

# Our aim is “the utmost level of safety”

JR East has made safety the top management priority since our establishment. With the concerted efforts of all group companies, we are tackling this issue and aim to create a culture of safety, to enhance safety equipment, and to become the world’s safest railway operator.

## Our concept of safety

### Four aspects of safety

Safety is one of the obligations JR East has toward society, and it is given the highest priority. There are important factors in safety measures: a system to remove the “buds” of accidents before they develop, enhancement of safety equipment, and learning from past accidents.

We believe that safety is ensured through management systems that synergistically link employees, rules, and safety equipment. We therefore are constantly reviewing and improving our management programs in order to ensure that these elements are properly linked.

### Four aspects of safety



## Safety initiatives in our medium-term management plan

In the JR East New Frontier 2008 medium-term management plan, the top management challenge is to “continue relentless efforts to provide safe and reliable transportation”. New Frontier 2008 sets targets to achieve our safety plan within four years.

In fiscal 2006, we invested 151.9 billion yen in measures against natural disasters such as large-scale earthquakes and gale force winds, against train collisions, and against transport disruptions in the Tokyo metropolitan area. To further reinforce these measures, in fiscal 2007 we plan to invest 145.0 billion yen for further safety.

## Fourth five-year safety plan: Safety Plan 2008

Since our establishment, JR East has continually created and implemented safety plans with ever-higher safety goals. By installing safety equipment according to our plans and raising safety awareness of each and every employee, we have succeeded in reducing the frequency of railway accidents to about one quarter of the level at the time of establishment.

Safety Plan 2008 was adopted in fiscal 2004 as our fourth five-year safety plan. It sets the target of reducing accidents causing fatalities or injuries to customers or causing fatalities to employees (including those of our Group companies) to zero. To accomplish this, we are rebuilding our safety programs from the ground up, focusing on the four initiatives indicated in the figure.

## Safety Plan 2008

Priority improvement plan for safety equipment

Safety enhancement

Safety management reforms

Creating a culture of safety

Accidents causing fatalities or injuries to customers or causing fatalities to employees



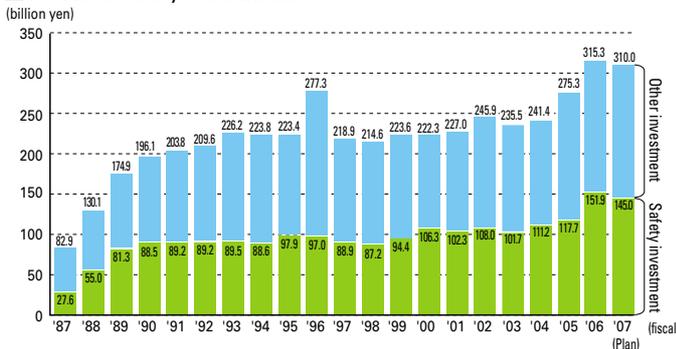
## Trends in railway accidents

In fiscal 2006, we had 92 railway accidents, 44 less than the previous fiscal year. This was the lowest number of accidents in the history of the company and was about one quarter of that occurring when the company was established.

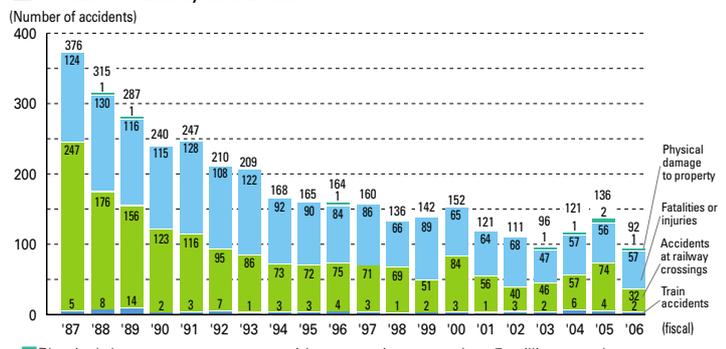
We have achieved a dramatic decrease in the number of accidents at railway crossings in which trains collided with automobiles or people. However, the number of fatalities or injuries by customers coming in contact with trains on platforms, falling from platforms, or straying onto tracks has remained at the same level for the past several years.

Compared with the time when the company was established, fatalities or injuries have nearly halved. However, we will continue to reinforce, maintain, research, and develop our safety facilities, while appealing to our customers to exercise safety on platforms through safety campaigns and other measures.

