# Chapter 4 Railway accident and serious incident investigations

## 1 Railway accidents and serious incidents to be investigated

### <Railway accidents to be investigated>

### ◎Article 2, paragraph (3), of the Act for Establishment of the Japan Transport Safety Board (Definition of railway accident)

"Railway accidents" mean accidents of (1) to (3) and serious accidents of (4) below.

(1) Accidents occurred during the operation of a train or vehicle (Article 19* of the Railway Business Act)

(2) Train collision, fire, or other accident during the operation of a train or vehicle occurred on dedicated railways

(3) Train collision, fire, or other accident during the operation of a train or vehicle occurred on tramways

(4) Serious accidents prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board)

* Train collision, fire, or other accident during the operation of a train or vehicle, which is prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Paragraph 1, Article 3 of the Ordinance on Report on Railway Accidents)

### ○Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (Serious accidents)

1 Accidents listed in items (1) to (3) in Paragraph 1, Article 3 of the Ordinance on Report on Railway Accidents

(1) Train collision: An accident in which a train collides or contacts with another train or a vehicle.

(2) Train derailment: An accident in which a train derails (excluding those related to snowplows in operation).

(3) Train fire: An accident in which a train catches fire.

2 Accidents listed in items (4) to (6) in Paragraph 1, Article 3 of the same Ordinance, which are listed in any of (a) to (d) below.

(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.

(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.

(6) Other accidents with casualties: An accident causing injury or death in the operation of a train or vehicle.

(a) An accident involving the death of a passenger, crew member, etc.

(b) An accident involving five or more casualties with at least one of the casualties dead.

(c) A fatal accident that occurs at a level crossing with no automatic barrier machines.

(d) An accident found to have likely been caused by a railway worker's error in procedure or due to the malfunction, damage, destruction, etc. of vehicles or railway facilities, which resulted in the death of a person.

3 Accidents listed in items (2) and (4) to (7) in Paragraph 1, Article 3 of the same Ordinance, which are recognized as exceptional.

(2) Train derailment: An accident in which a train derails
(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accident with casualties: An accident causing injury or death in the operation of a train or vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a train or vehicle causes damage to property of 5 million yen or more.

4 Accidents equivalent to those listed in items (1) to (7) in Paragraph 1, Article 3 of the same Ordinance occurred in dedicated railways, which are recognized particularly exceptional. (Accidents related to dedicated railways)

(1) Train collision: An accident in which a train collides or contacts with another train or a vehicle.
(2) Train derailment: An accident in which a train derails.
(3) Train fire: An accident in which a train catches fire.
(4) Level crossing accident: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a train or vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accidents with casualties: An accident causing injury or death in the operation of a train or vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a train or vehicle causes damage to property of 5 million yen or more.

5 Accidents specified by the public notice of the Japan Transport Safety Board as an accident equivalent to the above 1 to 3 accidents that occurred on tramways (accident under Article 3, Item 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation under Article 4, Item 7 of the same Ordinance) (Accidents related to tramways)

**・Article 1 of the public notice stipulating the accident specified in Article 3, Item 5 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation specified in Article 4, Item 7 of the same Ordinance (Accidents related to tramways)**

1 Accidents specified in (1) to (6) in Article 1, Paragraph 1 of the Ordinance for Report on Track Accidents, etc., which are listed in any of A to C.

(1) Vehicle collision accident: An accident in which a vehicle operating on the main track collides with or contacts with another vehicle.
(2) Vehicle derailment: An accident in which a vehicle operating on the main track derails.
(3) Vehicle fire accident: An accident in which a vehicle operating on the main track catches fire.
(4) Level crossing accident: An accident where a vehicle collides or contacts with a person or vehicle on a level crossing road.
(5) Accident against road traffic: An accident in which a vehicle collides or contacts with a person or vehicle on a road other than a level crossing.
(6) Other accidents with casualties: An accident causing injury or death in theoperation of a vehicle.

(a) An accident involving the death of a passenger, crew member, etc.
(b) An accident involving five or more casualties with at least one of the casualties dead
(c) A fatal accident that occurs at a level crossing with no automatic barrier machines

2. Accidents specified in the items (1) to (7) of the same Ordinance, which are recognized as particularly exceptional

(1) Vehicle collision accident: An accident in which a vehicle operating on the main track collides or contacts with another vehicle.
(2) Vehicle derailment: An accident in which a vehicle operating on the main track derails.
(3) Vehicle fire accident: An accident in which a vehicle operating on the main track catches fire.
(4) Level crossing accident: An accident in which a vehicle collides or contacts with a person or vehicle passing on a level crossing road.
(5) Accident against road traffic: An accident in which a vehicle collides or contacts with a person or vehicle passing on a road other than a level crossing road.
(6) Other accidents with casualties: An accident causing injury or death in the operation of a vehicle.
(7) Heavy property loss without casualties: An accident in which the operation of a vehicle causes damage to property of 5 million yen or more.

3. The operation of new tramways and shared tramways that are laid other than on the road surface shall follow the items (1) to (3) in Paragraph 1, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

## Railway accidents to be investigated

<table>
<tr><td>Category</td><td>Train collision</td><td>Train derailment</td><td>Train fire</td><td>Level crossing accident</td><td>Accident against road traffic</td><td>Other accidents with casualties</td><td>Heavy property loss without casualties</td></tr>
<tr><td rowspan="2">Railway<br>[Act 2-3]<br>(including tramway operated as equivalent to railway)<br>[Notice 1-3]</td><td colspan="3">All accidents*1<br>[Ordinance 3-1]<br>(Tramway operated as equivalent to railway shall follow this [Notice 1-3])</td><td colspan="4">・Accidents involving the death of a passenger, crew member, etc.<br>・Accidents involving five or more casualties with at least one of the casualties dead<br>・Fatal accidents that occur at level crossings with no automatic barrier machines<br>・Accidents found to have likely been caused by a railway worker's error in procedure or due to the malfunction, damage, destruction, etc. of vehicles or railway facilities, which resulted in the death of a person<br>[Ordinance 3-2]</td><td></td></tr>
<tr><td></td><td>Accidents that are particularly rare and exceptional [Ordinance 3-3]</td><td></td><td colspan="4">Accidents that are particularly rare and exceptional [Ordinance 3-3]</td></tr>
<tr><td>Dedicated railway</td><td colspan="7">Accidents that are particularly rare and exceptional [Ordinance 3-4]</td></tr>
<tr><td rowspan="3">Tramway<br>[Ordinance 3-5]</td><td>Train collision</td><td>Train derailment</td><td>Train fire</td><td>Level crossing accident</td><td>Accident against road traffic</td><td>Other accidents with casualties</td><td>Heavy property loss without casualties</td></tr>
<tr><td colspan="6">・Accidents involving the death of a passenger, crew member, etc.<br>・Accidents involving five or more casualties with at least one of the casualties dead<br>・Fatal accidents that occur at level crossings with no automatic barrier machines<br>[Notice 1-1]</td><td></td></tr>
<tr><td colspan="7">Accidents that are particularly rare and exceptional [Notice 1-2]</td></tr>
</table>

*1 Except for derailment accidents of working snowplows. [Ordinance 3-1] However, accidents that are particularly rare and exceptional are to be investigated. [Ordinance 3-3]

(Note) In the table, “Act” refers to the Act for Establishment of the Japan Transport Safety Board; “Ordinance” refers to the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board; “Notice” refers to the Public Notice by the Japan Transport Safety Board; and the numbers refer to the Article and Item numbers. (*In “Act”, the Article and Paragraph are abbreviated)

**<Railway serious incidents to be investigated>**

**◎Article 2, paragraph (4), item (ii), of the Act for Establishment of the Japan Transport Safety Board (Definition of railway serious incident)**

A situation prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board), deemed to bear a risk of accident occurrence.

**○Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board**

*The names of the situations listed in 1 to 6 are abbreviations.

1 "Incorrect management of safety block"

A situation where a train starts moving for the purpose of operating in the relevant block section before completion of the block procedure and another train or vehicle had existed in the zone.

