HATCH

Hatch Enhanced Track Assessment (HETA)

Stray currents are a well-documented phenomenon associated with DC traction systems and are known to greatly accelerate corrosion of metal infrastructure such as bridges, pipelines, buildings etc. If left unchecked, they can ultimately lead to greatly accelerated degradation and increased risk of significant failures.

Here are examples of problems caused by stray current.

Structural Steel

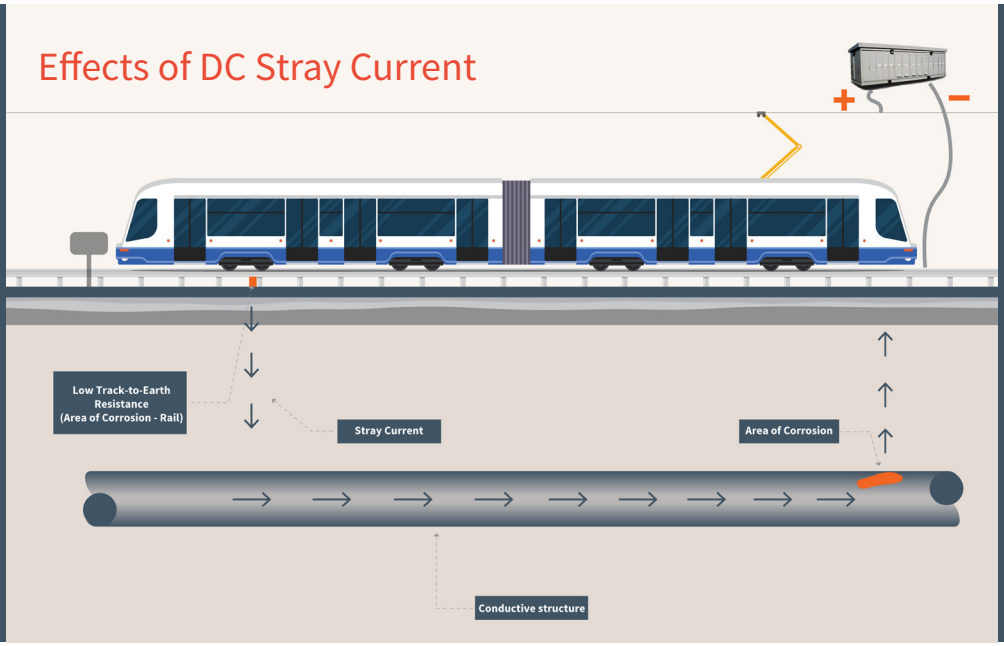
Corrosion to rails fasteners

Corrosion to rails

To effectively address the challenge of identifying areas with poor or degraded track insulation and mitigating the impacts of stray current, it is crucial to understand the scope of the problem and the potential solutions.

Stray current corrosion, primarily due to electrified DC transit systems, has been an issue for decades, with the United States spending upwards for $500 million. It not only affects the operations of transit agencies, but can also impact external infrastructure, leading to legal issues and direct and indirect costs.

Effects of DC Stray Current



In DC-powered railway systems, the running rails are a primary component of the electrical circuit that powers the trains. The current levels in the rails can reach thousands of amps and electrical isolation of the rails from ground is needed to prevent current leaving the rail and leaking into the ground or other adjacent infrastructure.

Incorporating regular stray current testing into the overall track maintenance and construction programs provides transit agencies and constructors with highly valuable information to assess condition and prioritize track maintenance of their rail systems. It is also highly beneficial for new rail construction applications as it can rapidly identify and pinpoint issues that can be immediately addressed to improve construction/handover timelines.

