Outlines of Railway Technical Research Institute (RTRI)

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Railway Technical Research Institute (RTRI)
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History of Japanese Railways

1872 British railway engineers brought railway in Japan
The first operation between Tokyo and Yokohama (29 km)
History of Railways in Japan

1881  Establishment of Nihon Tetsudo Kaisha, the first Japanese private railway company

1948  Japan National Railways (JNR) was founded by a public corporation.

1964  Tokaido Shinkansen (Tokyo-Osaka) was opened with a standard gauge.

1987  JNR was privatised into 6 JR passenger companies and 1 JR freight company.
Japan Railways Group – JR Groups

- Hokkaido Railway Company (HJR)
- East Japan Railway Company (EJR)
- Central Japan Railway Company (CJR)
- West Japan Railway Company (WJR)
- Shikoku Railway Company (SJR)
- Kyushu Railway Company (KJR)
- Japan Freight Railway Company (FJR)

- JR Information System
- Japan Telecom (Now, Soft Bank Telecom)
- Railway Technical Research Institute (RTRI)
Overview of Railway Technical Research Institute

**Outline (as of July 2010)**

- **Budget**: 208 mUS$
- **Personnel**: 522 persons
- **Doctors**: 147 persons
- **Patents**: 2,214

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**Dec. 1986** Founded

**Apr. 1987** Takeover R&D of

Japanese National Railways (JNR)

⇒ Japan Rail (JR) group
Funding

• Contribution from JR group companies (0.35% of railway-related income)
• Subsidy from the government
• Contract revenue from private companies
**Organization of the RTRI**

- **Board of Directors**
  - Chairman
  - President

- **Executive Directors**

- **Vice Presidents**

**13 Research Divisions**

- Frictional Materials
- Lubricating Materials
- Vibration-Isolating Materials
- Concrete Materials
- Applied Superconductivity

- Vehicle Structure Technology Division
- Vehicle Control Technology Division
- Structures Technology Division
- Power Supply Technology Division
- Track Technology Division
- Disaster Prevention Technology Division
- Signaling & Telecommunications Tech. Div.
- Transport Information Technology Div.

- **Materials Technology Division**
  - Railway Dynamics Division
  - Environmental Engineering Division
  - Human Science Division
  - Maglev Systems Technology Division
RTRI has set out the following basic policies:

1. Creation of new technologies aimed at sustainable development of railways
2. Accurate and quick response to demand
3. Information transmission and dissemination of results from its activities
4. Inheritance of railway technologies and using foundation technologies as the basis for more advanced research
5. Demonstration of expertise in research across the whole railway engineering spectrum as a railway engineering group
Research and development activities

Prioritized objectives

Targets

- Improved safety
- Harmony with the environment
- Low cost
- Improved convenience

Basic research for railways
Research and development for the future of railways
Development of practical technologies
Number of R&D Projects in FY 2009

- Basic research of railways, 36% (99)
- R&D for the future of railways, 8% (24)
- Development of practical technologies, 56% (155)
- Total 278
Rolling stock test plant

Purpose
- Test of impossible condition on actual lines
- Preliminary examination of newly designed trucks

Special features
- Test of one vehicle or one truck
- Vertical, lateral and rolling action

Maximum speed
- 500 km/h

Rail wheel
Large-scale shaking table

Purpose
- R&D on seismic performance of rolling stock, tracks, structures

Special features
- Two-dimensional horizontal excitation (±1 m)
- Maximum acceleration: ±2000 gal
- Maximum surcharge weight: 500 kN

Actuator

Vibration table (5m×7m)
Wind tunnel technical center

- Low-noise performance unequaled in the world. Background noise level: 75dB(A)
- Highest wind velocity (400 km/h) for the large-scale and low-noise.
- Equipped with a high-speed (216 km/h) moving belt ground plane.

Panoramic view of the center (Maibara city)
Current collection test

Purpose
- Test of overhead contact line - pantograph systems

Special features
- 500m-long test track
- Maximum speed of 200 km/h
English Publication

RTRI : http://www.rtri.or.jp/eng/index.html

◆ Quarterly Report of RTRI
Research Paper, Every three months
http://www.rtri.or.jp/eng/publish/qr_E.html

◆ RTRI’s Newsletter
(Railway Technology Avalanche)
Latest information of railway technology
Every 3 months
https://webform.rtri.or.jp/ent/entry/index.html

◆ Annual Report
http://www.rtri.or.jp/eng/rtri/annualreport.html

You can download all of document by pdf files.
Thank you very much for your kind attention!
Ride comfort simulator

Purpose
- Simulation of passenger riding quality.

Special features
- Vibration, environmental factors in and outside of cars.

Interior

Window view
Brake test stand

Purpose
- Test of brake performance of brake disc, bread brake and adhesion between rail and wheel

Special features
- Maximum speed of 500km/h (Ø860mm wheel diameter)
- Snowy and wet condition

Brake disc test unit  Tread brake test unit  Adhesion test unit
Cerajet: Improving Wheel/Rail Adhesion

preventing slip and skid

nozzle

reservoir

rubber hose

nozzle

air reservoir

electromagnetic valve

RTRI Japan

Cerajet

Railway Technical Research Institute
Frictional Materials

Technology
- Design
- Experiment
- Analysis

Phases
- Search Introduction
- Investigation of phenomena

Practical Use
- Improvement
- Maintenance

Fields
- Tribology
- Degradation
- Fatigue
- Fracture
- Collision
- Material Science

Target components
- Wheel
- Contact strip
- Rail
- Braking Materials
- Wheel/Rail
- Bearing

Railway Technical Research Institute