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Better batteries

Each year around this time we take a look at the battery market and technology. Almost all of the products we cover contain at least one battery - ladders and scaffolds excepted - and an increasing number run on substantial often multi-unit battery packs. This has always been the case with smaller self-propelled lifts, but it is increasingly true of small to medium truck mounted lifts and spider lifts, as well as most trailer lifts and a broad range of electric powered pick&carry cranes. Given this fact it becomes clear why batteries are an increasingly important component in the lifting world.

The types of batteries employed falls largely into two camps, although with the emergence of practical lithium battery packs there are now possibly three. On the one side are the full traction batteries used for a long time in the fork truck industry and now used on pick&carry cranes and big scissor lifts, such as Holland Lift's massive 105ft platform height/34 metre working height Megastar G-320EL30. On the other side are the vast majority of aerial lifts with traditional lead acid battery packs - most of them six volt 225 Amp/Hour semi-traction/deep cycle batteries. Full traction batteries tend to be well looked after because of their huge cost and the fact that they are usually equipped with automatic watering systems and more sophisticated electronic protection. So we are focusing most of this feature on smaller batteries.

When it comes to the typical four six-volt battery packs used in small slab scissor lifts, little has changed in the basic technology since such lifts surfaced in the 1970's. However hundreds of small changes along the way have extended battery life immeasurably. Despite this, some rental companies are getting more than twice the life from their batteries than other companies and therefore halving their battery costs.

This saving can be much greater when all related costs of a defective battery and the machine are calculated. A machine with well

maintained batteries is delivered, works faultlessly through the contract and results in a satisfied customer. Conversely an identical machine with poorly maintained batteries can start generating problems on day one if the machine starts cutting out before the shift is over. The customer calls the rental company - which asks him if it was fully charged the night before - the customer says: "yes I think so", since its late they agree to make sure that the machine is fully charged overnight. Next day a similar thing happens, this time the customer is less than amused, the rental company sends out an engineer if he knows his stuff he detects a battery issue either replaces the machine or gets a new set of batteries sorted - either way this is costly and causes more disruption.

The entire affair will have cost four new batteries - at least £300/€375, plus at least one service call-out. It may also include the collection of the faulty machine by truck and delivery of a new one, up to a day of downtime, possibly the crediting of one or two days rental and maybe the loss of a good customer. Total costs for not maintaining the batteries correctly may be double or even triple the cost of a set of new batteries. These days that can equate to five or more weeks revenue or getting on for eight percent of the machines cost new! With some companies this might be the entire net profit on that machine for the year!



C&a

batteries

Thankfully most new lifts use good quality batteries from top-line manufacturers and a far more efficient drive train than in the past, with motor controls, more efficient pumps and motors and on some, direct electric drive. Motor controls also feature thermal and low voltage cut-outs for protection, eliminating the chance of batteries being run down to absolute zero - something that really damages a lead acid battery. In addition most battery chargers are better than they were even 10 years ago and help protect the batteries. So the chances of starting out with a product that is designed to provide a full working life - it takes abuse and poor maintenance to experience regular problems, these days.

Whereas in the past only those companies that worked hard at it avoided battery problems, today good standard routines will almost always ensure a trouble free life - it takes abuse and poor maintenance to experience regular problems, these days.

There are also an increasing number of options available to help extend battery life and reliability further without incurring high service costs most of which we have covered before including battery additives



Additives such as Thermoil claim to extend battery life.

such as Thermoil and more sophisticated battery chargers from companies such as Gantic.

While some say additives such as Thermoil offer no benefit - and may even damage the battery - others, mostly users - say the additive really works. The oil floats on the top of the electrolyte - reducing both evaporation and gassing, two factors that can cause premature battery failure.

Better charging

Battery chargers have come a long way in the past 20 years and the best will now automatically charge the batteries in such a way that they ensure that the maximum charge percentage is achieved and that the batteries are not 'overcooked'. One example of the latest such chargers, the new M&G



The GanticCharger charges individual batteries ensuring a fully balanced battery pack



A classic four, six-volt battery pack

model, is highlighted on our innovations page later in this issue. Another is from Norwegian-based Gantic which charges each individual battery in the classic four, six-volt battery pack, ensuring the battery pack is fully balanced. The added benefit is a measurable power saving, which when multiplied over a decent sized fleet can be quite significant.