HETA

HETA, Hatch's innovative portable system, is engineered for swift deployment and efficient track testing within limited non-revenue time frames. As a key component of Hatch's Specialized Measurement and Analysis Services, HETA offers numerous advantages:

- **It enhances maintenance programs for transit agencies by:**
  - Swiftly pinpointing the most critical track insulation issues
  - Providing precise location data aligned with track chainage
  - Offering high-resolution data that correlates with critical external trackside infrastructure, aiding in prioritizing repairs to safeguard critical assets
- **Combining integrated track-to-earth measurements with real-time leakage data collection, HETA delivers a quick comprehensive snapshot of track condition:**
  - Capable of assessing up to 4 km of dual track within a 2.5 - hour testing window
- **Establishes baseline metrics for ongoing asset management and monitoring of track insulation performance:**
  - Secures complete data records for future comparative analysis and trend identification
  - Serves as an early alert system for insulation degradation, pre-empting significant failures

By streamlining the testing process and providing actionable insights, HETA is an invaluable tool for transit agencies aiming to maintain optimal track conditions and ensure the longevity of their rail infrastructure.

How it works

The Hatch Enhanced Track Assessment (HETA) is used to assess the overall condition of the track insulation and identify areas of high stray current of DC railway lines. The system has been designed to:

Measure Track to Earth Resistance

- End-to-end measurement of the insulation resistance on fixed lengths of track (~1km)
- All tests are completed without disconnection of running rails or impedance bonds
- Results are comparable to typical methods within industry standards

Scan Track for Leakage Current

- A HETA proprietary scan that provides an accurate detection (meter to meter) of areas of stray current leakage
- Segmented scan for a higher resolution insulation resistance measurement on short segments (50m) of track

