

Mobile power houses



Batteries are a critical element in the powered access and lifting world with seven out of 10 self propelled aerial work platforms powered by lead acid batteries. In the crane market, only the industrial pick and carry cranes are currently battery powered. However at least one manufacturer - Mr Gru in Italy - has developed a fully battery powered city crane. Of course, every regular crane on the market relies on a battery or two to get started every morning. The technology used in a lead acid battery has hardly changed in over 70 years and traditional lead acid cells are the mainstay of the industry. That could be about to change.

'Idiots buy cheap'

While lead acid battery technology may hardly have changed, it is also true that manufacturers specialising in the provision of deep cycle batteries for aerial lifts or other heavy-duty applications have been constantly refining and updating their offerings. This has now reached the point where the better-made batteries installed by manufacturers so outshine their cheaper substitutes that only an idiot would fit a low cost alternative. Using cheap generic batteries will, over a two to three year period, easily cost double or treble that of a quality product, not to mention the downtime costs involved and the customer irritation that it can cause.

Gel comes of age

Within the traditional battery technology the gel battery is finally coming of age. While this low maintenance battery has been around for quite a while, it is only recently that the mainstream, deep-cycle battery producers such as Trojan have felt comfortable developing and promoting them for aerial lift

applications. Trojan launched its new six volt deep-cycle gel battery, early last year and reports strong sales particularly in continental Europe.

The UK and Ireland on the other hand have been very slow to move to gel batteries with the exception of companies responding to particular end-user requirements. It is possibly this growing end-user demand will inevitably move more rental companies over to gel rather than the attraction of its other main benefit of being virtually maintenance free.

An increasing number of aerial lift users ranging from food plants to airports and hospitals are banning traditional lead acid wet batteries from their premises. Gel batteries are seen as cleaner and safer so this demand is likely to spread steadily across an increasing number of premises as more facility managers dig deeper into risk assessments and realise that gel batteries for aerial lifts are now widely available.

Should you switch to gel?

So should you switch your electric fleet to gel? Here we look at the main factors affecting battery choice with the pros and cons of gel compared to regular lead acid batteries.

1. Cost: This is certainly the main reason why gel batteries have not yet taken off in the UK and Ireland. A regular top quality lead acid battery

can be sourced for around £65 if purchased in volume. A gel battery from the same supplier is likely to be double that. So a full four battery power pack for a slab scissor lift will cost £520 compared to £260. This can of course be offset by the elimination of battery testing.

2. Life span: This argument can go either way. On the one hand a good gel battery used in an aerial lift application will last around two years before it needs to be replaced. On the other hand a good quality traditional wet battery will, if well maintained, last around five years, perhaps longer. However, if you look at statistics

compiled by battery companies that specialise in the deep cycle batteries

commonly used in lifts, it is interesting to compare the life expectancy for an identical battery when used in golf carts (five years), cleaning machines (three years) and aerial lifts (two years). The fact that aerial lift companies are currently only achieving a two year lifespan due to poor maintenance, means that for most companies there is no life span downside for gel batteries and companies can ignore battery maintenance with a clear conscience.

3. Cleanliness and safety: No question, on this issue the gel battery is cleaner and safer than the traditional wet battery. It can be



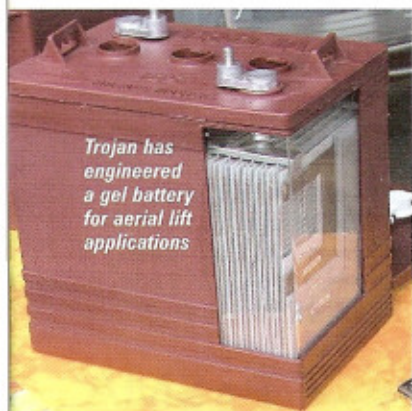
Pick and carry cranes and the largest scissor lifts use full traction fork lift type battery packs

tipped on its side or even upside down and it will not leak. For this reason alone many companies are specifying that only sealed batteries are used on their premises. The sealed maintenance-free alternative to gel is Absorbent Glass Mat (AGM) in which the electrolyte is absorbed into a fibreglass mat. While being an excellent battery for starting or standby, they do not respond well to the deep discharges required in aerial lift applications and are not therefore a practical alternative.

