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Battery care improves margins

The rental rates for slab electric scissor lifts in the last issue of Cranes & Access showed they were keener than ever. For a 19ft compact model rates of around £100/€120 are often cited as a good. However with this sort of return for a machine that costs in the region of €7,500 an in-field battery problem can easily kill six months or a year's profit margin. A busy contractor can quickly rack up a few hundred Euros of down time for a skilled tradesman when a critical machine fails.

With increasingly larger aerial lifts and cranes migrating towards electric power the costs can be significantly higher. The reliability of the electrics, hydraulics and mechanical components on most aerial lifts has improved significantly over the years to the point where most well-known brands are becoming increasingly 'bullet proof' and easy to maintain. However the same is not true of the typical battery packs used in most aerial lifts where at first sight little has changed.

Start with a decent battery

While lead acid battery technology appears to have changed little in recent years, the difference between cheap batteries - of which there are many more on the market - and the deep cycle batteries produced by the specialists has grown significantly as the main players have continued to refine their products. So lesson number one make sure you have decent batteries on board before you start. If you are buying a lift from one of the global aerial lift suppliers you are almost certain to find them fitted with well-known quality brands such as Trojan, US Batteries or Crown - all three American producers. This is no surprise given the millions of golf carts and RV/campers in the USA using this type of battery, providing the volume to support both competitive/value for money prices and ongoing research and development funds.

Starting off with a reputable battery pack is essential

If buying a machine from one of the more recent aerial lift entrants check the batteries out, either before you buy, or if the machine purchase price is such that it does not merit such scrutiny then after you have taken delivery. If they are fitted with an unknown brand - or even worse, a cheap counterfeit - then change them out before putting the machine into service. You might be lucky, the unknown battery could be a gem? Trouble is you don't want to discover it isn't while it is working on an important job or with a valuable customer.

If you are unsure about the batteries fitted to your new machine - consider changing them

So starting off with a decent set of batteries is a critical first step, and if, like most buyers you are sourcing a well-known brand then this is a given. However it is essential thereafter to ensure that they are well maintained - which is not as onerous as it might sound - and more importantly they are regularly charged. Most modern machines will stop operating once the voltage drops below a certain level in order to protect the modern electronics and motor control systems from current spikes caused by low voltages. This will also protect the batteries of course, however if a machine is run-down close to this level and then allowed to sit for a few weeks, the batteries will continue to lose charge which could eventually result in long term damage. It may not show up immediately, but is likely to result in a shorter life, especially if repeated regularly.

All it takes during a period of colder weather is for the drained batteries in machines to come back into a rental yard on a Friday evening and be left for the weekend. If you

Put machines on charge as soon as they return and if possible keep indoors

Batteries form part of machine's counterweight so check the weight is the same when switching

are not already doing so it is good practice to simply plug machines in and charge them at the end of every shift - for rental companies whenever and as soon as they are returned to the yard. To do this you will of course need somewhere where multiple units can be put on charge at the same time. A charging bank is therefore a good idea and if possible store electric machines indoors.

Choosing a deep cycle battery

When choosing a replacement battery pack there are now several alternatives to the plain lead acid flooded product and they are increasingly available within a sensible price range. It is also important to recall that batteries form part of the counterweight on lifts and cranes. So ideally you need the same size and weight as the original when considering alternatives and if they are lighter consider replacing the weight in the same location.

Flooded water batteries

The classic lead acid battery is still the best in terms of cost, battery life between charges and overall life. However it does need regular maintenance and is prone to spills and gassing while charging.

Advantages of Flooded batteries:

- Cheaper to buy
- Longest life between charges when well maintained
- Widely available
- Long overall life if looked after

Disadvantages:

- Higher maintenance
- Prone to gassing while charging
- Can spill acid and be messy

AGM batteries

Absorbed Glass Mat batteries are now widely available and becoming increasingly popular for use as power packs for aerial lifts. The reasons for this are twofold - the fact that they require very little maintenance as they are sealed, and they are often specified for specific applications and locations where spills or gassing are not permitted such as airports or in food processing plants.