## Trends in safety investment



## Trends in railway accidents



Physical damage to property : accidents causing more than 5 million yen damage to property by train operation  
 Fatalities or injuries : people killed or injured by train operation  
 Accidents at railway crossings : people or automobiles hitting or being hit by trains  
 Train accidents : train collisions, derailments, and train fires

## Creating a culture of safety

### Creation of a culture of safety to improve safety throughout the whole group

Railway safety is maintained by linking trains, railway lines, electricity, railway signals and other equipment with the people who operate them in a systematic and rational manner. In other words, safety is preserved only when all employees correctly understand our safety systems and practice their fundamental operations without fail each day.

In order to further raise our safety level, it is vital to uncover the buds of potential accidents hidden in near misses and take preventive measures.

To instill a culture of safety in the workplace, JR East runs a number of safety programs, including our Challenge Safety Campaign and Head Office Safety Campaign.

### The Challenge Safety Campaign

In 1988, 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. Through this new safety campaign, we strive to foster professional judgment and knowledge in the workplace and create a corporate culture in which each employee remains constantly aware of safety and acts on this awareness. We are carrying out the campaign by taking three phases into consideration. First, each employee identifies safety challenges from his or her day-to-day work. Second, employees discuss these challenges and set action targets for improvement. Finally, they work each day toward attaining the targets.



Discussions were held on safety in the workplace through the Challenge Safety Campaign

## Head Office Safety Campaign

We run the Head Office Safety Campaign once a year. Executive officers from the Head Office and front-line employees hold direct discussions and use the results to implement concrete measures to further improve safety.

The results of these discussions have been the establishment of many project teams and adoption of a large number of safety measures. In fiscal 2006, we discussed what we should do to improve safety with the theme, “the current status of our systemization and newly-discovered safety weak points”. Each of our branch office also independently holds regular discussion sessions on safety between managers and front-line employees.



Head Office Safety Campaign where executive officers from the Head Office, including the President, hold direct discussions on safety with front-line employees

## Railway Safety Symposium

Since 1990, we have held the Railway Safety Symposium for the purpose of improving each employee’s awareness of safety and vitalizing our various efforts to improve safety, including the Challenge Safety Campaign. In fiscal 2006, the symposium was attended by about 700 people from JR East and our Group companies.

We have also invited outside experts to the symposiums for panel discussions and for presentation of case studies on the initiatives taken by other companies. The participants carry the discussions back to their workplaces and share the consciousness of problems with other employees.

## Safety education

### Three steps of safety education: on-the-job training (OJT), drills, and training courses

To enhance the safety consciousness and skills of each employee for practical use in their daily work, JR East thoroughly educates its employees on safety in three steps: on-the-job training (OJT), training at the General Training Centers (one located at each of the 11 branch offices), and at the JR East General Education Center (Shirakawa City, Fukushima Prefecture).

In on-the-job training (OJT), JR East plans and holds training based on the work at each work place. For train crews, we hold regular training once per month.

At the General Training Centers at each branch office, training with accident prevention simulators is held regularly to improve the skills of both new and veteran train crew members.

At the JR East General Education Center, we train drivers and conductors in addition to providing training for human resource development, and improvement of knowledge and technical capabilities.

In fiscal 2006, about 18,000 employees took part in these courses and drills.

### Safety training programs

JR East General Education Center <small>subtotal 5,700 participants</small>	
<b>Crew training programs</b>	<b>2,400 participants</b>
Train driver training	
Train driving instructor training	
Conductor training	
Transportation control training, etc.	
<b>Facility training programs</b>	<b>2,900 participants</b>
Maintenance vehicle chief training	
Accident prevention training	
Field-specific technology training, etc.	
<b>Safety culture and safety instructor training programs</b>	<b>400 participants</b>
Challenge Safety Campaign promoter training	
Safety standards expert training	
Safety instructor training	
Transport accident data analysis training, etc.	
<b>General Training Centers at each branch office <small>subtotal 12,100 participants</small></b>	
<b>Total:</b>	<b>17,800 participants</b>

## Learning from accidents (the Accident History Exhibition Hall)

Most rules and equipment for ensuring railway safety are based on lessons learned from tragic accidents in the past.