2 "Incorrect indication of signal"

A situation where a signal indicates that a train should proceed even though there is an obstacle in the route of the train or the route of the train is obstructed while the signal indicates that the train should proceed and a train had entered into the route.

3 "Violating red signal"

A situation where a train proceeds regardless of a stop signal, thereby obstructing the route of another train or vehicle and another train or vehicle had entered into the protected area of the signal which protects the zone of the route.

4 "Dangerous damage in facilities"

A situation that causes a malfunction, damage, destruction, etc., of facilities and which caused malfunction, damage, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train.

5 "Dangerous trouble in vehicle"

A situation that causes a malfunction, damage, destruction, etc., of a vehicle, and caused malfunction, damage, destruction, etc., bearing particularly serious risk of collision or derailment of or fire in a train.

6 Any of "Incorrect management of safety block," "Incorrect indication of signal," "Violating red signal," "Main track overrun[*1]," "Violating closure section for construction[*2]," "Vehicle derailment[*3]," "Dangerous damage in facilities," "Dangerous trouble in vehicle," "Heavy leakage of dangerous object[*4]" and "A situation equivalent to the prior 9 items (others)," which is recognized as particularly exceptional.

*1 "Main track overrun" refers to a situation in which a train or vehicle overruns a main track between stations.

*2 "Violating closure section for construction" refers to a situation in which a train runs in a section during construction or maintenance work that should be done by stopping train operation.

*3 "Vehicle derailment" refers to a situation in which a vehicle derails, and includes the following situations;

・A vehicle derailed on a main track.
・A vehicle derailed on a side track and disrupted a main track.
・A vehicle derailed on a side track, and the cause can be attributed to a cause other than the equipment or handling specific to the side track.

*4 “Heavy leakage of dangerous object” refers to a situation in which hazardous materials, explosives, etc., leak significantly from a train or vehicle.

7. Situations which are specified by the public notice (Article 2 of the Public Notice which defines the accident of Item 5, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation of Item 7, Article 4 of the same Ordinance), as those equivalent to the situations of the items 1 to 6 above occurred on tramways.

**・Article 2 of the Public Notice which defines the accident of Item 5, Article 3 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board and the situation of Item 7, Article 4 of the same Ordinance (Serious incident related to tramways)**

*The names of the situations listed in 1 to 4 are abbreviations.

1 “Incorrect management of safety block”

A situation where a vehicle is operating on a main track for the purpose of operating in the relevant safety zone before the completion of safety system procedures and another vehile operating on the main track had existed in the zone.

2 “Dangerous damage in facilities”

A situation that causes malfunction, damage, destruction, etc., of tracks, facilities, etc. that disrupts the safety of a vehicle operating on a main line, and caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment, or fire in the vehicle operating on the main track.

3 “Dangerous trouble in vehicle”

A situation that causes a malfunction, damage, destruction, etc., of running device, braking device, electrical device, coupling device, etc., that disrupts the safety of a vehicle operating on a main line and caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment, or fire in the vehicle operating on the main track.

4 “Incorrect management of safety block” “Violating red signal[*1],” “Overrun on main track[*2],” “Dangerous damage in facilities,” “Dangerous trouble in vehicle,” “Heavy leakage of dangerous object[*3]” and “A situation equivalent to the prior 6 items (others),” which is recognized as particularly exceptional.

*1 “Violating red signal” refers to a situation in which a vehicle operating on a main track overruns a stop signal and obstructs a course of another vehicle.
*2 “Overrun on main track” refers to a situation in which a vehicle overruns a main track.
*3 “Heavy leakage of dangerous object” refers to a situation in which hazardous materials, explosives, etc., leak significantly from a vehicle.

5. The operation of new tramways and shared tramways that are laid other than on the road surface shall follow the items 1 to 6 in Article 4 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

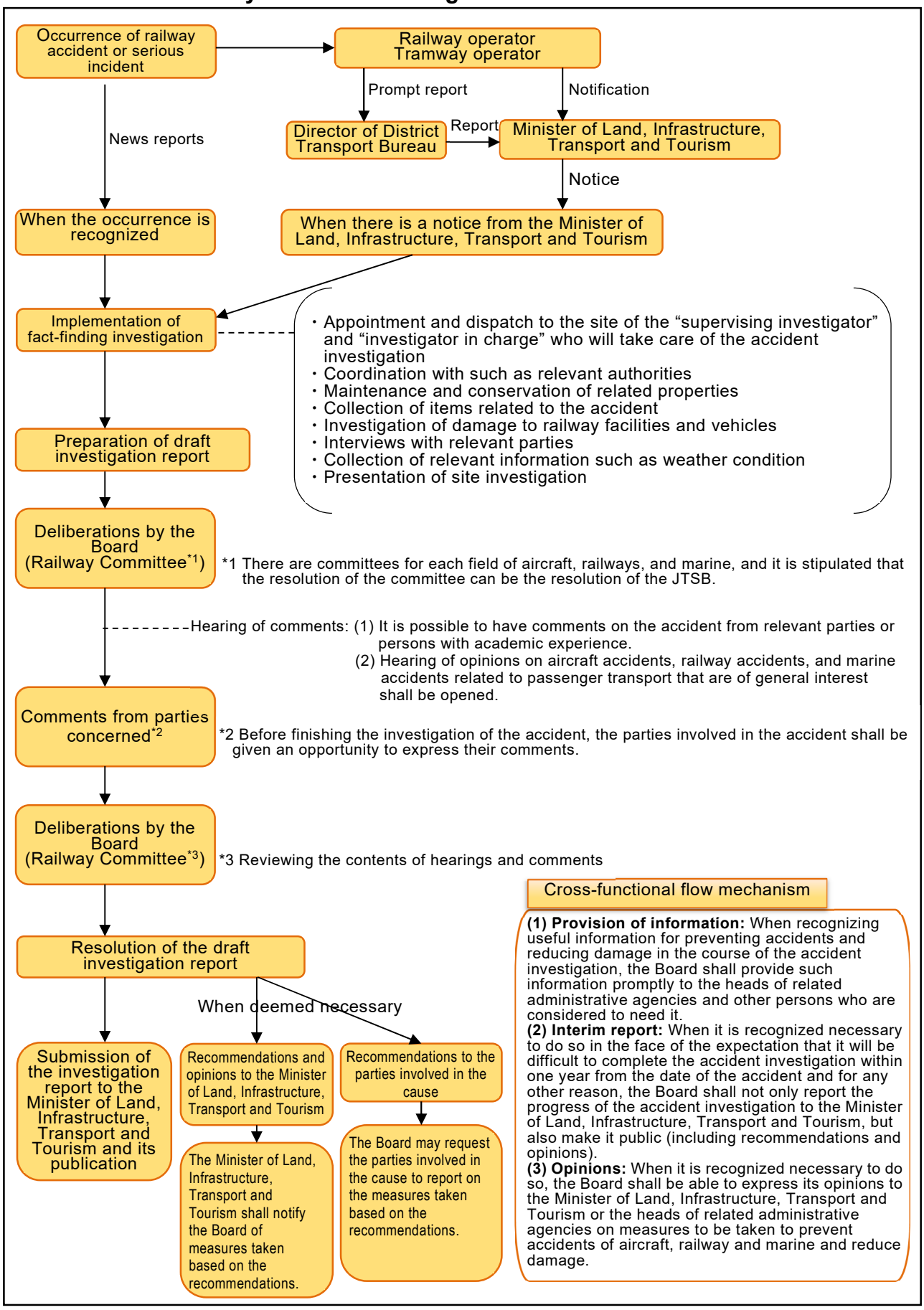
## Serious incidents to be investigated

<table>
<tr><td>Category</td><td>Incorrect management of safety block</td><td>· Incorrect indication of signal<br>· Violating red signal</td><td>Dangerous damage in facilities</td><td>Dangerous trouble in vehicle</td><td>· Main track overrun<br>· Violating closure section for construction<br>· Vehicle derailment<br>· Heavy leakage of dangerous object<br>· Others</td></tr>
<tr><td rowspan="2">Railway<br>[Act 2-4-2]<br>(including tramway operated as equivalent to railway<br>[Notice 2-5])</td><td colspan="2">Certain conditions such as the presence of another train [Ordinance 4-1, 4-2, 4-3]</td><td colspan="2">Risk of collision, derailment or fire [Ordinance 4-4, 4-5]</td><td></td></tr>
<tr><td colspan="5">Incidents that are particularly rare and exceptional [Ordinance 4-6]</td></tr>
<tr><td></td><td>Incorrect management of safety block</td><td>Violating red signal</td><td>Dangerous damage in facilities</td><td>Dangerous trouble in vehicle</td><td>· Main track overrun<br>· Heavy leakage of dangerous object<br>· Others</td></tr>
<tr><td rowspan="2">Tramway<br>[Ordinance 4-7]</td><td>Certain conditions such as the presence of a vehicle<br>[Notice 2-1]</td><td></td><td colspan="2">Particularly remarkable risk of collision, derailment or fire [Notice 2-2, 2-3]</td><td></td></tr>
<tr><td colspan="5">Incidents that are particularly rare and exceptional [Notice 2-4]</td></tr>
</table>

