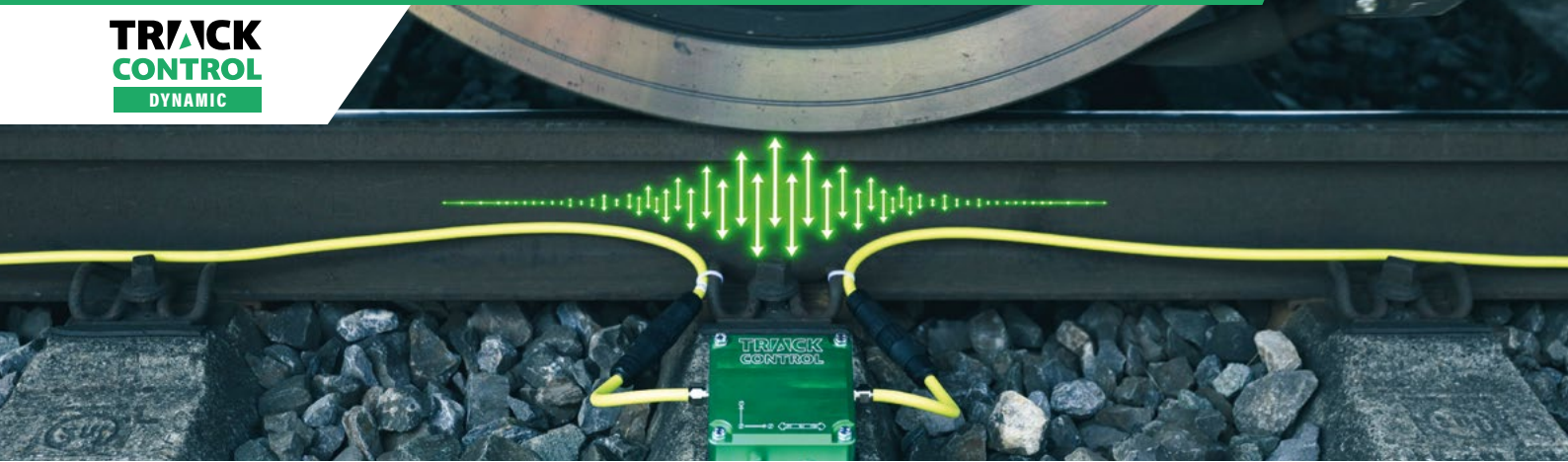




AMBERG TRACK CONTROL DYNAMIC

Next Generation Track Monitoring

Nowadays, tracks are generally monitored in an unloaded state. However, deformations under load during the passage of trains are of interest. The new Amberg TrackControl Dynamic solution enables the dynamic measurement of all relevant track parameters under load.

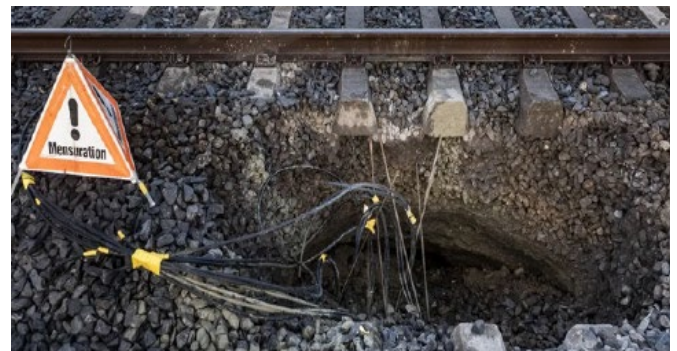
System Description

- **24/7 monitoring of track stability in loaded and unloaded condition**
All-in-One Solution
- **Monitoring of all relevant track parameters**
Track swing, superelevation, twist, vertical versine
- **Scalability**
From single-point measurements to entire track sections
- **GEOvis Cloud Software**
Real-time results available around the clock



Applications

- **Early detection of effects from construction sites close to the tracks**
(e.g. undercuts, pipe jacking)
Damage to the subgrade cannot be immediately detected in static measurements. Track subsidence when trains pass over indicates weak spots at an early stage.
- **Early detection of structural weak points of the rail superstructure/substructure (e.g. underwashing)**
Long-term monitoring of known problem areas.

