TrainView-LS

TRIMBLE TRAINVIEW-LS SYSTEM

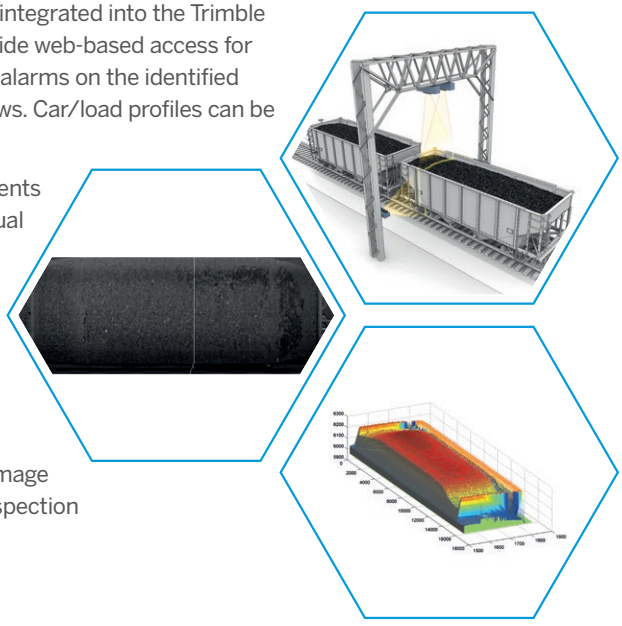
FULL SCALE TRAIN LASER SCANNING & INSPECTION

Trimble® TrainView®-LS is an automatic full scale train laser scanning inspection system that uses 3D data to inspect each car (wagon) in a train at mainline operational speeds.

Trimble TrainView-LS uses a high speed digital imaging together with laser based structural light to generate three dimensional data for inspection and measurement of rail cars (wagons). Every car (wagon) body is scanned from both sides and the top to produce a full scale model of every train car (wagon).

Acquired images are processed by a set of image processing algorithms to reconstruct the profile of cars (wagons) body in three dimensions, and report measurements and defects. For car (wagon) based viewing and analysis, the system utilizes multiple sensors and algorithms to pinpoint axle position, car (wagon) beginning and car (wagon) end positions. Typical system applications are structural gauge and high-wide load detection, car (wagon) load profile, load carry back detection. The TrainView-LS imaging system and processing algorithms are designed to operate in all ambient light and weather conditions.

Processed data and images from the Trimble TrainView-LS system are integrated into the Trimble CMMS™ (Condition Monitoring Management System) software to provide web-based access for data visualization, alarm management, and data analytics. Automated alarms on the identified defects can be used to facilitate condition based maintenance workflows. Car/load profiles can be visualized and assessed.



TrainView-LS's rugged design enables operation in harsh rail environments and at mainline operational speeds. The system is designed for continual operation with minimum manual maintenance.

The system's scanner boxes are mounted on towers on each side of the track (or on a full gantry). The TrainView-LS is installed at a safe distance from the center of the track. System installation does not require any track modifications or extended closures.

By combining data from the Trimble TrainView-LS system with image outputs from the Trimble TrainView system a composite 3D data and image output can be created and used to improve automated car (wagon) inspection which can help maximize safety.

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INSPECTIONS & MEASUREMENTS

Trimble TrainView-LS system inspections and measurements include:

- Car (wagon) structural gauge and profile.
- High-wide detection.
- Car (wagon) load profile.
- Load carry back.
- Car (wagon) orientation detection (leaning cars).
- Side walls inspection.

Depending on the rolling stock types and requirements, the system's imaging, inspection, and measurement outputs may require optimization or customization.

Many other measurements, inspections, and detections are possible, though may require the development of further Machine Vision Algorithms (MVAs) depending on requirements.

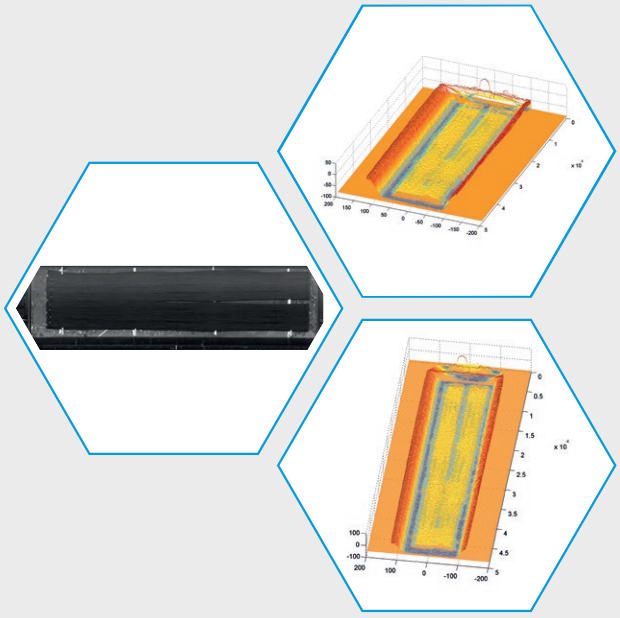
FEATURES

System Features

- Bi-directional system.
- Inspection and measurement at mainline operational speeds.
- Operates in extreme environments.
- Installed off track on tower or pole (concrete or steel base) with no track interference.
- Easy maintenance.
- Automatic defect reporting.

Software Features

- Digital image acquisition/processing.
- AEI (RFID) integration.
- Automatic reporting.
- Web-based database/visualization (with Trimble CMMS™ (Condition Monitoring Management System) or TrainWatch™ software).
- Remote monitoring/control.



Specifications subject to change without notice.