Cross Company

Five Reasons To Choose Lithium Over Lead-Acid Batteries

The mobile equipment market is moving steadily towards more electrification. As this occurs there is a growing demand for quality batteries for this equipment. The inevitable debate that comes up is whether to go with traditional lead-acid batteries or lithium-ion batteries. At Cross, we believe that lithium-ion batteries are the future for mobile equipment energy storage, so we've put together a list of the top reasons we prefer lithium to lead-acid.

1. Longer Service Life
Although the initial cost of lithium batteries is higher, their exceptional capacity and service life make them a much more cost-effective option in the long term. Lithium batteries can last up to 10 times longer in life than lead-acid batteries under most conditions. This brings the cost per hour of lithium lower than that of lead-acid, and also means the lithium pack will be replaced far less than the lead-acid.

2. Increased Capacity
Less charging, more working. Batteries aren't fully discharged when they are used in order to increase their lifespan. For lead-acid, this means only discharging down to 50% capacity, and any discharge beyond that puts the battery lifespan at risk. Lithium on the other hand has a higher depth of discharge (DOD) so it can be discharged down to 20% capacity, giving it a higher usable capacity.

3. Efficiency
Lithium is more efficient than lead-acid. Lead-acid batteries are around 80% efficient while lithium is around 95%. This means lithium batteries charge faster, as more energy is put into the lithium system in less time. Likewise for discharging, more energy is available from a lithium battery due to its increased efficiency.

4. Energy Density
Battery energy density is the measure of energy in proportion to the pack size, typically in Watt-hours per liter. Lithium can range from 200-600 Wh/L and lead-acid ranges from 60-200 Wh/L. This means in the same volumetric space, lithium can have up to 10 times the capacity of lead-acid. This translates to more space available for other components on a vehicle. Additionally, a high energy density means less weight which translates to more vehicle range.

5. Increased Insight from the BMS
Lithium batteries need a battery management system, or BMS, to operate. The BMS prevents operation of the battery outside of each cell's safe operating conditions, balances the cells to prevent mismatch, and communicates battery parameters and operating conditions with the operator, typically via CAN networks. If the BMS senses a fault, it will automatically shut off the battery's internal contactors disconnecting it from the machine to prevent damage and maintain safety.

Lithium-ion batteries can help you improve the quality of your machine by helping it to operate more efficiently. If you are interested in learning more about energy module options for your mobile equipment, contact our experts today to determine what is best for your specific application.