

Wireless Charging for Truck Sensor

Enhancing Autonomy and Minimizing Maintenance with Qi-Compliant Wireless Charging and a Supercapacitor

Graduate



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Introduction: In logistics hubs, a typical safety hazard arises when a gap forms between the loading dock and the truck during operations. This gap may result from the failure to secure the vehicle properly with chocks or brakes, or because of coordination issues among logistics personnel, due to language barriers, noise, and poor visibility. Such unnoticed gaps significantly increase the risk of forklift accidents and serious injuries. Viacam Sàrl addresses these risks with the CALEC system, featuring a wirelessly connected wheel sensor in the chock that sends an alert in the event of a truck's premature departure, thereby enhancing safety and reducing accident rates in logistics operations.

Problem: The CALEC system truck sensor, consisting of the electronics for detecting the vehicle's wheel and communicating with the master station, is housed in a plastic enclosure designed to snugly fit into a standardized plastic chock. It is powered by a battery that requires manual recharging every 2-3 months. To improve reliability and minimize maintenance needs, Viacam plans to integrate an automatic charging system into the truck sensor. It should activate when the chock, including the sensor, is returned into its wall mount, thereby enabling continuous operation without the need for manual intervention.

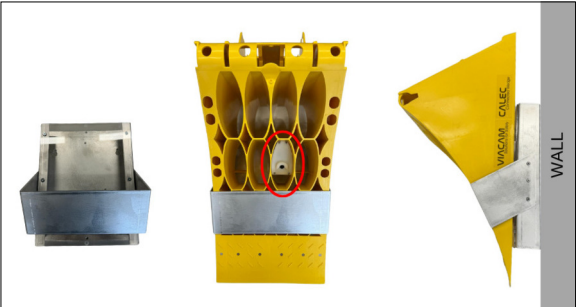
Result: This bachelor's thesis facilitated the development of a wireless charging solution compliant with the widely used Qi standard. The original battery system was replaced by a supercapacitor, enabling recharging even at sub-zero temperatures; this is capability beyond the reach of most rechargeable batteries. Additionally, the sensor enclosure was slightly redesigned to accommodate these new components while still fitting into the standardized plastic chock.

The sensor is fully operational, recharges completely in just 10 minutes, and offers approximately 30 hours of autonomy. This performance exceeds the requirements for ensuring safe logistics operations and effectively minimizes maintenance.

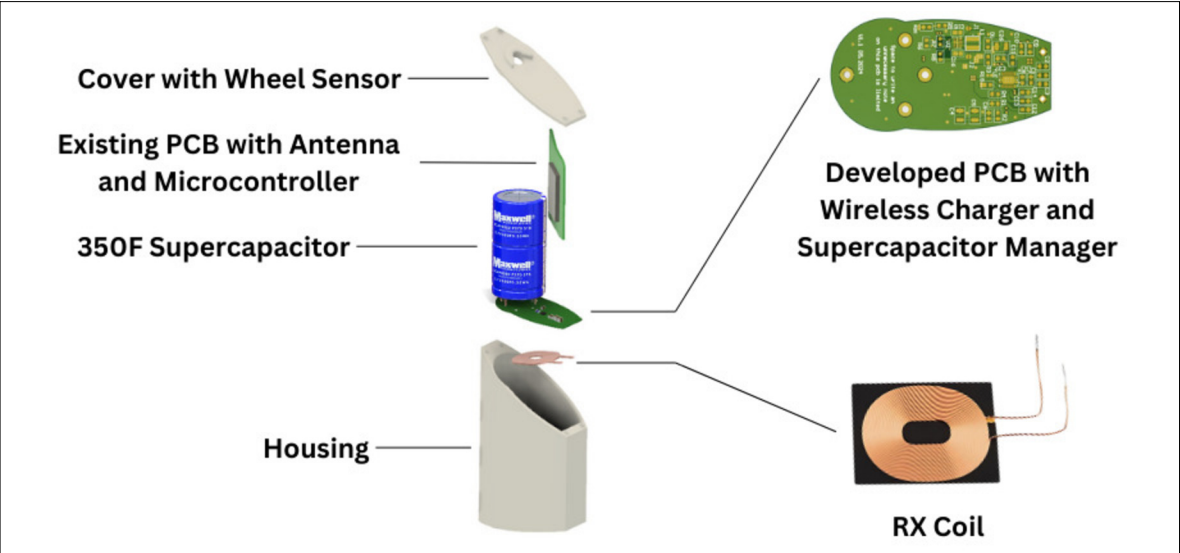
Forklift Falling from Loading Dock
MHI-Improving the Safety and Efficiency of Your Loading Dock



Wall Holder, Wedge with CALEC Sensor (surrounded in red) in Wall Holder, Wedge in Wall Holder (side view)
CALEC-Viacam Sàrl



Exploded View of the Sensor with Enclosure and the new Wireless Charging and Energy Storage System
Own presentment



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Subject Area

Wireless
Communications

Project Partner

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