachments for handling materials, increasing working height and working outside of the platform.

More manufacturers are also entering the market or expanding their ranges, with the first units also appearing from China. As with other equipment, telematics and other technology is also playing an increasing role. We take a look at some of these developments and new products.

The move towards more electric powered booms has gathered pace in recent years to the point where most manufacturers have been adding new and larger models - often with four wheel drive - while exploring hybrid and lithium power packs in order to give them greater autonomy.

One company that has led the charge towards hybrid booms is UK manufacturer Niftylift which launched its first hybrid machine in 2011 and has been a driving force in the development of low emission booms, giving it substantial market share in the markets such as Germany. In fact its reputation for hybrid machines has overshadowed other innovations that it is known for such as lower weight, more outreach and fully integrated secondary guarding. Last year the company launched its third generation hybrid boom lifts, offering two and four wheel drive models up to 86ft.

Niftylift has also introduced a new 'super efficient' battery electric version of its 62ft HR21, its first product with direct electric drive. The lift has 13 metres outreach, 20.8 metres working height, 150 degree articulating jib with a 1.8 metre wide ToughCage 250kg capacity platform with 160 degrees of platform rotation. As with all Niftylift booms the overall weight is low at 6,640kg. Niftylift also gave customers an advanced glimpse of its first telescopic/straight boom - the HR22 S - around two years ago and is still refining the product prior to starting final production.



Niftylift has introduced a new 'super efficient' battery electric version - the HR21 4x4 - its first product with direct electric drive

Demand for such a machine initially came from Germany where rental companies and end users are ahead of the curve on the adoption of all electric or hybrid equipment.

Battery developments key

For many years the major manufacturers took little notice of the move towards hybrid or all-electric booms given that it was a niche product and not something being asked for in the American home market which has usually tended to drive new developments. However, all that has now changed with electric, hybrid and lithium the new buzz words.

Just a short aside on battery development and lithium ion in particular. For many, lithium batteries represent the ultimate factor in the move away from diesel power. However it should be remembered that battery development is moving rapidly, so fast in fact that we may look back on lithium as the equivalent of the 'mini disc' Walkman which moved portable music forward enormously from the cassette player, but which was totally wiped out by the iPod and now internet downloads.

Existing battery technology

such as AGM has also improved significantly, offering more storage capacity than lead acid along with the maintenance free benefits of lithium ion. When used on machines with direct electric drive, they can now have enough life for two shifts, are a lower cost than lithium and without the concerns of overheating and challenges of recycling.

Another alternative that is just starting to emerge is Lead Crystal batteries, which are said to offer similar performance to lithium - i.e. they can be discharged to zero without stressing the battery, recharge in half the time of



Existing battery technology has improved significantly and alternatives including Lead Crystal batteries are starting to emerge.

traditional batteries, do not leak charge when stored, nor suffer from battery memory issues. They are also said to last up to 18 years, are 99 percent recyclable through traditional channels and are classified as non-hazardous goods for transport. Lead crystal has been designed to provide a realistic alternative to lithium and while it may not be its nemesis it may well provide a more cost-effective alternative.

Major manufacturers now interested

Bauma really brought home how seriously major manufacturers are now taking the move into electric or hybrid powered boom lifts with Genie, JLG and Manitou all launching new electric powered booms at the show.

JLG has quickly moved from true hybrid to full battery electric power since Conexpo in 2016 - a sign of the rapidly changing battery and drive train technology. It unveiled three new mid range articulated boom models - the 34ft 340AJ, 45ft 450AJ and 52ft 520AJ - talking the highest volume sector of the boom lift market. It has taken a different path to Genie, initially choosing two wheel, rear axle drive and two axle steering, allowing the direct electric drive motors to be mounted in the traditional fully enclosed box section rear axle, where the motors and associated wiring are fully protected. A four wheel drive

option is listed, which will though require wheel mounted hub motors on the steering axles in the same way as Genie or Haulotte does on its Z-60E and FE. The lift mechanism and most of the structural part of the lifts are virtually identical to the current diesel powered models. JLG has decided to equip the new models with lithium ion batteries in order to provide more battery life and lower maintenance costs. In fact if you listen to the big manufacturers, lower running costs and maintenance is as much a selling point as zero emissions and low noise.

