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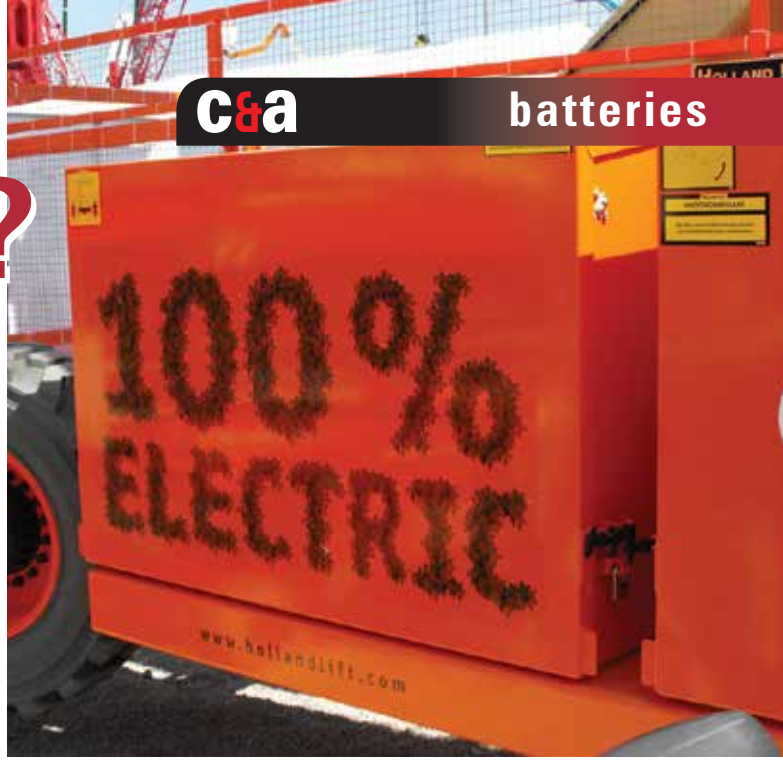
A profit opportunity?

Each year around this time we look at developments in the battery market, which is growing in importance powering an increasingly wide range of aerial work platforms and even small cranes. With regulations for internal combustion engine emissions getting tougher every year, the conversion from diesel to batteries or hybrid systems looks increasingly attractive for an ever wider line up of lifting equipment.



The problem with traditional lead acid batteries is that they require regular inspection, maintenance and proper recharging in order to keep them in peak condition and ensure that they do not fail prematurely. An average powered access rental company can easily spend £50,000/€65,000 or more on replacement batteries each year.

This cost doubles or trebles when labour and disruption is added into the equation. However is not all grim news. By adopting a few simple best practice procedures a company can easily reduce this cost not only saving money but also helping keep the customer satisfied.

Getting more from your batteries

In the past month or two we have spoken with a number of people at access rental companies that run large fleets of battery powered aerial lifts. Some of which operate fleets of around 6,000 units and more - that's around 25,000 batteries to charge and maintain every day! Even a small to mid-level fleet owner will have somewhere in the region of 2,000 batteries and that is before you add in starter batteries. Assuming an average life of around two years - which is optimistic for some companies - this equates to an annual replacement bill of between £65,000/€85,000 and £800,000/€1.1 million a year for the cost of batteries alone! Add in such things as labour, call out costs, dealing with the scrap - in a legal way - not to mention downtime and possible customer dissatisfaction through premature failure and it becomes clear how important this aspect of fleet management is. One large rental group told us that it had carried out load and dynamic tests on all of the better-known quality batteries a few years ago and that the difference in performance between them was marginal. With that in mind it decided to negotiate a single supply agreement in order to obtain the best price, electing to go with one of the top two performers based on the overall package of price and service offered by its distributor. This trend towards formal national, or even international single supplier contracts gathered pace last year with a number of deals announced in the UK, including AFI and Nationwide Platforms, both of which agreed deals for Trojan batteries with its UK dealer Platinum.

Care should be taken with the weight of replacement batteries as they often form part of the machines counterweight

A typical four x six volt lead acid battery packs found in aerial lifts

While both companies have signed exclusive supply deals, they do not convert batteries on new machines entering the fleet, preferring instead to run with the standard batteries supplied- unless they are of an unknown brand - until they need changing. When replacing such batteries, care must be taken with the weight of the replacements, as the batteries usually form part of the machines counterweight. If the new batteries are heavier and roughly the same size there is no issue. If however they are lighter, even a modest reduction in the machine's weight needs serious consideration.