To instill a culture of learning from accidents, we have established the Accident History Exhibition Hall at the JR East Gen-

eral Education Center that displays overviews of past accidents, measures taken, and related information. The objectives of the exhibits are to ensure that past accidents are never forgotten and to preserve the valuable lessons learned from past sacrifices. The hall is used as a venue for employee training.



The Accident History Exhibition Hall

## COLUMN

### How a “train driver” is born

Since train drivers bear responsibility for our customers’ lives, they need to go through rigorous training.

In this section, we introduce our idea of “safety and education” at JR East by describing the process a train driver goes through to become a qualified professional.

The qualification required to apply for the in-house examination to become a train driver is more than 5 years of continuous employment with JR East. The opportunity to sit for the examination is given only after the candidate has acquired an overall understanding of railway practices and experience.

Employees who pass the in-house examination go on to a four-month program involving 400 hours of study and training at the General Education Center.

#### Process 1

### Learning the mechanisms of safety

The curriculum to learn the mechanisms of safety covers a broad range of topics. As a person who will be in charge of trains in operation, a driver trainee needs to acquire a wide range of knowledge, including regulations on train operations, the structure and mechanics of rolling stock, basic knowledge about electricity, theory of train operation, railway facilities such as signals and tracks, emergency first aid procedures, prevention of accidents that could cause casualties, and past accidents and measures that could have prevented them.



Curriculum which covers a broad range of school studies and training programs

At the General Education Center, we attach importance not just to classroom lectures, but also to practical education using operation simulators, real rolling stock, portable educational materials (safety equipment, signalling equipment, main circuits, control circuits, and door equipment), etc.

#### Process 2

### Safety skills to be learned on trains

After completing school studies and training programs, trainees go through approximately four and a half months of skill training. Under the tutelage of an expert driver, trainees polish their practical skills in train operation (train-handling skills), checking of rolling stock before departure from the depot, and first aid.

After passing the skill examination and receiving a course completion certificate, the trainee is issued with a train driver’s license from the Ministry of Land, Infrastructure and Transport of Japan.

When they have received train driver’s licenses, new train drivers continue learning through on-the-job training, especially on matters that need extra attention such as operating conditions in their specific railway division. After operating actual trains while accompanied by a head driver, only train drivers who pass a test that includes several hundred check items are allowed to drive trains without supervision.

#### Process 3

### Further training

Even after train drivers commence work



“Train operation simulator”: accident prevention by training with a feeling of driving a real train

with full qualifications, the training process never ends. To assure their skills and overcome any weak points, train drivers repeat regular and special training at the General Training Centers of each branch office and in on-the-job training.



Yoshinao Watanabe, chief driver,  
Soga Transportation Depot, Chiba Branch Office

### While in charge of tutoring train drivers

The two most important things for train drivers are calmness of mind and basic actions in train operation. This never changes, even for seasoned veterans. By constantly maintaining calmness of mind, a driver can detect various dangers. In addition, in an emergency situation, by faithfully performing basic actions, a driver can minimize damage.

There are countless things train drivers need to learn, such as how to use their body, how to keep a watchful eye, how to avoid risks, and also the geography of each railway division, such as grades and curves. However, the most important things, I believe, are calmness of mind and the basic actions.

When riding with test train drivers for a “final test”, I emphasize these two points. At the same time, I try to instill in young train drivers as much pleasure and pride as possible in their career of providing safe and reliable train services every day.

## Safety management

### Establishing a management structure and means to eliminate causes of accidents

In order to ensure safety in train operation, it is necessary to accurately determine the causes of accidents by correctly ascertaining their root cause and then implementing appropriate preventive measures.

JR East is in the process of developing an integrated management structure to put this initiative into practice.

### Railway Safety Promotion Committee

JR East has established a Railway Safety Promotion Committee at the Head Office, chaired by the Director General from the Railway Operations Headquarters. The committee reviews the organization's basic policies to respond to and prevent accidents, and promotes safety measures within the railway business.

There are also Regional Safety Promotion Committees at each branch office and the Shinkansen Transport Dept., chaired by the general managers of the branch offices and the department. These committees implement specific measures in collaboration with the Railway Safety Promotion Committee, and investigate the causes of accidents, implement concrete preventive measures, and promote activities to enhance safety in their service areas.

### Implementation of safety management regulations

In response to revision of the Railway Enterprise Law, JR East implemented safety management regulations on October 1st, 2006.

