Forklift Battery Handling Equipment for Park & Charge Applications

Park & charge technology is touted as an alternative to the conventional battery room. In the warehousing industry, where square-footage translates directly into revenue, that claim gets a lot of attention. But without battery handling equipment, forklift batteries will eventually wither and fail, leaving fleet managers scrambling for costly replacements.

It is true that park & charge strategies can greatly reduce the number of battery changes required to keep forklift fleets running. But that fact side-steps a more pertinent consideration: There is more than one reason to pull a battery out of a lift truck. In fact, there are many, and managers ignore them at their peril.

In this paper, we will examine the industrial history of park & charge technology. Then we will explore some of the scenarios in which operators must remove batteries from lift trucks — or replace them outright — at facilities that use high-capacity chargers. We will conclude with suggestions for battery handling equipment that help to make a park & charge strategy viable.

A Brief History of Park & Charge Technology in the Warehouse

First, it is important to understand the differences between park & charge systems (sometimes called “fast charge technology”) and conventional chargers, a difference that goes back to the genesis of the high-capacity charger.

Fast charge pioneers like Minit-Charger and Posicharge developed the technology in the 1990s. They were hoping to stay ahead of changing environmental standards in California. At the time, the state was cracking down on motor vehicle emissions, and the race toward the electric car was in its first lap. To mimic the gas-station model drivers were used to, electric cars would need a charger that could quickly restore battery capacity.

There was a problem, though. By 1996, the fast chargers were ready, but the cars themselves were not. Peter Michalski, managing director of Minit-Charger, told industry news site ForkliftAction.com what happened right before park & charge technology hit the warehousing scene:

> “The high-powered fast charger was originally created for use in electric cars. Eventually, the limited range the cars offered did not win sufficient mainstream customer attention... Subsequently, some customers in the forklift industry saw the opportunity to apply fast-charge technology to their forklift fleets…”

As a technology that was originally intended for a different purpose altogether, it’s no wonder that high-capacity chargers overlook some of the unique challenges of forklift batteries. Conventional chargers were designed specifically for forklift batteries, and integrate with an existing suite of battery handling equipment that ensures the longest possible lifespans for batteries. But there is a way to combine the best of both technologies.

Is Park & Charge the Technology of the Future? Maybe. But Not On Its Own.

Most industry analysts agree that lead-acid batteries will remain a major source of motive power for forklifts well into the foreseeable future. Technological progress will come from improvements on batteries and chargers, but will probably not fundamentally change the electro-chemical processes that power electric lift trucks.

For indoor motive power, the industry overwhelmingly prefers lead-acid batteries, which are sensitive. Without a comprehensive maintenance plan, they quickly lose capacity as sulfation sets in. That is only one of the factors that go into optimal battery life, a subject not addressed by park & charge systems alone. Simply installing fast chargers in a facility may lead to greater fleet efficiency, but only when decision makers also address the following issues:

- **Electricity requirements within facilities** - Conventional chargers power batteries at a rate of 12-18A/100Ahrs. High-capacity chargers provide 40-60A/Ahrs. The greater electrical requirements in park & charge systems may be too much for a facility’s existing electrical service, necessitating costly upgrades.

- **Lead-acid battery cycle limits** - Most forklift batteries contain enough active material for about 1,500 full charging cycles. After that, they must be replaced.

  Forklift consultant Scott McLeod warns that park & charge applications will burn through active material much more quickly than conventional systems, which provide lift trucks with two or three batteries to cycle between.

  “Think of the battery as fuel and only fuel,” McLeod wrote in Material Handling & Logistics.

  In order to replace this fuel, even park & charge systems need capable forklift battery changers, like the Automatic Transfer Carriage (ATC) from Battery Handling Systems.

Figure 1. Strategically placing a Hydrogen Exhaust Gas Detector and fan (HEF-KIT) throughout a facility provides a safer park and charge environment as well as OSHA compliance.

- **Existing federal safety regulations about battery charging** - A standard from OSHA, 29 CFR 1910.178(g)(2), states that “Facilities shall be provided for... adequate ventilation for dispersal of fumes from gassing batteries.”

  That requirement makes sense. During the final stages of the charging process, batteries emit hydrogen, which creates a serious explosion and fire risk when it accumulates at a concentration of four percent or greater.

  Conventional charging applications solve this problem by localizing their chargers in an area with powerful ventilation systems: the traditional battery room. A huge part of the appeal of fast chargers is their distribution throughout the facility, though. That limits charges to only about 80 percent capacity, above which gassing would outstrip the limits of danger.

  Cautious users of park & charge systems may still want to install Hydrogen Exhaust Fan Kits (HEF-KIT) strategically throughout the facility. While hydrogen production is strictly limited in park & charge applications, some gassing may still occur.

- **Forklift battery maintenance requirements** - To realize the full potential of a battery investment, frequent maintenance is essential. Trade publication Material Handling & Logistics recommends watering battery cells on a weekly basis, and cleaning the tops of battery cases at least once a month. Once or twice a year (or more, depending on usage, maintenance, and environment), batteries should be thoroughly cleaned in a Roller Wash Station (RWS) or, even better, an automated Battery Wash Cabinet (BWC).

  For all of these crucial maintenance tasks, staff will need dedicated battery handling equipment to remove batteries and replace them when the job is complete. For lift trucks with battery cases designed for vertical extraction, that means a Non-Power Drive Gantry Crane (PGC) at the very least. Forklifts designed for side extraction will rely on a battery Bridge Trolley (BT), Battery Transfer Carriage (BTC), or Automatic Transfer Carriage (ATC).

