KeolisAmey Metrolink (KAM)

Automated Pantograph Inspection Case Study
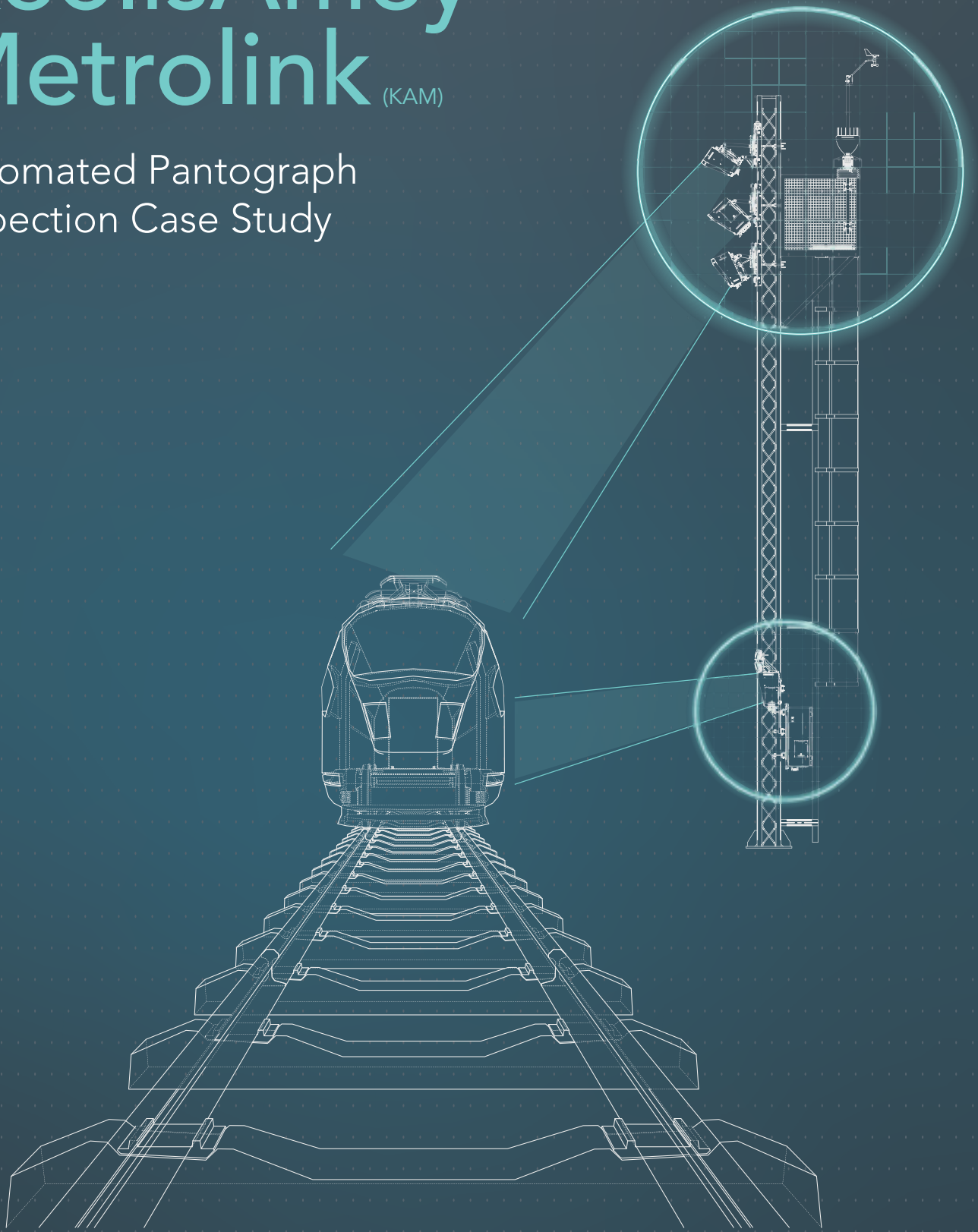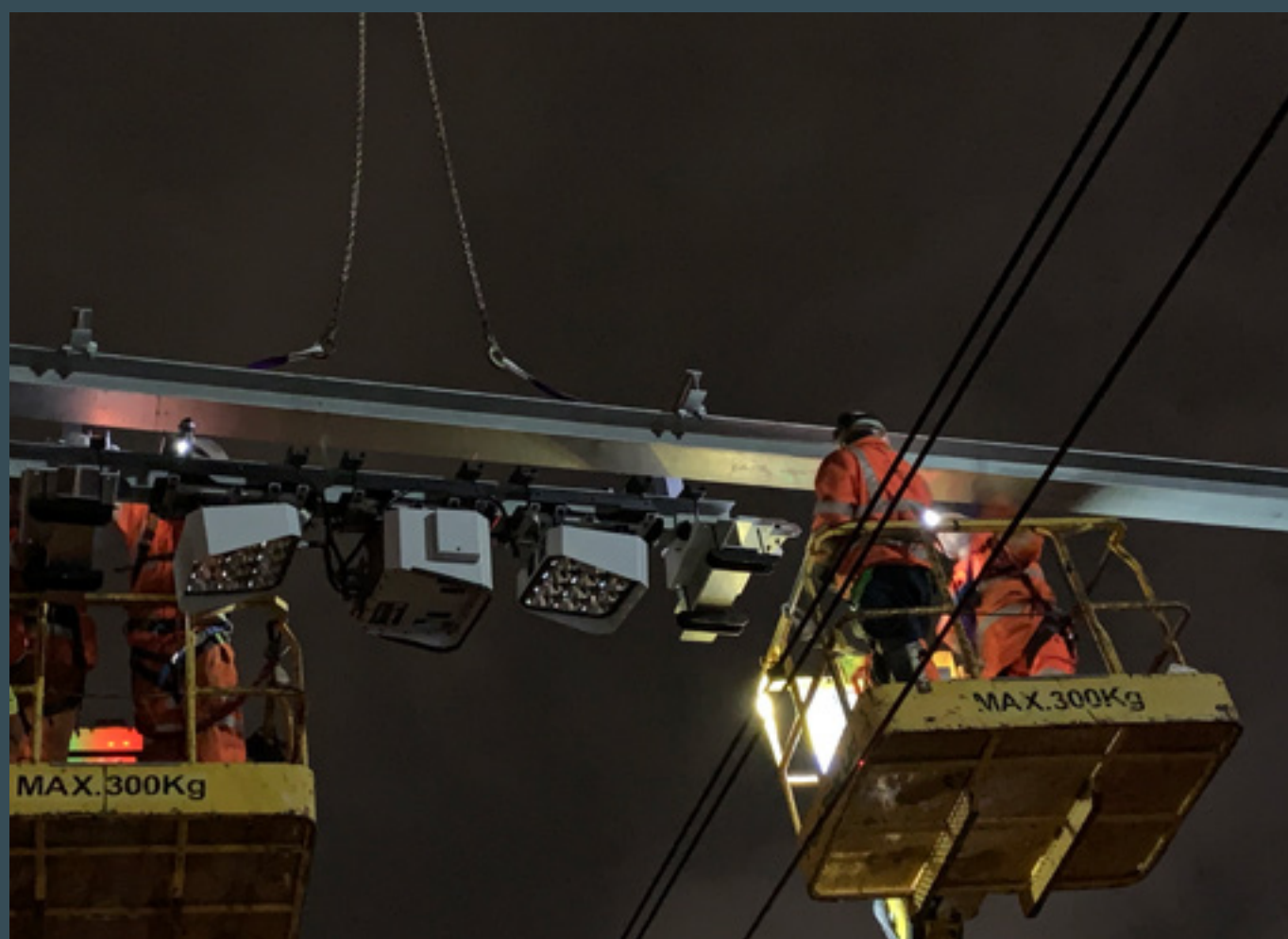
"Since installing PanVue, KAM has seen the positive impact by already identifying trams that need to be withdrawn from service with issues. The effectiveness of Camlin's technology has already been proven"