The safety management regulations have defined key safety management issues including the responsibilities of top management and the organization to ensure safety. In addition, the regulations include guidelines for selecting general safety managers, operation managers, and train crew training managers. Also, safety mission statements have been incorporated into the regulations as codes of conduct for all safety-related employees.

### Safety promotion system in collaboration with group companies

For JR East group to achieve the desired level of acceptable safety within its operations, it is essential to implement a system for sharing information and common safety values among employees and enhancing mutual safety support of train operations. Toward this end, the JR East Safety Network 25 (JES-Net25) was established in fiscal 2004. This network comprises 25 Group companies and other entities engaged in work related to train operation or construction projects for promoting safety.

JES-Net25 promotes activities based on three core principles: developing and utilizing information networks; supporting front-line safety efforts; and monitoring and improving safety regulations and each company's level of safety. JR East is committed to improving the safety level through

out the JR East Group through the united effort of each company in JES-Net25.

### Safety research system

JR East group is researching and developing a wide range of safety-related technologies and systems at the JR East Research & Development Center in Saitama City.

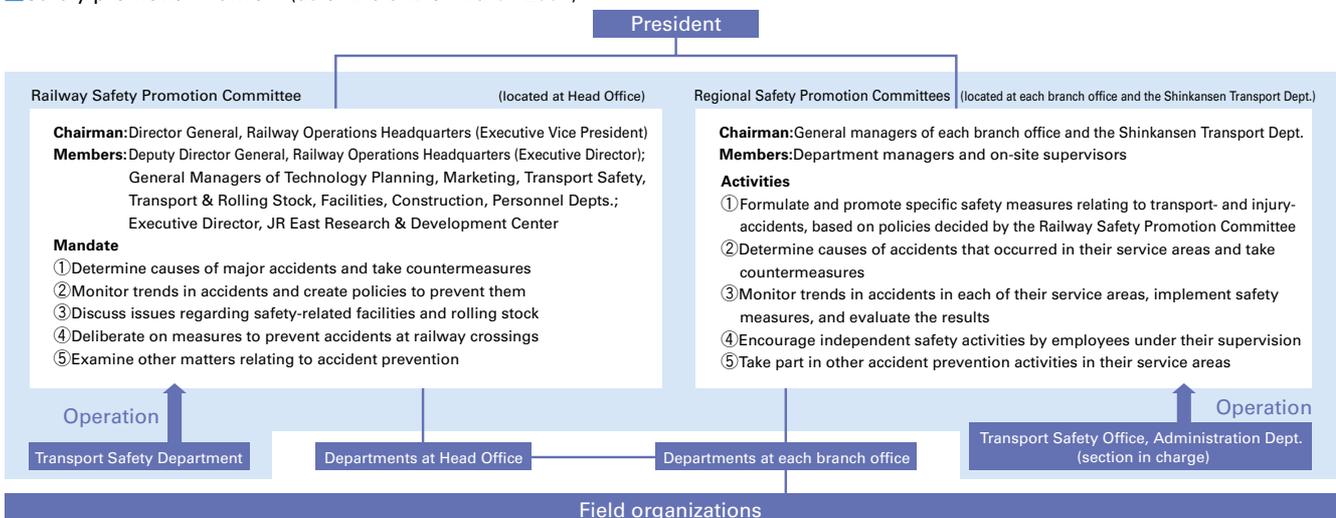
Five organizations have now been established at the center: the Frontier Service Development Laboratory, Advanced Railway System Development Center, Safety Research Laboratory, Disaster Prevention Research Laboratory, and Technical Center. These have formed a focused coalition to conduct research and development with a key objective of "enhancing the safety and reliability of our operations".

The activities of the JR East Research & Development Center include research into human factors that cause accidents by developing a greater understanding of the characteristics of human behavior. The Center also conducts analytical investigations of the mechanisms of Shinkansen and other train derailments, and seeks to provide corresponding preventive measures. In addition, research is being carried out for the development of seismic resistance techniques for bridges and other construction methods.



Test facility in the Research & Development Center of JR East Group (bogie testing equipment)

### Safety promotion network (as of the end of March 2007)



**Promoting the introduction of safety equipment**

**Investment in safety equipment**

The Safety Plan 2008 campaign has earmarked a total of 400 billion yen over a five-year period for the prevention of major accidents. JR East is investing these funds in ways that will strengthen safety measures, including the implementation of earthquake-resistant technologies for viaducts and the installation of ATS-P and ATS-Ps automatic train stop systems.

