

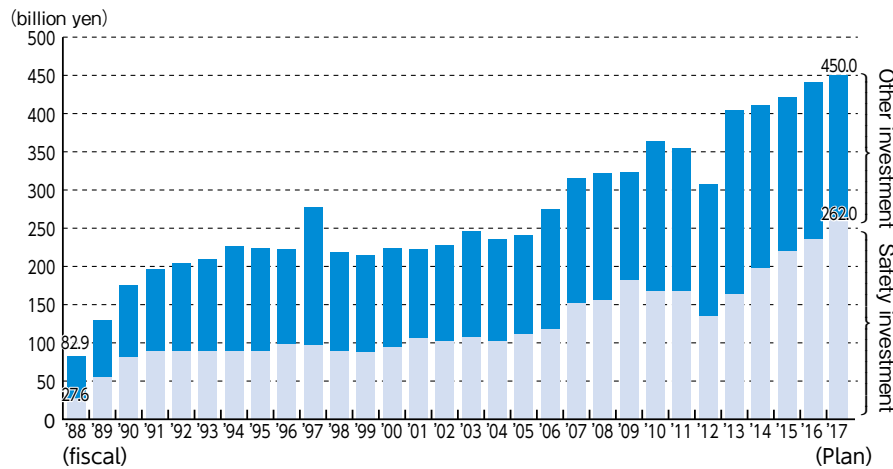
I-4 Efforts to further improve safety levels

I-4-1 Investment in safety equipment

▶ Safety facilities investment

JR East has invested more than three trillion yen during the 29 years following the company's establishment. In our Group Safety Plan 2018, JR East's Five-year Safety Plan, which was announced in Feb. 2014, JR East plans to invest approximately one trillion yen in safety measures during the five years from FY2015 to FY2019.

■ Trends in safety investment



▶ Major safety investment in FY2017

In FY2017, JR East will steadily implement improvement of ATS, measures against large-scale earthquakes, local gusts and gales, improvement of platform doors for the Yamanote and Keihin Tohoku Lines, and safety measures for level crossings.

JR East plans to invest 450 billion yen in total in its facilities and 262 billion yen of that total will be invested in safety.

■ Major safety investment

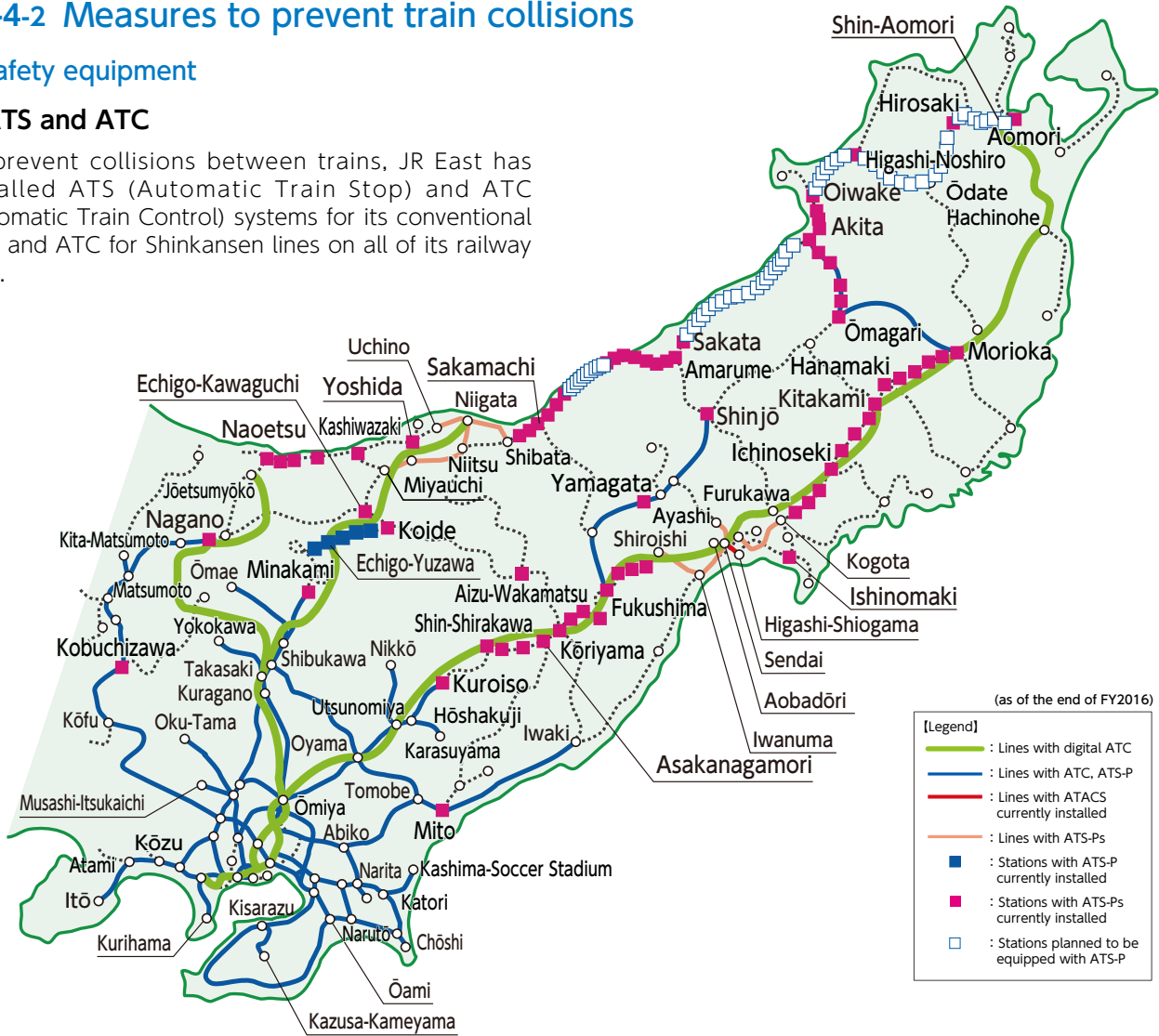
- Improvement of ATS, etc.
- Measures against large-scale earthquakes (seismic reinforcement of elevated bridges, embankments, buildings)
- Measures against natural disasters (rainfall, local gusts, and gales, etc.)
- Improvement of automatic platform doors for Yamanote and Keihin Tohoku Lines, etc.
- Improvement of dot-Braille blocks that indicate which direction is away from the edge of the platform
- Safety measures for level crossings (level crossing warning systems, obstacle detectors, etc.)

I-4-2 Measures to prevent train collisions

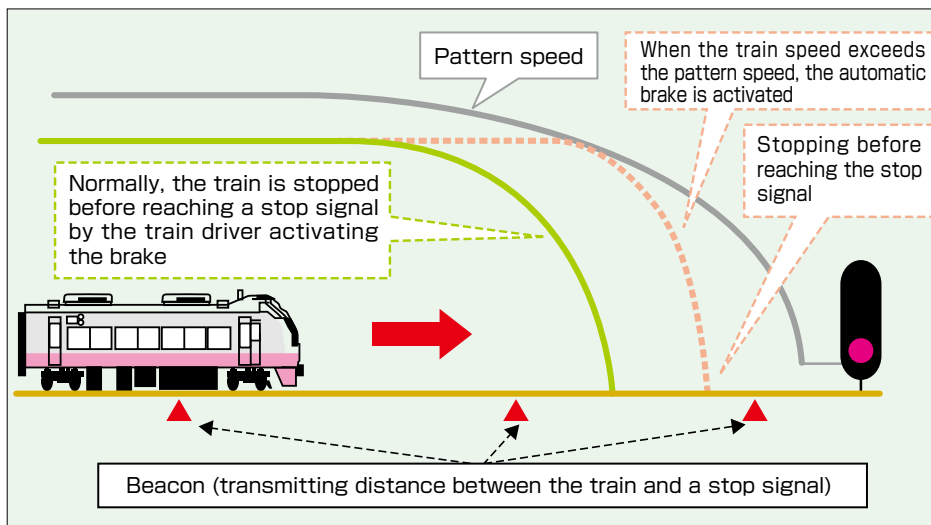
Safety equipment

ATS and ATC

To prevent collisions between trains, JR East has installed ATS (Automatic Train Stop) and ATC (Automatic Train Control) systems for its conventional lines and ATC for Shinkansen lines on all of its railway lines.



