Since 1987, TUV-RSI has been providing specialized consulting, testing, engineering and training services in the areas of derailment investigations, track/train dynamics, system and operational safety, operations planning and analysis, testing and instrumentation (laboratory and field), material engineering and non-destructive testing.

Why choose TUV-RSI?
As a member of the wide-spanning international network of the TÜV Rheinland Group, TUV-RSI provides consulting, testing, approval and certification services for global markets. Its flexibility, experience and technical expertise has successfully resulted in a steadily growing client base, which today includes all of the major domestic freight railroads, several short line, transit and passenger railroads, many leading local and international suppliers, international railroads and government agencies.

Its Experts Cover the Following Modes:
- Heavy Haul
- Passenger Intercity Rail
- Commuter Rail
- Light Rail
- Metro & Subway
- Automated People Movers
- High Speed
- Maglev
- Monorail
- Intermodal

Capabilities
- **Vehicle Dynamics, Simulation Analysis and Modeling**
  TUV-RSI is proficient at various train and vehicle simulation platforms including VAMPIRE®, Quasi-static Lateral Stability Model (QLTS) TOS, LS-DYNA, and a proprietary TTP model for over-the-road simulations.
  TUV-RSI’s capabilities with these platforms allow for a wide range of service offerings including but not limited to:
  - Vehicle Dynamics Modeling
  - Suspension Design
  - Car & Locomotive Designs, Chapter XI Analysis for AAR Acceptance
  - Derailment Prediction Models
  - Longitudinal Dynamics Simulation
  - Curving Stability Studies

- **Electromagnetic Compatibility/Interference (EMC/EMI)**
  TUV-RSI experts have access to TÜV Rheinland’s North American network of EMC laboratories. They can provide lab and field testing of railroad components and systems to:
  - North American Standards & Regulations, such as FCC, APTA, AREMA, AAR, UMTA & MIL 461
  - European EMC Directive including Standards such as EN 50121
  - IEC Standards

  Using mobile test equipment, TUV-RSI can also investigate and troubleshoot EMC/EMI problems in the field and perform site surveys.

- **Positive Train Control Services**
  Positive Train Control (PTC) is a rapidly growing concern within the railway industry. TUV-RSI is uniquely equipped to help with the implementation of PTC systems.
  TUV-RSI’s capabilities include but are not limited to:
  - Independent Safety Assessments (ISA), e.g. as outlined in 49 CFR 236 Subparts H & I
  - Software Assessments
  - Interoperability Assessments
  - Braking Analyses
  - System Integration Support
  - Lab & Field Testing
Material Engineering, Testing and Instrumentation Capabilities

With the combined strengths of a materials engineering laboratory in Omaha, Nebraska, TÜV Rheinland’s affiliate TRIS, a team of experienced field testing technicians, and being a part of the TÜV Rheinland Group, TUV-RSI has access to an extensive network of testing labs and expertise. Testing can be performed in a laboratory environment or on site in the field. Service offerings include a full range of destructive and non-destructive testing (NDT) methods:
- Ultrasonic
- Radiography
- Magnetic Particle
- Liquid Penetrant
- Ground Penetrating Radar
- Eddy Current
- Positive Material Identification
- Charpy
- Tensile & Compression
- Fatigue
- Acceleration
- Vibration
- SOMAT - 64 Channels
- Impact
- Harness
- Material Testing Per ASTM Standards
- SEM & UT Studies
- Salt Spray Chamber; Corrosion Analysis
- Weatherometer; Paint Analysis
- Roller Bearing & Side Bearing Tester
- Fatigue Analysis; Failure Analysis
- MTS Equipment, up to 60 kip Capability
- Welder & Weld Procedure Qualifications
- Environmental & Construction Inspection Services
- Environmental & Calibration Services
- Wayside L/V Measurement
- Longitudinal Rail Strain
- Dynamometer Coupler & Mobile Test Car
- Vehicle Suspension Analysis & Ride Quality
- Golden Shoe Testing of Airbrakes
- Track Gage Strength
- Locomotive Horn Testing
- VERSE® Testing of Rail Neutral Temperature
- Tensile Testing to 1.2M Lbs.
- Fixture building
- Wheel & Rail Profiling

Derailment and Accident Analysis

Derailments are costly, cause service disruptions and create customer dissatisfaction. The single most important way to prevent derailments is to accurately identify derailment cause(s). Today’s derailments tend to involve complex interactions between the rail car vehicle, the track and the train operation. TUV-RSI can provide an independent in-depth analysis to sort out primary and secondary root causes.

TÜV-RSI is the industry leader specializing in Derailment Investigation and provides the following services in derailment/accident issues:
- Simulation Support of Derailments
- On-Site ‘Go-Team’ Inspections of Track & Equipment
- Analysis of Possible Systemic Causation
- Event Recorder Playback & Analysis
- Metallurgical Failure Analysis of Components
- FMEA/Fault Tree Analysis of Safety Risks
- Derailment Predictor Model (DPM) Studies of Derailment Risk & Severity
- Training Seminars for Derailment Analysis
- Development & Support of Corporate Derailment Prevention Programs

Derailments are costly, cause service disruptions and create customer dissatisfaction. The single most important way to prevent derailments is to accurately identify derailment cause(s). Today’s derailments tend to involve complex interactions between the rail car vehicle, the track and the train operation. TUV-RSI can provide an independent in-depth analysis to sort out primary and secondary root causes.