Advantages of AGM batteries:

- Low maintenance
- Non-spill
- Minimal gassing
- High recharge efficiency
- Can use most standard battery chargers

Disadvantages:

- More expensive to purchase
- Battery life is not as good as flooded batteries

Points to look for when sourcing AGM batteries

Not all AGM batteries are created equal and many are not designed for true deep-cycle applications and will not provide a satisfactory battery life between charges. Additionally they will not last long in such applications. Have the manufacturer or its representative confirm that the batteries are suited for the application and ideally warrant them or simply source from one of the deep cycle battery specialists. Trojan says that it is planning to launch a new AGM battery mid-year, which has been engineered from the ground up for cycling applications such as those found in crane and access equipment applications.

Trojan T35 gel battery

Gel Cell Batteries

Gel Cell Batteries offer similar benefits to AGM batteries in terms of gassing, maintenance or spilling, however they are more expensive again and do not usually offer the same power capacity for a given physical size as the other two. Gel batteries must be also be recharged correctly or the battery will suffer premature failure, so it needs a battery charger designed for the job and if recharging from an alternator a special regulator must be installed.

Advantages of Gel Cel batteries:

- Low maintenance
- Non-spillable
- Non gassing

Disadvantages:

- Most expensive to purchase
- Battery life is not as good as flooded or AGM batteries
- Power will be lower size for size
- A special battery charge is required

Full Traction batteries

These are usually custom-made batteries widely used for fork trucks and pick&carry cranes as well as in the larger battery powered scissor lifts where space and weight is not a major issue. They are expensive and must be properly maintained as the cost of premature replacement is prohibitive.


Full traction batteries are widely used on pick&carry cranes

Making flooded batteries last longer

Most platforms are fitted with regular flooded batteries as standard and few buyers will swap them out on new machines, so what can be done to reduce the maintenance costs and help ensure that they are trouble free?

1. Regularly checking electrolyte levels and topping-up when necessary is probably the most critical task. One way to avoid this or rather reduce the need is to fit a central top-up system similar to those fitted to most full-traction battery packs found on fork trucks, larger platforms and cranes. A single-point watering system can significantly reduce the time and cost of keeping flooded batteries properly watered.
2. It's also important to measure the voltage of AGM and flooded batteries to ensure they are being properly charged. Consistently overcharging or undercharging a deep-cycle battery will impact its overall performance and life, resulting in increased operating costs since batteries will have to be replaced more frequently. A special battery charger can help eliminate this issue. At the top of the tree in this respect is the GantiCharger from Norway, which individually charges each cell and ensures they are balanced at every charging.
3. Consider using battery additives, such as Thermoil De-Mister. While few battery manufacturers seem keen to endorse this product which does appear to be too good to be true, those who have used it say that it does significantly reduce electrolyte evaporation while cutting gassing and therefore reduces maintenance.

Trojan has introduced the easily fitted Hydrolink system to automatically top up regular flooded batteries

Off the shelf battery charging points are available for multiple aerial lifts

The manufacturer can provide reams of test data which proves its point and the science is logical in that an oil type film helps reduce evaporation.

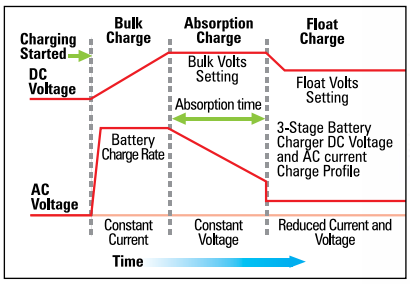
4. Keep batteries clean and regularly recharge them when machines are standing, especially in winter. Few things reduce battery life faster than allowing them to fully discharge or even allowing them to go beyond the 60 percent discharged point on a regular basis. One way to make sure that this happens is to use smart chargers and to install a charging bank where all machines can be left plugged in when not in use. A number of companies now supply standard or customised charging banks. A good local electrician can also design and install a practical solution.

A better charger?

The GantiCharger was developed several years ago by aerial lift rental veteran Tommy Jørgensen, in order to design a simple, reliable charger that would fully charge all the batteries in a pack without cooking them, while saving energy and being more environmentally friendly.

Today the GantiCharger is as good as mobile battery chargers get and has numerous features that are designed to appeal to access rental companies. The charger automatically detects the type of battery and can therefore be used for all three battery types mentioned in our article, including Gel. Once each battery is identified a three stage charging process kicks off, beginning with a bulk charge to

Many users claim that the use of battery additives has significantly reduced maintenance costs and improved battery life.