(Note) In the table, “Act” refers to the Act for Establishment of the Japan Transport Safety Board; “Ordinance” refers to the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board; “Notice” refers to the Public Notice by the Japan Transport Safety Board; and the numbers refer to the Article and Item numbers. (*In “Act”, the Article, Paragraph, and Item are abbreviated)

*For details, see each case on the website of the JTSB.
https://www.mlit.go.jp/jtsb/example.pdf (in Japanese only)

## 2 Procedure of railway accident investigation



## 3 Statistics of investigations of railway accidents and serious incidents

The JTSB carried out investigations of railway accidents and serious incidents in 2022 as follows:

13 accident investigations were carried over from 2021, and 14 accident investigations were newly launched in 2022. Among these, 11 investigation reports were published in 2022, and 16 accident investigations were carried over to 2023.

Moreover, one railway serious incident investigation was carried over from 2021, and two serious incident investigations were newly launched in 2022. Among these, one investigation report was published in 2022, and two investigations were carried over to 2023.

Among the 12 investigation reports published in 2022, none was issued with recommendations and none was issued with opinions.

Investigations of railway accidents and serious incidents in 2022

(Cases)

| Category | Carried over from 2021 | Launched in 2022 | Total | Published Investigation reports | (Recommendations) | (Opinions) | Carried over to 2023 | (Interim report) |
|---|---|---|---|---|---|---|---|---|
| Railway accident | 13 | 14 | 27 | 11 | (0) | (0) | 16 | (3) |
| Railway serious incident | 1 | 2 | 3 | 1 | (0) | (0) | 2 | (0) |

## 4 Statistics of investigated railway accidents and serious incidents in 2022

Regarding the number of railway accidents and incidents investigated in 2022, there were 14, an increase of three from 11 in the previous year, and there were two serious railway incidents, an increase of one from one in the previous year.

The breakdown by type of accidents and serious incidents is as follows: The railway accidents consisted of five derailments, eight level crossing accidents, and one other accident with casualties. As for railway serious incidents, there were two dangerous troubles in vehicle.


There were 22 persons killed or injured in 14 accidents, nine of whom were killed and 13 were injured.

The number of casualties (in railway accidents)

(Persons)

| 2022 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Category | Dead | | | Injured | | | Total |
| | Crew | Passenger | Others | Crew | Passenger | Others | |
| Casualties | 0 | 0 | 9 | 0 | 7 | 6 | 22 |
| Total | 9 | | | 13 | | | |

* The above statistics include incidents under investigation so may change depending on the status of the investigation and deliberation.

## 5 Summaries of railway accidents and serious incidents which occurred in 2022

The railway accidents and railway serious incidents which occurred in 2022 are summarized as follows. The summaries are based on information available at the start of the investigations and therefore are subject to change depending on the course of investigations and deliberations.

(Railway accidents)

| 1 | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|
| | January 4, 2022<br>Level crossing accident | Nagaragawa Railway Co. Ltd. | Shimo-Manba No.5 level crossing, class 3 level crossing equipped with road warning device without crossing gate, between Manba station and Kami-Manba station, Etsumi-south Line, Gifu Prefecture |
| | Summary | See “6 Publication of investigation reports” (No.10 on page 91) | |
| 2 | Date and accident type | Railway operator | Line section (location) |
| | February 7, 2022<br>Train derailment | Ohmi Railway Co., Ltd. | In the premises of Takamiya Station of Taga Line, Shiga Prefecture |

| | | | |
|---|---|---|---|
| | Summary | While the accident train was entering Takamiya Station, all axles (2 axles in the front bogie + 2 axles in the rear bogie) of the first car and the 1st axle of the front bogie of the 2nd car derailed at a curve section to the left in the train direction. | |
| 3 | Date and accident type | Railway operator | Line section (location) |
| | February 7, 2022<br>Train derailment | Iyo Railway Co., Ltd. | In the premises of Minara Station of Yokogawara Line, Ehime Prefecture |
| | Summary | While the accident train was entering Minara Station, the two axles in the front bogie of the first car derailed to the left in the train direction near the point. | |
| 4 | Date and accident type | Railway operator | Line section (location) |
| | March 16, 2022<br>Train derailment | East Japan Railway Company | Between Fukushima Station and Shiroishi Zao Station of Tohoku Shinkansen, Miyagi Prefecture |
| | Summary | While the accident train was running between the stations, an earthquake was detected and the train was stopped automatically. When the vehicles were checked later, all axles of the 1st to 4th cars, all axles of the 6th to 8th cars, all axles of the rear bogie of the 9th car, all axles of the front bogie of the 10th car, and all axles of the 11th to 17th cars had derailed. | |
| 5 | Date and accident type | Railway operator | Line section (location) |
| | April 5, 2022<br>Level crossing accident | Tenryu Hamanako Railway Co., Ltd. | Kubota level crossing, class 4 level crossing without crossing gate nor road warning device, between Gansuidi Station and Miyaguchi Station of Tenryu Hamanako Line, Shizuoka Prefecture |
| | Summary | While the accident train was coasting (moving without power) at 64 km/h, its driver, who had spotted a pedestrian waving his/her hand 120 meters before the level crossing, applied an emergency brake immediately, but the train stopped at 84 m past from the crossing. The pedestrian was later confirmed dead. | |
| 6 | Date and accident type | Railway operator | Line section (location) |
| | April 5, 2022<br>Level crossing accident | Fukushima Transportation, Inc. | At the 6k961m level crossing, class 4 level crossing without crossing gate nor road warning device between Hirano Station and Iojimae Station of Iizaka Line, Fukushima Prefecture |
| | Summary | The driver of the train, who saw a car entering the level crossing from the left in the train direction, applied the emergency stop, but the train hit the car.<br>The driver of the car was later confirmed dead. | |
| 7 | Date and accident type | Railway operator | Line section (location) |
| | July 19, 2022<br>Other accident with casualty | West Japan Railway Company | In the premises of Nada Station of Tokaido Line, Hyogo Prefecture |
| | Summary | When the train was passing through the station at about 95 km/h, the driver noticed an unusual sound and applied the emergency brake to stop the train.<br>A passenger was later confirmed dead. | |
| 8 | Date and accident type | Railway operator | Line section (location) |
| | August 25, 2022<br>Train derailment | Shikoku Railway Company | Between Hanke Station and Ekawasaki Station of Yodo Line, Kochi Prefecture |
| | Summary | When the accident train was running between Ekawasaki Station and Hanke Station, the driver detected a falling rock about 50 cm in size and applied the emergency brake. However, the train hit the falling rock and ran over it, causing all the four axles to derail. | |
| 9 | Date and accident type | Railway operator | Line section (location) |
| | September 6, 2022<br>Train derailment | West Japan Railway Company | West departure track No. 11 in the premises of Suita General Depot Kyoto branch of Tokaido Line, Kyoto Prefecture |
| | Summary | When the accident train departed, it departed with the rearmost wheel with the wheel chock on and ran up onto the wheel chock and derailed. | |
| 10 | Date and accident type | Railway operator | Line section (location) |
| | September 20, 2022<br>Level crossing accident | Takamatsu Kotohira Electric Railroad Co., Ltd. | Nakadai No. 1 level crossing, class 4 level crossing without crossing gate nor road warning device between Omachi Station and Rokumanji Station of Shido Line, Kagawa Prefecture |