In addition to the potential catastrophe of an onsite mid-job breakdown, poor maintenance can easily shorten the life of even the best batteries to 18 months or less. We are not talking abuse here just poor or inattentive service. Consider this - a battery change for a 19ft scissor lift - even in the workshop can easily cost £350 to £400 with parts and labour, with possible downtime on top of that. Just a little attention can easily double the battery life to three years or more,

as well as helping avoid unpredicted sudden battery death. This can provide savings over the life of the machine in a rental fleet of at least £800 to £1,000 and we have not even touched on the environmental issues that an increasing number of companies are keen to stress.

Better battery meters and cut outs.

Most scissor and boom lifts now use some form of Mosfet motor controls and therefore incorporate a low voltage cut-out that kicks in well before power spikes start to occur. These provide excellent protection for the batteries as well as the drive system. However another asset is a decent battery meter providing users with a realistic read-out of the battery life, allowing them to take precautionary steps should they be running low. In the past meters fitted to most platforms were notoriously



A full traction battery in a Manitou VTR lift

unreliable in terms of accuracy. Less so today as the latest indicators, often installed on the control box, are first class although not every manufacturer fits them.

Charging during use

For some equipment, such as trailer lifts, it can be quite practical to operate a battery powered machine while plugged into the AC - some trailer lifts are only AC powered in the first place. Do check that the machine is designed to allow this. Most are usually using a line contactor which effectively disconnects the charging process when a function is operated. The rest of the time the charger will be keeping the batteries topped up. There is a question here though with traditional lead acid batteries regarding battery 'memory'. Such batteries do need a deep discharge every now and again to maintain their full storage capacity. Lithium batteries on the other hand benefit enormously from being kept charged up, with total life being dependent on the number of full recharges they are subjected to.

The lithium option

While the battery industry disagrees



Lithium batteries suit certain products such as compact spider lifts

over when and if lithium batteries will take over as the standard power pack, most admit that the technology does now suit certain products such as compact spider lifts - where power demand is significant and space limited - and certain hybrid or semi-hybrid vehicle mounted lifts. For regular small scissor lifts the challenges are currently too great. The first issue is cost. Although prices are falling and batteries getting smaller they are still way off the cost of a lead acid battery. The fact that they are smaller and lighter is also not an advantage as in booms and scissors the battery forms part of the machines overall counterweight.

Another issue is heat. Larger lithium batteries require a great deal of



A battery powered spider lift can work indoors and out without stopping

cooling, which can easily soak up much of the power they generate, particularly if the system is designed badly. Their benefits however include a longer life - five years on average - faster to charge up, maintenance free and they deliver far more power for the space that they take up. These advantages are of course not insignificant. One

interesting possibility might be renting the batteries. As electric powered cars come to the fore, the idea of renting or leasing the battery pack - saving on operational costs - is growing in popularity. Who knows the leasing of battery packs to rental companies might be a business of the future?



Hinowa has pioneered the use of Lithium batteries in aerial lifts - here on its 23 metre spider lift



Battery types

Standard 'heavy duty' lead acid battery: total waste of time and a totally false economy that very quickly becomes self-evident. Don't buy at any cost.

Lead acid semi-traction/deep cycle batteries: The ideal battery for all small to medium aerial lifts. Buy a good one from one of the major manufacturers - they are not that much more expensive and well worth the small premium.

Full traction batteries: Best for large booms, scissors and cranes or for machines where space is not uniform such as mast booms. Perfect for larger or heavier units but make sure that they are extremely

well maintained. If not the replacement costs can be substantial.

AGM maintenance free: OK for light duty applications where cleanliness is critical and maintenance not likely. BUT better to spend a little more for a full gel battery.

Gel battery: ideal for clean environments and as a maintenance-free option, but don't expect quite the same life as a regular semi-traction battery.

