



DEPLOYABLE GAGE RESTRAINT MEASUREMENT SYSTEM (GRMS)

The newest enhancement to railroad safety and efficiency, the Deployable GRMS locates bad ties and weak connections for timely repairs.

A GRMS is a self-propelled state-of-the-art vehicle that conducts performance-based testing of railroad track strength. These production-oriented vehicles clearly find weaknesses in track structure and mark the location for follow-up corrective action. The Federal Railroad Administration (FRA) has implemented an alternative standard that allows the use of a GRMS vehicle for tie inspection. These vehicles measure gage restraint at 40 mph, track geometry at up to 60 mph and can cover entire territories in the time it would take visual inspectors to cover one mile of track.

The Deployable GRMS measurement axle is designed as a fifth axle that is deployed from the frame of a track geometry vehicle instead of using one of the vehicle's running axles. The axle is attached to a custom suspension that can vertically load, raise and lower, and properly align it with the track. This suspension allows the axle to be suspended from the underside of a railroad car and operate separately from the four running axles. The measurement axle is suspended such that regardless of the roll, pitch or vertical movement of the railroad car body on its suspension, or the curvature, profile, alignment and crosslevel of the track, both wheels of the measurement axle are always kept on their respective rails in proper alignment. The system also loads the measurement axle against the upper surface of the rails with a constant load that is always perpendicular to the plane formed by the upper surfaces of the rails. In addition, the suspension lifts and lowers the measurement axle assembly to allow it to be used or stowed at will, and orients the measurement axle so that the wheels are always tangent to the rails as track curvature varies.



Deployable GRMS onboard FRA's DOTX218 test vehicle is a result of ENSCO's close partnership with the FRA and industry to quickly bring new technology to bear on safety and performance.

Benefits

- **Safety:** Reduces the risk of derailment of the vehicle by decoupling a testing axle derailment from a vehicle running axle derailment. The new technology eliminates damage to GRMS hardware if the testing axle derails.
- **Efficiency:** GRMS testing speed has increased while still maintaining data quality. Retractable axle feature enables track geometry cars to do other testing at faster speeds with the GRMS axle lifted.
- **Enhanced detection capabilities:** Reduces the amount of data loss through switches by reducing the retract time. Lighter weight also contributes to ability to respond faster to track irregularities.

ENSCO is a leader in GRMS technology. With over 20 years of experience, ENSCO has improved and commercialized the original GRMS technology and has built

systems for CP Rail, Amtrak, CSX Transportation, and the Long Island Railroad. These commercial systems are in regular track testing service and have provided invaluable data to the owners for track maintenance and tie replacement planning.

Features

- Patented, deployable suspension design allows the necessary carbody motions relative to the track while maintaining predetermined vertical and lateral loads on the wheels
- Lifts and lowers the split axle assembly to allow it to be used or stowed at will
- Orients the split axle assembly so that its wheels are tangent to the rails as track curvature varies
- Inner bearing configuration reduces the balancing moment and therefore the size and weight of the system

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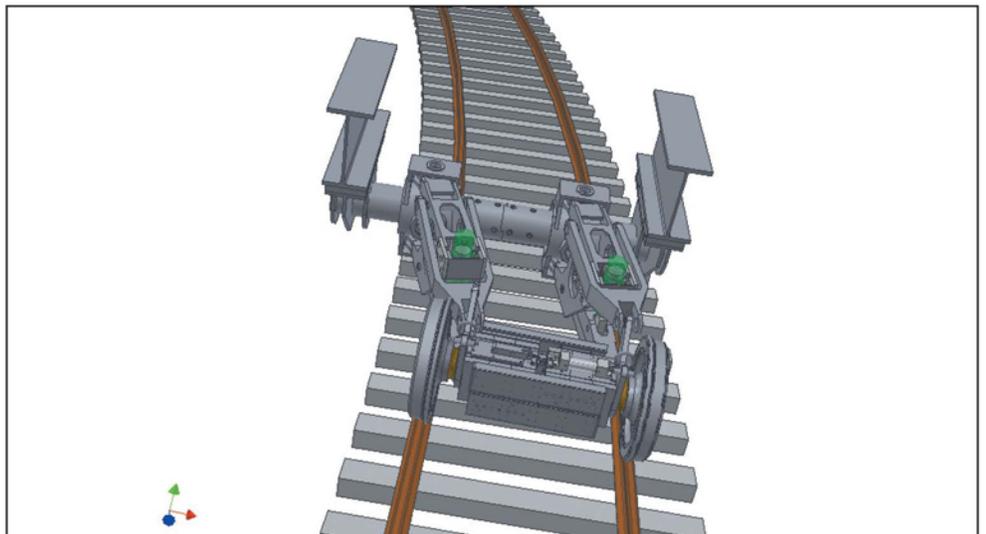
Innovation Starts Here

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- Hydraulic system generates the vertical and lateral forces that are applied to the rail, allowing vertical and lateral loads to be adjusted independently over a wide force range
- Hydraulically controlled stowage and latching device provides safe storage for the system when not in use



Deployable GRMS Measurement Axle. This technology plays an important role in insuring the safety of many U.S. railroad tracks.



Deployable GRMS split axle configuration

**For more information,
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