| | | | |
|---|---|---|---|
| | Summary | The driver of the train, who saw a pedestrian entering the level crossing from the left in the train direction, applied the emergency stop, but the train hit the pedestrian.<br>The pedestrian was later confirmed dead. | |
| 11 | Date and accident type | Railway operator | Line section (location) |
| | September 26, 2022<br>Level crossing accident | West Japan Railway Company | Niiya No. 4 level crossing, class 4 level crossing without a crossing gate nor road warning device, between Nakahama Station and Takamatsucho Station of Sakai Line, Tottori Prefecture |
| | Summary | The driver of the train, who saw a pedestrian entering the level crossing from the left in the train direction, applied the emergency stop, but the train hit the pedestrian.<br>The pedestrian was later confirmed dead. | |
| 12 | Date and accident type | Railway operator | Line section (location) |
| | October 17, 2022<br>Level crossing accident | Japan Freight Railway Company | Yanagida level crossing, class 3 level crossing without crossing gate, but with road warning device, between Nihonmatsu Station and Adachi Station of Tohoku Line, Fukushima Prefecture |
| | Summary | While the train was running at about 80 km/h, the driver of the accident train spotted a public person entering the level crossing by walking fast from the left side of the trian direction and applied the emergency stop, but the train hit the public person.<br>A dead body was later found in a nearby river. | |
| 13 | Date and accident type | Railway operator | Line section (location) |
| | October 31, 2022<br>Level crossing accident | Kyushu Railway Company | Ipponyanagi level crossing, class 4 level crossing without crossing gate nor road warning device, between Igaya Station and Saga Station of Nagasaki Line, Saga Prefecture |
| | Summary | The driver of the train, who saw a car entering the level crossing from the right in the train direction, applied the emergency stop, but the train hit the car.<br>The driver of the car was later confirmed dead. | |
| 14 | Date and accident type | Railway operator | Line section (location) |
| | December 21, 2022<br>Level crossing accident | Nagaragawa Railway Co., Ltd. | Manba level crossing, class 3 level crossing equipped with road warning device without crossing gate, between Manba station and Kami-Manba station, Etsumi-south Line, Gifu Prefecture |
| | Summary | The driver of the train, who saw a car entering the level crossing from the left in the train direction, applied the emergency stop, but the train hit the car.<br>The drive of the car was later confirmed dead. | |

(Railway serious incidents)

| | | | |
|---|---|---|---|
| 1 | Date and incident type | Railway operator | Line section (location) |
| | July 24, 2022<br>Dangerous trouble in vehicle | Enoshima Electric Railway Co., Ltd. | In the premises of Kugenuma Station of Enoshima Electric Railway Line, Kanagawa Prefecture |
| | Summary | When the train was on the point of entering the platform of Kugenuma Station, a passenger of the accident train reported that a door was open. When the conductor checked from inside the train, he/she confirmed that one of the rear boarding doors of the rearmost vehicle on the right side in the train direction was fully open. No passenger fell out of the train through the open door. | |
| 2 | Date and incident type | Railway operator | Line section (location) |
| | October 17, 2022<br>Dangerous trouble in vehicle | Kyushu Railway Company | Between Bungo Ogi Station and Bungo Takeda Station of Hohi Line, Oita Prefecture |
| | Summary | When the train arrived at Bungo-Takeda Station, the driver of the accident train received a report from a passenger that “one of the doors had been opening and closing while the train had been running.” When Kyushu Railway Company checked the train traveling data recorder, the order to open the side sliding door on the right side of the train direction was recorded.<br>No passenger fell out of the train through the open door. | |

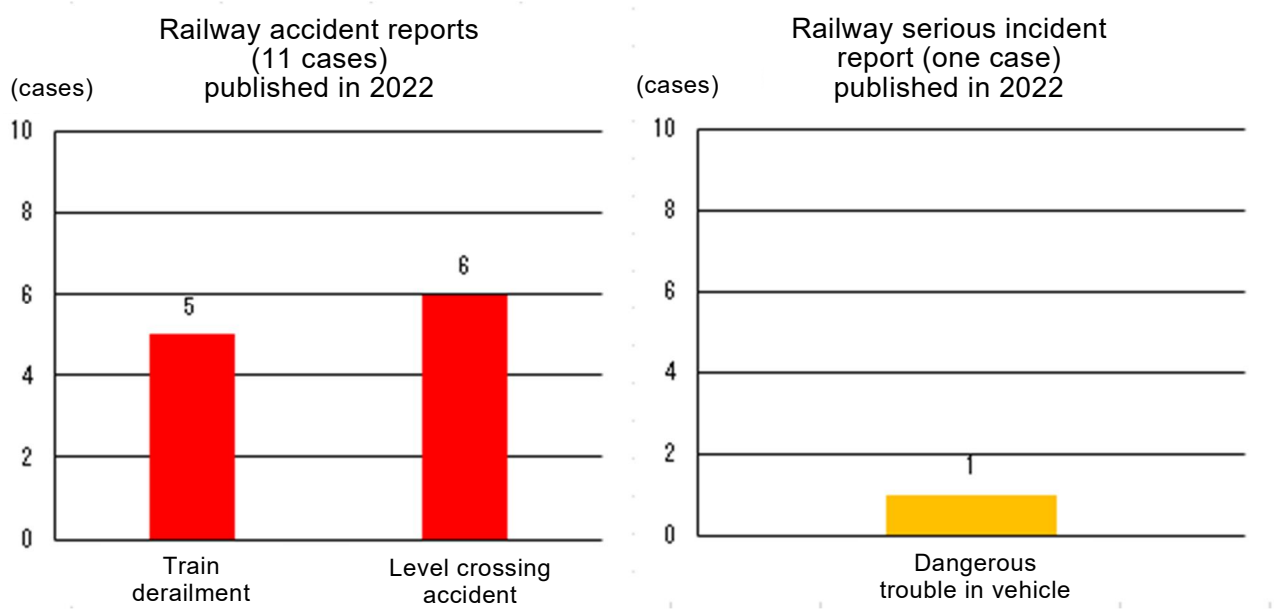
## 6 Publication of investigation reports

The number of investigation reports of railway accidents and serious incidents published in 2022 was 12, consisting of 11 railway accidents and one serious incident.

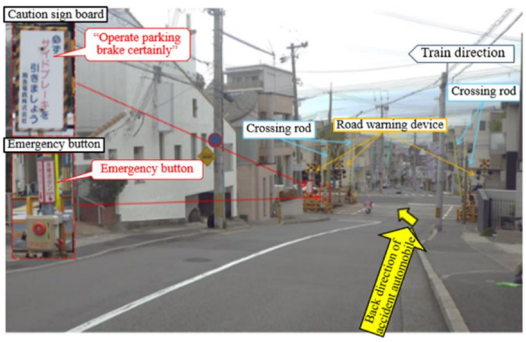
Breaking them down by type, the railway accidents contained five train derailment accidents and six level crossing accidents, while the railway serious incidents contained one dangerous trouble in vehicle.

In the 11 accidents, the number of casualties was eight, consisting of six deaths and two injuries.

The investigation reports on railway accidents and serious incidents published in 2022 are summarized as follows.



