ELIMINATING VARIANCE WITH POWER MANAGEMENT PROGRAMS

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The uptime of equipment in manufacturing facilities and distribution centers is essential for operational productivity. But the motive power necessary to limit downtime is perhaps the most overlooked, undervalued element of operations management.

In most cases, batteries that power lift trucks, reach trucks and order pickers represent about 20 percent of the per-unit cost of a truck. However, little attention is paid to the maintenance of batteries, chargers and best practices for managing power. As companies continue to struggle with hiring and employee retention, tasks such as watering of lead-acid batteries, for example, is often neglected, leading to cost overruns, the voiding of battery warranties and downtime.

Battery system maintenance is equally as important as scheduled maintenance of brakes, tires and hoses. A proactive plan for managing motive power is a critical component in maximizing the lifetime of assets. This whitepaper explores power management programs as an intentional approach to eliminating variance that leads to better cost control, predictability and safety of operations.

MOTIVE POWER NOW ON THE RADAR

As long lead times for lift trucks linger, companies are no longer able to mask motive power issues with short leases and equipment exchanges. And as labor shortages continue, understaffed and overwhelmed facilities are skipping protocols for regular battery maintenance, such as watering—the most important step in maintaining the life and peak performance of a lead-acid battery.

Additionally, companies looking for greater throughput are replacing battery rooms and battery swaps with fast-charging and opportunity-charging options.

Manufacturing and distribution facilities are beginning to realize that motive power can no longer be an afterthought in the dynamic world of material handling. And equipment suppliers are recognizing that power management is essential to a positive customer experience.