Barrie Lindsay, UK-based JLG director of engineering said: "As a manufacturer we have improved access to alternative drive systems now that electric drive technology has matured and we are ready to match technology with application. Also, battery development has improved with faster and opportune charging a reality. For JLG it is imperative there should be no reduction in performance, duty cycles or rough terrain ability on these machines."

"The electric 340AJ, 450AJ and 520AJ offer similar performance with their conventional diesel counterparts, and two wheel drive provides good capability on semi rough terrain. Maintenance and parts requirements are reduced, which is a benefit over diesel hydraulic machines, i.e. filter replacements and engine



JLG is working with Dana on the development of the Spicer Electrified e-Axle for future models

maintenance is not required. While these machines perform equally to conventional boom lifts, they produce hardly any noise or emissions, which the market is increasingly demanding for work in urban areas."

Future drive line developments

A good deal of manufacturers' R&D investment is currently going into electric and hybrid drive trains for boom lifts, with major driveline companies collaborating with aerial lift manufacturers - the same applies in the telehandler market. JLG is working with Dana on the development of the Spicer Electrified e-Axle for future models. Displayed on the JLG stand at Bauma the e-Axle combines single electric motor drive with a conventional looking off road axle.

The concept uses Dana's Spicer Smart Suite Intelligent Load Monitoring System (ILMS) and the intelligent steer system, designed to alert the operator of potential tipping situations, while the Spicer intelligent steer system continuously analyses the machine operation adjusting steering angles to help improve manoeuvrability, safety and productivity. Italian component manufacturer Comer also looking to enter this market and says that it is working with a major manufacturer to develop an axle based electric and hybrid drive train.

Manitou Oxygen

In a similar way to Haulotte's launch of its 'Blue Orientation' strategy at Intermat last year with the 60ft Pulseo HA20 LE articulated boom, Manitou introduced its 'Oxygen' label on a range of machines at Bauma, including the 60ft all-

electric 200 ATJ E articulated boom lift.

Manitou is applying the Oxygen label to equipment that features 'alternative energies and sustainable solutions', with three designations



- Oxygen for market ready products, Oxygen Lab for prototypes and solutions going through testing and evaluation, and Oxygen Concept which self explanatory.

Group innovation manager Arnaud Sochas says: "Contractors, rental companies and manufacturers - are faced with an increasing demand for flexible, low carbon solutions, especially on urban sites. It has become essential to focus on zero emissions and low noise levels on extended work areas. With the Oxygen label, we aim to provide a concrete response to these requirements. Our approach obviously includes electric machines, but our primary aim is to provide a proportional solution tailored to each application. These solutions must be cost effective for the user and we are working on reducing the total cost of ownership at the same time as their environmental impact."

Manitou 200 ATJ E

Manitou's new 60ft articulated boom is its first all electric rough terrain



A JLG EC 520AJ electric boom



Manitou's new 60ft 200 ATJ E articulated boom is its first all electric rough terrain boom

boom and is said to offer the same performance as its diesel powered models in terms of speeds and gradeability etc, without the noise or emissions. Manitou has taken a different approach to Genie, Haulotte or JLG maintaining its traditional telehandler type off road axles with drive shafts to a transfer box, with a large AC electric drive motor inputting the power rather than a diesel engine. The benefit is that it uses one larger motor rather than four smaller ones, which is also located inboard where it is fully protected from the mud and abuse of true rough terrain. A second electric motor located in the superstructure drives the hydraulic pump that powers platform movements.

The motors are powered by a 48 volt/460AH battery, capable of working a full one day intensive shift. Manitou says that keeping the relatively low voltage system allows technicians to work on it without special certification. The model is equipped with a new, easy to use control panel, with a screen in the platform that displays a wide range of information including accurate battery levels and a real time graphic display of the working envelope and platform position, including overload warnings. Overall width is slightly less than the diesel model at 2.32 metres, while overall weight is said to be 7,200kg compared to 10 tonnes on the standard model. Manitou says that the ATJ 200 E will have a 20 percent lower total cost of ownership compared to the diesel powered model when the fuel cost is included. The platform should be available early next year with a hybrid version produced later in the year.

Genie hybrid

Genie launched its first electric boom lift the Z30 early on and was an early adopter of Bi-Energy power packs on its 45ft articulated booms, mostly to compete in the European market with companies such as Niftylift. However, there was very little take up in North America. It was also one of the very first companies to add direct electric AC drive when it launched the rear wheel drive Z-40/23N industrial boom lift in 2007. But a four wheel drive, four wheel steer Rough Terrain direct electric drive boom lift had to wait for the right components to be available and then prove capable of handling the abuse of the rental market and rough construction sites.