The vast majority of batteries used on aerial lifts are deep cycle, six volt, flooded lead acid units, predominantly manufactured in the USA by Trojan, Crown or US Batteries. Most people we spoke to confirmed the average life of such batteries in their fleet is currently between two and three years, although over the years we have heard plenty of stories of the same batteries lasting 10 and 12 years or more. Abuse kills most aerial lift batteries well before their potential life is reached.

One rental company we spoke to said: "We would not expect to replace batteries that have been looked after or on contract hire for at least two to three years. However due to the abuse of the machines this is not what we are finding. Educating the customer on the proper charging of batteries is something that is needed right

Most current battery testers do not tell the full story.

across the industry. In most cases it is not a defective battery that causes the problem. Inadequate charging is far more likely. Customers need to make sure to charge with the correct amp/hour transformers and as short a lead as possible."

A more reliable battery tester

UK rental company Nationwide Platforms is currently trialling two prototype battery testers. Rather than conducting what it refers to as a 'drop test' - i.e testing what the battery can produce (amps) for a few seconds - the prototype testers discharge the battery under load for between four and a half and five hours, which is more indicative of an eight hour cycle on a machine. The length of time this discharge takes indicates whether the battery can then be given a clear-cut pass or fail. The prototypes have been developed entirely in-house by one of the company's engineers and the hope is they will be successful in defining a battery's true condition, categorically clarifying whether a problem exits that may let the customer down.

Talking of the aims of the programme, one said:"We looked at and assessed everything on the market but could not find anything that offered what we wanted that wasn't cost prohibitive. We need to understand the impact of these testers - if there are any hard savings on batteries we are

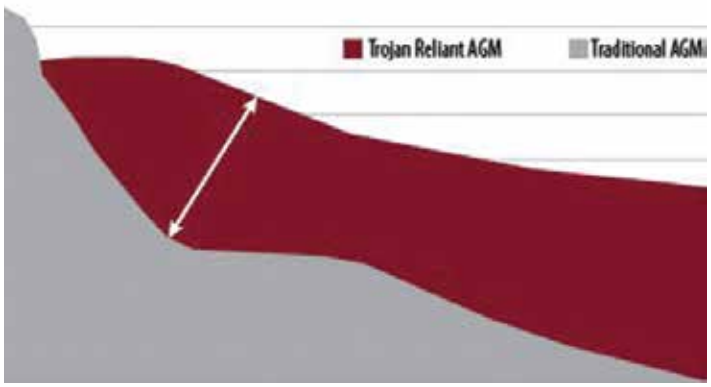
Long extension leads invariably leads to poor charging

Charge with the correct amp/hour transformer.

throwing away, or if there are softer savings from machines lasting longer and reducing breakdowns. The main reason for doing this is to ensure the battery can be sent out without causing a problem for our customer. Current tests comprise short load tests on the battery - checking the voltage and then a check with a hydrometer - which is all that most people do to give a battery a clean bill of health. What you don't know - unless you drive the machine around for eight hours - is if the battery is capable of lasting a full shift. Hopefully this is what our new tester will achieve."

Proper charging helps

Where there is a repetitive battery problem on site, a good starting point is to investigate how the machines are charged. Some sites shut down power overnight and therefore machines are not properly charged when work restarts in the morning. Other problems include very poor site power supply, and customers charging using 100 metre leads. A poorly charged battery may also be the result of the machine being used when the customer is not on site, preventing a full charge cycle. Security key pads can this one.



Trojan claims that its new AGM technology is much better for sustained duty cycle work.

Batteries are massively important part of the profitability of a rental machine. Changing batteries out prematurely can significantly eat into margins, but the performance of the battery is also part of the customer's experience of the machine so if it doesn't last a full shift he may start to look to hire a machine elsewhere.

Gel or not?

A few rental companies have been considering moving to maintenance-free batteries such as gel, In Germany and some Nordic countries a number of companies already insist on gel batteries in their machines, in order to comply with their environmental policies and reduce maintenance costs. However gel batteries are expensive, usually require different battery chargers and do not usually last as long as regular lead acid batteries. Absorbed Glass Mat (AGM) batteries offer most of the advantages provided by gel, while being considerably cheaper and do not usually require a different battery charger, however they do not have a great reputation for battery life and longevity. However some manufacturers, such as Trojan have recognised that AGM probably offers the best alternative to the traditional flooded cell batteries in heavy deep

be sure that the other main suppliers will also be upgrading their offerings in this area. While the latest AGM batteries are still more expensive than lead acid offerings, the savings in testing and replacement time should provide a fairly fast payback, while customers, such airports, healthcare facilities, shopping centres, and educational institutions, will appreciate their convenience and cleanliness. Assuming they work as well as expected we are likely to see a steady conversion over the next few years.