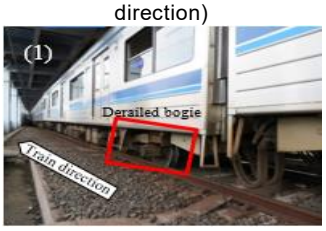
## Railway accident investigation reports published in 2022

| 1 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | February 17, 2022 | November 23, 2020<br>Train derailment | Hankyu Corporation | Takaha level crossing, class 1 level crossing equipped with crossing gate and road warning device, between Rokko station and Mikage station, Kobe Line, Hyogo Prefecture |
| | Summary | The train was running between Rokko station and Mikage station at the velocity of about 85 km/h, the driver of the train noticed the light motor truck entering Takaha level crossing, class 1 level crossing, so that applied the emergency brake immediately, the train collided with the light motor truck, and all two axles in the front bogie of the first vehicle derailed to left. The light motor truck had been going down the slope as no one was boarded.<br>One passenger was injured in this accident. |  | |
| | Probable causes | It is highly probable that the train derailed because an unattended light motor truck backed the sloping road, and entered Takaha level crossing in the status as the crossing rod lowered responded to the approaching train, and collided with the approaching train.<br>As for that the train had derailed, it is probable that left wheel of the first axle ran onto the rail and derailed due to the impact of the light motor truck which collided with lower left front part of the train, in addition, some parts of the light motor truck was caught between left wheel of the first axle of the front bogie of the first vehicle and rail, furthermore, left wheel of the second axle ran onto the rail and derailed due to the impact acted by these parts and the vibration acted by the derailed wheel.<br>It is probable that the light motor truck had backed because the driver of the light motor truck left from the light motor truck in the status that the measures required to keep the stopping status of the light motor truck had been insufficient, although the stopped place was the sloping road. | | |

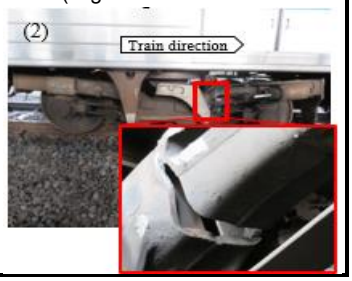
<table>
<tr><td></td><td>Safety actions</td><td colspan="3">(1) Measures Taken by the Company<br>1. In December 2020, the company requested the city of Kobe in charge of road management to take safety measures, such as installing warning signs to indicate the gradient of Takaha Kita Route 2. In addition, in May 2021, the company requested the installation of warning signs on roads connecting to the level crossings with the alignment and gradient similar to those of the road.<br>2. In October 2021, as a measure to reduce damage to railway facilities in the event of an accident, the company installed protective fences near the damaged instrument boxes and signal pole ladders.<br>3. In December 2020, the company replaced the warning sign “Be sure to pull the parking brake” with a new warning sign to warn drivers coming down the sloping road.<br><br>(2) Measures taken by Kobe City<br>In July 2021, in response to the request of (1)1, they installed a warning sign indicating “there is a steep slope ahead”.<br>(3) Measures taken by the Nada Police Station of Hyogo Prefecture<br>After the accident, not only that various traffic guidance regulations have been strengthened near Takaha level crossing, but also the area has been designated as a priority application area of the Parking Warden Activity Guidelines to share information with parking wardens*1 and strengthen monitoring of abandoned vehicles*2. In addition, in April 2021, an alert flyer was prepared as a warning message when parking and leaving a car on a sloping road with the aim to remind the driver to apply the parking brake, put the gear in the manual car, move the change lever to P (parking) in the automatic car, and use wheel stoppers, not only to display it on the website, but also to hand out to people on the streets during the national traffic safety campaign period.<br>*1 A “parking warden” is a person who patrols the area based on the Parking Warden Activity Guidelines to check abandoned vehicles and attach the identification mark under a corporation entrusted by the chief of the police station.<br>*2 An “abandoned vehicle” means a vehicle which is recognized as being illegally parked (in case of light vehicles, attached with a structure and device for being towed, and with the gross vehicle weight exceeding 750 kg) and which is unable to be driven immediately because of the absence of the driver.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-1-1e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-1-1.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-1-1-p.pdf (Explanatory material)</td></tr>
<tr><td>2</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>February 17, 2022</td><td>March 26, 2021<br>Train derailment</td><td>East Japan Railway Company</td><td>Between Tsuchiura station and Kandatsu station, Joban Line, Ibaraki Prefecture</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train was running between Tsuchiura station and Kandatsu station at the velocity of about 97 km/h, the driver of the train noticed an automobile on the down line track halting as crossed. The driver applied the emergency brake immediately but it was too late, the train collided with the automobile. The train stopped after ran for about 267 m as dragging the automobile. All two axles in the front bogie of the first vehicle derailed to right in this accident.<br>There were 66 passengers and two train crews boarded on the train, but no one was injured.<br> 
</td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | Probable causes | It is highly probable that the running train collided with the automobile which entered the track and was stopping on the railway track, and right wheels of all two axles of the front bogie of the first vehicle ran onto the rail and derailed to right side of the track, because the automobile got into the space between lower left part of the front surface of the first vehicle and the railway track.<br>It is probable that the automobile had been enter the railway track because the automobile broke through the net fence and enter the railway track and became stuck, because the driver of the automobile mishandled the steering wheel in the situation that the driver could not drive calmly in order to escape from the pursuit by the police. | | |
| | Safety actions | **Measures taken by Road Administrator**<br>After the accident, at the request of the company, the road administrator who has jurisdiction over the net fence took the following measures before June 3, 2021 at the location where the automobile entered.<br>(1) The damaged net fence was repaired.<br>(2) A guardrail was installed on the net fence side of the prefectural road 141. | | |
| | Report | https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-1-2e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-1-2.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-1-2-p.pdf (Explanatory material) | | |
| 3 | Date of publication | Date and accident type | Railway operator | Line section (location) |
| | March 24, 2022 | June 12, 2020<br>Train derailment | Keisei Electric Railway Co., Ltd. | In the premises of Aoto station, Main Line, Tokyo Metropolitan |
| | Summary | The train departed from Keisei Takasago station about one minute behind the scheduled time. While the train was entering the platform of Aoto station at the velocity of about 30 km/h, the emergency brake was applied and the train stopped about 44 m before the stop sign. The emergency brake had been applied by the conductor because the conductor felt the abnormal vibration of the train and pulled the conductor's valve.<br>After the train had stopped, the conductor checked the side surface of the train, and found that the seventh vehicle had been tilted to right and derailed. After that, the staffs of the railway company checked the derailed status and found that there was the crack in the side beam in front right of the rear bogie.<br>About 100 passengers, the driver and the conductor were boarded on the train, but no one was injured. | | |

(Left side in the train direction)

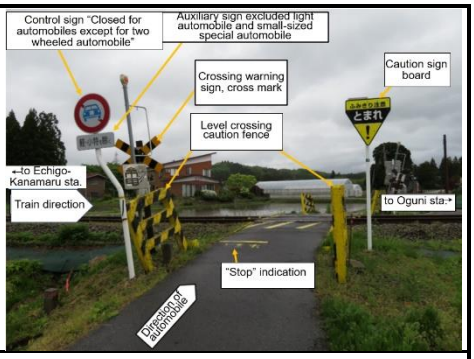



(Right side in the train



| | | |
|---|---|---|
| | Probable causes | It is probable that the right wheel climbed up on rail and derailed at around the edge in the direction to Aoto station which is the end edge of the guard rail where derailment could not be protected. It is probable the vehicle passed the curved track in the status that the unbalance of wheel loads in the front axle of the bogie became large and the wheel load of right wheel had been decreased and the lateral force[*1] increased, while the vehicle ran in the status that the crack was generated from the lower surface to upper part of the side surface of the side beam of the bogie and expanded.<br>It is probable that the unbalance of the wheel loads in the front axle of the bogie became large because the shared vertical load could not be supported by the decreased strength of the side beam due to the crack.<br>Furthermore, it is likely that the crack had occurred in the side beam because the large stress was generated locally by the stress concentration in the inside of the side beam where the reinforcing plate was welded, and became to the origin of the crack and the crack had expanded due to the fatigue failure.<br>It is likely that the railway operator could not find the crack expansion in the periodic inspection, because there was the possibility that the crack had not been opened when the latest general inspection before the occurrence of this accident was conducted, even though there was the possibility that the crack had already been reached to the surface of lower surface of the side beam at that time, and the place to be inspected by the magnetic particle testing[*2] for the side beam had not been prescribed precisely.<br>*1 "Lateral force" refers to the horizontal component force acting between the wheel and rail, which is in the plane perpendicular to the longitudinal direction of the rail.<br>*2 "Magnetic particle testing" is the nondestructive test to detect flaws in the surface and in the neighborhood of surface by visualizing flaws by the leakage magnetic field. The proper test materials including magnetic powders are used. |
| | Safety actions | **Measures Taken by the Company**<br>The Company added the implementation of the visual inspection and the hammering test after wiping in the similar place as the place where the crack had occurred in the train inspection and the monthly inspection, targeted all bogies owned by the company and Hokuso Railway.<br>Additionally, the company implemented the measures, for the point where the crack had occurred and the similar point, to indicate the important inspecting points on real object using the chalk clearly, to make thoroughly the removal of paints on the lower surface of the side beam, and to add the double check system by two inspectors, in the magnetic particle tests in the critical part inspection and the general inspection, targeted the same type of the bogie. Furthermore, the company prescribed to conduct education on the magnetic particle test once a year, and to conduct the magnetic particle test every two years until the causes of this accident were identified.<br><br>**Measures Taken by the Ministry of Land, Infrastructure, Transport and Tourism**<br>On June 12, 2020, the Ministry of Land Infrastructure, Transport and Tourism instructed the railway and tramway operators who own the bogies of the similar structure, to conduct the urgent inspection by the visual check, etc. It was reported that there was no abnormality in the targeted bogies, about 9,900 bogies including the company, as the result of the inspection. |
| | Report | https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-2-1e.pdf<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-2-1-p.pdf (Explanatory material) |
| | Reference | Major activities in the past year (page 5) |