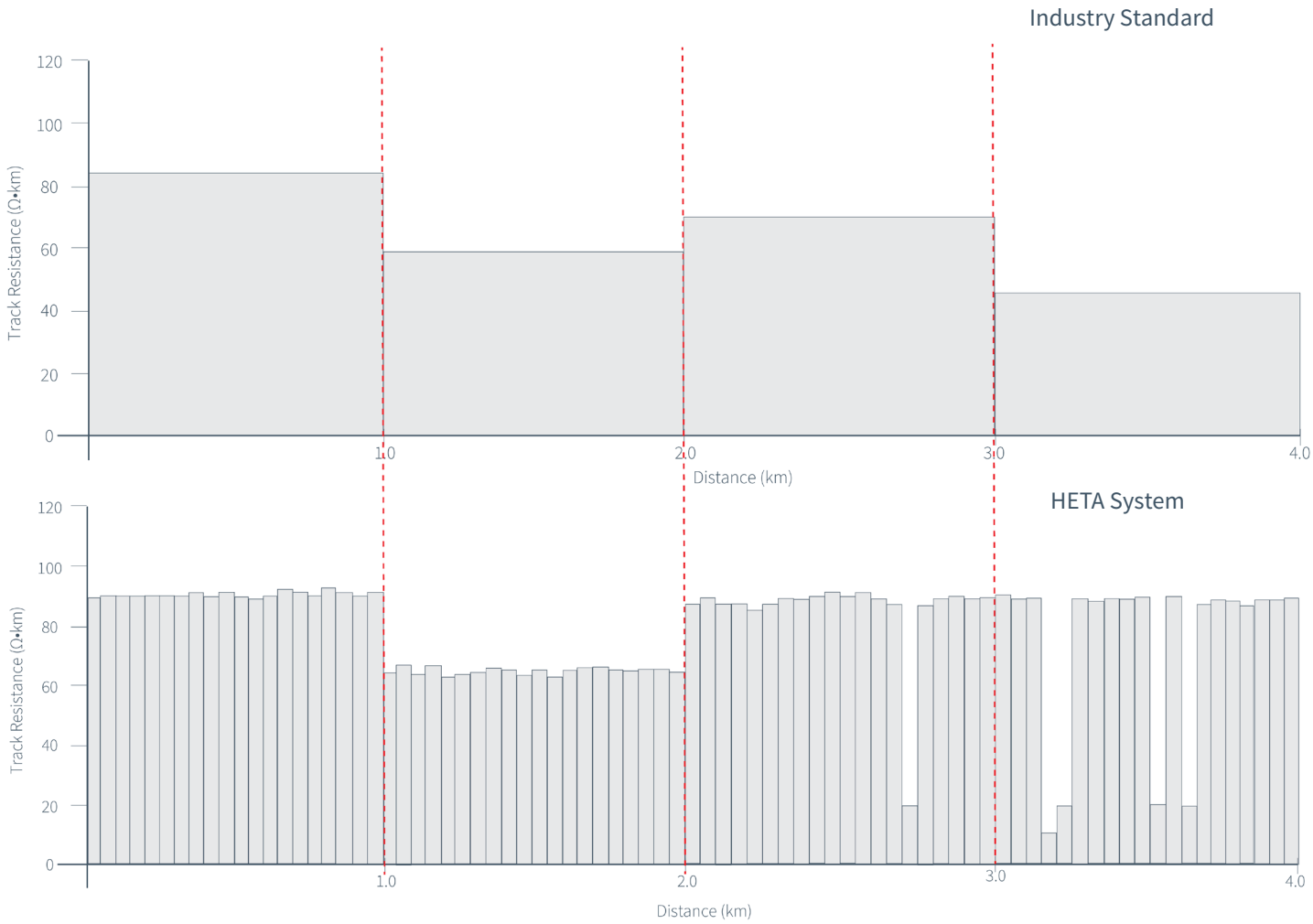


Figure 1- Track-to-earth resistance

Project examples

Transit Agency #1 – HETA tested +15km of subway track

The rail network is a brownfield subway system in a major Canadian city that consists of over 50 km of track and is powered by 600 Vdc. The system has been expanded over the years and includes a wide array of track infrastructure, including underground tunnels with direct fixation tracks to ballasted track and wooden ties. The electrical system configuration from traction power to the trains included areas with single negative return rails and areas with double negative return rails.

In 2022-2023, HETA was used to conduct a test campaign across the network that included strategic tests across all the different areas of the network, covering more than 15 km of dual track.

The results of the study provided key information to the client, including:

- Identified the trends in the track-to-earth resistance across the network. It was clear that newer track was quite good and older areas needed more attention.
- Identified specific areas (e.g., track and ballasted tracks crossovers) with high stray current leakage.

