



Platform Safety Measures

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Summary

East Japan Railway Company (JR East) has worked to achieve safety and peace of mind for passengers at stations, especially on platforms.

As part of our safety measures for platforms, we have been installing platform screen doors at all stations along the Yamanote Line. This line has 29 stations, of which 24 are now equipped with platform screen doors. In addition, we also finished installing Braille blocks with lines indicating the inward side of the platform at stations used by over 100,000 people a day by the end of 2015.

Furthermore, we have conducted several campaigns to raise customers' awareness of safety; for example, some campaign titles were "Don't use a smartphone while walking" and "Let's eliminate platform accidents."

Introduction

There are 1,665 stations across the JR East network. In this document, we will introduce our physical and psychological platform safety measures in the Tokyo metropolitan area which has many customers.

1. Situation of platforms in the JR East network

1.1 Numbers of passengers and trains in the Tokyo metropolitan area

In the metropolitan area centered on Tokyo, trains are very crowded especially in the morning commuter rush hours. To help relieve this problem, trains need to run very frequently.

The text below numerically shows the transportation density level in the metropolitan area (in 2015).

- Largest number of passengers carried per hour: About 83,000 (Chuo Line: Nakano to Shinjuku)
- Shortest operation interval: 2 minutes (Chuo Line: Nakano to Shinjuku)
- Number of passengers at busiest station: Shinjuku station, About 760,000 passengers per day
- Number of cars: Up to 15 (about 300 m in length; riding capacity: up to about 2,200 people)