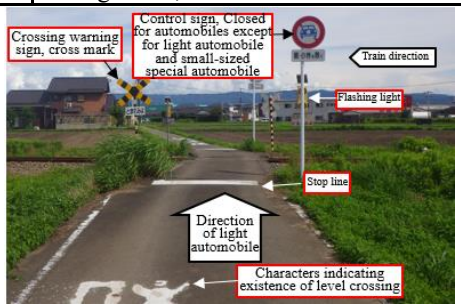
| 4 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | March 24, 2022 | May 16, 2021<br>Level crossing accident | East Japan Railway Company | Masuoka level crossing, class 4 level crossing without crossing gate nor road warning device, between Echigo-Kanamaru station and Oguni station, Yonesaka Line, Yamagata Prefecture |

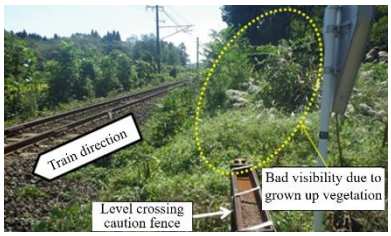
| | | |
|---|---|---|
| | Summary | The train was running between Echigo-Kanamaru station and Oguni station at the velocity of about 52 km/h, the driver of the train noticed the light automobile entering Masuoka level crossing, class 4 level crossing, so that applied the emergency brake immediately, but the train collided with the light automobile.<br>The driver of the light automobile was dead in this accident.<br>  |
| | Probable causes | It is certain that this accident was caused by the collision of the train and the light automobile which entered Masuoka level crossing, the class 4 level crossing where the crossing gate and road warning device were not equipped, in the status that the train was approaching to the level crossing.<br>Although it is likely that the driver of the light automobile did not notice the approaching train, it could not be revealed the details of the reason the light automobile entered the level crossing in the status that the train was approaching because the driver of the light automobile was dead. |
| | Safety actions | **(1) Measures Taken by the Company**<br>1. On May 20, 2021, the company conducted an on-site inspection of the level crossing with the town office of Oguni Town, police and local residents and repainted the zebra pattern inside the level crossing and removed unnecessary billboards in order to further improve visibility. In addition, during the on-site inspection, the company informed those present that the company wished to abolish the level crossing. However, the local residents showed disapproval to the idea and no agreement on its abolishment was reached.<br>2. On May 20, 2021, the company conducted enlightenment activities to prevent level crossing accidents at a supermarket near the Oguni station.<br>**(2) Measures taken by the town office of Oguni**<br>On May 20, 2021, the town of Oguni, together with the company, the local police, and local residents, conducted an on-site inspection of the level crossing and decided to repaint the "STOP" sign in front of the level crossing to ensure that there is more room between the stop position and the level crossing. |
| | Report | https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-2-2e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-2-2.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-2-2-p.pdf (Explanatory material) |

| 5 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | May 26, 2022 | July 21, 2021<br>Level crossing accident | Hokkaido Railway Company | Naito level crossing, class 4 level crossing without crossing gate nor road warning device, between Shikaribetsu station and Niki station, Hakodate Line, Hokkaido |
| | Summary | The train was running between Shikaribetsu station and Niki station at the velocity of about 81 km/h, the driver of the train noticed the pedestrian entering Naito level crossing, class 4 level crossing, from left side of the train direction, at about 100 m before the level crossing, so that sounded the whistle and applied the emergency brake immediately, but the train collided with the pedestrian.<br>The pedestrian was dead in this accident. | | |
| | Probable causes | It is probable that this accident was caused by the collision of the train and the pedestrian who entered Naito level crossing, the class 4 level crossing where crossing gate and road warning device were not equipped, in the status that the train was approaching.<br>It could not be revealed the reason why the pedestrian entered the level crossing and continued to walk in the status that the train was approaching because the pedestrian was dead. | | |

<table>
<tr><td></td><td>Safety actions</td><td colspan="3">(1) Measures Taken by the Company<br>1. A discussion on the abolition was held with the landowner on October 12, 2021. However, the landowner rejected the idea because of its actual status of usage and no agreement on the abolition was reached.<br>2. Leaflets to call attention to the use of the level crossing was provided. On October 19, 2021, warning signs “Accident occurred here. Check left and right” were installed at the level crossing. (See Fig.1)<br><br>(2) Measures taken by the Landowner<br>On August 12, 2021, the landowner installed colored cones and a safety bar in front of this level crossing to remind people to stop before it. (See Fig. 2)<br><br> 

Fig. 1 Implementation status of the safety measures taken by the company<br> 

Fig. 2 Implementation status of the safety measures taken by the landowner</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-3-1e.pdf(Synopsis)<br>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-3-1.pdf(Japanese)<br>http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-3-1-p.pdf (Explanatory material)</td></tr>
<tr><td>6</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>June 30, 2022</td><td>July 12, 2021<br>Level crossing accident</td><td>Amagi Railway Co. Ltd.</td><td>Minami-Tsuchitori level crossing, class 4 level crossing without crossing gate nor road warning device, in the premises of Yamaguma station, Amagi Line, Fukuoka Prefecture</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train was running between Nishi-Tachiarai station and Yamaguma station, the driver of the train noticed a light automobile approaching to Minami-Tsuchitori level crossing, class 4 level crossing, from left of the train direction, and entered the level crossing, therefore, the driver of the train applied the emergency brake and sounded a whistle immediately, but the train collided with the light automobile which entered the level crossing.<br>The driver of the light automobile was dead in this accident.<br> 
</td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">It is certain that this accident was caused by the collision of the train and the light automobile which entered Minami-Tsuchitori level crossing, the class 4 level crossing without crossing gate nor road warning device, in the status that the train was approaching.<br>It could not be revealed the detailed reason the light automobile entered Minami-Tsuchitori level crossing in the status that the train was approaching, because the driver of the light automobile was dead.</td></tr>
</table>