In early 2016 it unveiled the 60ft Z-60/37 DC, followed by the FE 'hybrid' version with onboard diesel recharging generator. The new model offered the same, if not better performance than the diesel model with four wheel drive, four wheel steer and oscillating axle, but with zero emissions in battery mode and very little noise.



Genie wheel motor

The product has been a success and not only in Europe, but increasingly in the USA.

At Bauma it extend the range with the 45ft articulated Z-45 electric or FE hybrid drive, both with AC direct wheel motor drive, using the same technology as the Z-60 FE - (previously the Z-60/37 FE). The new boom has a maximum working height of 15.92 metres, an outreach of 6.94 metres, an up and over reach of 7.5 metres and 300kg platform capacity. The lift will almost certainly be joined by a Z-51 version.

Genie says that pure battery electric models



Genie has extend its hybrid range with the 45ft Z-45 FE with AC wheel motor drive

can work a full shift on a single battery charge, while in hybrid mode it can run for more than a week on a single tank of diesel. The Z-45 FE boom lift uses a Stage V/Tier 5 diesel powered generator to maintain battery charge. The system also allows generator power to recharge the batteries when braking or descending inclines. Genie says the machine needs 30 percent less fuel than typical diesel machines. The new model will be manufactured in Umbertide, Italy and available in Europe, Middle East, Africa and Russia early next year.

Other new electric booms

As well as the larger manufacturers, several other companies unveiled new electric powered articulated booms, including Airo, LGMG and Sinoboom.

The 50ft Airo A17 JE industrial type boom lift is similar in many respects to the company's smaller A15 JE in concept, with zero tailswing, direct AC motor drive, and a new smart pothole protection system. The lift mechanism - with twin sigma type risers, telescopic boom



The 50ft Airo A17 JE industrial type boom lift has 8.9 metres of outreach at an up and over height just shy of eight metres

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Sinoboom's latest model, the 52ft GTZZ 16EJ, has a maximum outreach of just over 9.37 metres.

and articulated jib - provides 8.9 metres of outreach at an up and over height just shy of eight metres. Overall width is 1.5 metre, while overall weight is 8,375kg.

Sinoboom's latest model, the 52ft GTZZ 16EJ, has a maximum outreach of just over 9.37 metres at an up and over height of just under eight metres. Platform capacity is 230kg and the new machine has direct electric drive and an overall weight of 7,200kg.

The 46ft LGMG A14J is the smaller of two articulated booms from LGMG, the other being the 53ft diesel powered AR16J. The A14J has direct electric drive, a traditional eight battery power pack and offers 7.81 metres of outreach at an up and over height of 7.26 metres with 230kg platform capacity. The machine has an overall weight of 7,500kg.

XCMG has launched a new all-electric articulated boom - the 46ft GTBZ14JD - using Curtis direct drive motors. The new model was not displayed at bauma and very little information is currently available, but assuming it is similar to the company's diesel powered GTBZ14J offers 8.22 metres of outreach, with a platform capacity of 230kg and weighs around 7,000kg.

How long does it last?

One question that is always difficult for manufacturers to answer directly when asked about battery/hybrid technology is how much work will the machine do on a full battery charge? This depends of course on how many full lift cycles it does, how far it is driven and the grades it climbs etc. Companies claim hours of typical usage, but even factors such as temperature can make a difference.

An early attempt to develop a standard test came in 1988 when Peter Hird Snr of UK crane and access rental company Peter Hird & Sons developed the 'Hird Test'. It came about after the company purchased four new Simon Boxer 120 articulating boom lifts and sent them out on a job replacing wall lights. The batteries lasted just three hours, leaving the customer having to wait eight hours to recharge!

The Hird Test

Unimpressed Hird measured the distances between the light units, their height and the angle the boom had to slew through to reach them and used them to create a practical operational test to measure battery performance in controlled conditions.

He found that the fully charged Simon could manage between seven and eight cycles before the battery was depleted. The manufacturer was just as interested to see the data and quickly set about modifying its machines so that by the end of 1991, the Boxer 120 could achieve 22 to 24 cycles.