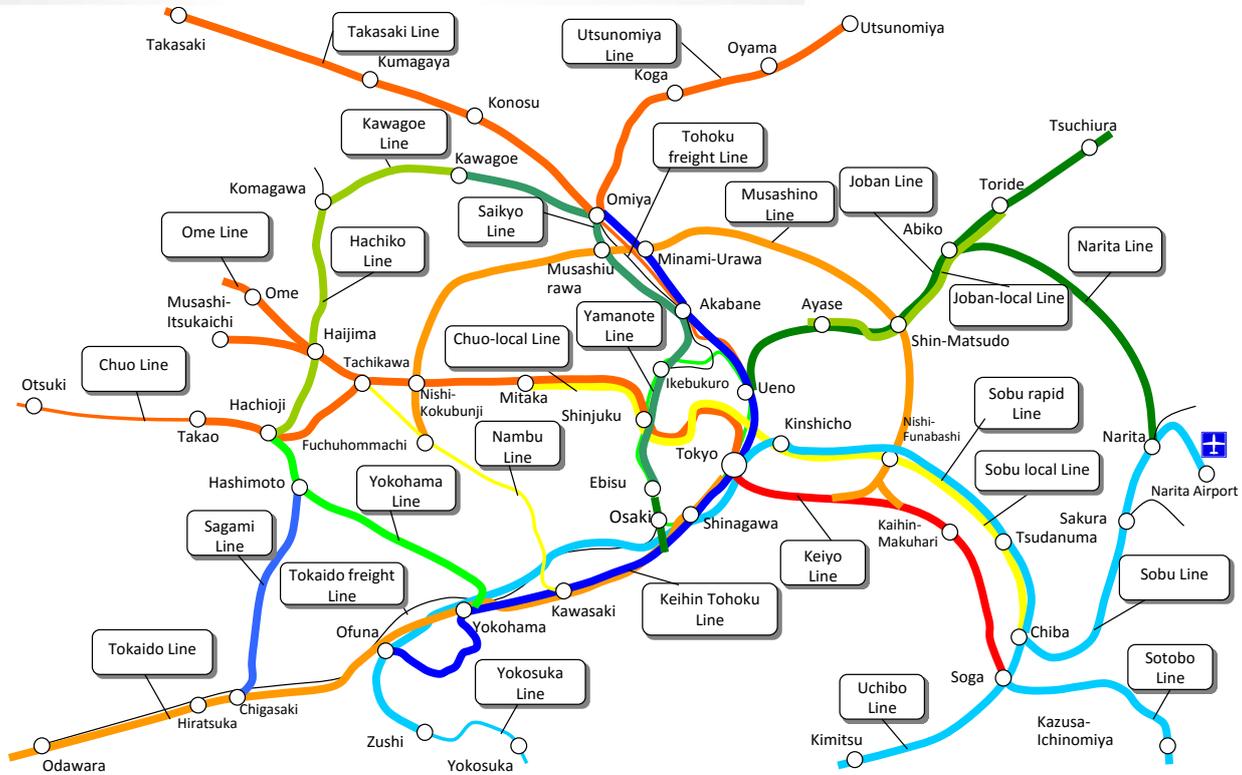


Figure 1: Network of rail lines in the Tokyo metropolitan area

1.2 Platform structure types

There are two platform structure types: Embankment and girder. The height from the rails to the platform is 1,100 mm.

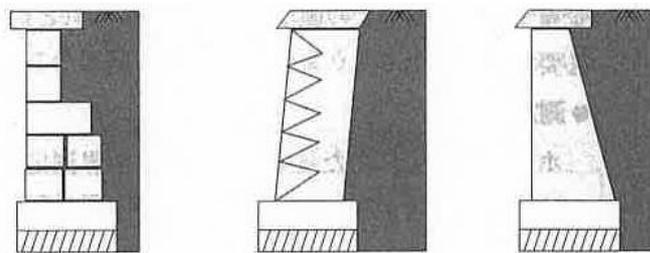


Figure 2: Embankment type

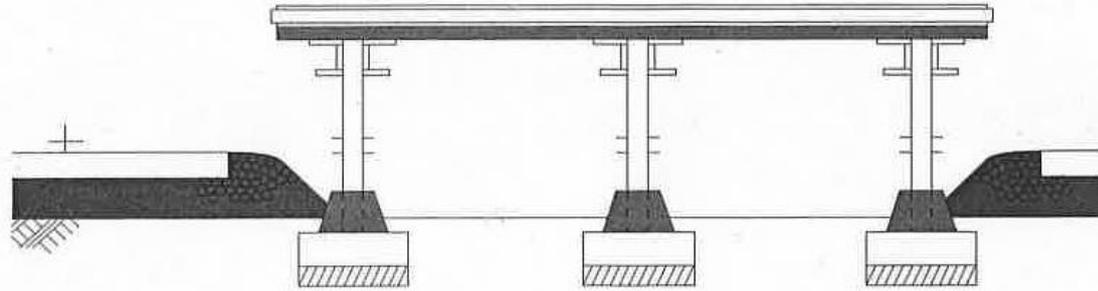


Figure 3: Girder type

2. Platform accidents

JR East had 144 accidents resulting in injury or death (deadly and injurious accidents caused by train or car operation) in 2015. Of these, 83 occurred on platforms. There were 182 other train accidents (train collision, derailment and fire). Therefore, the accidents resulting in injury or death account for about 80% of the total.

3. Measures to prevent platform accidents

Platform safety measures need not only physical preventive measures but also psychological measures for raising passengers' awareness as well as our staff's. Our activities are described below.

3.1 Physical preventive measures

3.1.1 Emergency alarm and train stop system

There are emergency train stop buttons on pillars at platforms. Passengers can inform a train driver, conductor and station staff of danger by pressing them. The buttons are connected to traffic lights and they turn them red (stop light). Then the train driver sees the red light and stops the train. In automatic train control (ATC) zones where trains including Shinkansen (bullet trains) operate, the brake is automatically applied. As of the end of 2015, the emergency train stop buttons have been installed at 372 stations across the local train network and 41 stations across the Shinkansen network.



Figure 4: Emergency train stop button



3.1.2 Fall detection mats

Mats installed under a platform detect any person who falls off the platform and automatically give instructions to stop trains. Like the emergency alarm and train stop system, it also turns the traffic lights red and train drivers see it and stop trains. In the ATC zones where trains including Shinkansen operate, the brake is automatically applied. As of the end of 2015, fall detection mats have been installed at 33 stations.



Figure 5: Fall detection mats

3.1.3 Platform steps

Steps are installed to make it easier for passengers who fall onto a train track to get back onto the platform. As of the end of 2015, they are installed at 161 stations across the local train network.



