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Improving battery power

C&A

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Semi or full traction batteries are a critical component of more than half of all aerial lifts and an increasing number of pick & carry cranes. Yet few rental companies or fleet owners spend much of their time or even take an interest in them. This is hardly surprising given that a modern lead acid battery appears to be pretty much the same as it was 50, or even 100 years ago. Many companies just look for a supplier that offers a keen price and has the size they need in stock and that's it. And yet this is an area that can make a massive difference to machine reliability and performance and therefore customer satisfaction.

OK recent changes to lead acid batteries are subtle - more evolution than revolution - but all of the quality manufacturers have improved and fine-tuned their products significantly over the past 10 years with changes in construction - both internally and externally - and additional features to make them easier to maintain.

But the major producers have also invested in their production facilities and technology, improving consistency, quality and as a result performance. And all for little if any extra purchase cost. In fact, thanks to increased competition and manufacturing efficiencies prices have fallen in real terms. If you then also add in the potential technology improvements from companies such as Trojan, Crown and US Battery etc... you should find that

total battery cost over the life of a machine has dropped significantly compared to say 10 to 12 years ago. As long as you buy a decent battery in the first place of course.

During the same time frame the availability of very cheap batteries from the developing world has proliferated and most owners have learnt the lesson on using cheap battery substitutions. But where you might have saved say €10 a battery 10 years ago, it is possible now to find a six volt battery of a similar physical size and 'power' that is €20 cheaper. Hopefully we need not repeat that buying a battery on dimensions, voltage and even amp/hour rating is totally folly! An \$80 economy can easily cost you €300 and possibly lose you a valuable customer.

Fred Wehmeyer, senior vice



Working in a hotel courtyard required clean noise free power



president of engineering at one of the three major suppliers - U.S. Battery Manufacturing - sums up some of the work that these companies have been doing when he says: "Developments in battery technology increasingly allows companies operating a fleet of aerial work platforms to lower their annual operating costs. Technology such as our XC2 formulation, used in conjunction with our Diamond Plate Technology dramatically extends the cycle-life and total amp-hour operation in deep-cycle batteries. These deep-cycle batteries can reach peak capacity in as few as 25 cycles. In addition, the battery's initial and peak capacity are dramatically increased, and its higher total energy delivery will allow fleets to save time and money."

In order to determine any cost savings, the fleet owner or manager must first make scheduled maintenance checks and take detailed notes on the condition of the batteries. Anyone in charge of maintaining a fleet of machines needs to look at their battery expenditure in terms of cost-per-cycle and cost-per-amp hours delivered over the life of the battery. Simply comparing battery ratings on the label or published cycle life, doesn't always tell the whole story. In addition, purchasing the least expensive batteries you can find, almost never results in a cost saving over the long run. Over the course of several months, the information gathered will show an average run-time and amp-hours delivered from the batteries. This allows for a proper comparison of battery performance against the purchase cost. Once you compare the actual





operating cost-per-amp-hour, you can begin to see that not all deep-cycle batteries are the same, and those that are more efficient, even at a higher initial purchase price, can actually save overall operational costs in the long run."

All the above depends of course on sourcing the right batteries from the start. Most equipment manufacturers install a decent battery on the new machines that they produce but you do need to ensure they are well maintained. You can buy the very best battery in the world, but it will not last long if subjected to sloppy maintenance or abuse.

New product design makes batteries go further

Whilst the improvements in the batteries themselves have been significant - albeit steady - far more dramatic things have been happening to the machines themselves which has transformed battery life beyond all recognition. Motor controllers limit the supply of power to the electric drive motors to match the speed or effort required. Inching a machine into position will use a great deal less than driving across a yard at full speed even if the time taken is the same. Improved tolerances on components such as hydraulic pumps have also made a difference, as has direct electric drive for travel, with an increasing move towards the even more efficient AC motors.



JLG is converting all of its electric booms to direct AC electric drive.



These changes are so significant that an electric powered 60ft Rough Terrain boom lift is now a very practical proposition. Genie is the latest to enter the market - joining Niftylift and JLG - which have had hybrid models for some time. Rough Terrain scissor lifts intended for real outdoor and Rough Terrain applications are now becoming increasingly popular and practical alternatives to IC powered models. The benefits include reduced fuel costs, quiet operation, cleanliness and zero emissions.

At the smaller end of the market, there are signs that improved batteries and more efficient drivelines could change the traditional power packs required for smaller scissor lifts. At last month's ARA-Rental show MEC launched its



The new Genie Z60/37DC uses four AC drive motors

new 13ft micro scissor - the 1332ES - which targets the 12ft mast lift market. Until now almost all aerial lifts apart from push around lifts operate on a pack of four, six volt lead acid batteries. The 1332 though only uses two 12 volt batteries, but that is not all, the batteries are also maintenance-free AGM (Absorbed

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The MEC 1332ES uses just two maintenance free batteries

Glass Mat) type, which typically have a shorter duty cycle than traditional flooded batteries as well as being more expensive. With this type of battery also improving and becoming less costly, we might see some major changes to the market.

Lithium is here to stay

At the higher end of the lift market - both in terms of working height and battery technology - lithium ion batteries are transforming platforms or cranes that need a lot of battery life and grunt yet have limited space on board. It is now more than six years since Hinowa kicked off the lithium battery powered spider lift market. At the time we heard all about how much longer they would last with an average age of five years, how long they would go

between charges with duty cycles of more than a full shift, and how fast they could be recharged from flat. So later on in this article we follow up on few lithium machines that have been in the field for a year or two.