<table>
<tr><td></td><td>Safety actions</td><td colspan="3">(1) Measures taken by the Company<br>In October 2021, the company and the Ogori Police Station handed out leaflets to increase awareness in front of the Ogori station of the Amagi Railway.<br>(2) Measures taken by the Road Administrator<br>Since the width of the municipal road on the north side is about 4 m and the width of the level crossing is about 3 m*1, outside lines (including zebra) and a text display (“the road ahead is narrower”) were installed.<br><br>*1 This means the road width (boundary width) of the narrow part of the road adjacent to the level crossing, and the part measured differs from the “level crossing width” of the railway.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-4-1e.pdf(Synopsis)<br>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-4-1.pdf(Japanese)<br>http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-4-1-p.pdf (Explanatory material)</td></tr>
<tr><td>7</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>June 30, 2022</td><td>September 27, 2021<br>Level crossing accident</td><td>Echigo TOKImeki Railway Company</td><td>Fukuzaki level crossing, class 4 level crossing without crossing gate nor road warning device, between Sekiyama station and Nihongi station, Myoko-Haneuma Line, Niigata Prefecture</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train was running between Sekiyama station and Nihongi station at the velocity of about 92 km/h, the driver of the train noticed a motorized bicycle entering Fukuzaki level crossing, Class 4 level crossing, from left, so that sounded a whistle and applied the emergency brake, but the train collided with the motorized bicycle.<br>The driver of the motorized bicycle was dead in this accident.<br>  <br></td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">It is certain that this accident was caused by the collision of the train and the driver of motorized bicycle, because the driver of the motorized bicycle entered Fukuzaki level crossing, which is a class 4 level crossing without crossing gate nor road warning device, in the status that the train was approaching.<br>It could not be revealed the detailed reason why the driver of the motorized bicycle entered the accident level crossing in the status that the train was approaching because the driver of the motorized bicycle was dead.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">After the accident, the company and the municipal government of Joetsu City continued talks based on the recognition of the need to take measures, and the municipal government took the initiative to discuss with local residents by listening to their wishes and opinions. As a result, an agreement on the abolition of the level crossing was reached with the relevant neighborhood associations in December, 2021.<br>As a result of discussions, the company and the municipal government of Joetsu City plan to abolish this level crossing in FY2022.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-4-2e.pdf(Synopsis)<br>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-4-2.pdf(Japanese)<br>http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-4-2-p.pdf (Explanatory material)</td></tr>
<tr><td>8</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>July 28, 2022</td><td>July 24, 2021<br>Train derailment</td><td>Japan Freight Railway Company</td><td>In the premises of Sumidagawa station, Joban Line, Tokyo Metropolitan</td></tr>
</table>

**Summary**

The train departed from the arrival and departure No.5 track of Sumidagawa station on schedule. While the driver of the train was operating in the powering operation at the velocity of about 18 km/h in the pushing operation by locomotive[*1] toward the turn-back track in the premises of the station, noticed a cloud of dust rising at around the freight wagon in ahead to the train direction, therefore, applied the emergency brake immediately.

After the train stopped, the driver got off the train and checked the situation, and found that all two axles of the front bogie of the third vehicle had been derailed. Furthermore, vehicles are counted from the locomotive. One driver was boarded on the train, but the driver was not injured.

*1 "Pushing operation by locomotive" means to control of train movement from other than the leading car, and according to the JR's freight operating standards, it is defined as operating a train by a place other than by the front driving seat of the foremost vehicle.

**Probable causes**

It is probable that the train, coupled with 19 freight wagons, derailed while running by the pushing operation by locomotive, in the concerned accident, because right wheel of the front axle of the front bogie of the third freight wagon climbed up on the guard rail of branch line side at the crossing part of the turnout, after that left wheel entered the wrong track side.

It is probable that the back side of the right wheel of the freight wagon climbed up on the branch line side guard rail at the missing part of the turnout, because the lateral force[*3] of the front axle of the front bogie increased and the wheel load[*4] of the right wheel decreased. It is probable that the vehicle body displaced horizontally and the excessively compressive automatic coupler force[*2] was generated in the status that the coupler swing angle of the freight wagon was expanded, while the empty loaded freight wagon was running around the turnout.

It is probable that the excessive compressive coupler force had been generated because the operation of the main handle of the mascon[*5] had not been implemented obeyed to the prescribed operation, related with that the setting of the weight selecting switch before started the pushing operation by locomotive was not in the prescribed position, and that the driver had been understood that the rule of handling operation in the pushing operation by locomotive did not applied to the concerned train, and the driver's consciousness had been concentrated to velocity and stopping position, although the velocity had not exceeded the limited velocity, just before the front bogie of the third freight wagon was running in around the crossing part of the 192B turnout.

It is likely that the education to understand the contents of the works in the pushing operation by locomotive correctly had been insufficient, related with that there was the difference of recognitions for the concerned rule between in the head office, the branch office and the engine division of the JR Freight, as the background of that the driver had been understood that the rule of handling operation in the pushing operation by locomotive was not applied to the concerned train.

*2 The "automatic coupler force" means force acting on the coupler between vehicles in the axial direction.
*3 The "lateral force" means the horizontal component force acting between the wheel and rail, which is in the plane perpendicular to the longitudinal direction of the rail.
*4 The "wheel load" means the vertical component force acting between the wheel and rail, which is in the plane perpendicular to the longitudinal direction of the rail.
*5 "Mascon" means "Master Controller", which is a device operated by the driver to control the acceleration and deceleration of the train.

**Safety actions**

**Measures Taken by the Company**

As an emergency measure in light of the occurrence of the accident, in order to make thoroughly known about the handling of the main steering wheel of the master controller stipulated in the "Driver Operation Standards" as a countermeasure against the horizontal buckling[*6] during the pushing operation by locomotive, the company issued a notice to each