Lithium: Only practical when designed in, small cells are now coming on the market, but they are expensive and may need special cooling.

COMPETITION...

It Brings Out the Best in Us

The reliable operation of aerial work platforms and lift access equipment is essential to helping you get to those hard-to-reach work places.

Trojan Battery understands that **reliability means everything** to your operations day in and day out. That is why we offer the broadest portfolio of quality, deep-cycle batteries to fit your every need.

Put our 85 years of battery expertise to work for you - Trojan Battery - for maximum productivity and worry-free operation.

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The one stop battery shop

Manbat claims to be the UK's largest battery distributor, especially since it increased its presence in the industrial battery sector with the acquisition of East Kilbride-based Battery Power Systems (BPS) a few months ago. The enlarged company is now forecasting sales of 1.2 million batteries this year - about 35 percent in the industrial/recreational sector - with sales approaching £46 million. The acquisition also strengthens Manbat's position within the industrial battery sector which has grown to £9 million.

While most of its business is in the automotive sector with brands such as Varta, Lucas and Numax, BPS supplies the forklift, floor-care, emergency power and electric vehicle sectors with batteries, chargers and service from Slovenian manufacturer TAB - the third largest manufacturer in Europe - and US Battery an OEM supplier to many aerial lift manufacturers.

BPS has three depots - East Kilbride, Washington Tyne and Wear and Bristol - offering nationwide coverage including 21 engineers, and has many customers in the lifting sector including Terex/Genie, JLG, Skyjack, Snorkel and rental company A-Plant.

Manbat is part of the Ecobat group, a leading supplier of lead, 80 percent of which is recycled from scrap sources ie batteries. With 25 operations and 2,700 employees it has an equal market share in North America, Europe and South Africa supplying about 20 percent of the total global lead requirement.



High quality wire is produced through recycling

The company also operates a scrap collection business and is market leader in the UK through G&P Batteries, which has 30 years of experience dealing with all aspects of the process from collection to recycling. Its primary activity however is the conversion of waste batteries into high quality finished products such as lead shot, strip, ingots and wire. The plastic casing and sulphuric acid are also recycled and used in recycled plastics, while the acid is used in the gypsum industry. In fact 99.8 percent of a battery can be recycled the only waste is the slag produced in the smelting process.

The 2006 European Batteries Directive 2006/66/EC requires member states to meet certain collection and recycling targets for all batteries including automotive, industrial and portable. There are no specific targets for industrial batteries (or automotive) however both the incineration and sending to landfill are prohibited, so by inference, there is a 100 percent collection target.



To make things clearer, the definition of an industrial battery is one "which is designed exclusively for industrial or professional uses, is used as a source of power for propulsion in an electric vehicle, is unsealed but is not an automotive battery, or is sealed but not a portable battery.

The introduction of this legislation has increased the number of waste batteries to be collected. Waste batteries are generally classified as both Hazardous Waste and Dangerous Goods and while many are benign, some are quite volatile and should be treated with respect. The correct use of suitable containers and a common-sense approach minimises risks. The vast majority will have some sort of caustic electrolyte inside which can explode if broken open or heated. Therefore when you have decided to dispose of them, make sure they are placed where they will not get damaged or overheated - even when they are 'dead' most still have some charge remaining.

G&P operates in four areas:

Bank - where batteries are stored and awaiting collection.

For the larger industrial batteries two sizes of plastic bins are available the larger measuring 763mm high by



A recycled lead ingot

1,000mm wide and 1,200mm long. **Collect** - using a dedicated fleet of vehicles for nationwide collection even large battery installations such as telephone exchanges and power stations.

Sort - where batteries are taken to its Midlands head office where they are sorted into more than a dozen different battery chemistries.

Recycle - identifying the most suitable route for recycling or if this is not possible the most appropriate route for safe and compliant disposal. Recycling processes fall into two basic categories - pyrometallurgical where a furnace is used to recover the metals and hydrometallurgical where chemicals are used to rescue the metal.

The positive end result of this is that batteries have almost a 100 percent recycling capability and therefore worth a reasonable amount when their useful life is over.

