

# RailSafe™ Integrity Analysis System

## Rotational Vibration Sensing System for Trains



Part of the Sentinel Suite™ Family

### Features and Benefits

- Precision measurement of rotating and vibrating components in rolling stock
- Attaches to axle hubs to measure wheel or track anomalies
- Real-time reliability data for advanced diagnostics and prognostics & health management (PHM) applications
- Solid state Flash drive enables fast data download
- Discoverable IP addresses and wireless technology make RotoSense IoT (Internet of Things)-compatible
- High sensitivity through MEMS accelerometers
- Three-dimensioned measurements (x, y, and z axes) accurately pinpoint problems
- Supports multiple nodes in a sensor network
- Secure, robust mounting hardware



### General Description

Ridgetop Group's RailSafe™ Integrity Analysis System is the new way for owners and operators of railway rolling stock and tracks to ensure the safety and reliability of their equipment. Based on Ridgetop's proven Sentinel Motion™ and sensitive RotoSense™ sensors mounted on a railcar, RailSafe collects and wirelessly transmits performance data to Ridgetop's patented predictive analytical tools to alert you to wheel or track degradation before the problems mushroom into a mechanical failure or a derailment. You save money by avoiding unnecessary servicing, while simultaneously improving safety and reliability. The RailSafe solution is a powerful and elegant solution to help keep your trains or tracks operating at maximum efficiency at the lowest cost.

Because the robust RotoSense sensors – originally developed for rigorous NASA applications – are mounted on each end of an axle, right where the wheels and track meet, the three-dimensioned microelectromechanical systems (MEMS)-based instruments continuously capture wheel and track vibration data with maximum sensitivity. The data are analyzed using the RailSafe Toolbox, including the Adaptive Remaining Useful Life Estimator™ (ARULE™), which has been proven in aerospace and industrial condition-based maintenance (CBM) systems. With ARULE and the rest of the RailSafe Toolbox, you can find:



*RailSafe RotoSense sensor module (blue)  
mounted on railcar axle hub*

- Small cracks in the rails or deterioration in the ballast causing anomalies as the cars or engines traverse particular track locations
- Irregularities in the wheels due to mechanical wear and tear or other damage
- Subtle performance differences across wheels on cars and engines, tracks, different loads, or runs over time, any of which can be precursors to impending failures
- Excessive g-forces applied when coupling/decoupling cars in the yard, or when operating on a particular stretch of track

RotoSense sensors are easy to install and use, and one on-board Sentinel Gateway™ IoT-enabled wireless data collection hub can receive and store data from 1,440 hours of operation across all the sensors on a car. The data can be compressed and uploaded to the cloud through an optional cellular connection, sent via Ethernet to another on-board data storage/processing device, or transferred manually for off-board analytics – or you can even install the RailSafe Toolbox on the train to alert operators to dangerous conditions in real time. The RailSafe Toolbox produces graphics depicting key performance parameters such as track or wheel state of health (SoH) and remaining useful life (RUL). No matter how you choose to use RailSafe, you will find it an indispensable yet affordable tool to keep your equipment in top operating condition.



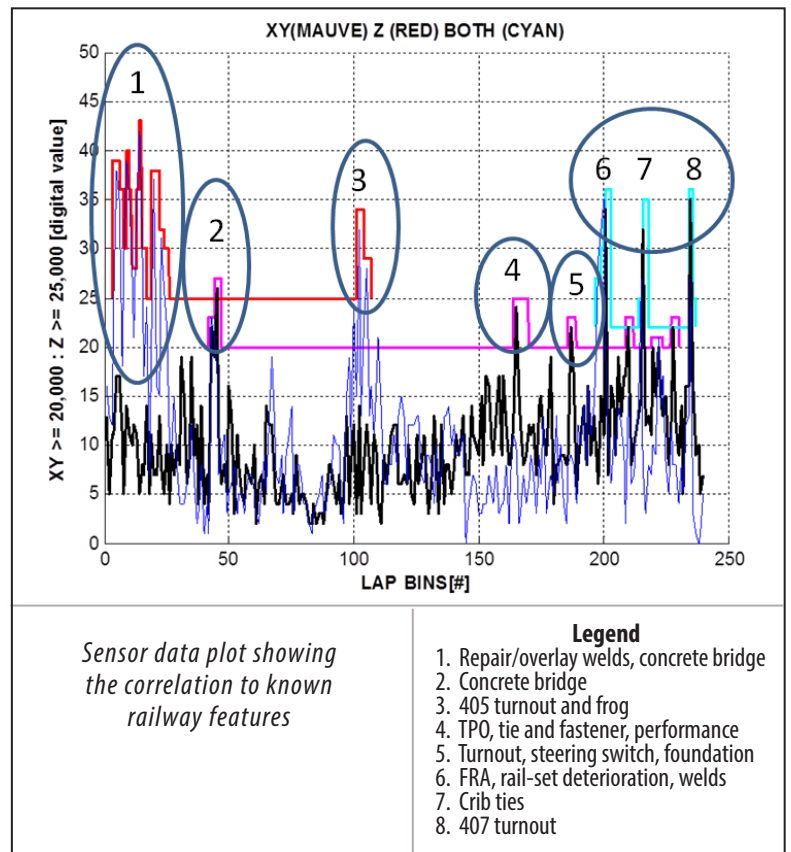
The Sentinel Gateway wireless data collection hub

## What You Get With RailSafe

The first thing you will need is the RailSafe Development Kit. It consists of:

- Two rugged RotoSense wireless sensor modules packaged for standard mounting on the wheels of a railcar or locomotive axle
- One Sentinel Gateway wireless data collection hub, to collect and store RotoSense data
- The RailSafe Toolbox, including the necessary software packages to set up and operate the RotoSense sensors and the Sentinel Gateway, and to extract and display diagnostic and prognostic information based on RotoSense data

Once you have the RailSafe Development Kit components operating as desired, you can purchase the individual RailSafe



components you need to outfit your engines and railcars, including additional RotoSense sensors, Sentinel Gateways, and RailSafe Toolbox licenses. For turn-key operation, Ridgetop also offers installation services and training.

## RailSafe Support

Ridgetop of course stands ready to provide you with the support you need to make your RailSafe system a roaring success. We can help you install and deploy your system, give you and your team operations and maintenance training, and answer any questions you may have in a timely manner to keep everything running smoothly and efficiently.

For more information, visit Ridgetop's Sentinel Motion RailSafe product page at: [www.ridgetopgroup.com/railsafe](http://www.ridgetopgroup.com/railsafe)

**Need modified or custom design? Contact Ridgetop at +1 520-742-3300 to discuss your ideal solution!**

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