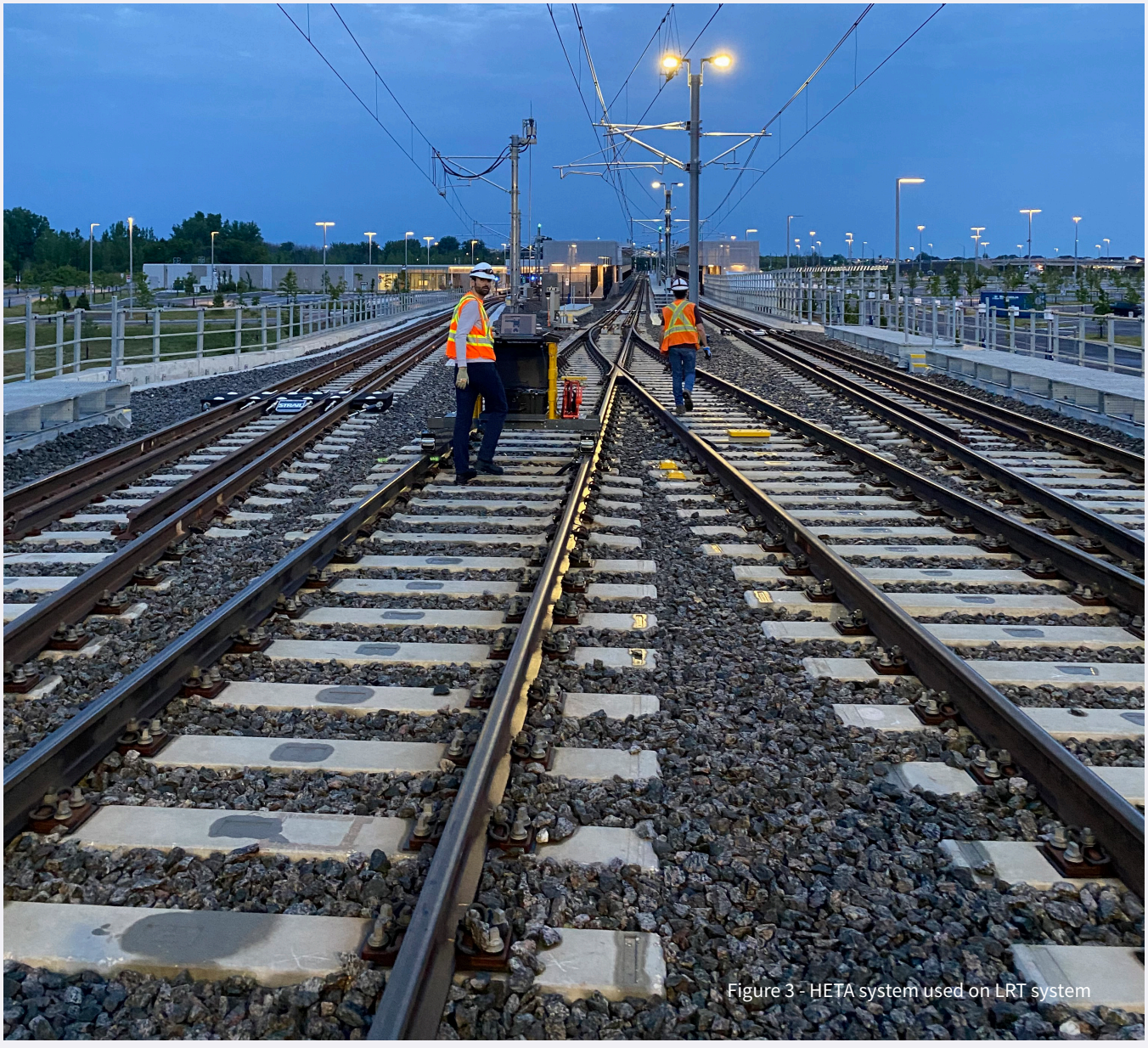


Figure 3 - HETA system used on LRT system

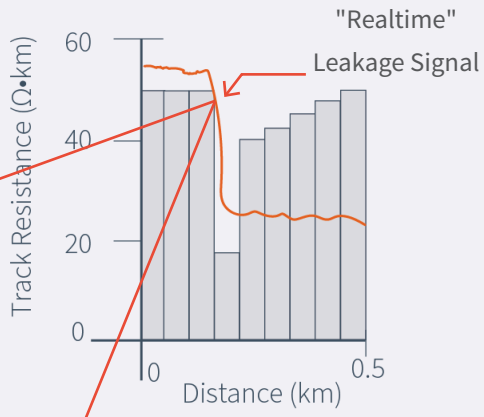
Transit Agency #2 – HETA tested +30 km of Light rail transit (LRT) track

The rail network is a newly constructed LRT system in a major Canadian city. The area tested consisted of over 15 km of track that was powered by 1500 Vdc. The system is primarily outdoors with both direct fixation and ballasted concrete tie construction. The electrical system configuration uses double negative return rails for traction power delivery to the trains.

In 2023, HETA was used to conduct complete tests across all areas of the network, including multiple passes covering a total of more than 30 km of dual track.

The results of the study provided key information to the client, including:

- Providing a clear map of the track-to-earth resistance across the network.
- Successfully identifying multiple locations where rail was unintentionally connected to ground.
- The results of these tests were instrumental in guiding the transit agency to make the necessary repairs.