The Hird Test is still around, however Niftylift says that it experienced difficulties explaining the Hird Test to customers and has therefore launched its own measure to help clarify the extended work run time of its new machines. The Standard Duty Cycle (SDC) gives each machine its own rating of how many cycles the machine can work on a fully charged battery until fully exhausted. While having some similarities to the Hird test, it involves charging the battery to 100 percent, driving 60 metres at full speed, lowering the outriggers if applicable, carrying out a boom cycle to full height and back and finally raising the outriggers, waiting two minutes between cycles and repeating until the battery is totally exhausted. Each machine is given a rating - 16 would be the number of repetitions needed to work for a full day shift. Niftylift says its latest machines have an SDC number of 32 or enough for two days work without charging. Perhaps something like this ought to be adopted as an industry standard?

Snorkel mid range booms

Diesel powered boom lifts still make up the majority of annual sales of course. At Bauma Snorkel showed CE compliant versions of its new 46ft Snorkel 460SJ and 66ft 660SJ, which are now both available



The 40ft 400S telescopic boom lift is the last in its four model mid-range boom line which also includes the 46ft 460SJ, 60ft 600S and 66ft 660SJ.

to order with European Stage V engines. Snorkel is now producing them at its UK facility, in addition to the existing assembly lines at both of its US facilities in Henderson, Nevada and Elwood, Kansas.

Snorkel also recently launched the production version of its 40ft 400S telescopic boom lift - the final unit in its four model mid-range boom line - which also includes the 46ft 460SJ, 60ft 600S and 66ft 660SJ. The 400S has up to 10 metres outreach with a platform capacity of 272kg, or 8.5 metres with its maximum platform capacity of 454kg. Standard features include 4x4 drive, an oscillating axle and 360 degree continuous slew. Total weight is 7.5 tonnes and power comes from a Deutz Tier 4 Final diesel.

There are also rumours that the company may be looking to get into the big boom sector, with an idea to producing models up to around 160ft...



The LGMG A14J has direct electric drive and offers 7.81 metres of outreach



The 42ft, 230kg ELS AE15

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The 66ft Dino 220RXT 4x4 boom lift with outriggers weighs 4,700kg.



Dinolift expands RXT range

Dinolift launched a new lightweight 4x4 boom lift with outriggers at Bauma, the 66ft Dino 220RXT. Its low overall weight of 4,700kg offers a much lower ground pressure for working on sensitive surfaces such as grass, along with easier transportation and lower maintenance and operating costs. Maximum outreach is 12 metres at an up and over height of 8.2 metres with 230kg platform capacity in the 700mm by 1.3 metre basket. An optional XL 750mm by 1.6 metre basket is also available with a capacity of 250kg. With outriggers deployed it has a footprint of 4.6 by five metres, with automatic leveling on slopes of up to eight degrees. An oscillating front axle and four wheel steering adds to maneuverability and maximum drive speed is 10kph. Other options include electric powered superstructure for work where emissions and/or noise is a factor, secondary guarding, LED work lights and 3.5kW hydraulic generator.

A new Aichi boom?

Aichi is planning to unveil the 46ft SP14DJ, a new four wheel drive diesel powered boom lift early next year. We currently only have a few basic details of the new machine which uses a three section boom and articulating jib offering 12.4 metres of outreach with a 270kg platform capacity in a 1.8 metre wide basket. Overall width is 2.3

metres, overall height 2.45 metres and overall length 7.45 metres, with a total transport weight of 8,200kg.

Dingli/Magni partnership

Dingli acquired a 20 percent stake in Magni Telehandlers back in 2016 and the co-operation is now beginning to bear fruit with both companies showing 'Italian designed' booms from the jointly held European Research & Development centre in Italy. The initial project was to design a new range of western orientated boom lifts. Many were keen to see what Riccardo Magni - a highly talented telehandler designer - could bring to



Dingli showed the 60ft GTBZ20AE



Magni unveiled the 92ft straight telescopic DTB30HRT at Bauma

the boom lift market.

The first of the jointly developed Dingli models - the straight telescopic BT24RT and the BT28RT - were shown as prototypes at Bauma China at the end of 2016, however the range has now expanded to include five articulated BA models with working heights from 16 to 28 metres - including a 60ft all electric articulated boom - and six straight BT boom models with working heights from 16 to 30 metres.