Overview of ATS-P system



■ **ATS (Automatic Train Stop)**

ATS stands for Automatic Train Stop. It is a system to automatically activate brakes so that a train can stop before reaching its stop signal. Currently, JR East is installing ATS-P and ATS-Ps systems with improved safety capabilities on its railway lines.

With ATS-P and ATS-Ps, based on information from ground equipment, on-board equipment calculates the allowed train speed to stop at a stop signal. When the train exceeds the speed pattern, the system automatically activates its automatic brake to stop the train. The system also responds to speed limits for curves and turnouts.

■ **Installation plan for ATS-P and ATS-Ps systems**

	Areas for planned installation	Installation status as of the end of FY2016
ATS-P system	Mainly for railway sections with frequent train operations in Tokyo metropolitan area	Completed installation in railway sections for 2,405.8km (service km)
ATS-Ps system	Provincial city areas and major railway sections excluding Tokyo metropolitan area	Completed installation in 72 major stations and railway sections for 210.8km

We have completed installation of ATS at curves, turnouts, track ends, and descending gradients by the end of FY2016 to comply with the 10-year time limit for installation that is required by the July 2006 revisions to the Ministry Ordinance for technological standards for railways.

■ **Installation status of ATS (For locations required by ordinance and time limit)**

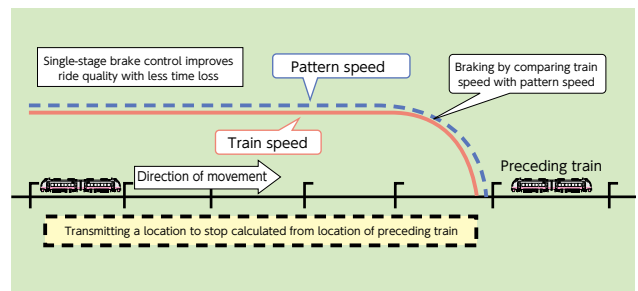
Category	Target locations	Installations as of the end of FY2016	Completion
Curves	934 locations	934 locations	FY2010
Turnouts	465 stations	465 stations	FY2016
Track ends	38 stations	38 stations	FY2016
Descending gradients	707 locations	707 locations	FY2012

■ **ATC (Automatic Train Control)**

ATC stands for Automatic Train Control. In this system, ground equipment continuously transmits signals to trains via the rails. The transmitted signals are indicated on the driver's cab and the system automatically activates the emergency brake if the train exceeds its permitted speed.

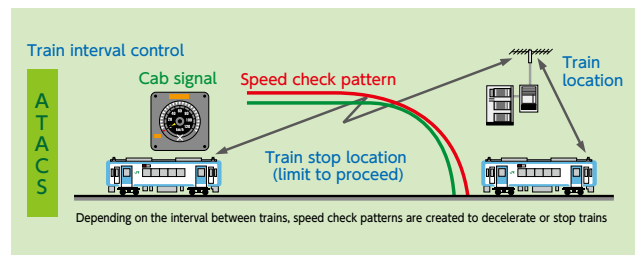
On the Shinkansen and the Yamanote, Keihin Tohoku and Negishi Lines, we have replaced the systems with digital ATC. This system transmits the location information of the preceding trains to the following train so that on-board equipment can control the train speed based on a speed pattern calculated from the information. With the introduction of the digital ATC, we can further improve the safety levels of our railway operations, as well as enhance the ride quality, shorten headways, and simplify facilities.

■ **Digital ATC**



■ **ATACS (Advanced Train Administration and Communications System)**

ATACS is a train control system that utilizes radio transmissions. It is a totally new system for trains to detect their own locations instead of using traditional methods of train location detection with track circuits. By using radio communications for the transmission of train location information between ground and on-board facilities, we can control train operations. JR East began using ATACS in October 2011 on the Senseki Line between Aobadōri and Higashi-Shiogama.

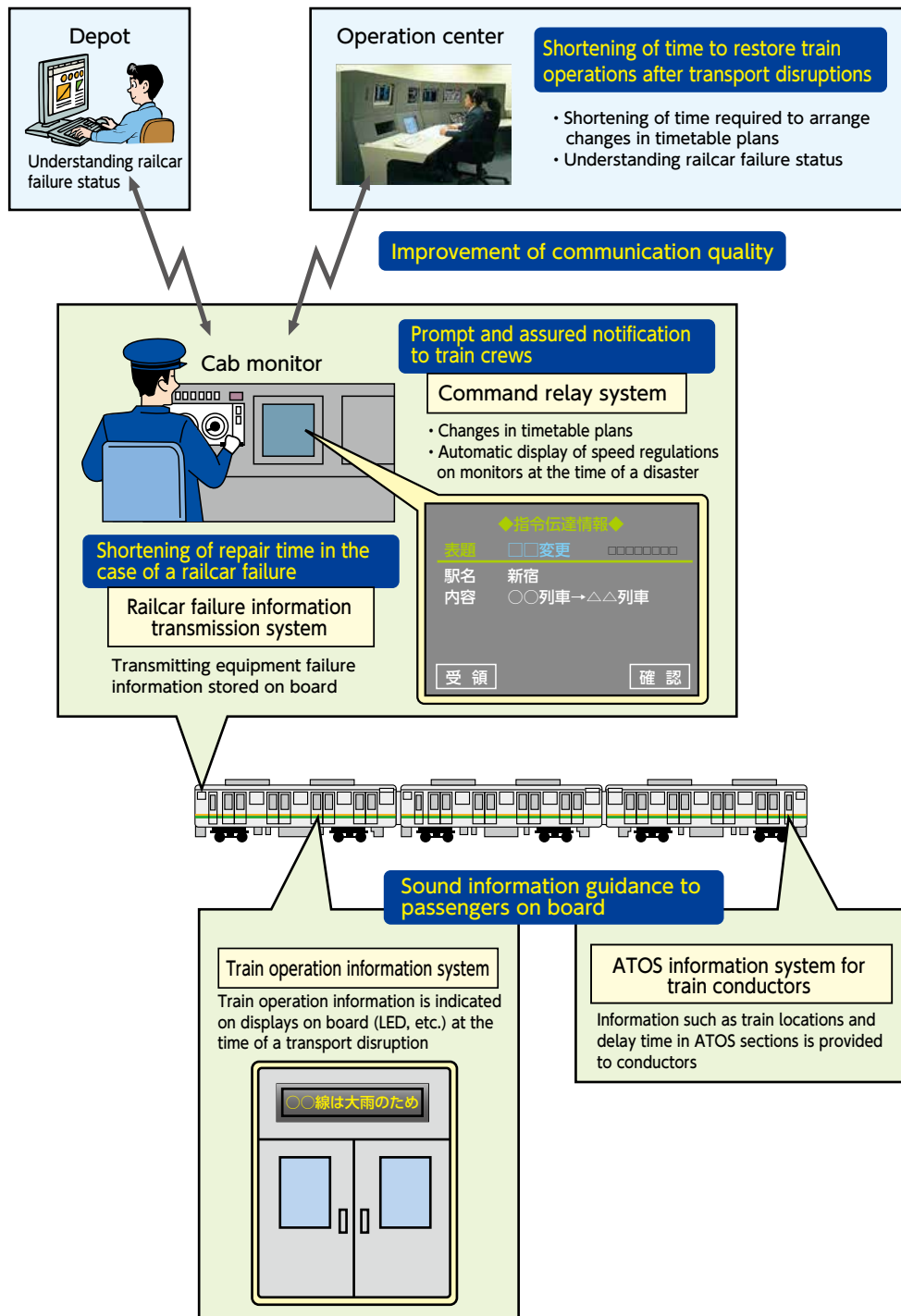


►Others

■ Digital train radio system for conventional lines

We completed the introduction of a digital train radio system for conventional lines for railway sections in the Tokyo metropolitan area in July 2010. Currently, we are extending the introduction of this system to other areas outside the Tokyo metropolitan area.

