Investments in Safety by JR East Japan

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SUMMARY

1. Safety is an important mission for our railway business

We have been working consistently to improve safety as our important mission.

For safety investments, we have invested more than 2,200 billion yen under the past four 5-year safety plans.

2. Prevention of accidents by evaluating risks in advance

Our present method to prevent serious accidents is mainly to prevent repeating the accidents or events that had happened.

In the fifth 5-year safety plan , we introduced risk evaluation that takes into consideration the frequency of the events we have experienced in the past ,and the maximum scale of damage of the events we can imagine.

3. Our way of thinking about safety investments

We will continue the present method to prevent serious accidents. In addition, we will advance the new method of before the fact prevention of accidents by risk evaluation

We will push forward countermeasures based on the experience of the Great East Japan Earthquake disaster, taking countermeasures for a possible earthquake directly beneath the Tokyo metropolitan area.

INTRODUCTION

A full 25 years have elapsed since the East Japan Railway Company (hereinafter referred to as “JR East”) was established, as a result of the privatization and division of the Japanese National Railway. JR East consists of the Metropolitan area transport network centered on Tokyo, and the inter-city transport routes of the Shinkansen (bullet train) and other lines, comprising an operation distance of about 7,500km, with 1700 stations, carrying 16 million passengers per day, on 12,700 trains operating each day, run by approximately 70,000 full-time employees across the entire group.

Safety is an important mission for our railway business. At JR East, we consider safety to be our most important mission, and since our establishment we have been implementing a wide variety of safety measures. We have also continuously made investments in safety, such as the installation of safety facilities, as part of our commitment to this issue.

Here, I would like to outline our way of thinking about investment in safety at JR East.

1. OUR PREVIOUS THINKING ABOUT INVESTMENTS IN SAFETY

1.1 The Transition of Five-Year Safety Plan

At JR East, since our establishment, we have executed Five-Year Safety Plans every five years and made continuous efforts to improve the safety of our railways. We developed the fifth Five-Year Safety Plan,

Figure 1: The Transition of the Five-Year Safety Plan

2013 Safety Vision, in 2009, and we are executing it to work toward the further improvement of the safety level of our railways.

The 2013 Safety Vision set as its goal zero injuries or fatalities of passengers in accidents and zero fatalities of employees (including those of group companies, etc.). As well as steadily proceeding with the implementation of conventional safety measures, in 2013 Safety Vision, we put emphasis on the two perspectives of safety-related human resource development and system improvement, and shifting from the prevention of the recurrence of accidents that have happened in the past, to the prevention of accidents by evaluating risk in advance. Here, we describe the latter.

1.2 The Transition in “Investment in Safety” and Our Thinking about it

When we observe changes of the past number of accidents, we can see that for the whole of the JR Group, the number of railway accidents, such as collisions of trains, derailments of trains, and fires on trains, is steadily decreasing. It is the result of implementing countermeasures by all companies of JR Group.

Regarding investments in safety of JR East, looking over the past 25 years, we can see that of the total amount of approximately 6 trillion yen in facilities investment, the amount of investment in safety is 2.7 trillion yen (45% of the total). The main items on the menu for facilities investment have been the replacement of aging ground installations and rolling stock, measures to prevent accidents at level crossings following major accidents, measures to prevent trains from failing to observe signals, and countermeasures against natural disasters. As such, the main emphasis has been on measures to prevent the recurrence of accidents that have happened in the past. As a result, the number of railway operating accidents (train accidents, accidents

at level crossings, accidents resulting in injuries or fatalities, and damage to railway property, etc.) has decreased to approximately one third of what it was 25 years ago, when our company was established

Now it is clear that circumstances are harsh, due to the stagnant economy in the aftermath of the economic shock created by the bankruptcy of Lehman Brothers and the European Currency Crisis, etc., as well as the impact of the Great East Japan Earthquake and Tsunami in 2011. But given this situation, as a company, we think that it is necessary to invest reliably in safety, as much as we invest for stable transport and for the growth toward the future.

