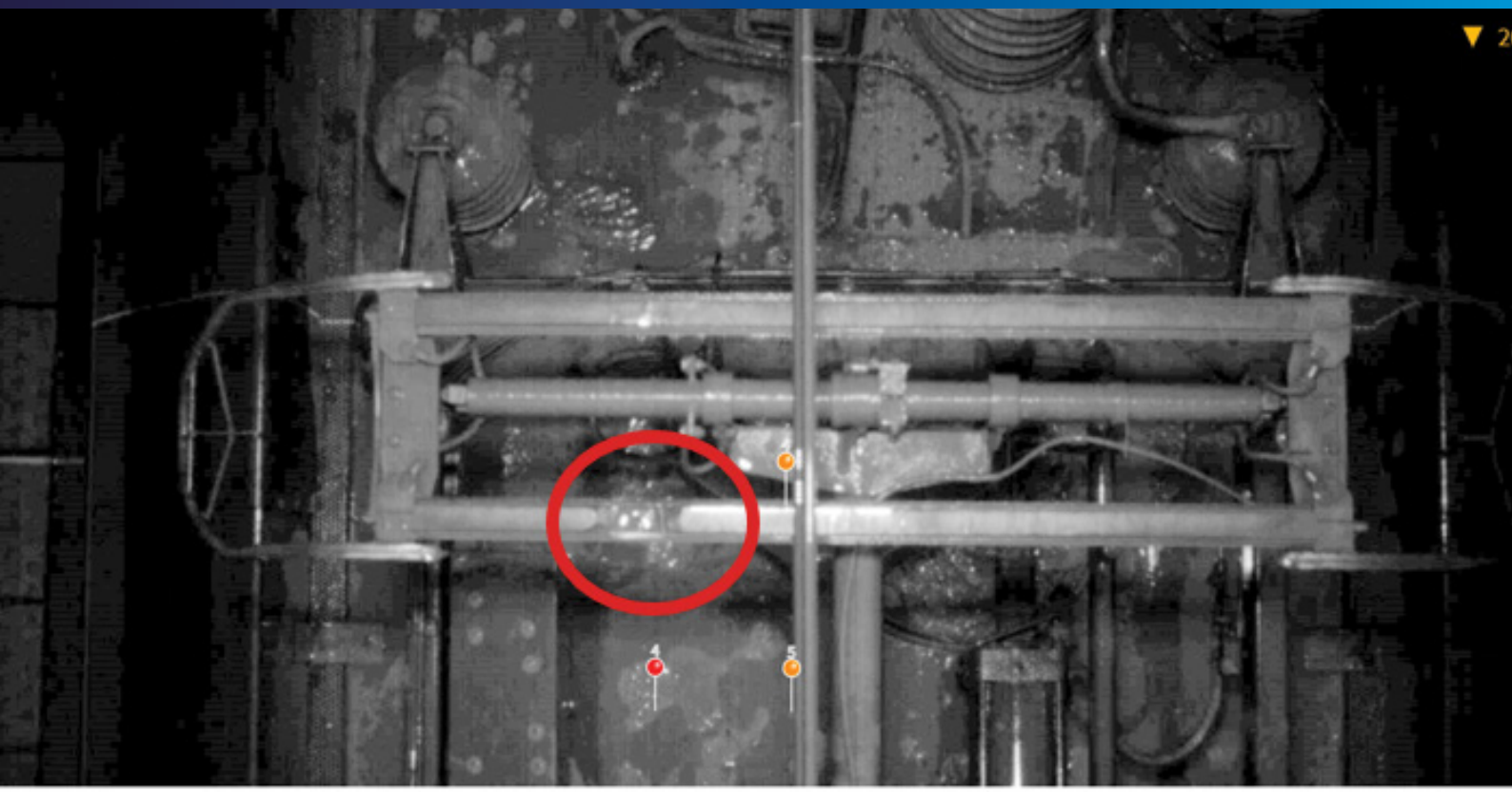
ASSET OPTIMISATION

PANTOGRAPH MONITORING



PANMON MONITORS PANTOGRAPHS FOR DAMAGE DURING EVERYDAY OPERATIONS

PanMon is a remote condition monitoring system that provides accurate measurements of damage on the pantograph units of passing trains as they continue daily operations.