In comparison to traditional analog systems, digitalized systems improve audio communication quality and make the communication between train dispatchers clearer. Additionally, the digital train radio systems for conventional lines introduced for railway sections of the Tokyo metropolitan area have made various data communications possible so that we can offer information to customers when an issue occurs, and prompt and accurate notifications to train crews are possible.

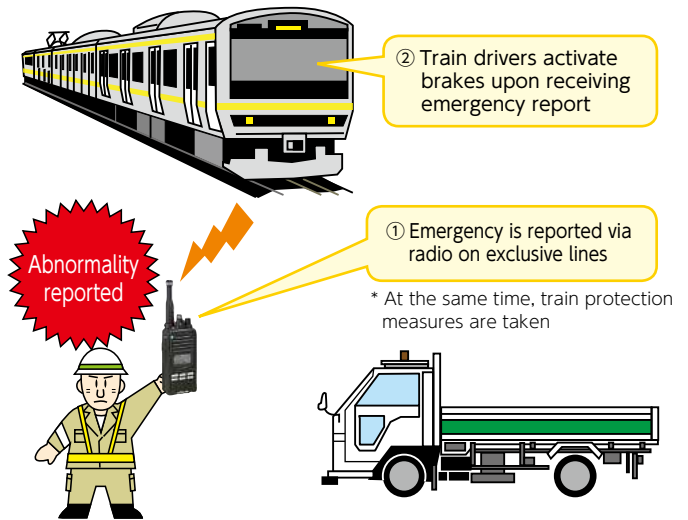


Collision prevention support radio system

Learning lessons from the derailment accident at the Kawasaki Station premises of the Keihin Tohoku Line in Feb. 2014, JR East introduced a collision prevention support radio system to help maintenance workers stop trains in case of an emergency during maintenance work.

The collision prevention support radio system alerts neighboring trains of an emergency by operating exclusive radio terminals in the case of an abnormality to immediately stop trains. The system is installed on all conventional line trains and when the emergency signal is transmitted, drivers receiving the signal promptly stop their trains.

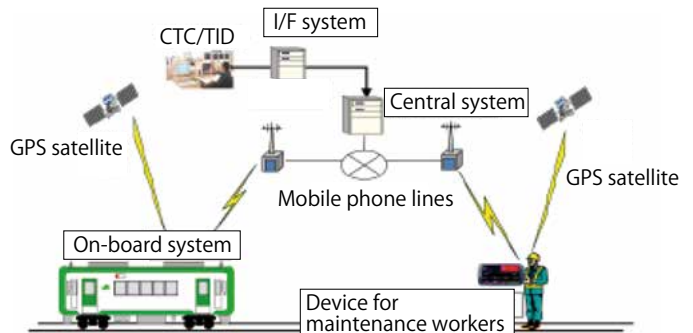
However, depending on radio and line availability, the signal might not reach all neighboring trains. For this reason, the collision prevention support radio system is used as a supplementary method for train protection.



Train approach alarm system

JR East utilizes alarm systems to warn maintenance workers on tracks of approaching trains. For railway sections with track circuits installed, we use a TC-type wireless train approach alarm system to warn workers of approaching trains by track circuit. For railway sections without track circuits, we developed a GPS train approach alarm system to inform workers of train locations by locating the positions of trains and workers on GPS. We started use of these systems on both the Iiyama Line and the Hachikō Line from April 2016.

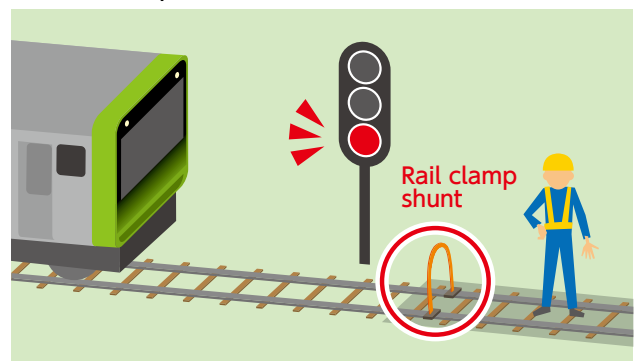
GPS train approach alarm system



Dual safety measures

When conducting track construction, maintenance, or inspection, we close tracks so that other trains cannot enter these particular railway sections. However, in the case of a failure of a track closure as a result of human error, it could result in a train mistakenly entering a closed section during construction, maintenance or inspection. To prevent this from happening, we undertake dual safety measures. In addition to the above-mentioned track closure procedure, by installing rail clamp shunts on the closed section, signals will change to a stop signal to prevent trains from proceeding to said closed section.

Dual safety measures



I-4-3 Preparedness against natural disaster

▶ Our measures against earthquakes

Learning from earthquakes in the past, JR East has employed the following three anti-earthquake measures:

- ① Preventing structural damage (seismic reinforcement measures)
- ② Stopping trains immediately (emergency train stop measures)
- ③ Minimizing secondary accidents following derailment (preventive measures against derailed trains leaving the track area)

① Seismic reinforcement measures

In response to the 1995 Great Hanshin-Awaji Earthquake, JR East steadily progressed its seismic reinforcement measures and completed all the reinforcement for Shinkansen lines. As for conventional lines, excluding part of the Southern Kanto and Sendai areas involving other construction work, reinforcement is complete.

Additionally, to further improve safety in the event of an earthquake, we are reinforcing elevated bridge columns susceptible to failure due to bending by strong earthquake motion. Furthermore, from FY2013, to be prepared for a possible earthquake with an epicenter directly beneath the Tokyo metropolitan area, JR is reinforcing its embankments, cuttings, bricked arch elevated bridges, and electric polls and also taking preventative measures against the collapse of ceilings and walls at stations and on platforms. We are also undertaking seismic reinforcement of elevated bridge columns and other bridge columns ahead of schedule. Moreover, by learning from the Great East Japan Earthquake, JR East is also reinforcing station buildings serving more than 3,000 passengers per day and electric polls for Shinkansen lines.

			Southern Kanto area	Sendai areas	Other areas	
Shinkansen	Susceptible to shear failure	Elevated bridges, bridge columns	Approx. 1,900 columns, approx. 310 units	Approx. 16,600 columns, approx. 2,030 units		
	Susceptible to failure due to bending	Elevated bridges	Without retail premises	Approx. 3,800 columns	Approx. 2,900 columns	Approx. 7,130 columns
			With retail premises	Approx. 1,100 columns	Approx. 410 columns	
		Bridge columns	Approx. 680 units			
Conventional lines	Susceptible to shear failure	Elevated bridges, bridge columns	Approx. 12,500 columns, approx. 530 units	Approx. 100 columns, approx. 10 units	Approx. 940 columns, approx. 820 units	
	Susceptible to failure due to bending	Elevated bridges	Without retail premises	Approx. 5,460 columns	Approx. 40 columns	
			With retail premises	Approx. 5,630 columns	Approx. 30 columns	
		Bridge columns	Approx. 1,090 units			