In fiscal 2007, we plan to spend approximately 145.0 billion yen, which is close to last year's 151.9 billion yen figure, for investment in safety measures, including enhancements to bolster safety against large-scale earthquakes, strong winds, rockslides, and other natural disasters.

**Installing safety equipment**

Train collisions can be major catastrophes. To prevent train collision accidents, we have installed ATC (automatic train control) systems on all of our Shinkansen lines and ATS (automatic train stop) or ATC systems on all conventional railway lines.

The current ATS systems have continuous speed monitoring functions, and we are installing ATS-P and ATS-Ps systems where they are needed for safety on curves and at other locations.

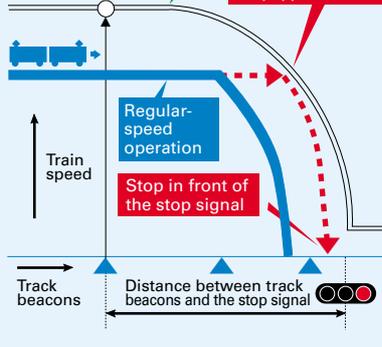
We are also increasing the number of ATS-P and ATS-Ps system locations according to plan, and these systems are now being installed at more curves, turnouts, and line terminals.

Following the accident on the JR West's Fuchiyama line, the Japanese Ministry of

**Outline of the ATS-P system**

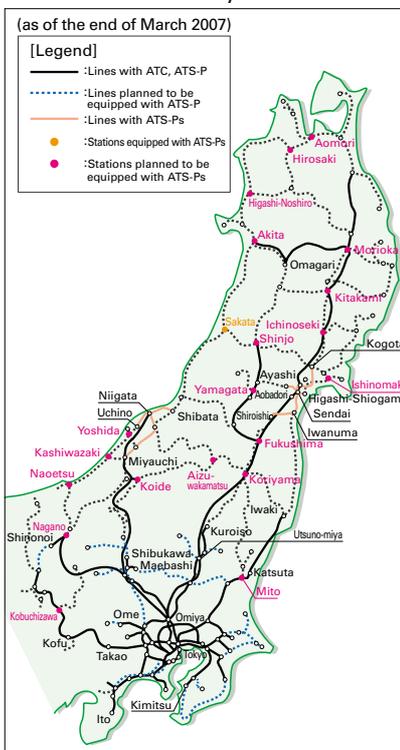
The train continuously receives and processes information on the distance from the track beacon to the stop signal.

Continuously checks the speed of a train between track beacons and the stop signal. If the train exceeds the pattern speed, brakes are automatically applied.



Land, Infrastructure and Transport issued in May 2005 regulations for JR East to take measures to prevent excessive speeds on 63 curved line sections. These measures were implemented by the end of fiscal 2005. By fiscal 2006, JR East had installed the systems at 271 locations. Plans are underway to install additional systems in approximately 570 locations by fiscal 2009.

**Railway lines and stations with ATC, ATS-P and ATS-Ps systems**



**Installation plans for ATS-P and ATS-Ps**

Type	General plan for use	Installation status in fiscal 2006	Installation plan in and after fiscal 2007
ATS-P installation plan	Mainly for busy lines in the Tokyo metropolitan area	Installation completed for approx. 1,850km	Plan for installation on about 850km in 20 railway sections by fiscal 2012, including lines near the Tokyo metropolitan area
ATS-Ps installation plan	For major lines in urban cities outside the Tokyo metropolitan area	Installation completed for approx. 230km and at one station	Installation at 20 stations by fiscal 2011 mainly at stations with frequent trains and many possible routes through the station

**Station platform safety**

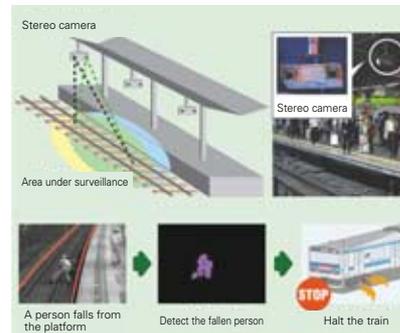
Accidents in which customers on platforms fell onto tracks or came into contact with trains occurred 36 times in fiscal 2006. JR East has put a wide range of protection-related devices into place at our platforms to ensure the safety of our customers, including mats capable of detecting fallen persons and objects; emergency train-stopping systems; image processing device to detect fallen persons; and barriers to prevent people and objects from falling between railway cars. In addition, we urge awareness and cooperation of our customers with our annual "platform safety campaign", which includes the display of posters requesting customers to "step behind the yellow line".