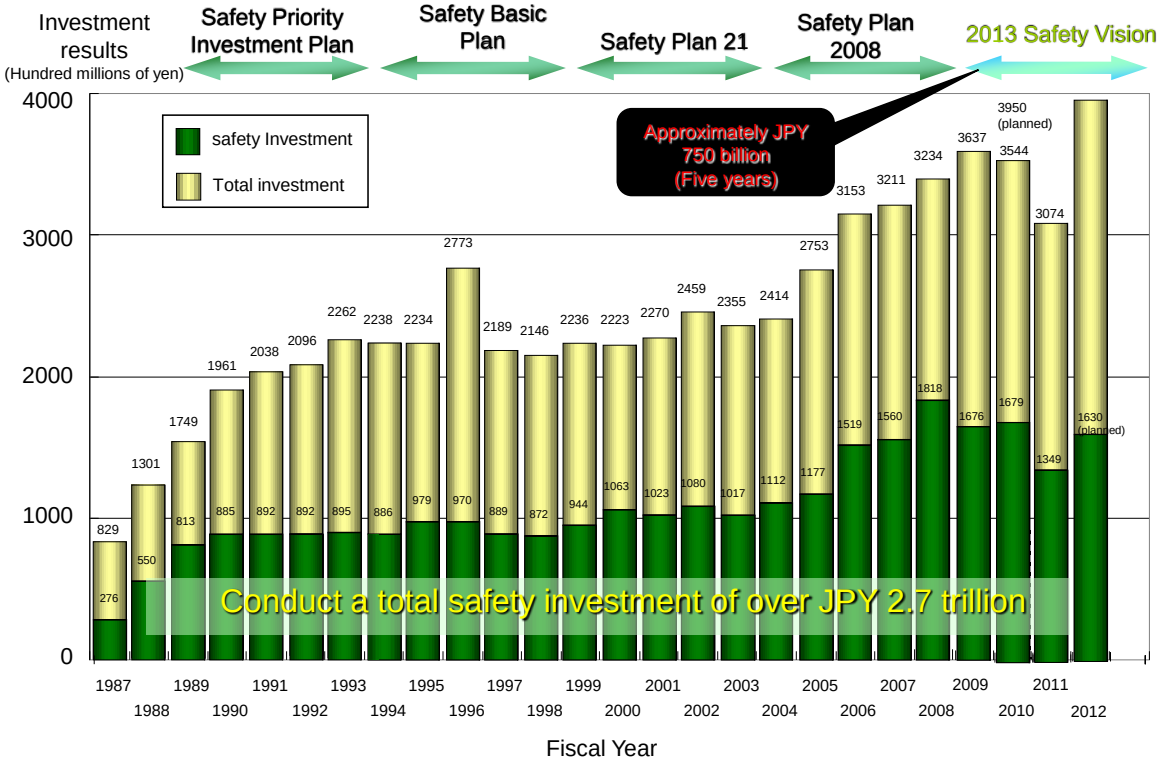

Figure 2: The Transition of Five-Year Safety Plan

2. RE-EXAMINING OUR THINKING ABOUT INVESTMENTS IN SAFETY

2.1 Re-examining Our Thinking about Investments in Safety in the Latest Five-Year Safety Plan

We introduced new thinking about investment in safety in the Latest Five-Year Safety Plan, from the perspective of shifting from the prevention of the recurrence of accidents that have happened in the past, to prevention of accidents by evaluating risk in advance.

The conventional method to prevent accidents is mainly to prevent repeating the railway accidents that have occurred in the past. We will continue this approach in the future, but there are also accidents that seem unimportant only because they have not yet caused major damage.