TÜV-RSI is the industry leader specializing in Derailment Investigation and provides the following services in derailment/accident issues:
- Simulation Support of Derailments
- On-Site ‘Go-Team’ Inspections of Track & Equipment
- Analysis of Possible Systemic Causation
- Event Recorder Playback & Analysis
- Metallurgical Failure Analysis of Components
- FMEA/Fault Tree Analysis of Safety Risks
- Derailment Predictor Model (DPM) Studies of Derailment Risk & Severity
- Training Seminars for Derailment Analysis
- Development & Support of Corporate Derailment Prevention Programs
• Litigation Support & Risk Management
TUV-RSI has supported litigation matters in North America, South America, Europe and Australia. TUV-RSI has a team of experts that encompasses all technical areas in Rail Transportation:
• Train Operation & Human Factors
• Derailment Analysis
• Control Systems
• Level Crossing Accidents
• Employee Injury
• Product Liability
• Environmental

• Planning, Consulting, & Studies
TUV-RSI has a staff of engineers and technicians with years of experience in design, analysis and engineering studies to develop operations strategies or build and improve upon existing plans. Some of the capabilities offered are:
• Rail Network Capacity Studies (Using RDCAM)
• Signal Spacing & Braking Analysis
• Workshop, Depot, & Maintenance Optimization
• Concepts for Modern “Asset Management”
• Design of Workshop Assembly Lines
• Technical & Operational Feasibility Studies

• Economic Analyses
• Planning & Design of Road & Railway Infrastructure & Public Transport Systems
• Reliability, Availability, Maintainability, and Safety (RAMS) Analyses
• Life Cycle Cost (LCC) Analyses
• Capital Planning for Track & Equipment

• Services for Railroad Bridges
TUV-RSI has the resources and technologies available to offer the following services:
• Diagnostics (Monitoring/ Automated Continuous Monitoring, Non-Destructive Testing, Vibrations, 3-D Measurement)
• Monitoring (Continuous Recording, Robust Measurement Technology, Automatic Recording Routines, Alarms, Comprehensible Data Management)
• Non-Destructive Testing of Fabrication

• Certification of Welding Operations
TUV-RSI provides authorized experts to certify welding operations for compliance with:
• AWS Requirements
• European Requirements, such as EN 15085

• International Compliance & Approval Management
TÜV Rheinland is a global leader in International Compliance and Approval Management. TUV-RSI offers a full range of services to guide an exporter through this process. With its access to TÜV Rheinland Group’s international laboratory and expert network, TUV-RSI is a one-stop solution in getting products to the global market. This includes identifying local and national standards and regulations, interfacing with regulatory authorities, and providing the required tests of products. Many international clients turn to TUV-RSI for its reputation as a global leader in Independent Safety (ISA) and Interoperability (Notified Body) Assessments for overseas markets.

• Global Sourcing Services
Being a member of a globally operating group, TUV-RSI’s experts can help buyers who source already or plan on sourcing parts, components and systems internationally with a wide range of services, including:
• Identification of Qualified Sources in Other Countries/Regions
• Supplier Audits
• Development of Specifications
• Evaluation of Supplier Quotes
• Resolve Technical, Commercial & Quality Issues
• Pre-Shipment and Other On-Site Inspections
Specialized Training Programs

TUV-RSI utilizes the extensive years of rail experience within its staff to offer specialized seminars covering all areas of rail operation.

• Derailment Cause Finding and Prevention Seminar:
  This popular course reviews the basic elements of railroading from track structure to mechanical principles to train handling and then integrates these elements with the 12 steps for determining the accurate cause(s) of a derailment. The course also reviews basic derailment prevention methods. This seminar is extremely popular within the rail industry with over 4,000 attendees from all classes of railroads, various suppliers, and personnel from the government sector participating in the past few years.

• Mechanical Inspection and Training:
  This seminar reviews all freight car mechanical components and their function and then reviews how those components interact as a system. The seminar also touches on how different issues such as side bearing clearance and friction damping can affect overall performance and, in certain cases, can contribute to a derailment. This course includes both classroom and hands-on training.

• Track Inspection Training:
  This course includes classroom review and discussion of basic track structure followed by in-depth review of each track component and how those components interact to create a viable, productive roadway. Derailment scenarios related to track structure, wear and defects are reviewed. The seminar also covers track geometry and FRA 213 Standards. Track geometry measurement and calculation methods are reviewed in the classroom and then reinforced by actual hands-on training.

• TransportationU.com:
  In 2007 TUV-RSI launched an online version of their popular in-person seminars. With the development of TransportationU.com, training has never been more affordable or widely accessible. Group licenses and custom content are also available through TransportationU.com.
TÜV Rheinland is the world leader in independent testing and assessment services. The $1.5 billion corporation is comprised of an international network of 13,300 employees at over 490 locations in 61 countries and serves most industry sectors and markets worldwide. With North American headquarters in Boston, Mass., TUV Rheinland North America Holding, Inc. has additional offices throughout North America.

**United States**
- Atlanta, GA
- Austin, TX
- Birmingham, AL
- Boxborough, MA
- Chicago, IL
- Detroit, MI
- Flint, MI
- Grand Rapids, MI
- Houston, TX
- Newtown, CT
- Omaha, NE
- Orlando, FL
- Pittsburgh, PA
- Portland, OR
- Raleigh, NC
- Rochester, NY

**Canada**
- Toronto

**Mexico**
- Guadalajara
- Mexico City
- Monterrey

Tel 404-294-5300
Fax 404-294-5423
Toll Free TUV-RHEINLAND
Mail info@tuvrsi.com
Web www.railsciences.com

TÜV, TUEV and TUV are registered brand marks. Any use an application requires prior approval.