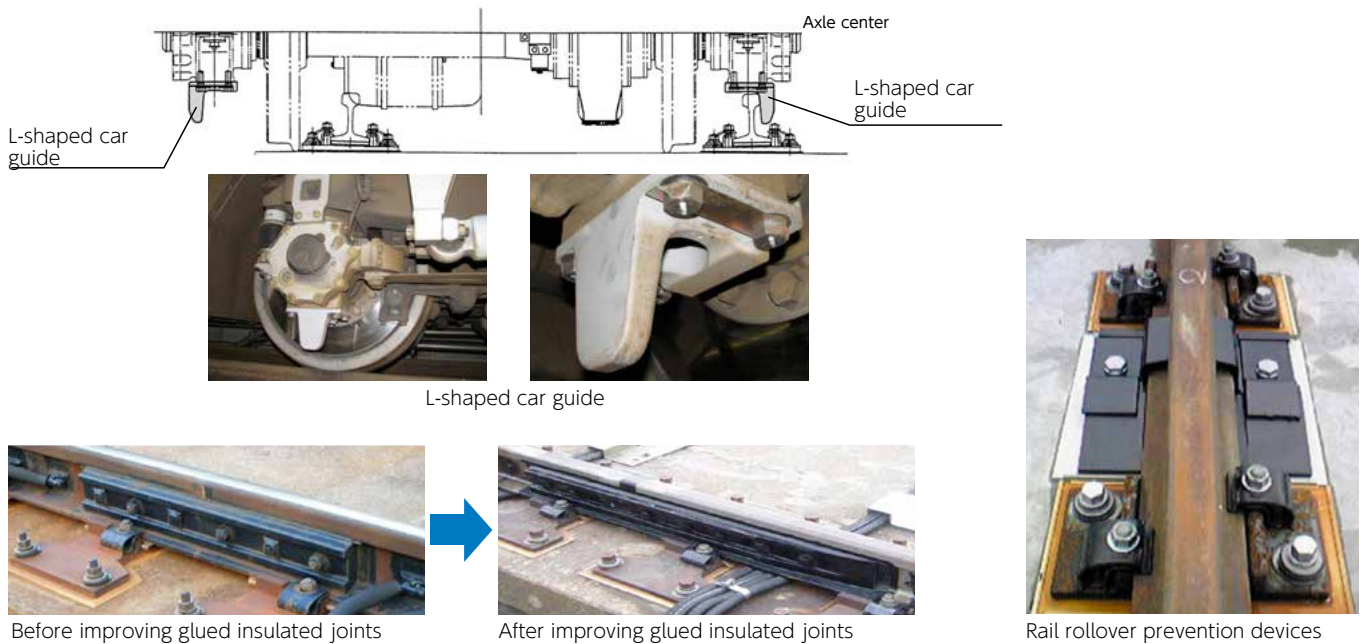
Completed by FY2009
 Completed by FY2016
 In progress

② Emergency train stopping measures

For Shinkansen lines, to automatically stop trains as quickly as possible JR East utilizes the Shinkansen early earthquake alert system, which is based on the installation of wayside and coastal seismometers to detect primary tremors (P-waves). Additionally, by installing power failure detectors, the time required for the activation of emergency braking is shortened by approx. one second compared to activating the brake using an on-board digital ATC system that detects power failures of overhead contact lines. To be prepared for an earthquake with an epicenter directly beneath the Tokyo metropolitan area and also for inland earthquakes, seismometers are installed at 30 locations and JR East started using the Earthquake Early Warning of the Japan Meteorological Agency from October 2012. For conventional lines, using information from the Shinkansen early earthquake alert system and also the Earthquake Early Warning of the Japan Meteorological Agency, JR East utilizes the Early Earthquake Alert System for conventional lines to activate the emergency brake of trains in the necessary sections at the time of a large-scale earthquake.

③ Prevention of secondary accidents after derailment

During the Niigata Chuetsu Earthquake in Oct. 2004, one of our Joetsu Shinkansen trains derailed. Fortunately, passengers and crew were uninjured. However, by learning lessons from the earthquake, JR East has taken preventative measures for Shinkansen trains and tracks. For Shinkansen trains, we have installed L-shaped car guides on bogies to prevent Shinkansen trains from completely leaving the track in a derailment. We have also improved glued insulated joints to reduce the impact of wheels and bogie parts in the event of a derailment. Additionally, we completed the installation of rail rollover prevention devices to guide the wheels along the rails following a derailment, thereby preventing a rail rollover and the rails from completely deviating from the track even after a train derails and the rail fasteners are broken.



■ Efforts to save lives

In the case of an earthquake directly beneath the Tokyo metropolitan area, numerous passengers might be injured and we might need to save the lives of passengers with the help of a limited number of our employees before the arrival of rescuers. For a major earthquake, placing top priority on saving the lives of the injured, JR East has prepared the following first aid kits and is also conducting drills to give personnel necessary first aid skills.

Rescue kits to save injured persons

We installed rescue kits (crowbars, jacks etc.) at each station of the five branch offices in the Tokyo metropolitan area to save injured persons from collapsed walls, furniture and fixtures.



Rescue kits

First aid kits to provide first aid to injured persons

We installed first aid kits (triangular bandages, etc.) to care for people's external injuries such as bleeding and fractures at each station within 30km of Tokyo.



First aid kits



Rescue and life-saving training

■ General emergency drills

JR East conducts general emergency drills to prepare for an earthquake during disaster preparedness week around Sep. 1st, every year. The drills include the following:

- Drills to operate an on-site disaster countermeasure headquarters at Head Office and each branch office
- Drills for rescuing, life-saving, guiding passengers during an evacuation, and initial firefighting in each district
- Safety confirmation drills for employees and their family members

in cooperation with Head Office, branch offices, and field organizations. Additionally, we participate in disaster drills run by local municipalities.



General emergency drills



Participation in drills run by local municipalities

▶ Measures against tsunamis

Before the Great East Japan Earthquake, we had set operational restriction methods and tsunami danger zones for each location, prepared manuals, and were holding study sessions and conducting drills on guiding passengers to de-board trains for evacuation. We believe that these efforts led to the prompt evacuation of passengers away from tsunami danger zones at the time of the earthquake.



Tsunami evacuation manual



Signs at stations showing evacuation areas



Drill to guide passengers to alight from a train for evacuation

Based on our experience with tsunamis at the time of the earthquake, we reviewed the rules, manuals and drills for the entire JR East Group and formulated action guidelines for evacuation during a tsunami for our employees in January 2012.

■ Formulating action guidelines for evacuation to avoid tsunamis

To prepare for a case when there is no time before the arrival of a tsunami, JR East formulated action guidelines for evacuation during tsunamis for each one of its employees to follow in January 2012.

■ Improvement of evacuation signs and routes and conducting drills for evacuation during tsunamis

For railway lines such as the Hachinohe Line, which resumed operations following damage caused by tsunamis, we have improved the signs and routes for evacuation from tsunamis. We will also improve evacuation signs and routes for other railway sections. Furthermore, in FY2016, we conducted drills on guiding passengers to alight from trains and escape from a tsunami at tsunami-prone locations, assuming that there was no time before the arrival of the tsunami. We will continue these drills every year at the same time of year.



Tsunami evacuation sign (Hachinohe Line)



Evacuation route (Hachinohe Line)



Drill to guide passengers to alight from a train during a tsunami

■ Action guidelines for evacuation to avoid tsunamis

1. At a time of a large earthquake, be prepared for tsunamis. Gather information by yourselves and if communication lines are disconnected, make your own decisions for evacuation. (Do not be afraid to make a mistake.)
2. Once decided to evacuate, by judging the conditions of customers, promptly guide customers to evacuate.
3. In alighting from trains, evacuating and gathering information, ask customers and local people to cooperate.
4. Even after evacuation, go to a higher place without being satisfied and thinking this would be high enough.
5. Stay evacuated with customers and do not return to field offices or trains while tsunami warnings are still issued.

▶ Measures for rainfall

To protect tracks from landslides due to rainfall, JR East takes disaster prevention measures for wayside embankments in all railway sections in accordance with its plans. Especially, in the Tokyo metropolitan area and for all Shinkansen routes we take thorough measures to secure safe and stable transport.

■ Countermeasures for rainfall



Cutting slope protection (spray frame work)



Embankment slope protection (spray frame work)

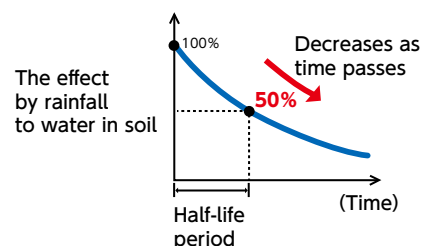
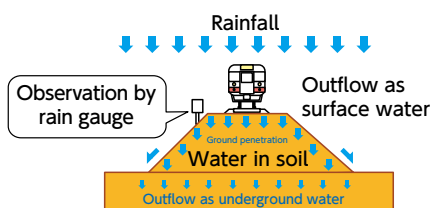


Natural slope protection (spray frame work)

▶ Operational restrictions for rainfall

For heavy rainfall, JR East ensures the safety of train operations by introducing operational restrictions such as limiting train speeds and suspending operations. Since June 2008, we have been using effective rainfall values which are highly related to landslide disasters due to rainfall. Effective rainfall is the amount of underground water remaining after changes over time in ground penetration and outflow. Since many of the disasters due to rainfall result from rainwater seeping into the ground, the effective rainfall index is more appropriate as an operational restriction index for railways. With this indicator, we can more precisely predict the occurrence of landslide disasters, thereby improving the safety and reliability of our train operations.