I can offer an example of this by using the case of level crossing accidents, as follows. In the experience of JR East since its establishment, there have been some level crossing accidents in which derailed cars were obstacles to movement on the other track, but this has never led to severe accidents. For this reason, until now, we have proceeded with the prevention of the recurrence of accidents that have happened. However, in this case, there is a hidden risk of a severe accident if another is train approaching. In order to prevent this sort of secondary disaster from happening, it is necessary to implement measures mainly for preemptive prevention of such a situation.

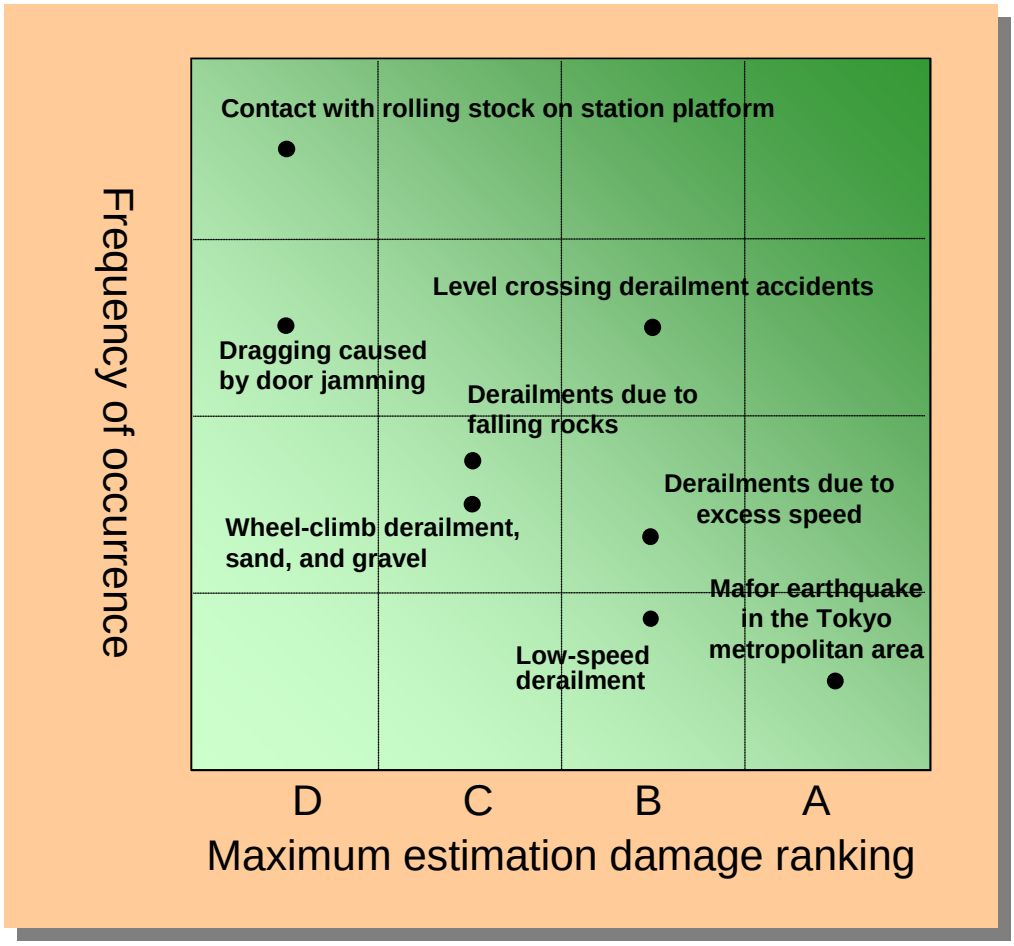

Figure 3: The correlation between the frequencies of these accidents or events and the damage from them.

On this occasion, we have introduced risk evaluation that takes into consideration the frequency of the events we have experienced in the past, including those with only small damage, and the maximum scale of damage of the events we can imagine. We will give high priority to preventing such accidents by using this evaluation.

At first, we will conduct classification in this way and will analyze the correlation between the frequencies of these accidents or events and the damage from them.

