

Charging on the Go: Over-the-Road Charging for Mobile Machines

Have you dreamed of charging your battery pack on the road between jobsites? Have you ever had to cut a job short to get your machine back to plug it into grid power to charge? Or have you had to purchase extra batteries to ensure your equipment has backup power if the primary batteries run out? If these are issues in your day-to-day operations, Cross Company's Mobile Systems Integration group can help.



For towable electric mobile equipment being brought to a jobsite, there is typically one main goal: to ensure that the machine is able to complete the job without interruption. And achieving this goal ultimately comes down to battery management and charging.

That's where over-the-road charging (OTRC) comes in. Over-the-road charging allows batteries to charge while the machine is in transit to the next job site. This provides a practical solution to extend duty cycles and increase operational productivity while minimizing the risk of having to reduce efficiency to accommodate vehicle charging.

The Balance Between Battery Life and Cost

For many operations relying on towing work machines to the job site, the traditional approach to maximizing battery life has been to either invest in more costly batteries or purchase multiple batteries to swap out throughout the day. While this approach is effective, it also presents several disadvantages

- **Cost** – Batteries are expensive. Needing to purchase additional battery packs can quickly increase the cost of your machine or operational costs in general
- **Downtime** – Needing to swap out batteries or end a day early due to low charge can lead to a significant loss of productivity
- **Space** – Having to carry around extra batteries takes up valuable space that could otherwise be used more efficiently

A better solution to this problem is opportunity charging. That means charging your machine's batteries when that machine isn't in use. And one of the most efficient ways to perform opportunity charging is while that machine is on the road to the next job site.

What Is Over-the-Road Charging?

Over-the-road charging is a type of opportunity charging that allows your machine's batteries to charge while driving from one job site to another. By utilizing the alternator in your work truck, you can send power to your machine's battery pack in transit. This effectively turns driving time into charging time.



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This charging works through a combination of

- **Dual Alternator Setup** – Many work trucks (for example, an F-450) are equipped with two alternators. One is for the truck's primary operation and the other is for auxiliary power
- **DC-to-DC Conversion** – A high-powered DC-to-DC converter is used to step up the 12V output from the truck alternator to 48V needed to charge the machine's battery pack
- **Connection Points** – Power cables are run from the alternator to a connector at the back of the truck. A mating connector on the trailer allows the battery pack to charge while the truck is in motion

OTRC is a simple but extremely effective system that allows you to charge your machine's batteries in transit. This reduces the need for additional batteries and increases the number of duty cycles able to be performed in a single day. It also provides additional opportunity charging times throughout the work day, such as lunch breaks. With over-the-road charging, there are many ways to ensure your batteries stay charged and your machines stay operational.

Why In-Transit Charging Matters

Over-the-road charging is more than just a convenience. It can be a game-changer for many towable machine owners who understand the frustration of having to push a job until tomorrow or call it a day early due to battery concerns. If you rely on your equipment to complete multiple jobs in a single day, here's why in-transit charging matters:

- **Increased Productivity** – By charging your machine batteries while driving, your machine's duty cycle can be effectively extended, allowing you to complete more jobs a day. For instance, if your machine typically handles four duty cycles before needing recharging, over-the-road charging could allow for a fifth cycle. And that extra job can make a substantial difference in profit margins
- **Reduced Battery Costs** – By utilizing over-the-road charging, you might not need to spend the money on that additional battery pack. Instead of having to rely on carrying extra batteries with you, you can rely on opportunity charging to keep your machine running throughout the day. This simplifies operations while reducing upfront costs
- **Better Use of Downtime** – Drive time between job sites is generally unproductive. This is particularly true if your job sites are an hour or more apart. Over-the-road charging turns that previously unproductive time into recharging for the next job. Even if you can only add 10% charge during a drive, that extra 10% can be the difference between finishing a job and having to wait to recharge
- **Simplified Charging** – To implement over-the-road charging, only one additional connection point is required, connecting to the back of your truck to the front of the trailer tongue. When the tow truck is started, the trailer will automatically begin charging from the tow truck alternator. This eliminates the need for complex charging stations or significant additional infrastructure

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Real World OTRC Application

At Cross, we frequently work with operations who regularly move work machines from site to site. Some examples of applications Cross has provided over-the-road charging for include

- Towable backhoe – A towable backhoe may be needed for a job. It may take an hour to get the machine to the job site and 30 minutes to dig a hole before being loaded back onto the trailer. Then it may be another hour to get to the next site. Those two hours of transit time are time wasted if the battery is steadily draining. This also puts the backhoe on a ticking clock. But with over-the-road charging implemented by Cross, the machine's batteries can recharge in-transit, ensuring it's ready to work upon arrival
- Towable bridge repair machine – A large part of the day-to-day operation of a towable bridge repair machine may just be bringing it to the bridge in need of repair. But when the truck towing the machine has an over-the-road charging system hooked up to its auxiliary systems, that charge can keep the equipment powered throughout the day as it moves from bridge to bridge
- Towable scale carts – A mobile scale cart by design has to be moved from jobsite to jobsite with sufficient power to perform readings throughout the day. The battery on a portable scale dying could mean less jobs performed in a single day, which translates to less productivity for the scale cart owner and more downtime for the jobsite. With OTRC, many of these issues can be mitigated or even potentially eliminated.

The Advantage of Partnering With Cross Company

At Cross Company, we specialize in designing, materials sourcing, and implementing innovative solutions for mobile work machines. With significant experience in hydraulic, electric, and hybrid systems, we have the expertise needed to optimize your vehicle for over-the-road charging.

We work directly with you to design a charging system tailored to the specific needs of your machine and operation. With our team of engineers, we have the experience needed to integrate advanced charging systems into your mobile equipment, ensuring reliable performance and seamless operation.

From design and installation to testing and optimization, we provide comprehensive support to help you get the most out of your equipment.

If your operation regularly travels between job sites, over-the-road charging solutions from Cross can provide greater productivity and efficiency. By turning drive time into charge time, you can extend your machine's duty cycles, reduce battery costs, and complete more jobs in a single day. Contact Cross Mobile Systems Integration today to learn more about how we can help you implement this robust, game-changing solution for your work truck or mobile machine.