Figure 6: Platform steps

3.1.4 Braille blocks with lines indicating the inward side of the platform

In addition to Braille blocks consisting of embossed points, we have pushed forward with installing an embossed line on the inside of platforms to indicate the inward side of platform for the visually impaired.

As of the end of 2015, we completed the installation of embossed lines at all stations used by over 100,000 passengers per day. At present, we are pushing forward with the installation at stations used by over 10,000 passengers. As of the end of 2015, 471 stations are equipped with the embossed lines across the local train network and 35 stations are equipped with them across the Shinkansen network.



Figure 7: Braille blocks with embossed lines indicating the inward side of the platform

3.1.5 Platform screen doors

There were some cases in the past where platform screen doors were installed at some Shinkansen stations that had no special platform for passing trains, but they were not installed at stations across the local train network.

In 2008, JR East decided to adopt platform screen doors on the Yamanote Line because it is the most important and symbolic line. And we installed those doors at two stations (Ebisu and Meguro stations) as a pilot project in 2010. Through the pilot project, we investigated the technical points, for example, appropriate settings of various sensors, adjustment of door opening/closing times and speed and optimization of maintenance frequency, and the impact of passengers requiring longer to get on or off a train on the train service timetable. In this way, we validated the impact of platform screen doors with an eye on their full-scale introduction.

The platform screen doors are in place at 24 stations out of 29 on the Yamanote Line. For the remaining five stations (Tokyo, Shimbashi, Hamamatsucho, Shibuya and Shinjuku stations), we plan to conduct a large renovation on them, so we will install the platform screen doors on that occasion.

We plan to install platform screen doors on the Keihin Tohoku Line which is an important line, along with the Yamanote Line, in the Tokyo Metropolitan area. As a schedule, those doors will be installed at Akabane Station by the end of 2016 and at Ueno, Oimachi, Tsurumi, Urawa and Saitama-Shintoshin stations in 2017 and Yurakucho station in 2018.

Other than the above, we will install platform screen doors at Sendagaya and Shinanomachi stations on the Chuo-Sobu Line (Chuo Local Line) (in time for the Tokyo Olympic Games in 2020) and Shinkoiwa Station on the Sobu Main Line (rapid line) (the time is TBD).



Figure 8: Platform screen doors

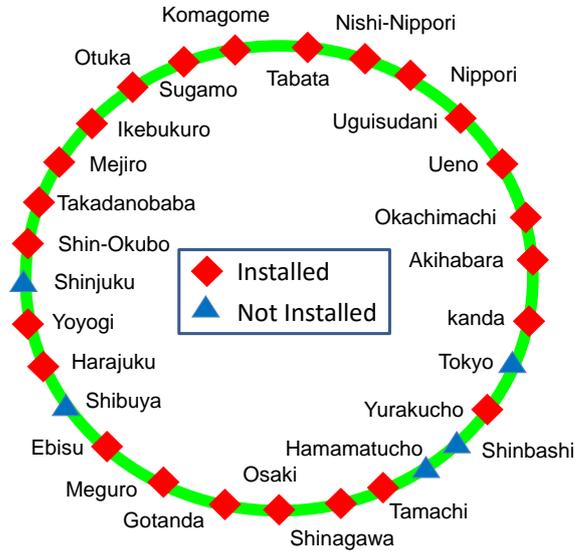


Figure 9: Platform screen door installation status across the Yamanote Line

In addition to installing platform screen doors, we are proactively working on the research and development of new types of doors. JR East Mechatronics, one of the JR East Group companies, developed the door as shown below. It has a wider opening than the conventional door and can reduce the cost and shorten the construction period of doors. We plan to install new type of doors at Machida station on the Yokohama Line by the end of this year to examine further introduction.