A: Hanshin-Awaji Earthquake, Tokyo metropolitan area large earthquake (assumption)

B: Osutakayama airplane disaster, Tsunami collision, Mikawashima collision, Fukuchiyama line derailment

C: Shigaraki-Kogen Railway collision, Uetsu Line derailment

D: People being hit by a train at a station platform

This analysis is presented in the figure above. The gradation of the background in the figure shows the priority level. This figure shows that we will take firm countermeasures against accidents leading to severe damage, even though their frequency of occurrence is small. Also, we will take firm countermeasures against accidents or events which occur many times, even though each of them causes only small damage.

In addition to the measures to prevent major accidents implemented until now, based upon our new way of thinking about risk evaluation, as described above, we are proceeding with the following efforts of preemptive prevention.

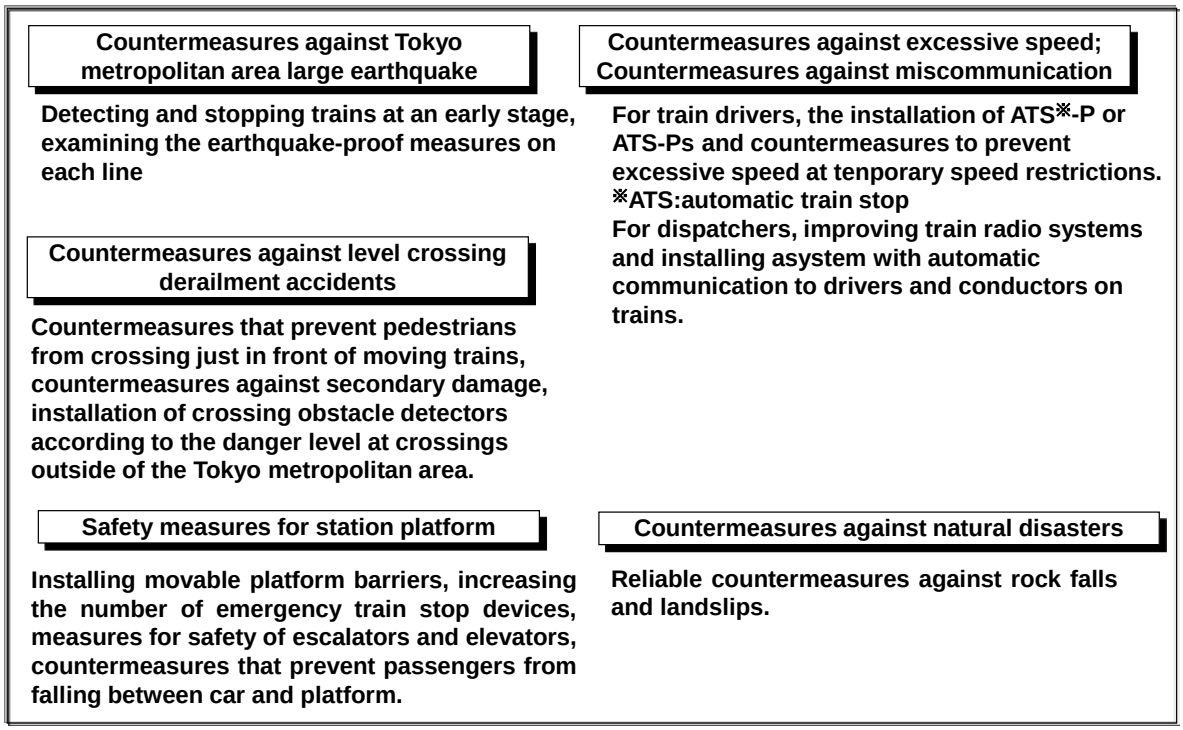

Figure 4: The major countermeasures resulting from risk evaluation

In addition, we have been working to improve severe accidents. Here, we describe countermeasures for 3 serious accidents.