The machines are characterised by low slung counterweights and clean, slim superstructures with all major components, including the engine, located in the chassis, mounted on both sides of the chassis frame for a low centre of gravity and even weight distribution and stability. At Bauma Dingli showed the BT24RT and the BT28RT for the first time in Europe as well as the 20 metre working height GTBZ20AE.

Magni unveiled several new articulated machines - the 86ft DAB28RT and the 72ft DAB24RT - together with provisional details of two smaller articulated models - the 46ft DAB16RT and the 60ft DAB20RT. It also unveiled the 92ft straight telescopic DTB30HRT.

Visually the Magni machines are almost identical to the Dingli versions but use different componentry and design detail and are both 500kg heavier than the Dinglis. The 86ft and 72ft models are 18 and 16.7 tonnes respectively.

Both ranges have platform capacities up to 450kg, while the ranges have a high degree of commonality between the models in terms of major componentry and structural fabrications. The booms mostly use telehandler axles, with four wheel drive and steer and differential locks for better traction on difficult conditions.

Work attachments for boom lifts

Alongside the new machine developments most manufacturers have also been looking at ways of making work at height with aerial work platforms easier and more productive, by offering a variety of attachments the most popular of which have been built-in welding sets and generators. The idea of more specific application focused attachments has been around for at least 20 years or more, but it seems that the market has finally become more receptive, helped by manufacturers building them in and certifying their use - essential with the latest regulations/standards.



The Dingli/Magni machines are characterised by low slung counterweights and clean, slim superstructures with all major components, including the engine, located in the chassis



Genie's new four metre platform.

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Higher platform capacities - now often 450kg with limits on maximum outreach - is also helping boost their uptake as is automatic and reliable platform overload systems.

Genie has arguably led the way with boom lift attachments in recent years, starting with the introduction of the 'Fall Arrest Bar' in 2015, a sliding anchor point for lanyards for use by boom lift users who need to exit the platform while at height. More recently JLG added a simpler Bolt on Fall Arrest System, for those that need to work outside of the platform at height. The system consists of two steel brackets



JLG Tri-Entry platform

connected by a 1.8 metre steel cable with a sliding ring to which a harness lanyard can be clipped.

At this year's ARA show Genie introduced a wider range of new accessories in a new 'Genie Lift Tools' range, including the 'Expo



JLG added a simpler Bolt on Fall Arrest System, for those that need to work outside of the platform at height

The Genie 'Expo Installer' is designed for hanging banners and signs



The system consists of two steel brackets connected by a 1.8 metre steel cable with a sliding ring to which a harness lanyard can be clipped

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Genie's Access Deck is a small secondary step up platform that adds 560mm to the platform height allowing easier access into tight spaces



The Genie Access Deck

Installer' for hanging banners and signs. Attached to a 1.8 or 2.4 metre platform in around five minutes, it uses a similar sliding track to that on the Fall Arrest Bar, but with two sliding clamps or trolleys with a combined capacity of 108kg, to which the sign or banner is connected. When lifting the boom, brake pads lock the sliding

clamps/trolleys firmly in place. It can be used with all 45, 51 and 60ft articulated booms and 40 to 65ft booms.

The company also demonstrated its boom Access Deck, a small secondary step up platform that adds 560mm to the platform height allowing easier access into tight spaces, such as through suspended ceiling panels or between joists and rafters. Currently being evaluated by market, it simply clips onto the platform mid rails at either end of S telescopic and Z articulating boom lift platforms and has a capacity of 136kg and comes with a handrail, to provide operators with three point contact. The handle can be folded away when not required.

Skyjack has its Accessoryzers range of attachments, which runs from tool trays to pipe racks, fluorescent tube carriers and glazier's kits and JLG has been offering platform convenience accessories from tool trays, to pipe racks for many years. Its latest one is a smaller platform, measuring 762 x 914mm, which is targeted at specific applications involving work among congested overhead structures, such as the construction or repair of bridges, where the smaller basket is easier to navigate between the steel and concrete support structures.

The manufacturer also expects the new option to be popular in petrochemical plants, refineries, co-generation facilities, stadiums and convention centres. In a way it is an alternative to Genie's Access Deck.

Sadly, space has limited the coverage in this issue, but one thing for sure the relatively mature boom lift market is changing fast.

One of many Skyjack Accessoryzers attachments - this is the Glazier kit.



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