Measures taken since the accident on the Uetsu Line

We would like to report the measures we have taken after the derailment accident of the limited express train Inaho No. 14 between the Sagoshi and Kita-Amarume stations near the No.2 Mogamigawa Bridge on December 25, 2005.

On December 25, 2005, limited express train Inaho No. 14 was derailed between Sagoshi and Kita-Amarume stations near the No.2 Mogamigawa Bridge. We sincerely pray for the victims of the accident and apologize to their families from the bottom of our hearts. We would also like to apologize deeply for the casualties from this accident and sincerely hope that all of the injured persons will recover at the earliest possible date.

An investigation into the cause of the accident is continuing, carried out by the Aircraft and Railway Accidents Investigation Commission of the Ministry of Land, Infrastructure and Transport (MLIT). We are cooperating with the investigation to our utmost. In the meantime we established the "Uetsu Line Accident Cause Investigation Committee" within our organization. We are attempting to ascertain the cause of the accident and are taking all possible measures that we can to prevent any re-occurrence in the future.

We would like to explain the measures taken since the accident.

Increased number of anemometers (wind meters)

To obtain more detailed wind speed data, we have installed 324 additional anemometers (264 on conventional lines and 60 on Shinkansen lines). An additional 28 anemometers have been installed at locations where windbreak fences have been installed. As of the end of June 2007, this brings the total number of anemometers in our service area to 672 (523 on conventional lines and 149 on Shinkansen lines).

Provisional "early restriction" for all lines

When operations resumed on January 19, 2006, operating restrictions due to wind were revised for all possibly hazardous locations, as shown in the table below.

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

To reduce the forces exerted on trains by wind, we decided to construct windbreak fences at 11 locations, including the site of the Uetsu Line accident between Sagoshi and Kita-Amarume stations (the No.2 Mogamigawa Bridge) and similar locations on the Keiyo Line between Kasai Rinkai Koen and Maihama stations. For locations where windbreak fences were installed, we changed the operating restrictions due to wind to the general restrictions shown in the foregoing table. These changes take the reduction of wind forces into account.

Windbreak fence installed at the No.2 Mogamigawa Bridge

Introduction of a gale warning system

We have been using a gale warning system on the Keiyo Line since August 2005. We introduced this gale warning system to 19 zones in six railway divisions, including the Uetsu Line accident site between Sagoshi and Kita-Amarume stations, by the end of March, 2007. 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. Therefore a higher level of safety can be assured.

Establishment of the Disaster Prevention Research Laboratory

On February 1, 2006, we set up the Disaster Prevention Research Laboratory at the JR East Research & Development Center. We are conducting various research projects on meteorological phenomena and on natural disaster phenomena in general.

Verification of operation restriction zones

Until recently, the operation restriction zones due to wind have been identified based on field investigations and the experience of local employees. We thoroughly reviewed the current operation restriction zones by drawing up gale maps from information such as upper level wind conditions and the topography of the areas.

Investigation of observation methods for 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. We have been investigating methods to forecast the occurrence of local gusts using meteorological information from external sources such as weather charts and weather radars. We have also been investigating methods of detecting local gusts with Doppler radar.

We are utilizing meteorological information from external sources to detect cold weather fronts from weather charts and weather radars and the accompanying development of cumulonimbus clouds. These methods are being used to identify methods for forecasting the possibility of local gust occurrence.

In January 2007, we installed a Doppler radar at the Uetsu Line Amarume Station and started test observations from February 2007. Doppler radar can determine wind conditions by detecting the movements of raindrops and rain clouds. It is used at some airports for detecting local gusts. However, since this is the first time that Doppler radar has been applied for monitoring local gusts for a railway, we are collecting and analyzing the data to develop ways of utilizing the radar for decision-making in train operation.

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

Doppler radar body

Sample image from a Doppler radar

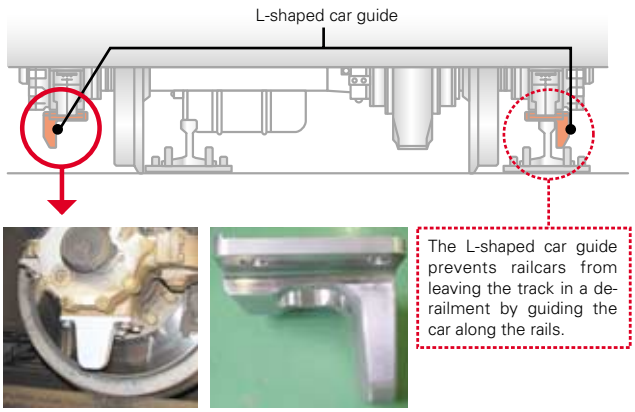
Measures after the Niigata Chuetsu Earthquake

We report measures we have taken after the derailment accident of the Joetsu Shinkansen train Toki 325 due to the Niigata Chuetsu Earthquake on October 23, 2004.

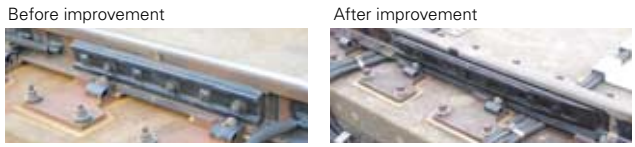
The earthquake that struck the Chuetsu region, mainly Niigata Prefecture, on October 23, 2004 caused the Joetsu Shinkansen train Toki 325 to derail and caused extensive damage to our tunnels and bridges.

Although a Shinkansen train was derailed, the rails guided the cars, keeping the train on the rails until it came to a complete stop. With the lessons learned from this experience, we have installed L-shaped car guides to prevent trains from completely leaving the track in case of a derailment. To safeguard against subsidiary fractures of glued insulated joints, we have also taken measures to prevent derailed wheels from directly contacting the connecting bolts of rail joints.

L-shaped car guide



Glued insulated joint



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

The “Shinkansen Early Earthquake Detection System” has been introduced to detect earthquakes and stop train operation. When seismometers installed along railways and coastlines detect an earthquake, the system stops electric power transmission to the overhead wires to stop trains. We are now developing methods to reduce the time from when an earthquake is detected to when the train stops.

For all conventional lines we have introduced systems for informing our train crews of the occurrence of earthquakes.