

# CASE STUDY

Earth bond cable  
clamp force  
monitoring

TfL Victoria Line  
Rolling Stock

September 2019

**SMART COMPONENT TECHNOLOGIES LTD**  
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In partnership with:



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# TfL Victoria Line Rolling Stock

## Clamp force monitoring of earth bond cable fasteners

### *The Challenge*

Transport for London identified an issue with bolts failing on earth bond cables on the '09 Victoria Line rolling stock. Bolt failure results from either loosening or shearing in service, causing positive earth faults and hazards from loose cables and bolts. To identify the cause of failures, TfL were keen to understand the level and repeatability of the clamp force achieved at installation.

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### *Our Solution*

An M10 variant of the Smart Washer was deployed at the Northumberland Park Depot to evaluate the clamp force achieved at installation. The Smart Washers were configured with a fast sampling regime, with clamp force sensor data being captured and stored in the Smart Reader – a ruggedised handheld tablet. The technology was setup in less than 5 minutes and over a morning session, all the major contributing factors which could affect the torque/ bolt tension relationship were evaluated.



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### *The Outcome*

The empirical evaluation identified that for 40% of the tests, the clamp force achieved at installation was lower than the recommended level, increasing the probability of in-service failure due to vibration induced loosening and fatigue. The testing not only highlighted the power and usefulness of the data the Smart Washer provides but also how easy the technology is to deploy.