



Newsletter on the  
Latest Technologies  
Developed by RTRI

Railway Technical Research Institute  
2-8-38 Hikari-cho, Kokubunji-shi  
Tokyo 185-8540, JAPAN  
URL: <http://www.rtri.or.jp>

Editorial Office: Ken-yusha, Inc.  
URL: <http://www.kenf.or.jp/en/>

Copyright © 2008 Railway Technical Research Institute.  
All rights reserved.  
Reproduction in whole or part without permission is  
prohibited. Printed in Japan.

# Railway Technology Avalanche

September 19, 2008 No.24

## GENERAL INFORMATION

- Research and Development for the Safety of Railways against Natural Disasters  
*Atsushi ICHIKAWA*..... 137
- Technical Discussion of LRT without Contact Wires  
*Toshihiro HAMAMOTO*..... 138

## ARTICLES

- Development of a Damage Detection System for Structural Members in the Ground  
*Hirokazu OHMURA*..... 139
- Preventing Fatigue Breakage of Contact Wires  
*Atsushi SUGAHARA*..... 140
- Research to Evaluate the Remaining Service Life of Aged Rails  
*Hiroo KATAOKA*..... 141
- Train Operation Control Indices for Use during Earthquakes in Japan  
*Masahiro KORENAGA*..... 142

## Research and Development for the Safety of Railways against Natural Disasters

**Atsushi ICHIKAWA**

Director, Research and Development Promotion Division

In recent years, heavy rains, strong winds, earthquakes and other natural disasters have frequently occurred in various areas around the world. Railways in Japan have also experienced a series of large-scale disasters. Railway structures, for example, have been seriously damaged by heavy rains. Shinkansen cars were derailed in one large earthquake, and some railway cars have been overturned by strong winds. In response to these disasters and accidents, the Railway Technical Research Institute (RTRI) has been active in promoting research and development to ensure the safety of railways.

To prevent damage due to strong winds, the RTRI has been developing methods to observe wind-force phenomena, investigate the effect of windbreaks and calculate the aerodynamic forces that affect railway cars on bridges and embankments. For this purpose, the RTRI implements on-site measurement and tests using large-scale wind tunnel test apparatus. Through these research and development activities, the RTRI plans to propose basic technologies to protect trains from strong winds within a few years.

To minimize earthquake-related damage to structures, the RTRI and Railway companies are now developing a low-cost, highly effective earthquake-proof reinforcing technology. Applying the results obtained so far from this development, Railway companies are now executing reinforcing work for existing railway lines. In parallel, we are developing guards to prevent derailment in earthquakes as well as guards to keep cars on the track even if their wheels derail. Some of the results of such development have already been applied to existing railways.



Given the abnormal weather conditions caused by global warming, it is anticipated that serious natural disasters will continue to occur in the future. This makes it increasingly important to promote research and development on the safety of trains against natural disasters. The author wishes this subject be addressed in conjunction with railway engineers in different countries.

市川篤司