— Bilal Mohamed, Engineering Director, KAM

KeolisAmey Metrolink Case Study

Greater Manchester Metrolink is Britain's largest tramway system, owned by the public body Transport for Greater Manchester (TfGM) and operated and maintained under contract by KeolisAmey Metrolink (KAM). Originally opened in 1992 at 31km in length, the line has since been extended to over 100km, carrying around 120,000 passengers each day, making it the most extensive light rail system in the United Kingdom.

Biggest UK light rail network

120,00 daily passengers

147 trams

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01. Map of KAM network and PanVue location.

02. PanVue installation site.

03. PanVue installation in progress.

As part of KAM's contract with TfGM, there is a requirement not only to maintain the network but also to monitor, report on and extend asset life. Having recently extended the line, KAM were looking for specialised ways to improve maintenance monitoring of the asset's performance, improve fault response and analysis. Having carried out extensive market research, KAM looked into the benefits of pantograph monitoring and discovered Camlin Rail's solution, PanVue.

"Monitoring the pantograph is a key part of KAM's maintenance strategy as if it gets damaged, it could damage the overhead line which interrupts service, resulting in loss of revenue and more. If we identify any pantograph faults before the damage occurs and remove the vehicle, this is clearly beneficial…"
— *Clive Pennington, Technical Director, Amey*

Camlin Rail installed the PanVue at Deansgate-Castlefield, Zone 1. This strategic point of the network and key location was purposefully selected to maximise coverage and efficiency, enabling 100% inspection on the operating fleet.

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" PanVue provides railways and operators a mechanism to increase inspection and minimise the impact of a damaged pantograph, while maintaining current manual inspection levels or even reducing them. For example, at KAM, manual inspection occurs every 20,000KM (typically 10 weeks) and with the introduction of PanVue, pantographs are now being inspected up to 10 times a day providing early fault detection that is otherwise unachievable."

— **Philip Heaney, Product Manager, Camlin Rail**

PanVue provides the railway operator with a unique and cost-effective tool set, combined with advanced analytics to improve operational decision making on train monitoring. Using advanced imaging and machine learning techniques to assess pantograph condition safely, accurately and in real time, PanVue significantly reduces the risk of costly and disruptive line tear-down due to a defective pantograph, including the associated loss in operating revenues while trains are taken out of service for repairs.

High-resolution images captured by the system's trackside stereoscopic camera are used to create a precise 3D model, revealing pantograph condition on trains traveling at speeds of up to 300 km/h with no need for manual inspection. By assessing parameters including contact strip condition, orthogonality, defects in horn structure and uplift,

the totally automated system improves overall system reliability of the pantograph plus overhead lines. This allows train operators to optimize their maintenance strategies by moving from time-based to condition-based maintenance.

100% fleet inspection

Maximising fleet availability

Protecting the network
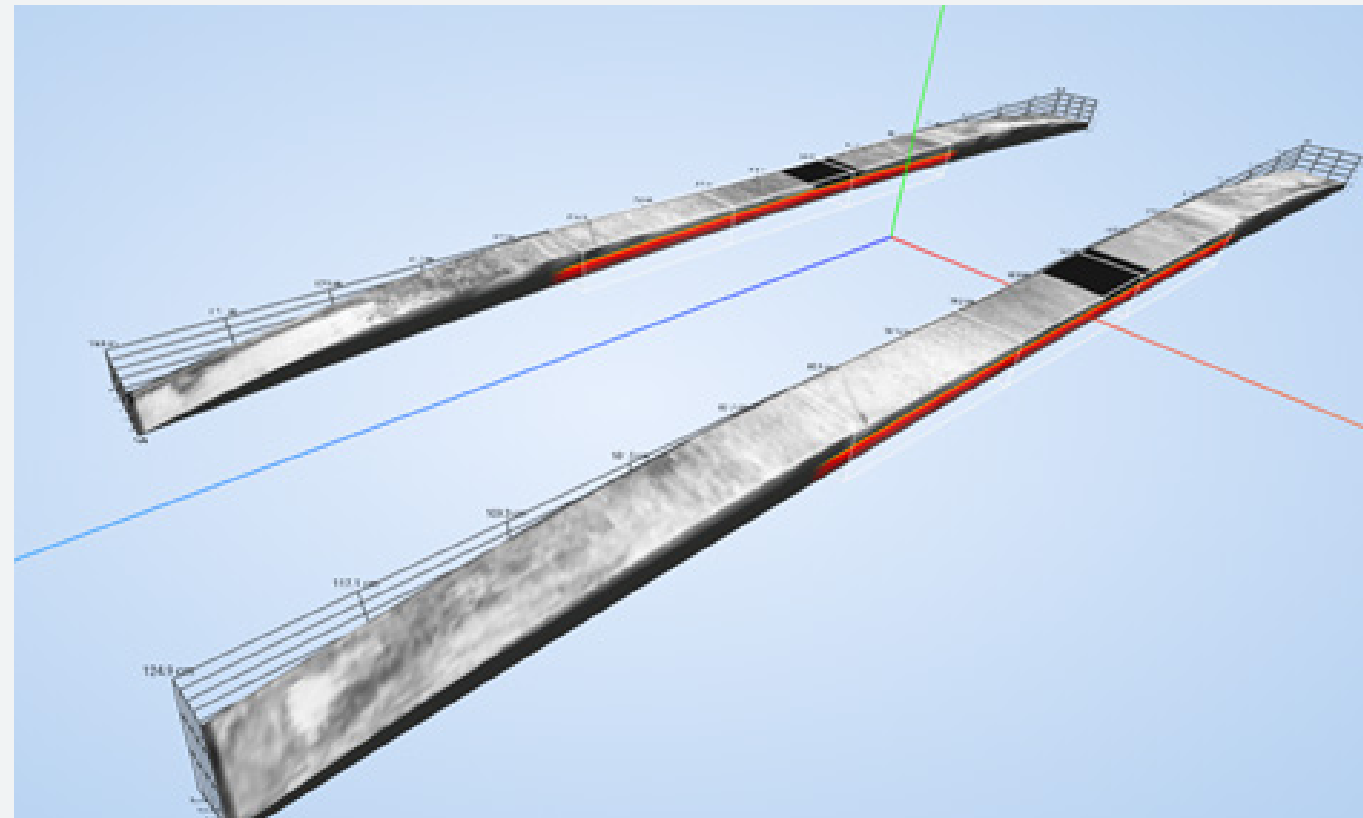
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"Camlin Rail has been easy to deal with, being both responsive and understanding to our requirements. They have been flexible, open and honest; dealing with any issues collectively. We look at them as a trusted partner, in which we are delighted to establish a long-term relationship with."