- **Battery replacement** - Even the most well-cared-for battery will eventually fail. Rather than relying on third-party providers to replace batteries when that happens, facilities with on-site battery extractors can quickly return their lift trucks to active duty with a new battery.

Figure 2. BHS Battery Service Stands (BSS) make battery storage during maintenance tasks simple, safe, and ergonomic.

Industry experts like Dr. Nasser H. Kutkut of Power Designers USA, a manufacturer of industrial battery chargers, say that some facilities will still realize substantial benefits from park & charge systems.

The ideal candidate for park & charge technology runs multiple shifts per day, with enough break time for frequent opportunity charging, Kutkut wrote in Material Handling & Logistics. This may be true, but those operations will still need plenty of traditional battery handling equipment to make their motive power plan pay off.

The Combined Park & Charge/Battery Handling Solution

Despite the claims of park & charge advocates, no forklift battery fleet is complete without some amount of battery handling equipment. For all the reasons outlined above, every facility — especially those who implement park & charge systems — should, at minimum, keep the following equipment on hand.

1. **One or more battery carts or carriages** - Whether it is a simple and affordable Walkie Transfer Carriage (WTC) or a fully automated Mobile Battery Extractor (MBE), every facility needs some way to remove and replace forklift batteries. Machines built specifically for that purpose reduce risk to staff and protect equipment during every change-outs.

2. **Charger stands** - A large part of the appeal of park & charge technology is the ability to charge forklift batteries at multiple locations in the facility. Chargers can be located right outside break areas, for instance, reducing travel time for greater operational efficiency.

   No matter where they are located, though, fast chargers should be mounted on stands to protect them from forklift strikes and keep all cabling out of travel paths. High Frequency Charger Wall Brackets (CWB-V1), Vertical Charger Stands (CS-VMP), or Dual Charger Stand Kits (CS-VHK) provide solutions to match various charger designs.

3. **Structural barriers** - Federal regulations, including OSHA's 29 CFR 1910.441(b)(1), require employers to protect battery chargers from "damage by trucks." Strategically placed Structural Bollards (SB) meet this requirement, and prevent potential damage to the significant investment of a high-capacity charger.

4. **Battery stands** - While park & charge applications do not require two or three batteries per forklift like conventional solutions, keeping a fleet of spare batteries can maintain optimal productivity even during maintenance or repair on primary batteries. Therefore, some sort of battery storage equipment is a must. Battery stands with acid-resistant poly roller beds, like BHS Battery Roller Stands (BS), provide the greatest combination of stability and ease during change-outs.

Figure 3. BHS Charger Stands come in a variety of shapes and sizes and provide a solution for complying with OSHA 29 CFR 1910.441(b)(1).

A 2008 article in the journal Industrial Safety & Hygiene News tells the story of a manufacturing company that made the leap from LP gas to an all-electric forklift fleet. The journal quotes the company's maintenance manager as saying:

> "Space is limited and installing battery-charging bays with overhead hoists, venting hydrogen gas during charging cycles, and exposing employees to corrosive liquids made the selection of conventional electric operated forklifts unattractive. When we explored the issue further, we found that electric forklifts using advanced fast charge technology would provide the best [environmental, health, and safety] benefits."

All of the manager's concerns could have been addressed by the smart use of battery handling equipment. But if the company didn't include at least a few pieces of battery handling machinery along with the fast chargers, they would soon have bigger problems. Rather than pitting park & charge systems against optimized conventional chargers, it is time to consider the strengths of each technology, and to use them together for better fleet management in the years to come.

References:

Densham, Annette. "Lead acid batteries here to stay." Forkliftaction. Forkliftaction.com, 25 Sept. 2008. Web. 9 Apr. 2016.

Dickinson, Blake. "Chargers ain't chargers." Forkliftaction. Forkliftaction.com, 6 Nov. 2014. Web. 9 Apr. 2016.

Faust, Brian. "Proper Care, Safety and Maintenance of Forklift Batteries." MHLNews. Material Handling & Logistics, 21 Nov. 2014. Web. 9 Apr. 2016.

Jerram, Lisa. "Lead-acid rules as forklift battery, but alternatives pursued." SAE. SAE, International, 1 May 2014. Web. 9 Apr. 2016.

Kutkut, Nasser. "Is Fast Charging for You?" MHLNews. Material Handling & Logistics, 1 June 2007. Web. 9 Apr. 2016.

Liew, Christine. "Fast charging — what is it?" Forkliftaction. Forkliftaction.com, 23 March 2006. Web. 9 Apr. 2016.

Markiewicz, Dan. "What is an e-forklift fast charge? This advanced technology has many EHS benefits." Industrial Safety & Hygiene News 2008: 20. General OneFile. Web. 9 Apr. 2016.

McLeod, Scott. "Forklift Fast Charging: the Positives and Negatives." MHLNews. Material Handling & Logistics, 1 Nov. 2010. Web. 9 Apr. 2016.

"Powered industrial trucks - 1910.178." OSHA. Occupational Safety and Health Administration, United States Department of Labor, n.d. Web. 9 Apr. 2016.

P.O. Box 28990 • St. Louis, MO 63132 USA • 1.800.BHS.9500 • Fax: 314.423.6444 • Email: sales@bhs1.com • Web: BHS1.com