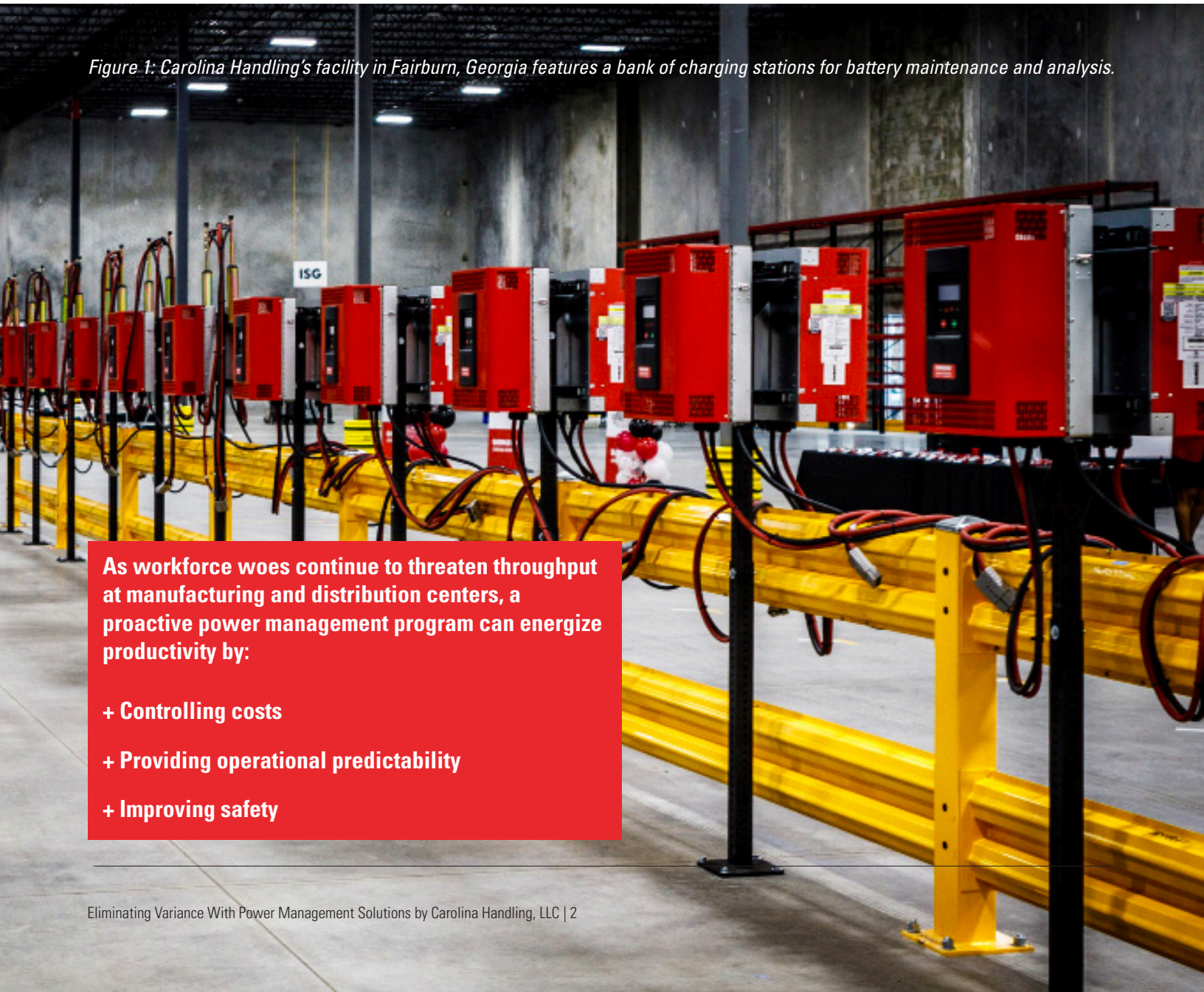

Figure 1: Carolina Handling's facility in Fairburn, Georgia features a bank of charging stations for battery maintenance and analysis.

As workforce woes continue to threaten throughput at manufacturing and distribution centers, a proactive power management program can energize productivity by:

+ Controlling costs

+ Providing operational predictability

+ Improving safety

INTRODUCING POWER UP

At Carolina Handling, enhancing the customer experience includes POWER UP Battery Management Programs, an innovative, intelligent approach to power system management that is designed to ensure battery integrity and reliability while reducing the total cost of ownership.

Using an initial power assessment, along with many years of experience at hundreds of companies in dozens of industries, Carolina Handling customizes power management programs to match the applications and unique needs of individual customers.

POWER UP

	Scheduled	Standard	Comprehensive
Maintenance	✓	✓	✓
Watering	✓	✓	✓
Liquidization	✓	✓	✓
Inital Consultation	✓	✓	✓
Breakdown / Repairs	🕒	✓	✓
Parts & Freight	🕒	✓	✓
Cells	🕒	✓	✓
Abuse / Misuse	🕒	✓	✓
Data Collection		○	✓
Hardware		○	✓
Reporting		○	✓
Ongoing Consultation		○	✓
Battery & Charger			✓

✓ Included ○ Optional 🕒 Time & Materials

Figure 2: Components of Carolina Handling's POWER Up Battery Management Programs.

CAROLINA HANDLING POWER UP PROGRAMS INCLUDE

+ **Scheduled Power Management** which offers foundational battery maintenance, watering, equalizing and insights into improved power utilization.

+ **Standard Power Management** which features all components of the Scheduled program plus costs such as parts, freight, bad cells and misuse.

+ **Comprehensive Power Management** which features all components of the Scheduled and Standard programs with an included battery and charger, plus automated data collection, hardware, reporting and ongoing consultation, all as a monthly service.

EQUALIZING COSTS

Power management programs create a predictable experience at a predictable cost. Much like comprehensive fleet maintenance, where costs are consistent over the course of a contract, power management programs can be used as a budgeting and planning tool.

One of the most cost-effective ways for a company to manage a power management system is to place it on a Fair Market Value lease and have its staff handle maintenance and repair. However, that scenario is typically not feasible for high-throughput, larger organizations.

Figure 3: A power management system ensures that an electric lift truck fleet operates at full capacity.

Cost controls are put in place using an upfront power assessment that determines the optimal battery and charger solutions for an industrial electric fleet. Components of the study consider facility environment, energy usage, power availability, time to charge and battery health. The assessment compares the operational and financial performance of various solutions based on a company's unique applications.

