

Customer Issue/Motivation:

Seeking a more reliable and longer-life alternative to lead acid batteries for powering 12V rail switches.

Legacy Approach - Batteries:

Lead acid batteries have long been used for railway power switch applications. Lead acid batteries provide an “instantaneous” and generally “reliable” source of power for operating a railway switch when called upon. Lead acid batteries used for this application however do not always provide the desired (or even expected) service life and reliability; in most cases only providing 1-3 years of service before needing to be replaced.

New Approach - Hybrid Ultracapacitors:

By nature railway power switches require an AC or DC power source that can provide a high initial current to meet the in-rush/break-away current demand of the switch or hydraulic motor. The short-time, high current nature of this load profile is well aligned with the characteristics and capabilities of a relatively new energy storage device known as an Ultracapacitor, Supercapacitor or Hybrid Ultracapacitor that store energy electrostatically. The “hybrid” technology combines an ultracapacitor and lithium ion battery to provide a source of short duration **power** and **energy** for long duration backup and recharging.

Rapid Recharge Time

Can be recharged extremely fast - from seconds to just a few minutes. Comparatively lead acid batteries can take between 4 and 7 hours with a “sufficient” charging source to recharge from 10% SOC to 100% SOC.

Wide Operating Temperature Range

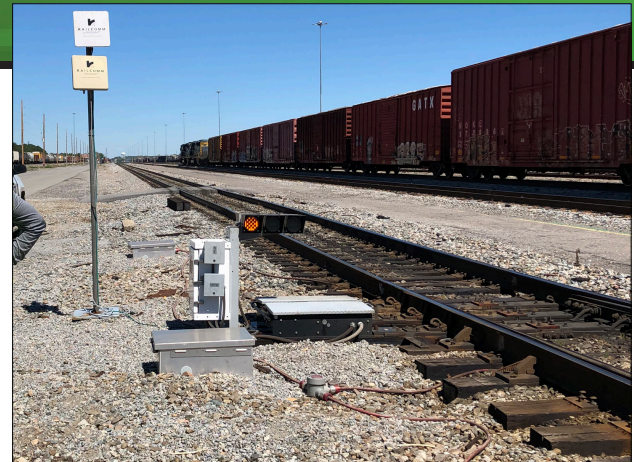
Capable of delivering energy down to -40°C and even -50°C with minimal impact on performance and efficiency. Lead acid batteries will struggle to perform as temperatures dip below 0°C.

Design Life

- Ultracapacitors/Hybrid Ultracapacitors: **10+ Years**
- Lead Acid Batteries: **1-3 Years**

Environmental / Safety

Hybrid Ultracapacitors are an environmentally friendly power source which do not contain heavy metals, are non-flammable, and pose no risk of explosion or thermal runaway like lead acid batteries.



Test Results:

12V Hydraulic Yard Switch
“Power Off Testing”

Charged Voltage: 13.5

125 Regular Operations with
30 second throw intervals

Additional 18 Operations with Simulated
Obstruction (Double Throws)

End Voltage: 10.9