A new approach to AGM

Trojan Battery has launched what it describes as the first true deep-cycle AGM (Absorbed Glass Mat) maintenance free battery dubbed the Reliant AGM with C-Max Technology. While the advantages of AGM or for that matter gel batteries are clear, until now they have not performed as well as they might in heavy duty applications such as that seen with aerial lifts. Even those supplied by reputable manufacturers have not matched flooded lead acid batteries for performance and life expectation.

Trojan makes a number of claims for the new battery technology, most importantly it maximises sustained performance (rather than rapid fall off of a starter

Gel and AGM batteries are sealed and thus cannot spill or leak and are maintenance free.

Charge with the correct amp/hour transformer.

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Trojan's new Reliant AGM sealed deep cycle battery.

battery) and increases the total energy output to meet demanding deep-cycling requirements such as powering self-propelled platforms. Changes include a new proprietary paste formula designed specifically for AGM deep-cycle applications, applied with a new dual-sided pasting process. A new Thick Design separator composition ensures high compression for effective contact between the glass mat and plates, while protecting against stratification in order to extend battery life.

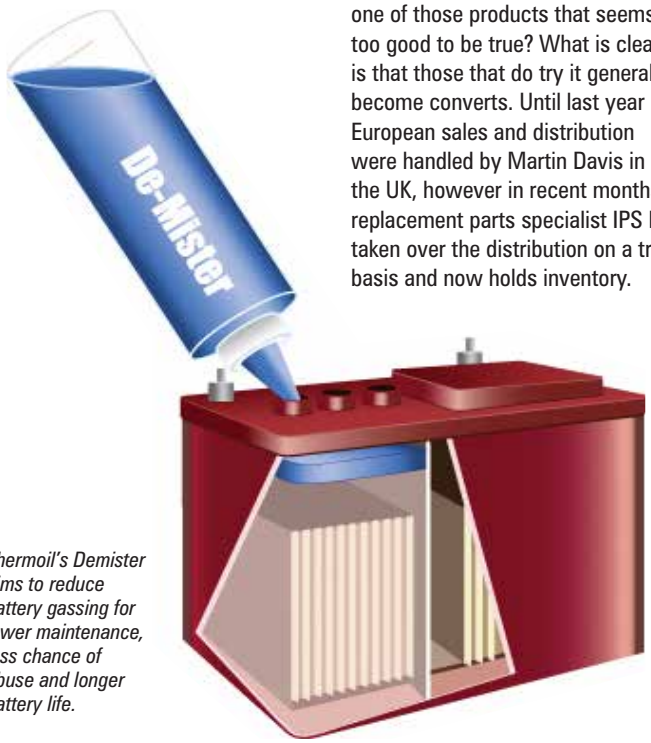
Other improvements include a special polymer case design with reinforced end walls to enable higher battery cell compression, and finally it uses improved flame arrestors with one flame arrestor for each cell for maximum safety. In addition to the technology, Trojan says that further improvements have been made through new manufacturing techniques, more stringent quality controls and an intensive test programme which includes compliance testing and verification to IEC, SAE and BCI Industry standards.

Batteries with the Reliant AGM technology are being manufactured in the USA at Trojan's most recently opened production facility in Sandersville, Georgia. In addition to aerial lift applications it is targeting floor cleaning machines, golf carts, material handling equipment, camper vans/RVs, renewable energy and remote telecom equipment.

Additive options

As we have already highlighted, battery testing and replacement costs are substantial and exasperate by abuse. While switching to high quality gel or AGM maintenance free batteries might at least cut premature failure from such abuse, there are solutions which have been promoted to reduce the need for testing, inspection and the need for frequent top ups. The most enduring of these is the Demister battery additive sold by US based Thermoil. The idea is that the 'oil' is added to the battery electrolyte where it forms a protective 'skin' on top of the acid/water solution substantially reducing 'gassing' - the escape of hydrogen gas during recharging -and thereby reducing evaporation and the need to top up so often. It is also said to help prevent the furring of terminals and help keep the plates cleaner, prolonging battery life.

The product has been on the market for a number of years but take-up is still limited, perhaps because it is one of those products that seems too good to be true? What is clear is that those that do try it generally become converts. Until last year European sales and distribution were handled by Martin Davis in the UK, however in recent months replacement parts specialist IPS has taken over the distribution on a trial basis and now holds inventory.