An emergency stop button, one of our systems for stopping trains in emergencies, installed on a post along a platform



A poster for the "platform safety campaign"



An image processing device for instant detection if a person falls to the track

## Initiatives to prevent accidents during maintenance work

JR East is committed to preventing accidents during maintenance by systematizing maintenance work.

We are enhancing our maintenance safety by ensuring that signals turn red when a maintenance vehicle is on the track, to prevent train collisions. In addition, security during maintenance work has been improved with the use of TC-type wireless alarm systems that warn our employees working on railway tracks if a train is approaching.

As an additional safeguard against human error and an improvement to our maintenance workers' safety, JR has introduced a system for workers to turn signals red from a handheld device when performing maintenance work. This system ensures that trains are stopped when required. It is already in use on all major lines in the Tokyo metropolitan area and is starting to be introduced in other railway divisions.

## Disaster Preparedness

JR East has installed rain gauges, water level meters, seismographs, anemometers, and other weather observation systems for disaster prevention along the railway lines, for immediate collection of essential information for safe train operations. Data obtained through the weather

observation systems are monitored automatically at all times by our command and technical centers and other facilities via an online system using telecommunication lines. If a monitor value on any of the observation systems exceeds a set regulation or alert threshold, the location in question is automatically displayed, and an alarm sounds to ensure that transport restrictions are set in place and inspections are carried out quickly and without fail.

JR East is also reinforcing seismic-resistance capabilities of elevated tracks and other structures as a measure against earthquakes. For the Shinkansen, we will complete seismic retrofitting of about 18,500 elevated Shinkansen viaduct support columns and 2,350 bridge columns by the end of fiscal 2007. For conventional lines in the southern Kanto and Sendai regions, we plan to complete seismic retrofit-



Reinforcement of seismic resistance of Shinkansen viaduct support columns is being carried out as planned.

ting of 12,570 viaduct support columns and 550 bridge columns by the end of fiscal 2008.

## Developing safety technologies

JR East is committed to improving safety through research and development. In fiscal 2006, we worked on the development of an automatic warning radio system. To prevent secondary accidents that can occur as a consequence of an initial accident, a radio signal is used to stop trains in nearby sections. JR East has developed a system to send these signals automatically if there is a major accident, in support of support train crews.

In addition, to prevent a major accident from overheating of a railcar axle bearing, we developed a system for detection of the temperature of axle boxes on running trains by sensors on the ground. We are currently performing field tests on this system.



Axle box temperature detection equipment [axle boxes are indicated by the yellow arrows]

## COLUMN

### Progressing step by step to achieve "zero accidents at railway crossings"

Twenty years ago when the company was established, there were 247 accidents during the year at railway crossings between railway lines and roads. By fiscal 2006, the number had been reduced to 32. JR East is working on measures to enhance safety facilities with the cooperation of everyone who uses our railway crossings.

Approximately 80% of railway crossing accidents involve automobiles. We have installed devices such as obstacle detectors, which are capable of detecting an obstacle such as an automobile stalled on a crossing and stopping trains, and at some crossings we have put crossing warning devices in a higher position for better visi-

bility. More red and white large crossing gates have been installed; the barrier arms are thicker than usual and have red and white reflective plates that cover the whole bar. These are expected to provide better visibility day and night to prevent careless driving onto the track when the crossing is closed. Studies are currently being carried



A red and white large crossing gate, to improve visibility and deter careless crossing of railway tracks

out on the effectiveness of these bars.

The cooperation and understanding of automobile drivers are indispensable for achieving "zero accidents at railway crossings" in an environment shared by automobiles and trains.

We are promoting a range of public relations activities for the prevention of railway crossing accidents, which include the display of posters asking drivers to "stop once at railway crossings".

In addition, we are trying to increase the number of overhead crossings to eliminate railway crossings, with the cooperation of local governments, neighboring residents, and the police. In the past 10 years, railway crossings at 176 locations have been replaced by overhead crossings.