■ The concept of the effective rainfall



▶ Efforts against wind

■ Uetsu Main Line train derailment accident

On December 25th, 2005, a derailment of the limited express train Inaho No.14 on the Uetsu Main Line between the Sagoshi and Kita-Amarume Stations caused the death of five passengers and injured 31.



State of derailment accident

We would like to report on the measures we have taken since this accident.

Increased number of anemometers (wind meters)

From 2005 to date, JR East has increased the number of anemometers at the accident site between Sagoshi and Kita-Amarume Stations on the Uetsu Main Line. In addition, for sections with operational restrictions for strong winds, we have installed multiple anemometers as standard. We have also increased the number of anemometers at places with windbreak fences.



Anemometer

	As of Dec. 25, 2005: A	As of Mar. 31, 2016: B	Increase (B-A)
Conventional lines	228 units	808 units	+580 units
Shinkansen lines	89 units	163 units	+74 units
Total	317 units	971 units	+654 units

Issuing tentative early restrictions for all lines

For all railway sections of conventional lines with operational restrictions for wind, after the resumption of operations of the Uetsu Main Line on January 19th, 2006 we reviewed the criteria for operational restrictions as indicated below. For locations with windbreak fences, we use prior general restrictions.

Restriction type	Wind speed (meters/sec.)	
	General restrictions	Early restrictions
Speed restriction (max. 25 km/h)	25 - 30	20 - 25
Operation halted	30 -	25 -

Reviewing operational restriction sections

We have been deciding on the operational restriction sections for strong winds based on a past field study and the experiences of field staff. We have newly utilized gale maps of the areas based on wind conditions and topography and reviewed operational restriction sections based on information from field staff. As a result, we have newly installed 75 operational restriction sections.

Installation of windbreak fences

In order to reduce wind force on trains, we have installed wind break fences at the following locations:

(as of the end of March 2016)

	Line name	Section	Location of installation	Time completed
1	Tōkaidō Main Line	Bridge next to Nebukawa Station	Both sides of the line	Jul. 1991
2	Jōban Line	Between Yonomori and Ōno	West side only	Feb. 1996
3	Kawagoe Line	Between Sashiōgi and Minami-Furuya	North side	Apr. 1998, extended in Jun. 2009
4	Uetsu Main Line	Between Sagoshi and Kita-Amarume	West side only	Nov. 2006
5	Tōhoku Main Line	Between Fujita and Kaida	West side only	Nov. 2006
6	Tōhoku Main Line	Between Kurihashi and Koga	Both sides of the line	North side: Mar. 2007 South side: Jun. 2007
7	Jōban Line	Between Fujishiro and Sanuki	Both sides of the line	Mar. 2007
8	Keiyō Line	Between Kasairinkaikōen and Maihama	South side only	Mar. 2007
9	Keiyō Line	Between Ichikawashiohama and Futamatashinmachi	South side only	Mar. 2007
10	Keiyō Line	Between Kaihinmakuhari and Kemigawahama	South side only	Mar. 2007
11	Musashino Line	Between Misato and Minami-Nagareyama	Both sides of the line	South side: Mar. 2007 North side: Jun. 2009
12	Keiyō Line	Between Shiomi and Shin-Kiba	Both sides of the line	South side: Jun. 2007 North side: Oct. 2012 South side: extended in Oct. 2012
13	Keiyō Line	Between Shin-Kiba and Kasairinkaikōen	Both sides of the line	South side: Aug. 2007 North side: Oct. 2012 South side: extended in Oct. 2012
14	Keiyō Line	Between Futamatashinmachi and Minami-Funabashi	South side only	Aug. 2007, extended in Oct. 2012
15	Musashino Line	Between Minami-Koshigaya and Yoshikawa	Both sides on bridge section North side	Both sides on bridge sections: Mar. 2009 North side: Feb. 2010
16	Musashino Line	Between Kita-Asaka and Nishi-Urawa	Both sides of the line	South side: Dec. 2009 North side: Aug. 2010
17	Uetsu Main Line	Between Atsumi-Onsen and Kobato	West side only	Dec. 2011
18	Uchibō Line	Between Sanukimachi and Kazusa-Minato	West side only	Mar. 2012
19	Keiyō Line	Between Shin-Narashino and Kaihinmakuhari	South side only	Dec. 2013
20	Sōbu Main Line	Between Koiwa and Ichikawa	South side only	Mar. 2014
21	Sōbu Main Line	Between Hirai and Shinkoiwa	South side only	May 2014
22	Shinetsu Main Line	Between Yoneyama and Kasashima	West side only	Oct. 2014
23	Jōban Line	Between Kanamachi and Matsudo	South side only	Mar. 2015
24	Jōban Line	Between Tennōdai and Toride	Both sides of the line	Mar. 2015
25	Jōban Line	Between Mito and Katsuta	North side only	Mar. 2015
26	Senseki Line	Between Rikuzen-ōtsuka and Tōna	South side only	May 2015
27	Senseki Line	Between Nobiru and Rikuzen-Ono	North side only	May 2015



Uetsu Main Line, between Sagoshi and Kita-Amarume



Keiyō Line, between Shiomi and Shin-Kiba

■ Foundation of Disaster Prevention Research Laboratory

JR East founded the Disaster Prevention Research Laboratory at the Research & Development Center of the JR East Group on February 1st, 2006. The Laboratory undertakes various research and development activities related to meteorological and terrestrial phenomena.

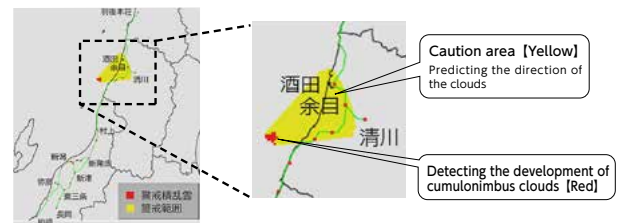
■ Gale warning system

JR East has been using gale warning systems on the Keiyō Line since Aug. 2005 and has installed the systems in all 296 locations as of Mar. 2016 on its conventional lines with a gale operational restriction, including the accident location between Sagoshi and Kita-Amarume of the Uetsu Main Line. Since 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, we can further raise the level of safety of our operations.

■ Utilizing meteorological information to test methods for operational restrictions

Local gusts are meteorological phenomena, and are difficult to observe with conventional observation equipment such as anemometers. Through meteorological information such as the intensity of rainfall obtained from the Japan Meteorological Agency's radars and Nowcast that supports detection of tornados, and by detecting the development of cumulonimbus clouds, we have been investigating how to forecast the occurrence of local gusts and to apply that information to our operational restrictions. Every year between November and the following March, we test the system in six sections of railway lines along the Sea of Japan including the Uetsu Main Line between Niitsu and Ugo Honjo.

■ Display of operational restriction area by utilizing meteorological information (image)



■ Research on a Doppler radar observation method

JR East has been researching the possible application of Doppler radar observation for train operation restrictions. Doppler radar can detect wind conditions from the movements of rain drops and rain clouds and is utilized for monitoring local gusts at some airports.

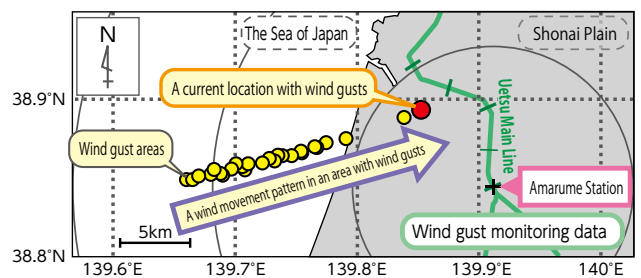
Since 2007, in cooperation with specialized institutes, we have been developing systems to detect the development of cumulonimbus clouds using a Doppler radar installed at Amarume Station and produce alerts for railway sections for trains' planned routes. From observation of test results, the detection capability of the radar has been improving. JR East is currently working on the construction for the installation of a higher performance Doppler radar in Sakata city, Yamagata prefecture.