① Countermeasures for the Uetsu Line accident

- Expanding the installation of anemometers
- Increasing the sections subject to speed restrictions when winds are high
- Conducting research related to tracking gusty winds using Doppler radar
- Examining the methods for using weather information to restrict train operations
- Promoting the installation of windbreak fences

② Countermeasures for the Fukuchiyama Line derailment accident

- Preventing excessive speed by installing ATS equipment at curves, turnouts, line terminals, and descending grades
- Introducing automatically transmitted train protection radio signals
- Completing the installation of the emergency brake system on rolling stock, which can stop the train automatically if the driver becomes unconscious

③Countermeasures for the Joetsu Shinkansen derailment accident and for earthquakes

- Breakaway prevention guard
- Countermeasures against rail rollover
- Seismic reinforcement of elevated bridges

2.2 Strengthening of Earthquake Countermeasures Based on the Experience of the Great East Japan Earthquake and Tsunami

The Great East Japan Earthquake and Tsunami that occurred in March 2011 caused major damage within the JR East's area of operations. Although major damage was incurred by railway facilities, such as the facilities above the ground on JR East Shinkansen and on conventional railway lines, there were no derailments of moving trains in operation and no passengers died at any of our stations or on any of our trains. Moreover, recovery efforts were commenced immediately after the occurrence of the Earthquake and the Tohoku Shinkansen resumed service on all lines 50 days after the occurrence of the Earthquake. In addition, with the exception of sections which had incurred massive damage due to the tsunami on the Pacific Coast, as well as the area neighboring the Fukushima 1st Nuclear Power Plant, the conventional railway lines also resumed service in steady succession.

JR East has been proceeding with its earthquake countermeasures since before the Great East Japan Earthquake and Tsunami using lessons from past earthquakes. In particular, it has proceeded with its earthquake countermeasures based upon the following three-pronged strategy, using the experience of the Great Hanshin Earthquake in 1995 and the Chuetsu Earthquake in 2004.

- Anti-seismic reinforcement measures in preparation for earthquakes

  Seismic reinforcement of viaduct columns and bridge piers

  Implementation of planned countermeasures for seismically vulnerable viaduct columns, etc. on a priority basis.

- Measures to ensure the emergency stopping of trains: to rapidly stop all trains which are in motion in the event of an earthquake.

  EW(Earthquake Early Warning) System for Shinakansen

  A system for the emergency stopping of trains when seismographs detect an earthquake of an intensity above the safety standard.

- Countermeasures to reduce derailment damage to the minimum

In addition, on this occasion, based upon the experience of the Great East Japan Earthquake and Tsunami, as well as proceeding with our earthquake countermeasures based upon the above three-pronged strategy, we have also decided to implement the following efforts:

- Further strength through anti-seismic reinforcement measures

  Preparations for an earthquake directly under the Tokyo Metropolitan Area

  Countermeasures for earthquake directly beneath the Tokyo metropolitan area(Viaduct columns, embankments and bridges, etc.)

  Expansion of countermeasures based on experience of Great East Japan Earthquake

- Decreasing damage after the occurrence of an earthquake

  Expanding the installation of seismometers

  Strengthening communication functions, enhancing capacity of batteries at communications offices, etc.

  Speedy search and rescue after the occurrence of an earthquake and measures to ensure the maintenance of the functions of the Countermeasures Headquarters.

- Tsunami countermeasures

  re-examination of the way how our manuals and training should be, establishment of a disaster message board and emergency evacuation routes, etc.

3 CONCLUSION

In the above, I have described investment in safety to reflect the experience of the Great East Japan Earthquake and Tsunami and the new way of thinking of “risk evaluation.” To improve the level of “safety,” not only tangible measures such as making limited investment in facilities and equipment, but also intangible measures such as improving the level of our employees’ awareness, operations and rules are necessary.

We will aim in the future for even greater improvements in safety based upon both tangible and intangible measures.