The other issue which will arise sooner rather than later is recycling. The lead acid battery is the perfect product when it comes to recycling, in that it is almost 100 percent recyclable. As a result they are most recycled consumer product by far, in the USA alone around 99 percent of all lead acid batteries are recycled almost 20 percent more than the next category - tyres. The whole process must be carried out properly and is now an increasingly regulated. But what of lithium? In



Hinowa started the lithium battery powered spider lift market

the car industry the battery pack was originally leased for about five years so the manufacturer will be involved in its recycling. But when it comes to aerial work platforms the battery pack is purchased and includes other components. We understand that some suppliers are already working on service exchange packs.

The car industry is making a massive impact on the lithium battery market, helping halve the cost of a battery over the past three years, and set to do the same again over the next three. But will that mean small scissors all shifting over

to lithium? Unlikely - while the price is falling it still has a long way to go to catch up with the lead acid battery and with the improvements we have mentioned and the more efficient drive trains, the pressures that existed back in the early 1980s have gone - the current batteries are generally completely satisfactory. However, we can expect to see more maintenance-free batteries making an appearance - especially given the challenges of finding service engineers. The last thing you want is to tie up their valuable time replacing or even checking batteries.

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Real life experience with lithium batteries

With Hinowa, CTE, Teupen, CMC and others now offering standard lithium battery powered spider lifts we thought we would find out what sort of experience those running the machines for a year or two had experienced. Given that the decision to switch from an engine powered tracked machine to a battery powered unit, would have been unthinkable a few years ago.

Barry Brady of UK-based rental company Elavation said: "The typical duty life is difficult to measure but we have no complaints. The terrain, temperature and driving conditions can all have a massive impact. The very nature of spider lift work can be very unusual. One application had us driving the machine to its final work site some two hours' drive away from the actual delivery point."

Thomas Cannon, director of UK rental company Cannon Access said: "In early February we rented the machine to Plantforce which required access to replant window boxes in the courtyard of an exclusive London hotel.

The hotel had stipulated a noise and emissions-free machine. The Hinowa 20.10's was able to set up in between planters and an outside dining area. Plantforce found the battery to be very good. They could get away with only charging the machine every other night (or whilst working) but charged it every evening as a precaution.

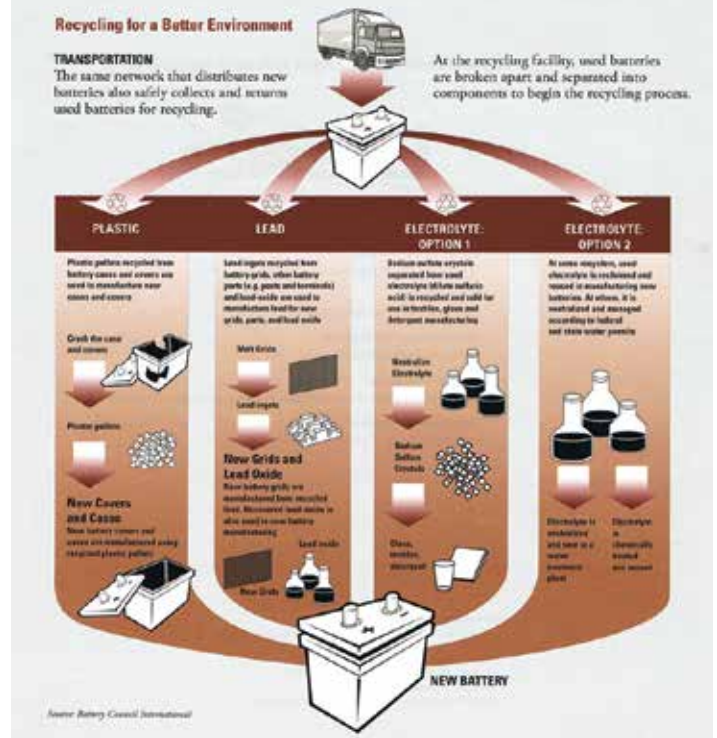
"In fact, we have not managed to use more than 50 percent of the battery capacity on any single day jobs so far, although if we need to charge whilst working it is no problem - it will actually charge faster than we can use the power! I was told to expect around five hours of battery life from constant use - from our experience this appears to be true, even conservative."

UK rental company Bella Access supplied one of its Hinowa Lithium spider lifts on a quarry job - not an application that immediately springs to mind for an electric power machine. Director Jason Dalmas said: "Before taking the quarry job on the customer questioned using electric instead of diesel. However once the machine was on site no more convincing was needed - it

Recycling for a Better Environment

TRANSPORTATION
The same network that distributes new batteries also safely collects and returns used batteries for recycling.

At the recycling facility, used batteries are broken apart and separated into components to begin the recycling process.



worked a 10 hour shift and the customer was more than satisfied, so much so that he rebooked this machine for the end of February. The fact that, after just a two hour charge, 80 percent of the battery capacity was available was also a massive bonus."

Given this sort of feedback it is very possible to imagine almost

all aerial work platforms and mini cranes eventually converting to the technology. The new Genie Z60/37 is the first mainstream 60ft boom lift to rely solely on battery power, although it is to add a hybrid model at Bauma. Many engineers and rental companies will be watching to see how it works out.

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