Safety

Our efforts to ensure safety

JR East's safety measures ensure that its customers can use its railway services with a high level of assurance.

Measures taken since the accident on the Uetsu Line

On December 25, 2005, the limited express train Inaho No.14 derailed between Sagoshi and Kita-Amarume Stations near the No.2 Mogami-gawa Bridge. We would like to report on the measures we have taken since this acccident.

Increased number of anemometers (wind meters) and the introduction of a gale warning system

In order to increase the effectiveness of our wind observation systems, we have increased the number of anemometers. We have also added the same gale warning system which we introduced on the Keiyo Line in August 2005 to additional locations, allowing us to observe a total of 69 locations on 18 railway lines, including the Keiyo Line. The gale warning system restricts operations not only when the actual wind speed measured by anemometers exceeds restriction thresholds, but also when the projected maximum wind speed exceeds these limits.

Provisional "early restriction" for all lines

After resumption of the operations of the Uetsu Line on January 19, 2006, the operating restrictions for wind speed for conventional lines were revised as shown in the following table.

Restriction type	Wind speed (meters/sec.)	
	Before revision (general restrictions)	Revised (early restrictions)
Speed restricted to 25 km/h maximum	25 m/s – 30 m/s	20 m/s – 25 m/s
Operation stopped	Exceeding 30 m/s	Exceeding 25 m/s

Installation of windbreak fences

In order to reduce the wind force on trains, we have installed windbreak fences at 11 locations, including at the site of the Uetsu Line accident between Sagoshi and Kita-Amarume Stations (the No.2 Mogami-gawa Bridge), and on the Musashino Line between Misato and Minami-Nagareyama Stations.

For locations where windbreak fences were installed, we changed the operation restrictions due to wind to the general restrictions shown in the preceding table. These changes take the reduction in wind forces into account.

Verification of operation restriction zones

Until recently, the operation restriction zones due to heavy wind have been identified based on field investigations and the experience of local employees. Our current operation restriction zones were established through careful construction of gale maps created with information that included upper level wind conditions and area topography, along with information accumulated by our field staff. As a result of these efforts, we have set up 75 additional operation restriction zones. By March 2008, operating restrictions had been initiated in 7 of these zones.

Investigation of measures against local gusts

Local gusts are extremely strong winds that occur over small areas for short periods of time. They are difficult to observe with conventional observation equipment such as anemometers. Taking these situations in consideration, we have been investigating the occurrence of local gusts.

One of our aims is to establish a system to forecast the occurrence of local gusts using meteorological information. We have been investigating how to forecast the occurrence of local gusts using weather charts and weather radars, and to apply that information to our operations. Between January and March 2008, this system was tested on the Uetsu Line between Niitsu and Sakata, and on the Hakushin Line between Niigata and Shibata.

We have also begun using a Doppler radar to observe local gusts. Doppler radar can determine wind conditions by detecting the movements of raindrops and rain clouds and is used at some airports for detecting local gusts. We installed a Doppler radar at Amarume Station on the Uetsu Line in January 2007 and started test observations from March 2007.

Together with data collection and analysis, we are investigating the possibility of using the system for operation restrictions, working in cooperation with a research institution.

Doppler radar installed on the roof of Amarume Station on the Uetsu Line

Doppler radar body

Disaster prevention measures against rainfall

To minimize temporary suspensions in train operations, reductions in train speed or other such effects of heavy rain, JR East employs disaster prevention measures against rainfall. In the Tokyo metropolitan area and for Shinkansen routes, we are taking particularly intensive steps to secure safe and stable transport. From April 2004, for routes mainly in the Tokyo metropolitan area and for those with especially high customer traffic, JR East conducted reinforcement work for disaster prevention against rainfall along its lines.

For the prevention of landslides, we constructed concrete lattice frames for banking and cutting, and fences for natural slopes. The construction was completed in June 2008, approximately a year ahead of schedule.

Anti-earthquake measures

Seismic reinforcement of elevated bridges

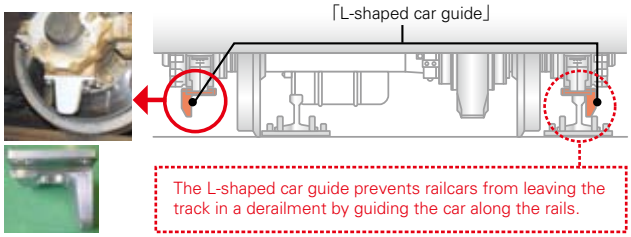
In response to the Great Hanshin-Awaji Earthquake of 1995, JR East employed a number of emergency seismic-reinforcement measures. We completed seismic-reinforcement in Southern Kanto and Sendai regions in 1998 for the Shinkansen lines and in 2000 for our conventional lines. Additionally, after the Sanriku-Minami Earthquake in 2003, we began seismic-reinforcement work in all regions other than Southern Kanto and Sendai. For elevated Shinkansen viaduct support columns, we completed the reinforcement of approximately 18,500 columns by the end of fiscal March 2008. For Shinkansen bridge columns, we began reinforcement in fiscal ended March 2006 and completed the work on approximately 2,340 columns by the end of fiscal March 2008. For conventional lines, we plan to complete the reinforcement of approximately 12,600 viaduct support columns and 550 bridge columns by the end of fiscal March 2009.

Reinforcement of elevated Shinkansen viaduct support columns was completed.

Prevention of secondary accidents after derailment

When the Joetsu Shinkansen Toki 325 derailed during the Niigata Chuetsu Earthquake in October 2004, the track rails guided the cars until they came to a complete stop. We used this experience to help us introduce a number of additional safety measures to our trains. We have developed and installed an L-shaped car guide to prevent trains from completely leaving the track in case of a derailment, a system to prevent derailed wheels from hitting the connecting bolts of rail joints, and equipment to further shorten emergency braking distance.

■L-shaped car guide



■Glued insulated joint

【Before improvement】 【After improvement】

Joint shape improved to prevent wheels or other parts of railcars from directly contacting the joints in a derailment.

In addition, we are currently developing a rail rollover prevention device. This innovation will prevent both rollovers and the extensive sideways movement of rails, even if rail fastenings are fractured during a derailment. With this device, L-shaped car guides will function more efficiently and prevent significant sideways movements of railcars, even in the case of a derailment.

Early Earthquake Alert System for conventional lines in the Tokyo metropolitan area

For our Shinkansen lines, JR East has installed seismographs at 90 locations along our railway lines and along coastal lines for the detection of primary tremors (P-waves). Our present system allows us to stop trains as soon as primary tremors are detected. For conventional lines in the Tokyo metropolitan area, our Early Earthquake Alert System enables trains in any section of track to be stopped in the case of an earthquake. The system, which has been in use since December 2007, utilizes information obtained from our Shinkansen seismographs, and from any advanced announcements given by the Japan Meteorological Agency.