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



Doppler radar main body



Monitoring of the development of a local gust (image)

■ Introduction of operational restriction methods by evaluating wind force on trains

The wind force on trains constantly changes. We have been researching the following methods to properly evaluate the wind force on our trains and to further improve our operational restrictions to enhance the safety levels of our operations, while incorporating opinions from external experts.

- 1) Further improved wind observation methods by anemometers
- 2) Calculation methods for rolling stock windproof stress taking account of track conditions and railcar shapes

These two methods have been utilized for two sections on the Uetsu Main since Dec. 2011.

Restoration of railway sections along the Pacific Ocean that were devastated in the Great East Japan Earthquake

We have been steadily proceeding with restoration work and resumption of operations in railway sections on the Pacific Coast that suffered extensive damage due to the tsunami, beginning with sections where safety can be ensured.

With the aim of integrating restoration with urban planning, we have been proceeding with construction work between Soma and Hamayoshida on the Joban Line, aiming for the resumption of operations by December 2016 .

In terms of our future policy for railway sections within 20km of the Fukushima Daiichi Power Station, in areas that are preparing to lift evacuation orders, with the support and collaboration of national and local governments, we are continuing to make preparations to resume operations through the necessary environmental improvements, such as decontaminating trackside areas and starting preparations for the return of residents. For difficult-to-return zones, we are aiming to open services after restoring damaged facilities as well as to complete the required decontamination and measures to ensure users' safety in the event of an emergency, again with the support and collaboration of national and local governments. Based on this policy, in line with the lifting of the evacuation order by the city of Minami Soma, we resumed operations for the section between Odaka and Haranomachi, in July 2016. We are currently working on the restoration of the line, aiming for the resumption of operations for the section between Namie and Odaka in spring 2017, the section between Tatsuta and Tomioka by the end of 2017, and the section between Tomioka and Namie by the end of FY2020.

For the section between Yanaizu and Kesenuma on the Kesenuma Line and the section between Kesenuma and Sakari on the Ofunato Line, with the aim of rapidly providing safe, highly convenient transportation services, we have been offering an interim Bus Rapid Transit (BRT) service. In line with progress made in urban development in the disaster-hit areas, for the further development of communities JR East proposed that the operations of the BRT service continue as a sustainable transport mode to contribute to the restoration, and reached an agreement on this plan with all wayside municipalities.

As for the section between Miyako and Kamaishi on the Yamada Line, we are restoring this section with the aim of re-opening it by the end of FY2019. As of August 1st, 2016, the total length of the sections where operations were suspended had been reduced from approximately 400km immediately after the earthquake to approximately 115km, with resumption of services for approximately 186km by railway and for approximately 117km by BRT.



Restoration of operations between Odaka and Haranomachi



Kesenuma Line BRT on exclusive lines

I-4-4 Safety measures for customers on platforms and measures to prevent accidents at level crossings in collaboration with local communities

▶ Safety measures at platforms

To secure the safety of customers on platforms, we are installing emergency train stop warning systems and image-processing fall detection equipment.

Moreover, we are proceeding with the introduction of platform doors for the Yamanote Line. Excluding five stations with planned large-scale improvements (Hamamatsucho, Tokyo, Shimbashi, Shinjuku, and Shibuya Stations), by the end of August 2016 we plan to start using platform doors at 24 stations. Additionally, we are considering the introduction of platform doors at Akabane, Ueno, Oimachi, Tsurumi, Urawa, Saitama-Shintoshin, Yurakucho Stations on the Keihin Tohoku Line; at Shin Koiwa Station on the

Sobu Rapid Line; and Shinano-machi and Sendagaya Stations on the Sobu Local Line.

JR East is currently working to install an increased number of dot-Braille blocks that indicate which direction is away from the edge of the platform. For stations where the daily number of passengers exceeds 100,000, we have completed their installation. For stations where the daily number of passengers is less than 100,000, we are proceeding with the installation of dot-Braille blocks, mainly at stations used frequently by visually challenged customers.

Emergency stop buttons on platforms



By pushing an emergency stop button installed on platform pillars, people on platforms can notify drivers, conductors, and station staffs of danger.

ITV for station platforms and concourses



By installing monitoring cameras on station platforms and in concourses, we continue our efforts to improve safety on platforms and strengthen security in station premises.

CP lines



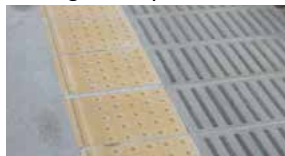
Painting the ends of platforms red or orange to create CP lines promotes awareness among railway users and also improves visibility for station staff and train conductors. JR East is currently introducing CP lines to test their effectiveness.

Platform doors



To improve visibility, glass is used for platform doors.

Dot-Braille blocks that indicate which direction is away from the edge of the platform



The inner line of the blocks is trimmed with lined bumps so that visually challenged customers can tell which side is away from the edge of the platform.

Fall detection mat



A mat placed on the tracks along the platform detects whether a person has fallen onto the tracks and notify incoming trains to stop.

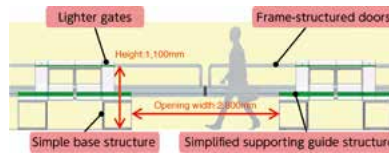
■ About the trial introduction of elevating platform fences

On the inbound platform of the Hachiko Line at Haijima Station, we will introduce elevating platform fences on a trial basis. As the openings of the fence can be widened, it can accommodate trains that have different door locations.



■ About the trial introduction of new-type platform doors

On a trial basis, we will introduce new-type platform doors with wider openings, at lower costs and a shorter construction period at Machida Station on the Yokohama Line by the end of FY2017.



Platform doors to be introduced (image)

Functions to detect persons or objects stuck between railcar doors

209 Series and later railcars are equipped with a function to weaken the closing power of doors when the system detects that the bodies of customers or their belongings are stuck between train doors. For the rubber part of the door, from the floor to 30cm height, hard rubber is used so that the system can detect objects such as strollers.



Station platform safety campaign

We are running station platform safety campaigns to ask for the cooperation of customers by utilizing station posters and the Train Channel to promote safety on platforms. The Train Channel is an onboard information display installed on railway lines including the Yamanote and Chuo Rapid Lines. In FY2015, JR East conducted a station platform safety campaign together with 24 other railway operators.



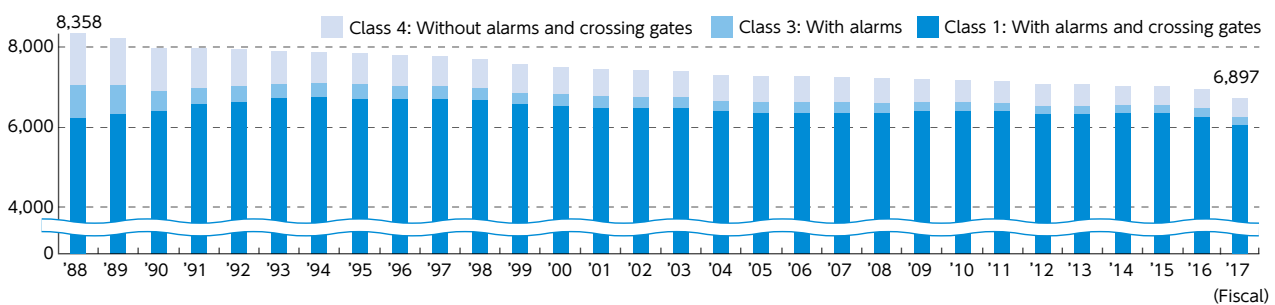
▶ Measures to prevent accidents at level crossings

As safety measures at level crossings, in cooperation with local communities, JR East is working on the elimination of level crossings with the introduction of grade separated crossings, thereby integrating and reducing the number of level crossings.