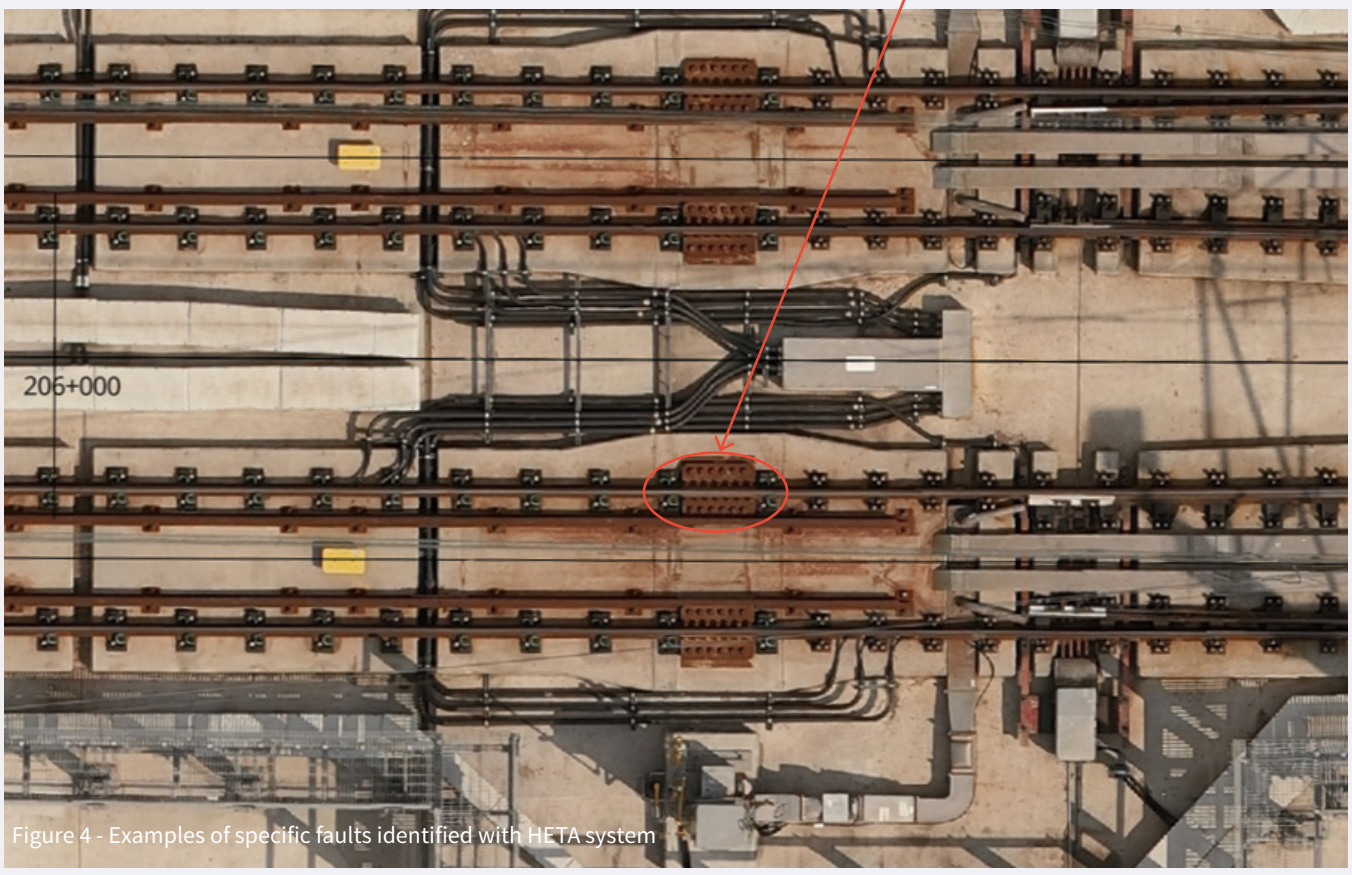


Figure 4 - Examples of specific faults identified with HETA system

About Hatch

Whatever our clients envision, our engineers can design and build. With over six decades of business and technical experience in the mining, energy, and infrastructure sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient, and innovative. We draw upon our 10,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

hatch.com

Scan the QR code to learn more about what our Rail team can do.

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