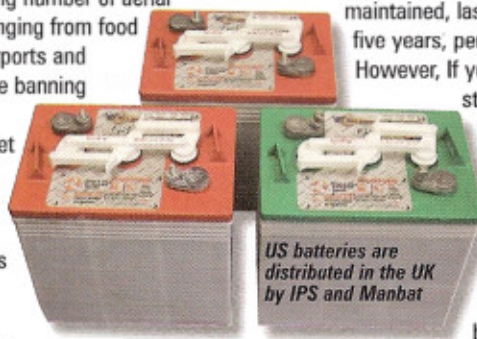
The future is bright

However if we look beyond the aerial lift market to the world of electric delivery vehicles, not to mention cars of course, the pace of development is blistering, reminiscent of the rapid progress made a few years back with mobile phone and laptop batteries and systems.

There has been more development over the past seven years in this area than in the previous 70! And yet over the next five years the pace is likely to be even more rapid and could easily spell the beginning of the end for the lead acid battery as we know it.



Trojan has engineered a gel battery for aerial lift applications





Batteries should be easily accessible

Not only is progress rapid, but high tech expensive technology such as Lithium Ion Phosphate batteries are plunging in price making them practical and cost effective at the top end of the vehicle market offering more power and longer periods between charges for a given size while also providing rapid recharging times. Start talking with the real battery enthusiasts and they witter on about the huge strides being made in battery chemistry, the potential of nano technology and the virtues of Nickel Cobalt for starting batteries, with its high power to weight ratio, strong performance when cold and better turning power.

However, when it comes to traction or deep cycle power, the nirvana is currently the Sodium Nickel Chloride battery with its amazing density. With a price of around £6,000 for a set to power an average car it is currently cost prohibitive although this could rapidly change as the focus on electric vehicles gathers pace.

A Zebra sodium nickel chloride battery as used on SEV's Newton delivery truck.



If we look at where these new batteries are likely to be produced you need only to look east to China where a number of companies are evaluating the new technology with the aim to be in pole position on the grid as the price barriers fall and volume escalates. The Chinese battery industry has not been at all successful with quality deep cycle batteries - the vast majority of these are still produced in the USA - however by concentrating on future battery technology it is entirely possible that they will leap frog western battery producers.

It is entirely possible, perhaps even likely that electric booms and larger scissors coming off-line in 2012, just as the UK Olympics get underway, are powered by batteries totally different to the ones we are all familiar with today.

When it comes to smaller machines it is hard to see the new technology replacing lead acid batteries any time soon. What might change is better built in battery monitoring and improved three stage battery chargers. As new production facilities come on stream we are also likely to see the cost of gel batteries fall until they are competitive with wet batteries.



How to get five years from your batteries

By looking after your batteries it is easily possible to more than double their life expectancy saving substantial sums in terms of replacement cost, which includes both the purchase price for a new set of batteries and installation manpower.

Inspect batteries regularly

- Keep them clean
- Make sure cables are properly attached and in good condition
- Check for any cracks and leakage (catch cracks early and they can be repaired)

Keep batteries well charged

- Leaving batteries in a prolonged state of discharge is one of the most harmful things you can do to a battery. Make sure that users understand the need to recharge batteries every night in order to keep them topped up. Machines coming back from a rental contract should be put on-charge as soon as they return to the yard.

Keep electrolyte topped up

- Ideally top up batteries with distilled water only after charging
- If the level is so low that the plates are exposed to air, add just enough water to cover them, charge and then top up.
- Never add acid to a battery - a surprising number of batteries are damaged by people topping up with acid rather than water.



Hydrometer

Test batteries regularly

- For specific gravity
- For voltage

This will warn of an impending problem and it could save a field call and an on-site battery or machine swap.



battery voltage tester

Don't let batteries freeze

Don't leave a machine where the batteries can freeze, a fully charged battery will resist freezing more than a discharged one. A machine that is stored outside in the depths of winter with flat batteries will suffer badly.

It's not just the battery cost

Don't forget that the replacement cost of a battery pack is far more than the cost of the batteries themselves. There is the labour to remove the old and install the new, batteries need to be conditioned to achieve peak performance and finally when batteries start to fail they will begin to let users down with shorter working times between charges. This can easily cost a day or two rental, an extra delivery cost and an irritated customer.

Recycle

One last thought the battery directive will require a major shake up in battery recycling in 2009 that will force every user to play their part. In the meantime don't overlook the fact that a four unit deep cycle battery pack will fetch £32 in scrap!