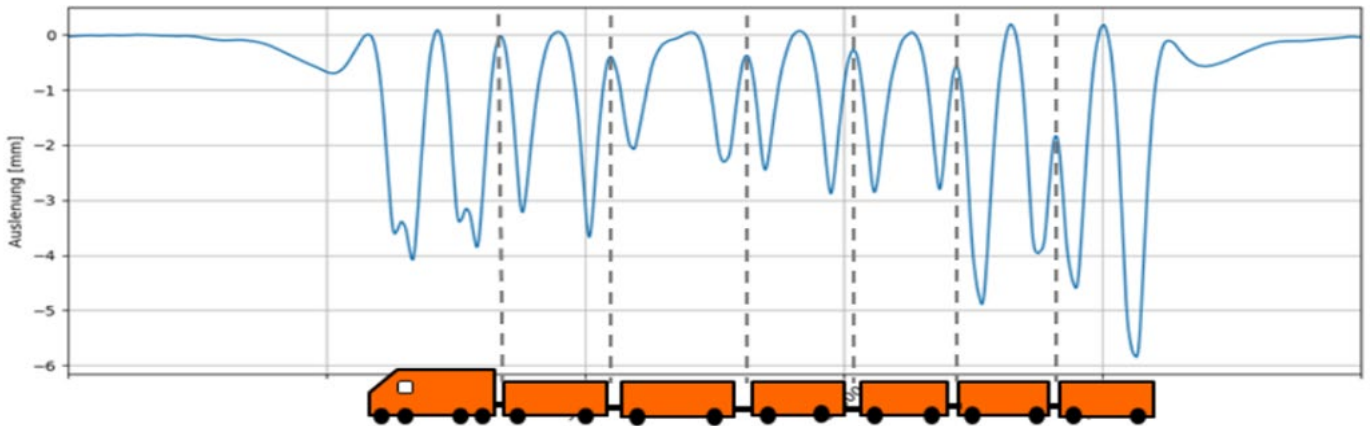


- **Monitoring of transition areas of auxiliary structures / auxiliary bridges**
In transition areas to temporary auxiliary structures, weaknesses in terms of stability often occur. The result is slow speed zones. Permanent dynamic monitoring of all track parameters can increase safety and, if possible, prevent slow speed zones.
- **Site investigation**
Determining the subgrade conditions based on the depth of track subsidence during train passage, as a function of groundwater levels and weather conditions.

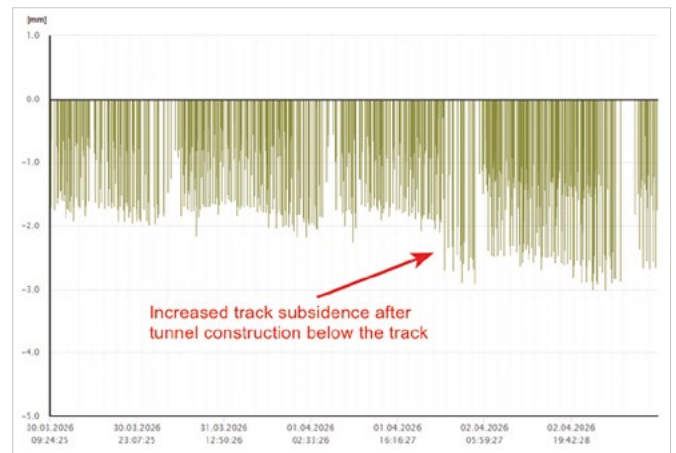
COMPREHENSIVE TRACK MONITORING

The newly developed and patented sensors can precisely determine the track sinking depths for each wheel axle as the train passes. The combined measurement of the static track position and the dynamic track deformation enables

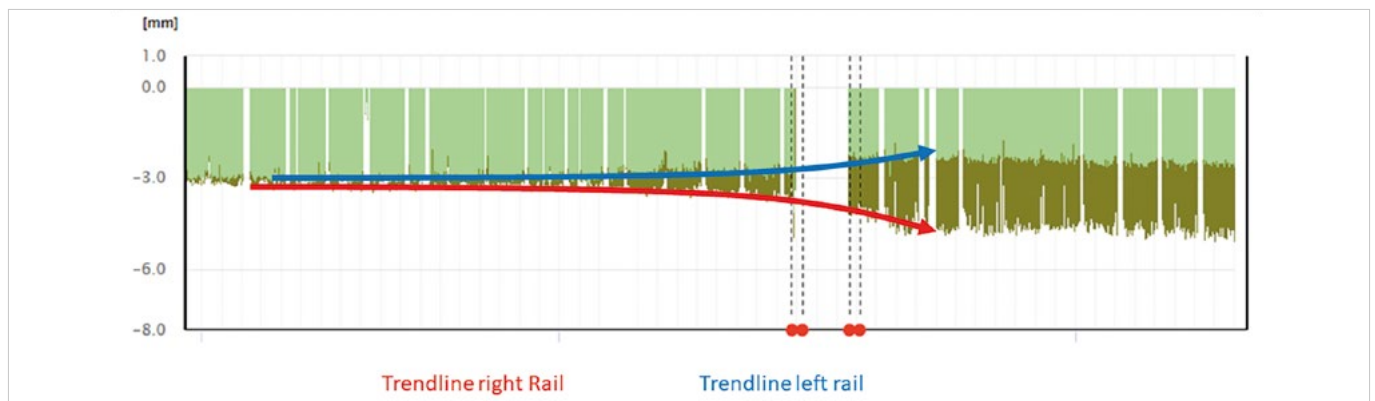
comprehensive monitoring of the tracks. The Amberg TrackControl Dynamic measuring system can be used to determine the effective track parameters 'track superelevation', 'twist' and 'vertical versine' under load.



In addition to real-time measurements (maximum/median per train), the GEOvis monitoring cloud software can also be used to analyse and visualise long-term behaviour. This allows the development of track position and stability to be



monitored comprehensively and trends to be identified at an early stage. This enables cost-effective and proactive planning of maintenance work on the substructure and superstructure of the track infrastructure.



TrackControl Dynamic Trendline Median