To further improve our safety measures, we are further increasing the installation of large obstacle detectors and level crossing alarm systems. Additionally, as a measure to improve visibility at level crossings, we are installing crossing warning devices in a higher position for better visibility.

Moreover, we are promoting level crossing zero accident campaigns to ask for the cooperation of pedestrians and automobile drivers in accident prevention at level crossings.

■ Changes to the number of level crossings (as of April every year)



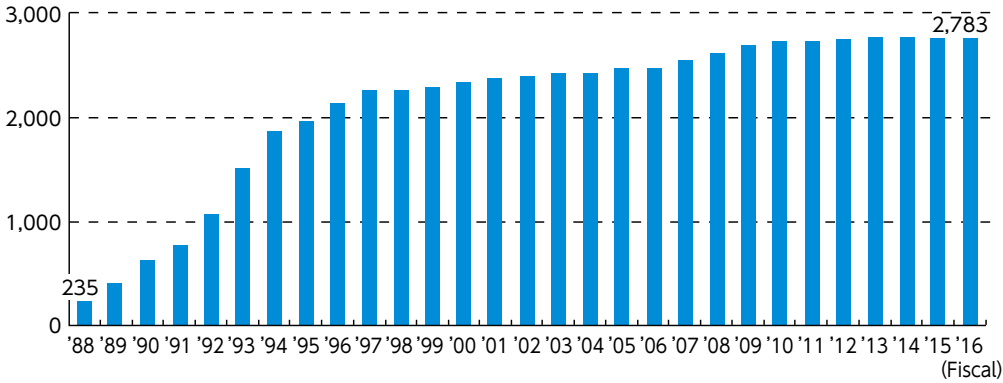
■ Efforts to abolish level crossings

No. of level crossings abolished due to measures such as the introduction of grade-separated crossings (excluding those transferred to semi-public sectors)

FY	2011	2012	2013	2014	2015	2016
No. of abolished level crossings	22	11	24	12	37	17

■ Obstacle detectors

The detectors notify trains of danger by detecting a stalled automobile or an obstacle on a level crossing.

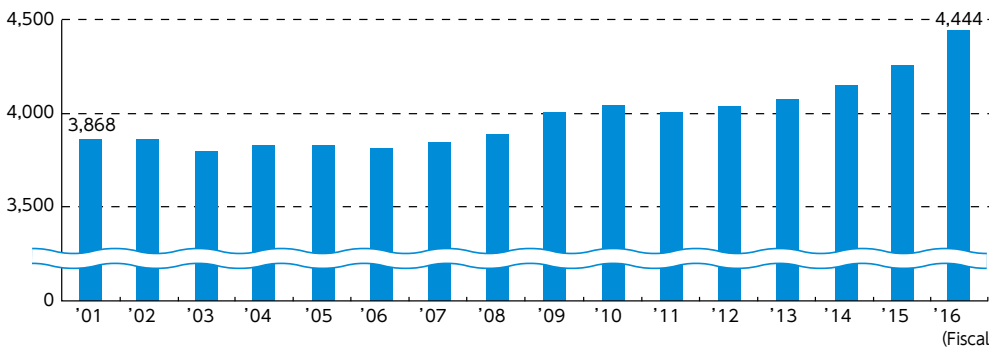


Three-dimensional laser radar obstacle detection method (large obstacle detector)

Based on three-dimensional data measured by laser beams, the system detects obstacles in predetermined monitoring areas.

■ Level crossing alarm system

Automobile drivers or pedestrians can notify trains of dangers by using the system when they are stuck on level crossings.



Level crossing alarm system

■ Measures to improve visibility at level crossings

JR East implements various measures to improve visibility at level crossings for pedestrians and automobile drivers.

A crossing warning device located in a higher position for better visibility



By installing alarms at a higher position, level crossings become more visible to pedestrians and drivers.

A large crossing gate



Larger crossing gates have been installed; the barrier arms are thicker than usual.

■ Separating level crossings for pedestrians and for automobiles



In cooperation with road administrators, we are increasing the width of level crossings and separating crossings for pedestrians and for automobiles.

■ Efforts in snowfall areas



We utilize road heating for level crossings with heavy traffic in snowfall areas.

■ Measures to prevent accidents at Class 4 rail crossings without crossing gates and alarms

To prevent accidents at Class 4 level crossings that do not have crossing gates or alarms, we take measures such as installing solar-powered illuminated signs to alert pedestrians and automobile drivers of the rail crossings. We are also continuing our efforts to install crossing gates and alarms for these Class 4 crossings to make them Class 1 crossings with crossing gates and alarms. Additionally, mainly for level crossings with prohibition of automobile crossings, we have installed fences to block automobile traffic.



We have installed solar-powered illuminated alarm signs for all Class 4 level crossings without crossing bars and alarms to notify pedestrians and drivers of the crossings by blinking of lights for improved visibility.



Installation of fences to prohibit automobile traffic at level crossings where automobile crossings are banned

■ Level crossing zero accident campaigns

For this reason, we ask our customers and neighboring communities to understand the risk involved in railway operations and cooperate in the safe use of level crossings.



During the campaigns, we post campaign posters and distribute pocketable tissue packs with campaign information at stations.



In cooperation with local police stations, we visit local elementary schools near Class 4 level crossings without crossing gates and alarms for educational activities.

I-4-5 Fostering safety-oriented personnel

▶ Safety education and training

To heighten safety awareness among employees, by placing priority on safety education and training JR East is offering educational and training opportunities to its employees at the JR East General Education Center (Shirakawa City, Fukushima Prefecture) and General Training Centers (branch offices), and on-the-job training in each workplace. The JR East General Education Center offers group training for personnel development and improvement of knowledge and skills, fostering the development of new train crews and also providing the necessary training for job transfers. The General Training Centers in each of our branch offices offer education and training to improve the skills of train crews by utilizing accident prevention simulators on a regular basis. In OJT (on-the-job training), we offer education and training to suit the situations of each workplace.



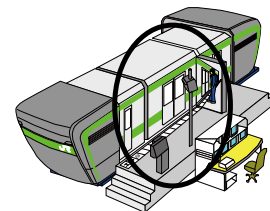
JR East General Education Center



Cab simulator



Train protection drills on training tracks



Accident prevention simulator installed at General Training Centers at branch offices

▶ Enhancement of educational and training facilities

By introducing cut models and mock-ups of actual devices and equipment at General Training Centers at all of our branch offices, educational and training facilities are being further enhanced. Through the provision of more practical training, we will promote educational efforts to teach about purposes, objectives and sense of values as to the reasons for each action, in addition to the structures and working principles of all devices and equipment that we deal with.



Example of training facility

► Fostering integral safety leaders and professionals

In this time of rapid change in generations, since it is of the utmost importance to enable our employees to play major roles in securing safety in our operations, we are taking various measures as indicated below.

■ Key Safety Leaders

We are fostering three capabilities in Key Safety Leaders in field organizations: comprehensively understand situations, training and fostering successors in each workplace. Key Safety Leaders have a thorough understanding of the safety rules, details of past accidents and safety weaknesses in their own workplace, offer guidance to other employees on a regular basis in the workplace, and contribute to the betterment of safety levels in field organizations.



Key Safety Leaders' meeting

■ Safety Professionals

We have selected Safety Professionals from each branch office and construction work office to train them as Safety Professionals. They are expected to be professionals capable of guiding other employees through their long experience in railways and abundance of knowledge of safety rules and details of past accidents as well as their countermeasures.



Safety Professional certification ceremony

■ Chroniclers of Safety (narrators of oral history)

JR East is currently experiencing a rapid change in the generations of its employees including frontline staffs and therefore needs to steadily instill successors with safety-related knowledge, leadership, and technical capabilities. We assigned ex-employees of JR who possess an abundance of knowledge and applied skills in railway safety to act as our "Chroniclers of Safety" (narrators of oral history).