— Bilal Mohamed, Engineering Director, KAM

"What we particularly liked about Camlin Rail was the use of light for measurement and low power lasers for detection, with regards to the public domain. Of course, other factors such as price came into play and also the 'fit it and leave it' solution, until you receive an alert which you can the assess and decide if you need to react."

— Clive Pennington, Technical Director, Amey

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Using wayside equipment, Camlin Rail's PanVue provides a regular health check of in-service pantographs, using high-resolution imaging to identify damage, missing components and misalignment. If anomalies are detected, alerts are sent via email and/or SMS to maintenance staff and detailed visualisation, accessed via a web portal, allowing engineers to examine parameters such as section views of the pantograph, analysis of pitch and roll angles, and provide an informed response to the defect preventing a potentially service disrupting incident. This identification of incidents is cost-effective by allowing operators to withdraw faulty vehicles from service, protecting their overall infrastructure.
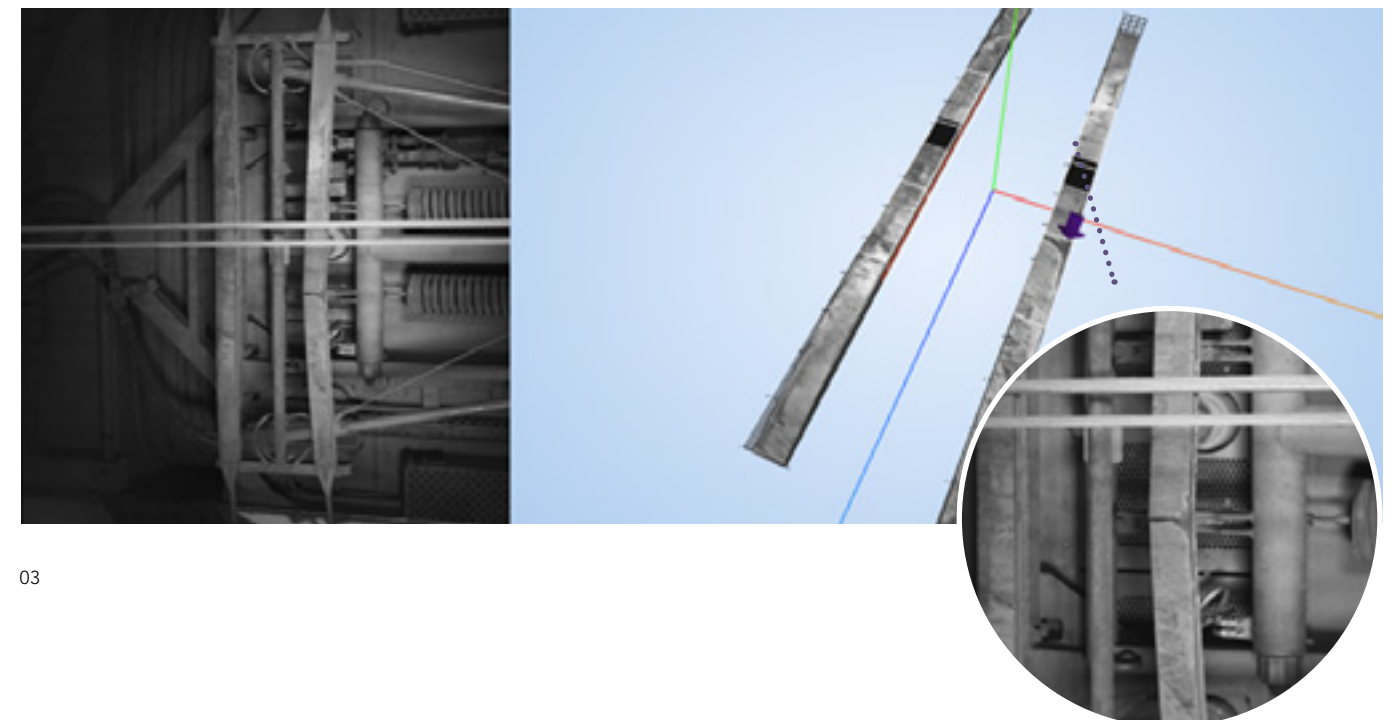
"Since installing PanVue, KAM has already seen the positive impact by already identifying trams that need to be withdrawn from service with issues. The effectiveness of Camlin's technology has already been proven, and we are now in the stages of fine-tuning the project details."