Installed at key locations along routes, PanMon captures images and measurements without causing any interruption to services.

Infrastructure asset managers can then assess the condition of each individual pantograph unit on the network, and then collaborate with vehicle owners to prevent defective units from inflicting damage to overhead wires.

PanMon scans the following

- Carbon thickness
- Cracks/chips in carbon
- Uplift
- Symmetry (roll, pitch and yaw angle)
- End horn (alignment, break)

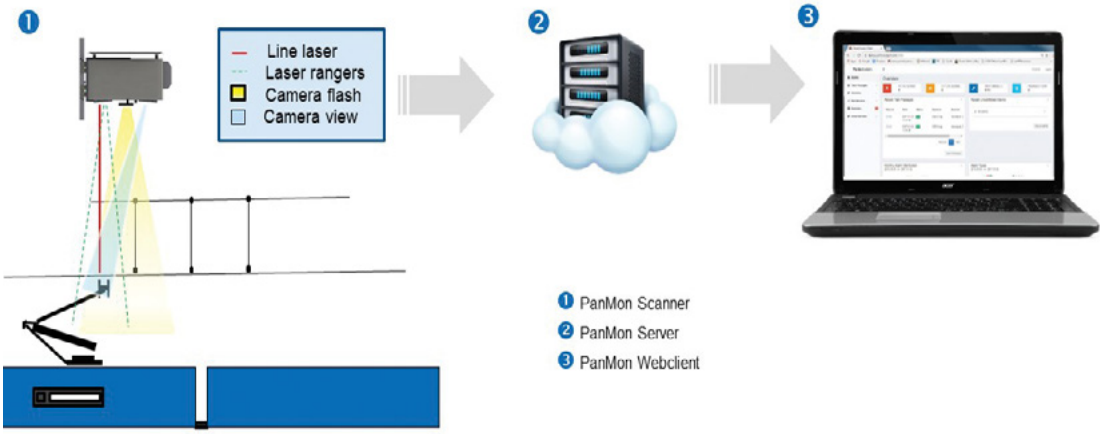
The system has been successfully installed in Germany, Denmark, France, Australia, Belgium and United Kingdom.

HOW IT WORKS

PanMon uses lasers to capture and measure each passing pantograph unit. In addition, a digital camera including UV flash is integrated in the system, taking photos that can be used for manual visual inspection. Vehicle/train identification is included in the functionality.

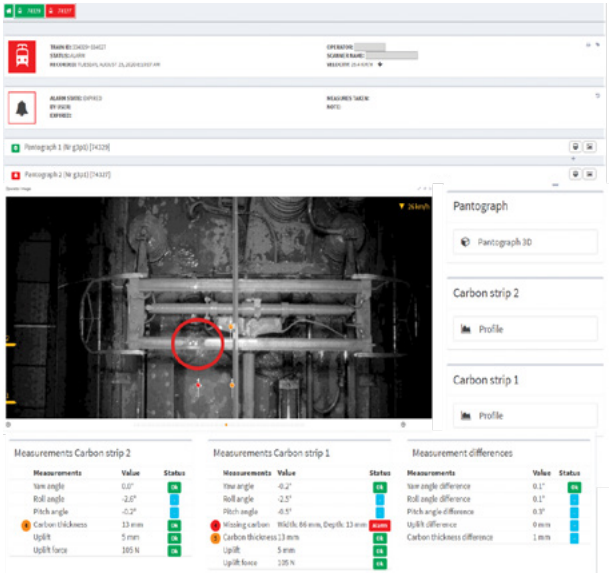
The scans are sent to a server where the software creates 3D models and analyses the condition of each unit. Real-time reports of a range of damage categories are displayed to engineering teams via a customised dashboard.

Should the reported damage exceed a pre-defined threshold, the system automatically raises an alert to give maintenance planners the option to immediately intervene.



BENEFITS

- The system delivers a 3D laser model as well as a 2D photo.
- The laser technique provides accurate scans detecting carbon wear, cracks, horn damage and symmetry.
- When damage is detected an alarm is sent to a control centre for further action.
- Trends are highlighted and used for preventative measures.
- Thresholds can be easily modified.
- The system requires minimal maintenance.
- In many cases, PanMon can be installed on (signal) bridges, tunnel heads or gantries along the route.
- Uplift measurement is integrated in the system.



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