When is it time to replace your printer battery? Before it's too late.

TIMELY BATTERY REPLACEMENT IS CRITICAL TO ENSURING OPTIMAL PRINTER PERFORMANCE AND PRODUCTIVITY

Batteries operating at less than full capacity can impact the performance of your mobile printer and the productivity of your workers. Today's state-of-the-art lithium ion batteries come with many benefits, including low weight, easy maintenance, high energy density and low discharge rate. But no battery lasts forever, and as lithium ion batteries age, their performance degrades.

Variables Impacting Printer Battery Performance

A number of variables can impact printer battery performance, including: the type of applications supported, the printer's usage profile, storage conditions and environmental factors, to name a few. Even standard usage and regular charging will decrease a battery's functionality over time.

APPLICATIONS

Mobile printer batteries that support applications with heavy printing requirements, such as warehouse picking applications, will degrade faster than those with lighter printing requirements. In general, printers that are used heavily over an 8 to 10 hour shift and charged daily will require replacement earlier than printers that are used sparingly and charged every few days.

As mobile printers become more mission-critical, the reliability of the printer and battery life become essential. Imagine being unable to complete your product delivery route due to a battery that is past its useful life. The driver has no choice but to return to headquarters to replace the battery. This not only impacts the ROI for the company but decreases satisfaction for the end customer.

USAGE

How you use your mobile printer can further affect battery life. For instance, battery life will vary based on print speed, print darkness, print coverage and extreme environmental conditions. It is important to be aware of how usage conditions affect the life of your battery so that you can ensure you have enough battery life to power your printers for an entire shift.

ENVIRONMENTAL FACTORS

Many unavoidable environmental factors can accelerate the degradation of your mobile printer's battery, including exposure to temperatures above 60°C/140°F or below freezing. If a battery is used heavily in sub-freezing temperatures, for example, efficiency can be reduced as much as 60%.

Ultimately, printers that operate in challenging environments will require more frequent battery replacement than those operating in typical environmental conditions. This is why Zebra suggests that enterprises use tools to track their battery health – so they can see whether a battery will last a full shift before the shift even begins.

UNDERSTANDING THE OPERATIONAL IMPACT

Even a small reduction in battery output and performance can dramatically impact your business operations – even if your battery is still able to last a full shift.

Printers that are using aged batteries can experience operational issues such as shutting down in the middle of a print job or a noticeable degradation in print quality or print speed.

In many cases, companies mistakenly send a mobile printer into service for repair, thinking it has malfunctioned — only to discover that the battery was actually at fault. There are hidden operational costs associated with mobile printers that are diagnosed as no-trouble-found (NTF) due to poor performing batteries, including:

- **Loss of worker productivity**
- **Service charges if not covered under a service agreement**
- **Logistics and shipping costs**

To minimize productivity loss and optimize printer performance, Zebra recommends that you replace your battery after 300 to 500 charge cycles; when the battery capacity has reached 70% to 80%. The actual number of cycles will vary depending on usage patterns, temperature, age, and other variables.

Bottom Line Implications

Waiting too long to replace a printer battery can have a significant impact on your bottom line. Among other issues, use of inefficient batteries can lead to poorly printed, hard-to-scan barcodes. Not only do unreadable barcodes need to be reprinted, they can also result in a variety of operational and logistical issues – as well as fines from regulatory agencies and customers.

According to National Chargebacks Management Group, major retailers issue chargebacks – often ranging from 2% to as high as 10% – if the merchandise they receive does not meet their expectations or is not compliant with their policies. So if a manufacturer ships $60 million worth of merchandise with unreadable barcodes to its largest customer, it could face chargeback fees ranging from $600,000 to $6 million.

Unreadable barcodes can also cause the retailer to return the merchandise for replacement, resulting in reverse logistics costs. Eventually, such issues can lead to a loss of business for the manufacturer – all due to unreadable barcodes caused by a printer's aging batteries.

THE HIDDEN COST OF UNREADABLE BARCODES	
CATEGORY: MANUFACTURING	**FINANCIALS**
Merchandise sales	**$60 million**
Chargeback fees due to unreadable barcodes	**up to 10%**
Potentional revenue loss due to unreadeable barcodes caused by aging batteries	**$6 million**

The above example is for illustrative purposes only

The real world impact of inefficient batteries and poorly printed bar codes >

In retail stores, unreadable barcodes can lead to long lines at the checkout counter, inventory inaccuracies and improper customer charges due to increased errors resulting from manually entered item numbers.

In warehouses, unreadable barcodes can cause costly shipping bottlenecks if workers have to spend extra time re-marking pallets or entering codes manually. In addition, workers will need to return to the settlement room to replace their batteries.

At hospitals – where the practice of verifying medication with barcodes can reduce potentially harmful errors – unreadable barcodes can increase medication delivery mistakes, putting the health of patients at risk.

Worker Productivity

Poorly printed, hard-to-read barcodes can take longer to scan or even require manual entry, which has a dramatic impact on worker productivity.

In a retail store application, a typical worker might scan 50 barcodes per hour in an 8-hour shift. That's 400 scans in a typical work day. If each scan takes just one second, that mobile worker spends about 6.7 minutes per day – or 33.5 minutes every work week – scanning items.

If those barcodes are poorly printed, however, rescanning those barcodes – or having to enter the codes manually – could easily double the time it takes a worker to make those scans, costing 33.5 minutes in productivity every week.