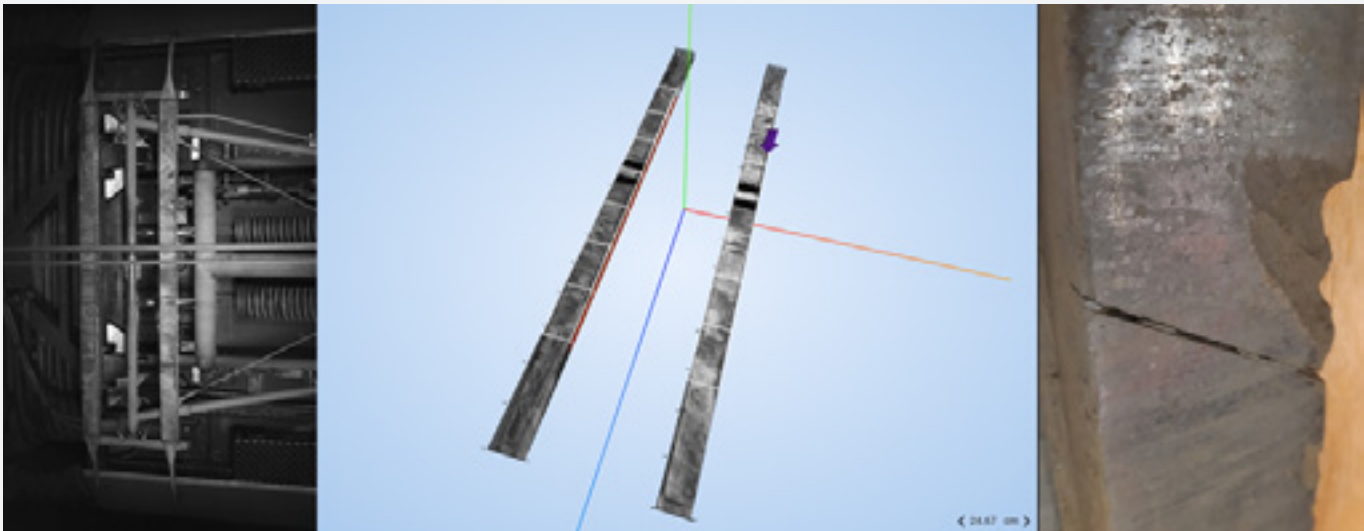— Bilal Mohamed, Engineering Director, KAM

"The main takeaway from working with Camlin Rail was the effectiveness of their site-visits. The Camlin team were able to help KAM develop a bespoke arrangement and identify suitable placements, so the system could perform as it's best."

— Clive Pennington, Technical Director, Amey

The PanVue's unique technology was able to effectively capture and report pantograph damage to KAM, as seen in the below images. These two events demonstrate the ability to detect pantograph issues and prevent OLE damage such as a tear down that has a typical cost association of £100,000.

01. 3D detail of scanned Pantograph.
02. PanVue OMF during installation.
03. Pantograph alarm raised due to damaged carbon.

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Camlin Rail are delighted to be collaborating with KAM and look forward to working alongside both partners to provide solutions that enable the best impact and continued results.

PanVue is currently contracted globally by train operators including Heathrow Express, Network Rail (UK), MTR (Hong Kong), RFI (Italy), Talgo (Spain), SEPTA, Stadler Rail, Caltrain and Amtrak (US).

To find out more about Camlin Rail and PanVue, get in touch with the team or visit camlingroup.com/rail today to take the journey further.

Camlin Rail