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# Evolving power source

c&a

batteries



Hinowa pioneered lithium battery packs on spider lifts

When talking batteries in the crane and access market, the focus jumps immediately to battery powered electric lifts and small cranes, such as pick & carry models or spider cranes. The fact is that just about every single, aerial lift, crane or telescopic handler is equipped with at least one (starter) battery – only mains AC powered products such as tower cranes are exempt.

We will however focus on battery powered equipment, rather than starter batteries which have evolved to the point where they are ultra reliable and last so long that their cost is of too little a consequence to justify any significant management attention. It is also a factor that prevents any serious demand for further innovation. Having said that it is well worth using good quality maintenance-free starter batteries if they not already fitted as standard.

When it comes to the battery power packs that run an ever growing number of electric powered lifts and cranes it is a slightly different story. An increasing number of fleet owners now focus on battery management and sourcing, while European-wide rules demand that owners pay particular attention to recycling them. With rental rates still looking a little fragile, rental companies need to look at every opportunity to drive down costs,

and for many there are still big savings to be made in the area of battery packs. This includes looking after them properly and ensuring good quality replacements from a competitive supplier. The cost of a replacement set of new 'flooded' lead acid batteries - which still power the vast majority of electric powered equipment - varies substantially, so shopping around definitely pays.

The first thing to do of course is to draw up a short list of acceptable products, because when it comes to deep cycle work, not all batteries are born equal. As a sweeping, but relatively accurate, generalisation the top brand American batteries are the best. Companies such as Trojan, Crown and US batteries - to name just three - have been targeting the aerial lift and golf cart market for many years and have refined their products on a regular basis. Differences are largely internal as the vast majority of aerial lifts still use four or eight unit packs

of six volt 280 amp/hour lead acid batteries. Each of the major suppliers will argue its own merits, talking about the quality of their plates, grids, paste and separators. These are all important and do separate the decent from the poor batteries that barely last a year on a typical aerial lift. So it is well worth paying attention to this when drawing up your battery short-list. Each manufacturer also has a few additional features on the outside such as heavier duty battery boxes and quick access for checking electrolyte levels and even single top-up points etc.

## So who makes the best battery?

The challenge is knowing which battery is actually the best, all of the top manufacturers will show you test statistics that prove that their products are superior. To be honest they all do the job very well, and if looked after can last for years - saving not only the cost of new batteries, but also the labour involved in changing them and the possible lost income when they fail prematurely and let down a valued customer or disrupt a critical job.

In recent years Trojan has become the battery of choice for many



manufacturers as original equipment on new aerial lifts, taking over a position once firmly held by US batteries. Meanwhile Crown has made substantial progress in recent years as it focuses more intently on the aerial lift market.

Looking at some of the latest developments, Trojan has arguably been the most active in recent years, introducing its Alpha Plus paste with T2 technology and T2 separators. While some of the 'gains' may be down to Trojan's strong marketing than significant technical progress, the company does work hard on small developments which keep nudging its products forward.

## Service counts

Once you have shortlisted the top three or four battery manufacturers the next step is to look at the dealer or supplier. The fact is that as long as you choose one of the better brands, the most important factor on reducing your battery budget is the service available from the supplier. The better companies will offer the service that suits your operation and they will ideally tailor their offer to suit you. This can range from providing a pallet load of batteries at exceptionally keen prices, to supplying individual machine replacement battery packs as required at short notice and even



A classic four six volt battery pack for small slab scissor lifts



Trojan now offers a visual fluid check system and single point top up, entitled HydroLink.



New rules require old batteries to be properly stored, recycled and fully documented.



installing them. And finally ensure all your recycling is done properly including all the documentation which is now required by law. It is worth spending time on building a good partnership with a battery supplier in order to obtain kept prices along with superior service.



### Maintenance-free alternatives

While maintenance free batteries are ideal for engine starting purposes, when it comes to battery power packs the story is different for deep cycle batteries. Valve-Regulated Lead-Acid (VRLA), Absorbed Glass Mat (AGM) or gel batteries, do offer some significant advantages in that they do not require regular topping up of electrolyte levels. They also 'gas' less and are clean and virtually leak free, making them ideal for many applications such as in food

production plants or other clean environments. They are however considerably more expensive, do not last as long between recharges and tend to have a shorter overall life compared to well-maintained, normal 'flooded' lead acid batteries.