The power assessment helps ensure a properly specified system, with a coordinated service and warranty program that eliminates cost overruns due to improperly sized or poorly maintained equipment. It allows suppliers to gain an understanding of each truck's day-to-day usage, including power demand and charge time, to help ensure the proper batteries and chargers are implemented with new equipment.

Most often used in preparing a proposal for new systems, power studies also can be used to examine existing operational systems for diagnostic purposes. To accomplish this, a site probe is used to connect the truck and its battery, staying with the truck if the battery is changed. It records data continuously throughout the workday to evaluate when and how much energy is required.

POWER ASSESSMENT OPERATIONS PROFILE

A Power Assessment measures the following elements to provide a thorough understanding of how each lift truck type operates, pinpointing the power required to keep the lifts running every shift, every day.

- Shift schedule / hours per shift (per lift type)
- Operating days per week
- Lunch / breaks / shift changes (per shift)
- Start and end time for each shift
- Quantity of each truck type / model in operation (for existing electric users)
- Quantity of each truck type being quoted (for existing nonelectric users)

A power assessment can include a demo to help confirm that the proposed system can meet the operation's power needs. It also provides the power management supplier with further data for system approval. Once approved, system installation and training take place to ensure proper utilization and a positive ownership experience.

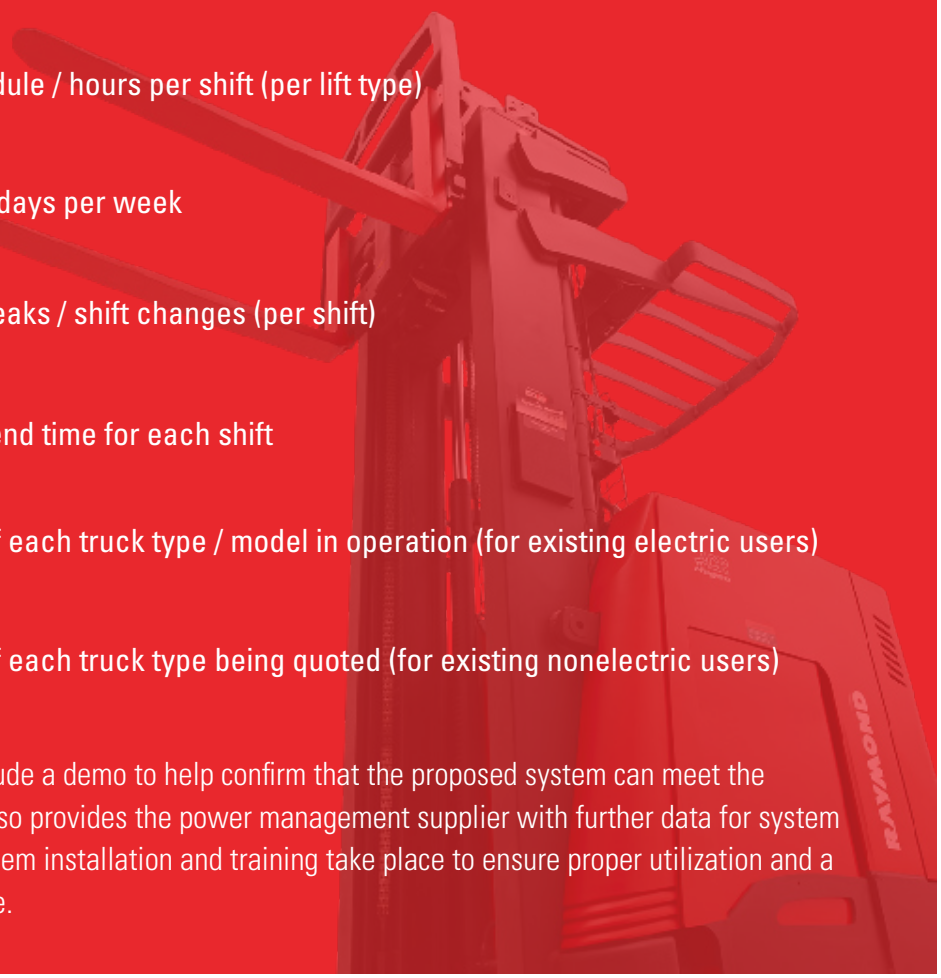

Figure 4: Components of a Power Assessment Operations Profile.