That's a whopping 2.5 hours of lost productivity for every mobile worker each month, simply caused by an old mobile printer battery. So if you have 10 mobile workers who each scan 400 poorly printed barcodes on each shift, you could be losing 25 hours of productivity every month.

While most companies consider replacing their batteries as a cost to operations, the reality is that replacing aging batteries before they have the chance to affect the operation of your mobile printers can actually improve your bottom line – by eliminating operational bottlenecks, reducing errors and lowering the chances of incurring costly fines.

HOW AGING PRINTER BATTERIES CAN REDUCE WORKER PRODUCTIVITY	
CATEGORY: RETAIL	**PRODUCTIVITY ANALYSIS**
Number of barcode scans made in an 8-hour retail store shift	**400**
Time required to complete scans (based on 1 second per scan)	**33.5 minutes per week**
Time required to complete scans with poor quality barcodes caused by aging printer batteries (based on 2 seconds per scan)	**67 minutes per week**
Productivity cost per month per employee	**2.5 hours**
Total monthly productivity cost (based on 10 employees making 400 scans each shift)	**25 hours**

The above example is for illustrative purposes only

TIPS FOR BETTER BATTERY USE, STORAGE AND DISPOSAL

✓ To optimize printer performance, replace your battery after 300 to 500 charge cycles; when the battery capacity has reached 70% to 80%. The actual number of cycles will vary depending on usage patterns, temperature, age and other variables.

✓ Li-Ion batteries should be charged at least once every 6 months between uses. Zebra recommends that any battery pack remaining unused and uncharged for more than 12 months should be replaced.

✓ Zebra batteries, chargers and printers are designed, tested and certified as a complete system to ensure optimal performance and safety; use only genuine Zebra batteries and chargers with your Zebra mobile printer.

✓ Charge battery packs within a temperature range of 0°C to 40°C (32°F to 104°F).

✓ Do not store batteries in direct sunlight or in temperatures exceeding 60°C/140°F.

✓ To avoid potentially "shorting" the battery packs, do not carry them in a pocket that contains other battery packs, loose change, paper clips or any other conductive materials.

✓ Ask for information about your battery manufacturer's service program – and how it can help you streamline battery replacement and recycling. With Zebra, you can upgrade from Zebra OneCare (Essential, Select or Premier Support Contracts) to include enhanced battery support, which can assist you in maximizing uptime and availability for your devices and critical operations.

   — **Battery Maintenance:** When a printer arrives at a Zebra depot, the battery is tested to see how much life it has remaining. If the battery fails the test, Zebra will simply install a new battery.

   — **Battery Refresh:** Zebra will proactively send a new battery once during a three-year service contract and twice during a five-year contract.

✓ Enterprises that turn to Zebra to service their batteries and devices report less downtime and better mobile printer performance. Zebra OneCare battery maintenance and refresh provides an easy, cost-effective way to ensure the right replacement batteries are available when they are required.

✓ Don't drop your discarded batteries in a bucket. Call 1-800-BATTERY in North America for information on recycling.

✓ Implement battery management system software (such as PowerPrecision+ and Zebra's Asset Visibility Service) to proactively manage battery fleet health and prevent costly downtime.

Maximizing Productivity and Safety for Your Business

When it comes to mobile printer batteries, Zebra offers several choices — including both PowerPrecision+ standard Li-Ion batteries and PowerPrecision+ extended capacity Li-Ion batteries for its premium mobile printer models.

Zebra's PowerPrecision+ batteries and mobile printers operate as a single unified system and are designed to maximize the operation of both your battery and your printer. Zebra PowerPrecision+ batteries are designed and manufactured to meet the rigorous standards required to deliver superior full shift performance and reliability.

At Zebra, we start with premium high-grade cells that have a higher capacity, providing longer life cycles than the typical competitive battery. The strong robust housing increases durability, while the design improves safety by ensuring proper discharge behavior as well as preventing overcharging and electrical shock.

PowerPrecision batteries provide precise battery health information that allows users to see the percentage of battery power remaining during their shift.

In addition, technology inside the batteries tracks and maintains metrics required to provide real-time visibility into battery health — such as the state of health meter, charge cycles consumed and battery asset information.

Increasing ROI on Your Technology Investment

If your batteries are operating at less than full capacity, this can impact not only the performance of your mobile printers but also the productivity of your workers and workplace safety. That's why it's important to replace aging batteries before they begin to impact your business operations – and why it's critical to choose the right replacement batteries.

Genuine Zebra batteries are designed to help you get the greatest ROI on your mobile printers by delivering both unmatched performance and unparalleled insight into battery health.
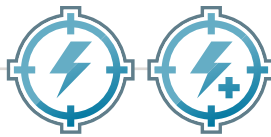
RELIABILITY YOU CAN COUNT ON

Zebra's PowerPrecision battery solutions are now available for Zebra mobile printers, mobile computing devices and mobile scanners. So no matter which Zebra mobile devices your business uses, you have the visibility you need to ensure every battery is operating at optimal capacity — and will continue to operate at peak performance throughout a worker's entire shift.

For more information on how Zebra's PowerPrecision batteries can help you improve productivity and reduce costs by more intelligently managing the health of your mobile printer batteries, visit www.zebra.com/powerprecision

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