ASSET OPTIMISATION

PUPIL

TRACK GEOMETRY ASSESSMENT TOOL

As all railway tracks deteriorate over time, monitoring geometric quality becomes an important aspect of ensuring safe operations.

Combining a detailed library of vehicle types, speeds and loading conditions with actual track condition measurements, Ricardo's PUPIL simulates vehicle reactions to produce assessments of track forces and Y/Q safety against derailment coefficient and car body accelerations.

An alternative to traditional track assessment techniques, PUPIL provides direct insight of locations where track forces, derailment risks and vibrations exceed safety limit values, as well as offering insight into the likely causes and appropriate responses.

Benefits of using PUPIL from Ricardo:

- Assessment of track geometric quality (level, alignment, cant, twist) by means of simulated vehicle reactions.
- Enhanced safety performance across the network.
- Reduced costs through preventive maintenance.
- Increased track capacity via informed advice on safe speeds limits.
- Higher passenger satisfaction through improved ride comfort.
- Compliance to EN 13848-1:2019.
- Easy implementation.

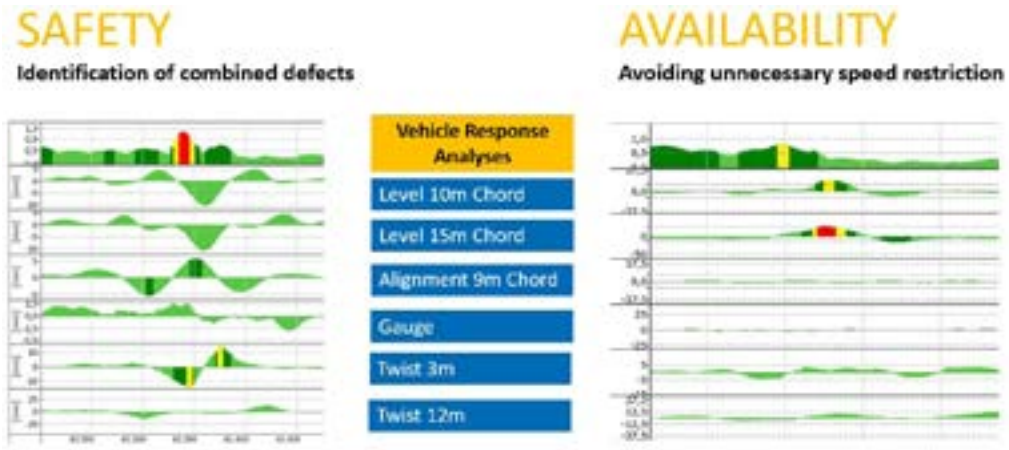
CASE STUDY

PUPIL uses geometric data generated by regular track surveys to simulate the dynamic behaviour of more than twenty different vehicle types, determining quantities such as wheel/rail forces, derailment coefficients and vehicle accelerations.

The values are assessed according to EN14363 methods and related limit values, to identify critical locations on the track. Within its virtual environment, PUPIL can simulate the cumulative effects of defects positioned together along a route, as well as the impact of a combination of defects at the same location.

By using the profiles and filters stored in its library, PUPIL can process thousands of kilometers of measured track data.

Specific locations on the network that are shown to be causing critical vehicle dynamic behaviour can then be pinpointed, along with the exact nature of the defect. With access to such detail, maintenance teams can trace the origin of the defect and obtain specific guidance on the appropriate corrective intervention.



CASE STUDY

PUPIL has been used by the Dutch infrastructure manager, ProRail, for more than 15 years and remains the only tool utilised for assessing the safety of track geometric quality across the Dutch rail network.

The library of vehicle profiles and filters stored within PUPIL continues to be updated to include new vehicle types as they arrive on the network.

For more information:
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