

BOGIES & WHEELSETS Germany

Eliminating manual inspection of wheelsets

German private operator IGE has adopted the Calipri Prime contactless wheel profile measuring tool as a way of eliminating risk from the wheel inspection process.

STEFAN GÄRDITZ

Operations Manager
Internationale Gesellschaft für
Eisenbahnverkehr

PETRA GÖTTFRIED

Marketing Manager
Nextsense Worldwide

Inspecting the wheels of a train before it departs is a time-honoured part of ensuring safe railway operations. Like many operators, Germany's Internationale Gesellschaft für Eisenbahnverkehr has, over its 30-year life running passenger and freight services across Europe, employed vehicle examiners to check wheel profiles before departure using hand-held callipers.

This manual and visual inspection process takes between 2 h and 3 h, depending on the length of the train and the condition of the vehicles. On completion, the paperwork is handed to the driver before departure. Any vehicles deemed unsafe to travel are shunted out of the formation, and moved to a siding for further inspection in partnership with the asset owner. For understandable reasons, such defects are normally found on freight wagons rather than passenger cars, but they still represent a risk that has to be managed.

Early detection of any faults in the wheelset is essential to establishing if the train can run, but this in turn means that the inspection must be relatively detailed and comprehensive, which can put pressure on the examination staff.

To date, the wear of the individual wheels has been checked manually by the examiner going under the wagon and placing a calliper on the wheel. As a rule, the wheel flange is measured, although an experienced examiner can sometimes determine the hollow tread of the rolling surfaces with the naked eye.

The manual method has a number of inherent flaws. A major risk is that the inspection results vary depending on the individual carrying out the task, while time pressure and incorrect handling of the calliper are the two most frequent sources of error. Consistency



Photo: IGE/Nextsense



Photo: Krug/Nextsense

Top: Stefan Gärditz of IGE using the Calipri Prime.

Above: A view of the wheel profile as a point curve.

and comparability of results is almost impossible to achieve, while the physical nature of the task is also an increasing problem given the demographic of an ageing railway workforce in Germany.

User-independent results

IGE discovered an alternative method by trialling Nextsense's optical measuring instruments at a trade fair. The devices are based on a patented development of laser light section technology. An algorithm corrects tilting and twisting of the measuring instrument, resulting in the same measurement data being obtained regardless of the individual user.

Calipri Prime is an entry-level device which provides user-independent measured values in the micrometre range when testing wheel flange wear. Within a few seconds, the camera/laser unit records the flange profile, giving parameters for flange height, flange thickness and qR size. There is no need for any contact with the wheel, so there is no risk of 'tilted contact' often found with conventional gauges.

Where appropriate, the wheel width, hollow tread and rollover values can also be determined and limit violations colour-coded. The variables are displayed on the device immediately after measurement and are also made available for transfer to a PC.

Although a significant change in technology can sometimes be difficult to roll out across a large organisation, staff have welcomed the adoption of Calipri Prime. Removal of the need to physically climb under the wagons for inspection work was particularly appreciated, but the staff have also taken up the tool as a means to verify the quality of their own work, contributing to a culture of self-improvement.

Versatile fields of application

IGE primarily uses Calipri Prime for the random profile measurement of freight wagon wheelsets, but it has also found a number of other beneficial uses. The tool is used as part of the training course for inspection staff, and there have also been cases where staff have deployed it mid-journey to assess the cause of ride quality problems on one of the company's tourist-oriented railtours.

The operator's goal is to provide every vehicle inspector with their own tool, and eliminate error-prone manual measurements. This would be accompanied by the roll-out of paperless administration of the results. Each wheelset would be assigned a barcode, and its individual measured values could be transmitted digitally to the vehicle owner immediately after the measurement.

Nextsense shares this digital railway vision, and the supplier has already developed a smartphone app from which a measurement plan can be compiled and updated. Vehicle inspectors can also enter data for identifying the vehicle, axle and wheel from the lineside in real time. ■