PREDICTABILITY OF OPERATIONS

Unplanned downtime costs industrial manufacturers as much as $50 billion a year, according to a study conducted by *Forbes*, with 82 percent of companies reporting at least one unplanned downtime incident over the past three years.

Research shows that preventive methods are better at boosting uptime and keeping production running, but many facilities rely on reactive maintenance that is performed after equipment has broken. In the case of motive power, simple maintenance tasks such as the watering of batteries often is not performed at all.

A power management system ensures that an electric lift truck fleet operates at full capacity, providing proactive and reactive maintenance services, along with innovative application management technology to help maximize equipment availability and minimize downtown.

Implementing the correctly specified battery and charger solution allows a company to get the most power and productivity from its lift truck fleet. Proper installation and maintenance of power systems keeps batteries and chargers in optimal working condition over the lifetime of assets, eliminating operational variance.

IMPROVED SAFETY

Batteries of all types store large amounts of energy that can escape in the form of heat, spark and fire, and can cause serious injury if not handled correctly. According to the Transportation Research Board, battery explosions cause 22,000 injuries annually.

A power management program reduces risks associated with the installation, handling and maintenance of batteries and chargers. Motive power experts will ensure that chargers are installed correctly and are programmed properly to eliminate any miscommunication between the charger and battery that can lead to overheating and a decreased lifecycle.

A foundational battery maintenance program also assures proper inspection, cleaning, watering and equalizing of batteries. Trained battery technicians will perform physical inspections, check energy output of chargers and measure and record cell voltage and specific gravity. This is especially important in a facility with a mix of assets.

A PROGRAM FOR EVERY NEED

While lead-acid represents the majority of battery systems in the North American market, emerging technologies such as lithium-ion and gel-type batteries are gaining attention.

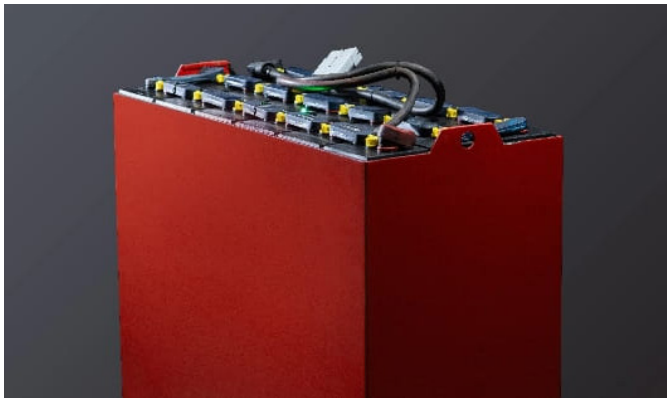

Figure 5: Lead-acid battery

Figure 6: Lithium-ion battery

Customers are willing to pay three to fours times more for a lithium-ion battery to get away from something as simple as watering batteries, power management specialists say, which makes it evident that power system maintenence is an ongoing issue.

In addition to no watering, a primary advantage of a lithium-ion battery is a charge that is up to two times faster than lead-acid—a benefit for time-sensitive applications where trucks have high utilization and fewer break intervals.

Lithium-ion may also be a solution for high-throughput applications such as a facility running three shifts or operating seven days per week.

CONCLUSION

A power management program is a proactive, strategic approach to charging your lift truck fleet and optimizing uptime.

Whether a company is using long-standing or emerging technology, a power management program is a useful asset management tool. A power program designed using data from a power assessment study will help eliminate spikes in costs and improve predictability of operations and safety. Most importantly, it will keep your fleet running.

Carolina Handling's POWER UP Battery Management Programs are scalable for every size and type of operation as needs change and can be customized to meet a facility's unique needs. POWER UP programs offer an innovative approach to management of motive power systems and are a step toward helping companies find ways to be more efficient as new technologies such as wireless charging for automated trucks and the use of solar power for lift truck operations emerge.

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