Assignment of ex-employees of JR East who possess an abundance of knowledge and applied skills in railway safety to act as our "Chroniclers of Safety" (narrators of oral history)

■ Accident History Exhibition Hall

Many of the safety-related rules and facilities have been created from our experiences of and reflection on past accidents. With the objective to further improve our safety levels by learning lessons from accidents, which is our basic policy for safety, we will never forget past accidents and are committed to pass on these valuable experiences learned from those lost lives. To this end, JR East established the Accident History Exhibition Hall at JR East General Education Center and the hall is used for various trainings to learn the importance of safety in railway operations.



Accident History Exhibition Hall



Accident History Exhibition Hall (Accident Train Preservation Center)

■ The Challenge Safety Campaign

We started the Challenge Safety Campaign with the aim of encouraging our employees to actively take on the challenge of further improving safety levels, rather than just passively maintaining safety, with each one of our employees thinking about safety and autonomously taking actions. With initiatives of field staffs, in a consorted campaign with all employees JR East is working to create a corporate climate in which its employees actively engage in pursuing higher safety levels in our operations. In the campaign, each one of our employees finds their own safety issues and takes actions to solve these safety issues with support from branch offices and Head Office.



Development of safety-related discussions in each workplace



Examples of CS Campaigns (realizing and sharing)

■ Challenge Safety Aoshingo (Challenge Safety Green Light)

Since April 1989, we have been publishing a monthly safety information magazine, Challenge Safety Aoshingo, to comprehensively distribute safety information to our employees. The magazine offers useful information for CS Campaigns in each workplace such as specific efforts of the campaigns in each workplace and details of past accidents.



Challenge Safety Aoshingo (Aug. 2016 issue)

■ Safety portal

JR East established an intranet portal site, the Safety Portal, to offer tools for accident prevention. Employees can search for necessary educational materials for CS Campaigns and their study sessions. We are increasing the amount of safety-related information so that employees can learn whenever they want.



Safety portal

■ Railway Safety Symposium

With objectives to improve the safety awareness of each one of our employees and to further vitalize various safety improvement activities including Challenge Safety Campaigns, JR East started Railway Safety Symposiums in 1990. Symposiums are attended by approximately 700 people including employees of group companies. We invite key figures from outside of the company to host panel discussions and introduce detailed safety examples of other companies. Participants bring back what they learn at symposiums to their workplaces and share safety awareness with other employees.



The 24th Railway Safety Symposium in FY2016



Opening speech by Tetsuro Tomita, President and CEO, JR East



A scene of the symposium①



A scene of the symposium②

■ JES-Net (JR East Safety Network)

JR East and its group and partner companies are required to share common safety values and offer railway services trusted by our customers.

To this end, the JR East Safety Network (JES-Net) was established in FY2005 as a safety promotion network consisting of 25 JR East Group and partner companies that are engaged in work directly affecting train operations. As of March, 2016, the number of companies in this network had expanded to 37.

Through JES-Net presidents' meetings with presidents of each group and partner company and JR East's top management and through safety reviews where frontline staffs of each office and Transport Safety Department exchange various opinions, the JR East Group continues to promote measures for improvement and share issues to enhance safety levels across the whole group.



JES-Net presidents' meeting



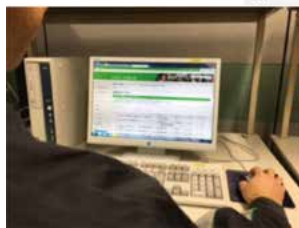
Safety review

► Safety-related research and development

JR East Group conducts various safety-related research and development activities with the Research & Development Center of JR East Group as its core.

At the center, depending on roles and missions, six research organizations promote their research and development in each specific field to pursue extreme safety levels, while at the same time working in unison. These six research organizations are the Frontier Service Development Laboratory, Advanced Railway System Development Center, Safety Research Laboratory, Environment Engineering Research Laboratory, Technical Center and Disaster Prevention Research Laboratory.

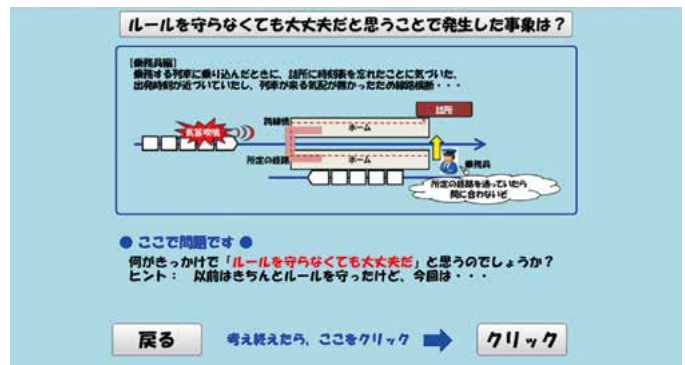
Research themes at these organizations include those related to promoting the sharing of safety information and knowledge, in addition to efforts among employees; development of systems to prevent accidents due to failures in maintenance work procedures; research on safety evaluation of natural disasters such as wind, earthquake, heavy rain and snow; research on the safety of railcars to prevent flange climb derailment at low speed; and research to ensure the safety of customers at stations.



Safety portal bulletin board



Visualization of maintenance work procedures



Educational programs on the intranet to learn how to prevent errors through actually experiencing human error



Utilization of areal precipitation information from weather radars in decision making for train operations

Topographic map

Geologic map

Reading of disaster environment factors

Table to search topographic disaster

災害種別	発生頻度	被害規模	発生場所
暴風雨	高	大	全国
大雪	中	大	北日本
地震	高	大	全国
津波	中	大	太平洋沿岸
豪雨	高	大	全国
台風	高	大	太平洋沿岸
火山	中	大	全国

Assessment example

Assessment of risk for each kind of natural disaster (topographic disaster)

Large-scale natural disaster risk evaluation

Special Topic I

Aiming to "Raise Safe and Reliable Transport to the Next Level"

We have caused a series of accidents and incidents since April 2015. These accidents and incidents are attributable to the JR East Group facing various "inflection points" both within and outside the company, including rapid generational change, advances in technology, and a broadening of the horizontal division of labor. With an aim to further improve the "safe and reliable transport" of JR East, our group companies, partner companies, front line, branches, and headquarters are implementing full-scale efforts to solve the issues one by one.

Major incidents since April 2015



April 12, 2015
Electric post collapsed between Kanda and Akihabara on the Yamanote line (serious incident)



April 29, 2015
Transport disrupted by cut overhead contact line at Koriyama station on the Tohoku Shinkansen route



Aug. 4, 2015
Transport disrupted by cut overhead contact line between Yokohama and Sakuragicho on the Negishi line



Aug. 9, 2015
Broken window pane on a Tohoku Shinkansen train



March 15, 2016
Transport disrupted by breakdown of electrical equipment at Kagohara station on the Takasaki line

Inflection points (background factors)

Changes in railway system

Broadening "horizontal division of labor", mainly for group companies

Rapid generational change among employees

Aiming for solutions

To solve these issues, we will go back to the basics and consciously and steadfastly perform "basic actions" such as daily conversations for confirmation and pointing and calling, as well as reviewing safety education and training, improving the whole group's technological strength in cooperation with partner companies, enhancing response capacity in emergencies, and strengthening facilities and rolling stocks of Shinkansen.

Reviewing safety education and training

⇒By training in not only "procedures" (such as manuals) but also the "essentials" (such as the point or purpose, and systems or operating principles) in a practical manner, we will improve safety awareness and sensibility.

Improving the whole group's technological strength in cooperation with partner companies

⇒Streamline the implementation system to strengthen railway work management, expand and deepen personnel exchanges, and share information on risk

Enhancing response capacity in emergencies

⇒Limit the impact and enhance early-recovery system
⇒Save customers swiftly and convey appropriate information
⇒Improve ability to manage and control each emergency task force

Strengthening facilities and rolling stocks of Shinkansen

⇒Implement firmer measures that consider "inflection points" of acceleration, deterioration, etc.

Strengthening electrical equipment in the Tokyo metropolitan area

⇒Make it resilient and secure dual systems to minimize impact on transport

- Ensure "recurrence prevention" (monitor whether countermeasures for past serious incidents are being implemented)
- Conduct "preventive measures" by grasping risks and weak points (identify risks and weak points, then take measures before a serious incident happens)