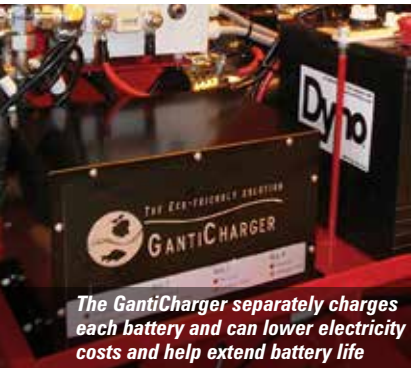
The GantiCharger goes through a three phase charging process.

An increasing number of utility type vehicle mounted lifts are equipped with lithium hybrid power packs.

quickly take the batteries up to a certain level, it then switches to a slower absorption rate - which uses considerably less electricity - to take each battery up to its maximum charge. Finally a float charge is also used to keep batteries charged up when machines are not in use. During the charging process for flooded batteries the charger will also automatically provide short high voltage pulses to de-sulphate, something that significantly extends battery life and efficiency.

Gantic claims that this charging process will take most batteries to at least 97 percent of maximum charge, while cheaper chargers tend to cut out at between 75 and 80 percent. Even a quality charger can stop after it reaches 85 to 95 percent. The main benefit though is that as soon as each battery is fully charged the charger stops charging it, while continuing to charge the others. Normal chargers either cut out when the first battery reaches full charge even though the others are not, or more typically it carries on until all four are fully topped up 'cooking' those that reached full charge first.

In summary the charger uses less electricity, takes batteries to a higher charge and extends their life. It all sounds a bit too good to be true, but the science is very clear and the claims 100 percent factual, yet over four years since launch the take up remains low.



The GantiCharger separately charges each battery and can lower electricity costs and help extend battery life

Lithium batteries slowly progressing

Lithium ion batteries are the long promised solution to battery life issues on mobile battery powered equipment, and while perfected for small appliances they are still a challenge for larger equipment.

Witness the challenges that Boeing faced last year with the lithium battery packs on its Dreamliner. The advantages are clear - they are 60 percent more compact, offer three times the battery life between re-charges, can recharge in half the time, are almost maintenance free, have no memory and can last over five years in a typical application. The main downside though in a word is heat management, although in the aerial lift and crane industry cost is of course also a major factor.

Hinowa pioneered the adoption of lithium batteries in the lift business, by fitting them to its spider lifts which require too much power to practically use lead acid batteries. Other spider lift manufacturers have followed suit and they are gaining in popularity with payback now well within their five year anticipated battery life, making them economically viable compared to diesel power. With four years field experience under its belt Hinowa will be closely watching how the first units are doing as they reach their fifth birthday.

Another application for lithium batteries which is working well, is on hybrid and all-electric vehicle mounted lifts. The most popular installations are hybrid set ups where the battery powers the aerial lift while the vehicle retains its traditional power unit. The unit recharges the batteries while travelling between jobs - almost for free - and if the machine is working for a long time in a single location without moving, the batteries can be plugged in to the mains to keep them topped up or the vehicle engine used in the normal way - either through a standard PTO or by running a generator that maintains battery power. So far most of these machines have been purchased by utility companies. They are not only seeking green credentials, they also appreciate the fact that the boom operates silently, which is ideal for working in residential areas especially at unsocial hours. It is also a benefit in that those working in the platform can communicate with the ground crew without needing to shout over the engine noise. Finally it is a great deal more efficient than burning fuel killing the engine with the start stop nature of aerial lift working.

One key advantage of the hybrid system is that it can be very easily retrofitted. Companies currently offering such systems include Versalift and Terex AWP.

Bottom end conveninence

Other markets with real potential for lithium battery packs are the smallest push-around lifts and powered material lifts. The little Bison X-Step lift launched last year uses a small slide-in 24 volt battery which provides up to 80 full lift cycles and can be swapped easily with a spare in the same way as hand drill.

Hinowa has pioneered lithium battery power options on spider lifts

The X-Step uses a sealed 24 volt battery that can be changed in seconds