### Recharge regularly

The key to long trouble-free battery life involves a few simple rules and procedures, the most important of



which is the regular recharging. This not only applies after each use, but also after periods of inactivity. Lead acid batteries will leak down while

standing idle. Few things damage a battery more than becoming completely discharged and left for any time in this state. Modern battery chargers are all pretty good. Most are automatic and run through a multi stage recharging process that helps prolong battery life as well as ensuring that they are charged close to their maximum capacity. One battery charger that



Larger heavy-duty scissor lifts and mast booms tend to use full traction type batteries

as costing less per charge through energy savings by treating each unit in a pack separately.

### Keeping an eye on battery charge

Significant progress is being made with the accuracy of the battery charge indicators used on both aerial lifts and small cranes, helping users ensure batteries are always kept topped up. Modern machines also use low voltage cut outs to protect the motor control systems that regulate motor speed and provide proportional control. This also protects the batteries from the old issue of running them into the ground and causing damage.

It is also well worth having the specific gravity of each battery checked at the same time as the electrolyte levels. Trojan recommends checking fluid levels every two weeks. If specific gravity values seem to be consistently low it could be caused by not fully charging the batteries, or by the recent addition of water which dilutes the electrolyte at the top of the cell. In both of these conditions, the battery should be given a sufficient equalisation charge that should restore it to ideal levels.

A battery maintenance log should also be kept to record both voltage and specific gravity readings over time. This will help when trouble shooting problems and will force commitment to a regular maintenance plan.

### What about Lithium?

In recent years Lithium ion batteries have progressed from the small units used in mobile phone and similar applications to powering electric cars as well as creeping into the aerial lift market. These larger lithium batteries have also come down in price as volumes increase. Pick & carry cranes and large heavy duty scissor lifts tend to



Maintenance free gel batteries save on topping up and are cleaner but cost more and do not have the same life as regular batteries



Terex Utilities and Versalift are leading the charge towards semi electric and full electric vehicle mounted lifts.

use full-traction forklift-type battery boxes with automatic electrolyte top-up and monitoring, so are less likely to make a switch to lithium any time soon.

Italian spider lift manufacturer Hinowa pioneered the use of lithium batteries in the access market, along with some vehicle mounted lift manufacturers such as Time/Versalift. Spider lifts benefit more than any other lift from the smaller more powerful lithium battery units, in that they need to maintain their compact dimensions and light weight, as well as having batteries for the high power requirements for the crawler tracks. Lithium battery installations on the other hand need to be far more highly engineered than regular batteries in that they can easily overheat and are very expensive to replace. Hinowa carried out extensive tests and trials and took a long time to perfect its lithium battery pack. Since unveiling it in 2009 the company has delivered around 200 machines with lithium power and has now rolled it out across its full range. The effort is well worth it - lithium batteries will last at least five years under normal usage, can be fully recharged from empty in around half the time required for lead acid batteries and provide substantially longer cycle times between recharges. On top of all that they are totally maintenance free.

Other spider lift manufacturers have joined the 'lithium revolution' including CTE and Bluelift, with the latter seeing a sharp rise in customers ordering the lithium option in recent months. Expect to pay a premium of around €5,000 for a lithium battery spider lift compared to an internal combustion powered model.

### Semi-Electric truck mounts

Lithium battery packs are also being specified on a rapidly

increasing number of truck mounted lifts for utility work, forming part of a semi-hybrid type power unit. The batteries are used to power the lift allowing the vehicles large engine to be shut off while the lift is in use, saving fuel and providing a quiet working environment. Users say this is safer and more efficient, thanks to better communication between the ground crew and those in the platform. It is also better when working in sensitive areas, such as near hospital or school buildings, or for carrying out street work in residential areas at night. The shorter recharge times allow the batteries to be fully recharged while the vehicle is travelling between jobs or when heading back to depot.

The big question though is when we might see lithium batteries on small self-propelled scissor lifts or booms? On the scissors - not for many years if ever - the cost is unlikely to ever come close to that of lead acid batteries and with drive systems on these machines becoming more efficient, battery life with the current packs is more than adequate for most applications.

Boom lifts though, especially larger ones, could benefit from the higher power to weight ratio offered by lithium batteries. However one wonders if the recent lithium battery fires that caused the grounding of the new Boeing 787 Dreamliners might slow their uptake in new applications?



Lithium batteries are made in standard formats for heavy duty applications but are not attracting much interest yet for larger equipment.

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