Thermoil's Demister aims to reduce battery gassing for lower maintenance, less chance of abuse and longer battery life.

Solar powered platforms

Solar panels are relatively easy to install

The majority of the world's electricity is - as we all know - currently generated from non-renewable fossil fuels such as coal, oil and natural gas. In recent years increasing demand and taxes have driven up prices and the long term trend is upwards, especially given the commitment of most western governments to substantially reduce the use of fossil fuels over the next 20 to 30 years.

Regulatory pressure for cleaner emissions is already driving equipment manufacturers towards developing more electric powered machines - this is noticeable in the aerial lift market, where battery powered or hybrid machines are multiplying. This year is certain to see further growth, as new AC hub drives are adopted on Rough Terrain booms and scissors as well as industrial pick & carry cranes. Converting machines from diesel to battery electric does not in itself reduce overall emissions - it just shifts it to the power station - unless of course the electricity is generated by a renewable resource such as wind or solar power.

Of the renewable sources, photo-voltaic solar power is the most practical for homes and businesses, and is making the most progress. A common misconception is that they require direct sunlight. While direct sunlight will provide the highest efficiency, the system still generates electricity on cloudy days because solar power converts light photons rather than direct sun light.

An increasing number of homes and businesses have already installed solar panels in order to generate some of their power requirements, however at least one rental company has extended that to power its aerial work platforms. UK based rental company GT Access has installed 120, 30kW photovoltaic (PV) solar panels on the roof of its Bromsgrove facility, and is using the power to recharge its platforms, as well as provide electricity for the offices and workshops. During the summer months the company claims the solar panels will provide enough power to maintain the building and charge all of its battery machines prior to delivery, providing close to 25,000kWH a year, with an estimated payback of around seven years. Obviously machines that are only in depot overnight will benefit little from solar recharging, especially in the winter months, however those staying for a day or two will.

GT Access owner Jonathan Till said: "Having already made many energy efficiency measures at our head office, including switching to LED lighting, we looked at Solar PV for further cost savings. The system has been sized so that for around eight months of the year the building is self-sufficient and also allow us to charge our battery machines from excess solar energy. Currently this is only available at our Bromsgrove location, but we are looking to install solar power at our other depots."

The company is also installing an electric vehicle charging point at its depot allowing customers to recharge their electric vehicles free of charge.

GT Access has recently installed 120 solar panels on the roof of its head office in Bromsgrove

Quick battery swap

When Genie launched its new, all-electric Z33/18 boom lift last year it mentioned a secondary battery pack option that could be quickly changed-over should the need arise, allowing it to work two arduous back to back shifts.

The standard eight six volt, 48 volt 315 Amp/hour battery pack is said to have a conservative eight hours duty cycle, thanks to and efficient electrical system and direct AC electric drive. However it claims the two battery boxes - one on either side of the machine - can be quickly replaced during a shift hand over. Each box, containing four lead acid batteries, weighs 240kg and can be disconnected from the machine with a single plug. A retaining latch unlocks the box, allowing it to swing out making it easier for a fork or pallet truck to lift it from its gravity hinge and then re-install the replacement pack.

A pallet truck can quickly remove the battery pack

The new boom has a box of four batteries on each side of the chassis

JCB Battery Box

JCB has launched a new product dubbed the JCB Battery Box B40 which aims to store power from mobile generators, in order to save fuel, reduce noise and increase the life span of the generator.

Sold as a secondary 'hybrid' power solution JCB claims the product can significantly improve efficiency, providing power in low load periods with the generators turned off - conserving fuel and reducing emissions. The Battery Box is compatible with all sizes and makes of generator and with mains electricity, allowing it to be charged on site.

Packaged in a steel enclosure, the Battery Box delivers up to 10kVA continuous power output with a 20kVA peak and is available in both 50 and 60Hz configurations. As it has zero emissions the power pack is ideal for use in sensitive applications. The maximum discharge can be set between 30 and 50 percent to prolong battery health.

Manbat acquires PowerCell

Last year Ecobat Technologies acquired UK-based PowerCell Industrial Battery Engineers - a major forklift and deep cycle battery supplier - through its specialist UK battery distribution subsidiary, Manbat, the UK distributor for US Battery.

Manbat managing director Steve Sheppard said: "This acquisition is the perfect fit with our existing industrial battery business and strengthens our position within the sector. It also adds to the group's battery distribution businesses, which are based in the UK, Netherlands, Belgium and France. Derek & Ingrid Anderson of PowerCell will stay with the business and play an important role in the integration with Manbat Industrial, and the general development of Manbat's growing Industrial Division."

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