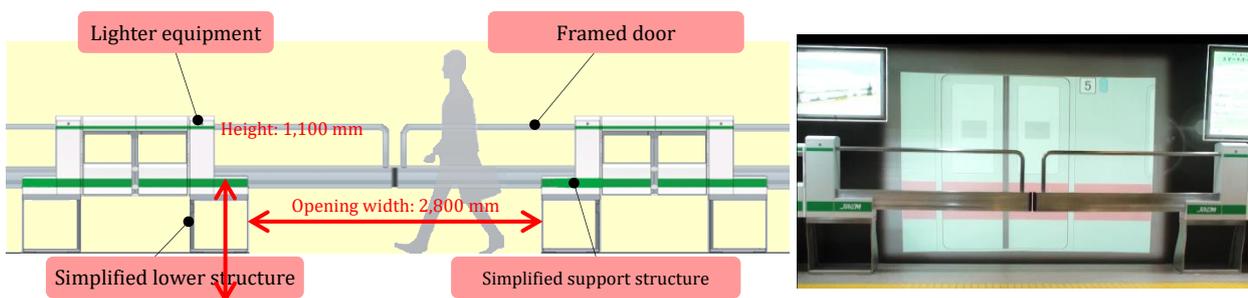


Figure 10: A new type of door under development

3.1.6 Safety sheet between cars

To prevent passengers from falling in the gap between cars, we have put in place a rubber sheet between cars for about 11,000 trains.



Figure 11: Safety sheet

3.2 Awareness-raising activities

On top of our physical preventive measures, we are also working on activities to raise the awareness of passengers and improve the safety level by calling for their cooperation.

3.2.1 Activities for making the emergency train stop button (emergency alarm and train stop system) well known

At events held by stations or JR East, we have set up a device that lets passengers experience an emergency train stop button. At these events, we ask passengers to press the button if they come across a dangerous situation.



Figure 12: A simulation device to experience pressing an emergency train stop button

3.2.2 A campaign to prevent passengers from being caught by doors

We have conducted a campaign to have people understand the risk of being caught by doors, where we ask them not to rush into a departing train or intentionally let their bag or umbrella get trapped by doors. We have been conducting this campaign in an area with a radius of 100 km centered on Tokyo since 2014.

We emphasized the potential risk through station posters and in-car/station displays in April and May 2016 and featured the campaign on JR East's official Facebook page.



Figure 13: Poster of the campaign to prevent passengers from being caught by doors

3.2.3 A platform safety campaign

Every year we conduct a campaign on platform safety in cooperation with 24 railway companies in the Tokyo Metropolitan area during the year-end and New Year period. Targeting drunken passengers, we try to raise their awareness of accidents where people come into contact with a train or fall off the platform and ask them to press the emergency train stop button in an emergency.

Like the campaign to prevent passengers from being caught by doors, we sent out a message through station posters and in-car/station displays and featured it on JR East's official Facebook page.

3.2.4 A campaign to Don't use a smartphone while walking

In November 2015, we ran a campaign to stop people from using a smartphone at stations while walking in cooperation with the Telecommunications Carriers Association and its participating mobile phone carriers. The aim was to prevent passengers who use a smartphone or cell phone while walking from getting injured. We are now arranging a collaboration with other railway companies for a campaign this year.



Figure 14: Poster on the campaign to Don't use a smartphone while walking



3.2.5 Poster to stop dangerous photography on platforms

An increasing number of people are carrying out dangerous photographic activities on platforms, especially using a selfie stick. If someone uses a selfie stick in a station, they run the potential risk of getting an electric shock. At events, photographers get hooked on taking pictures and may come into contact with a train or get others involved in an accident. We have prepared posters to send out the message that dangerous photographic activities (e.g., using a selfie stick or stepladder) must be stopped in multiple languages, namely Japanese, English, Chinese and Korean.



Figure 15: Poster to stop dangerous photography on platforms

4. In conclusion

JR East has given top priority to safety from a management perspective since its establishment in 1987 and carried out many different safety activities. As a result, we have achieved certain effects; for example, we have reduced the number of serious accidents including train collisions. However, regarding safety measures for railroad crossings and platforms, we need cooperation from the local people and passengers other than station staff in addition to our physical measures. Therefore, a steady and long-time approach is essential.

We will make further efforts to improve the safety level so that passengers can use JR East with peace of mind.