FRA DOTX216 HIGH-SPEED RESEARCH VEHICLE

FRA DOTX216 High-Speed Research Vehicle

The FRA Office of Research and Development owns and operates FRA DOTX216 to support a wide range of track research programs.

The DOTX216 is a converted Amtrak Metroliner coach equipped with a track geometry measurement system, a rail profile measuring system, a multi-car ride quality measuring system, and other state-of-the-art instrumentation for conducting railway research. DOTX216 is capable of making track measurements at speeds up to 165 mph and serves as a high-speed track research instrumentation platform for a variety of tests and research projects in the Office of Research and Development. DOTX216 is also used to support efforts undertaken by the FRA's Office of Safety.

DOTX216's mission includes the following objectives:

- Provide a test bed for the development and deployment of new technologies for track and vehicle/track interaction assessment
- Assess track condition and ride quality over candidate High Speed Rail routes
- Assess relationships between ride quality and track conditions
- Assess effectiveness of new high-speed track geometry standards, ride quality standards and typical maintenance practices

DOTX216 has four distinct areas designed to meet the needs of personnel on the car:

- A workshop area to support maintenance of instrumentation and equipment throughout the car
- A conference area that provides general seating, a conference table with built-in light table and numerous displays to allow passengers to observe data
- An instrumentation area containing control equipment and computers for data display and analysis
- An observation area at the end of the car providing riders with an opportunity to view the track

DOTX216 also offers sleeping quarters and a kitchen to accommodate long-term test efforts.

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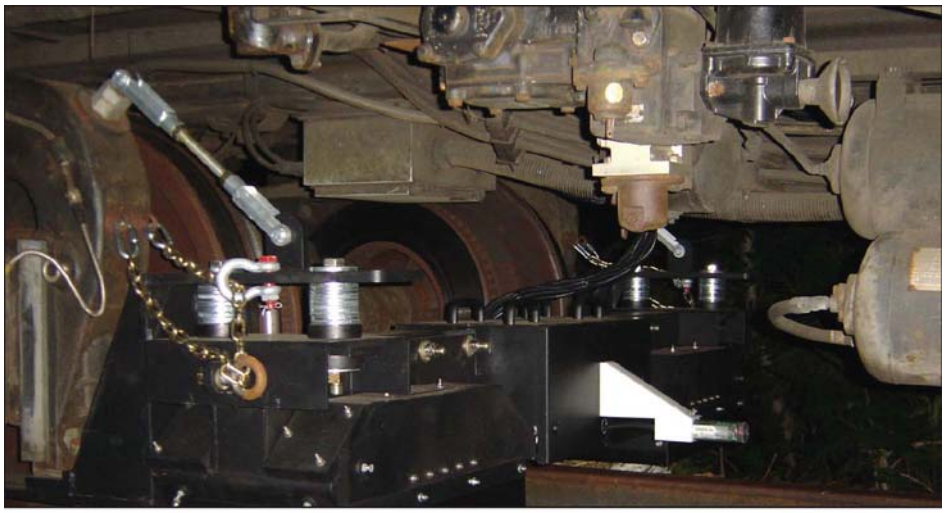
A Product of FRA Research
Federal Railroad Administration, Office of Research and Development

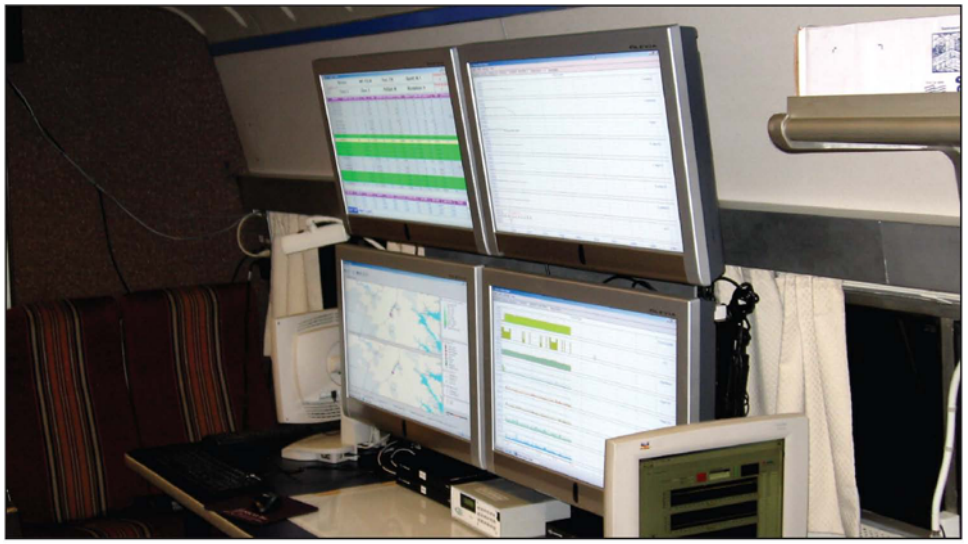
Features

- Track Geometry Measurement System, capable of real time exception detection and editing employing multiple thresholds
- Instrumented wheelsets capable of measuring lateral, vertical and longitudinal forces as well as contact positions
- Ride Quality Monitoring System capable of recording carbody and truck accelerations from DOTX216 and additional signals from a variety of sources;
- Rail Profile System capable of real-time rail recognition and calculation of wear, cant, and lip parameters
- Differential Global Positioning System used to tag exception and railroad features for ease of location during follow up inspections
- Real-time determination and display of Track Quality Indices
- Deployable Remote Monitors that allow for the wireless communication of measurements from other rail vehicles to DOTX216
- Track Analyzer capable of determining the worst vehicle response over a range of speeds based on geometry
- Implementation of a Neural Network utility to predict track locations where combinations of track geometry anomalies could generate wheel load conditions that pose a high risk to derailment for a variety of vehicles
- Automatic Track Data Alignment System (ATDAS) capable of matching measured data to previous records, allowing for the identification of areas exhibiting high track degradation rates or critical growth



DOTX216's Track Geometry Measurement System's Beam.

DOTX216's Instrumented Wheelset System.



DOTX216's On-Board Displays, Featuring Maps, Video Strip Charts and Track Quality Indices.