<table>
<tr><td></td><td></td><td colspan="3">railway operation group to make known about the following contents.<br>(1) At the time of the startup, the lock shall be set to 3 notches*7 or less for the EF210 and EF510 models and to 2 notches or less for the EH200 and EH500 models.<br>(2) At the time of increasing the notch, an interval of 5 seconds or more shall be left between each notch. In addition, the same procedure shall be applied when increasing power (accelerating).<br>(3) The load selection switch shall be set to the medium load or less for the EF210 model.<br>In addition, when performing a pushing operation by locomotive between the arrival and departure track and the turn-back track of the Sumidagawa station, the operation method has been revised, such that the course which passes the branch line side of the No. 8 simple turnout shall not be used, and when it is used, a conventional locomotive with the traction force smaller than that of the new type locomotive shall be used. Furthermore, it has been decided to launch the work to replace the No. 8 simple turnout with the No. 8 curve crossing simple turnout as the No. 192 Ro turnout in FY2022.<br><br>*6 “Horizontal buckling” means the phenomenon of train buckling, in which when an excessive load acts on the train in the longitudinal direction, train cars deviate significantly in the horizontal direction from each other at the connecting surfaces.<br>*7 “Notch” means the notch on the steering wheel operated by the driver.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-5-1e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-5-1.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-5-1-p.pdf (Explanatory material)</td></tr>
<tr><td>9</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td></td><td>September 29, 2022</td><td>July 5, 2021<br>Train derailment</td><td>East Japan Railway Company</td><td>Between Mataki station and Rikuchu-Kanzaki station, Ofunato Line, Iwate Prefecture</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train departed from Mataki station on schedule. The driver of the train, while the train was running in the section between Mataki station and Rikuchu-Kanzaki station in the dark circumference at the velocity of about 67 km/h, found fallen trees in ahead and applied the emergency brake, but it was too late, the train collided with the fallen trees and all 2 axles in the front bogie derailed to left side of the train direction.<br>There were 5 passengers and a train crew, i.e., the driver, boarded on the train, but no one was injured.</td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">It is highly probable that the train ran onto the fallen trees, and derailed as being involved the fallen trees, in this accident, because the train collided with the fallen trees which had been invaded the structure gauge and hindered the route of the train.<br>It is highly probable that the fallen trees had been invaded the clearance gauge and hindered the route of the train, because the trunk of the tree, which had been grown up in the cut slope in right side of the train direction, broke at around the root where hollowed partly due to the progress of the deterioration, and collapsed toward the railway track.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">Measures Taken by the Company<br>The measures taken by the company's Morioka branch office after the accident are the following:<br>(1) That, a field investigation of trees of nearby trees along the railway line at places in which serious damage is expected to occur when a train collides with a fallen tree (places in which a train overturns, falls off or collides with a tunnel entrance when the train derails) was conducted in an emergency manner and about 80 trees in 5 line sections which were considered to be attended to immediately were taken care of (cutting them down or fixing them with wire) in an emergency manner by October 19, 2021.<br>(2) That, about other 180 trees which were to be cut down in a planned manner based on the investigation of the item (1) above were taken care of, such as by cutting down by December 24, 2021.<br>(3) That, it was decided to conduct an inspection of soundness of trees by tree experts at places in which there is a risk of a train overturning, falling off or colliding and assign priorities based on the investigation result and take measures such as cutting down in a planned manner from FY2022 onward.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-6-2e.pdf(Synopsis)</td></tr>
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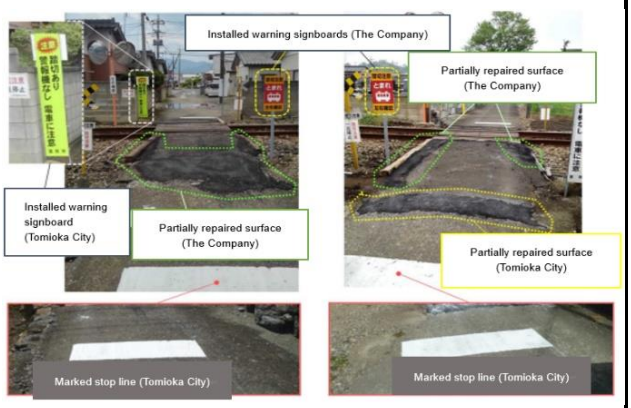
<tr><td></td><td></td><td colspan="3">http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-6-2.pdf(Japanese)<br>http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-6-2-p.pdf (Explanatory material)</td></tr>
<tr><td rowspan="5">10</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>September 29, 2022</td><td>January 4, 2022<br>Level crossing accident</td><td>Nagaragawa Railway Co., Ltd.</td><td>Shimo-Manba No.5 level crossing, class 3 level crossing equipped with road warning device without crossing gate, between Manba station and Kami-Manba station, Etsumi-south Line, Gifu Prefecture</td></tr>
<tr><td>Summary</td><td colspan="3">The train was running between Manba station and Kami-Manba station at the velocity of about 50 km/h, the driver of the train noticed the automobile entering the Shimo-Manba No.5 level crossing, class 3 level crossing, from left side of the train direction, therefore, sounded a whistle and applied the emergency brake immediately, but the train collided with the automobile.<br>The driver of the automobile died and the fellow passenger was seriously injured in this accident.<br>  </td></tr>
<tr><td>Probable causes</td><td colspan="3">It is highly probable that this accident was caused by the collision of the train and the automobile, because the automobile entered the level crossing in the status as the train was approaching, in Shimo-Manba No.5 level crossing, the class 3 level crossing equipped with the road warning device.<br>It could not be determined the precise reason the automobile entered the level crossing in the status as the train was approaching, although it is likely that the driver could not notice only the approaching train but also could not notice the flashing of the red flashing lamps and the warning sound, because the driver of the automobile was dead and the fellow passenger lost memories of before and after of the collision.</td></tr>
<tr><td>Safety actions</td><td colspan="3">The measures taken by the company and Gujo City about this level crossing are the following:<br>(1) Measures taken by the Company<br>1. On January 18, 2022, the company, the police station and Gujo City jointly called for users who use Shimo-Manba No.5 level crossing to make a stop before crossing the level crossing and not to enter it while the crossing signal is sounding.<br>2. On April 20, 2022, the faded level crossing warning signs and alarm posts were repainted.<br>(2) Measures taken by Gujo City<br>1. On March 10, 2022, the city painted the level crossing in color to improve visibility.<br>2. On March 28, 2022, in order to draw attention of users of the level crossing to check safety, the city newly installed a warning signboard with the description “Make a stop before the level crossing and check safety.”</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-6-1e.pdf(Synopsis)<br>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-6-1.pdf(Japanese)<br>http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-6-1-p.pdf (Explanatory material)</td></tr>
<tr><td rowspan="3">11</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>October 27, 2022</td><td>December 30, 2021<br>Level crossing accident</td><td>Joshin Dentetsu Co. Ltd.</td><td>Seiunji level crossing, class 4 level crossing without the crossing gate nor the road warning device, between Higashi-Tomioka station and Joshu-Tomioka station, Joshin Line, Gunma Prefecture</td></tr>
<tr><td>Summary</td><td colspan="3">The train was running between Higashi-Tomioka station and Joshu-Tomioka station, the driver of the train noticed a passerby squatdown in Seiunji level crossing, class 4 level crossing, and applied the emergency brake and sounded a whistle, but the train collided with</td></tr>
</table>

| | | |
|---|---|---|
| | | the passerby.<br>The passerby was dead in this accident. |
| | Probable causes | It is certain that this accident was caused because the train collided with the passerby and the bicycle who entered and staying in Seiunji level crossing, the class 4 level crossing without crossing gate nor road warning device.<br>It could not be revealed the detailed reason the passerby was staying in the level crossing because the passerby was dead, although it is likely that the passerby did not notice the approaching train due to be concentrated the consciousness to some actions as the bicycle fell down in the accident level crossing, or the passerby could not move the body due to some causes. |
| | Safety actions | **(1) Measures taken by the Company**<br>As shown in the figure, warning signboards were installed on both sides of the level crossing, and some grooves and holes in joints in the asphalt pavement were repaired.<br>In addition, in the wake of this accident, the company together with the Gunma Prefecture conducted a survey on the pros and cons of abolishing the class 4 level crossing to each municipality along Joshin Line (on February 10, 2022) and decided to proceed with the discussion with the road administrator to abolish 7 level crossings which had been confirmed to be abolished (this level crossing is not included because it is installed in a private land only accessible to a municipal road) in future. Furthermore, the company abolished one of the class 4 level crossings "Under the up line signal level crossing" which had been determined to be abolished in March 2022.<br><br>**(2) Measures taken by the Road Administrator**<br>As shown in the figure, the Tomioka City, as the road administrator, marked stop lines on both sides of the level crossing, partially repaired the road surface on the south side, and added warning signs. |
| | Report | https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2022-7-1e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2022-7-1.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RA2022-7-1-p.pdf (Explanatory material) |




North side of the level crossing　　South side of the level crossing

Fig. Measures taken by the company and government of Tomioka City for this level crossing

## Published Investigation Report on Railway Serious Incidents (2022)

| 1 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | December 1, 2022 | November 23, 2021 Dangerous trouble in vehicle | Kintetsu Railway Co., Ltd. | In the premises of Ise-Asahi station, Nagoya Line, Mie Prefecture |

**Summary**

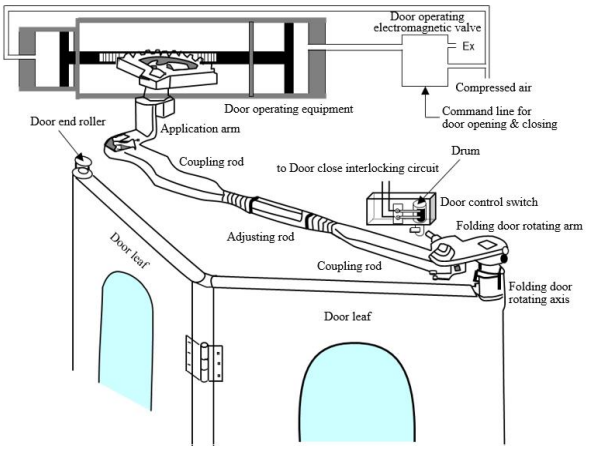
The conductor for passenger management in charge of the train noticed that the left door for entraining and detraining passengers in the rearmost of the train had been opened at around Ise-Asahi station, and communicated to the driver to stop the train. The driver, as received the communication, applied the brake to stop the train.

After the conductor for passenger management locked the concerned door and checked all doors obeyed to the instruction from the train dispatcher, the train resumed the operation with monitoring the concerned door. The train took an emergency stop at the next station, Kawagoe-Tomisuhara station, and let the deputy stationmaster boarded on the train to watch the concerned door, and continued the operation till to Kintesu-Yokkaichi station, but the operation of the train beyond this station was suspended.

There were 127 passengers and 3 train crews, i.e., the driver, the conductor, and the conductor for passenger management, boarded on the train, but there was no injury due to fall off, etc.

**Probable causes**

It is probable that this railway serious incident was caused because the folding door moved and opened since the force, by the wind pressure and the swaying and vibration of the vehicle body while the train was running in high speed, which exceeded the resistive force against opening door, was acted, in the status that the pushing force generated in the door operating equipment did not transmit and the folding door would open if the external force had acted due to the breakage of the welded part between axis part and plate part of the rotating axis of the folding door, in the door in left side of the train direction in the rear most of the train, while the train was running.




It is probable that the welded part between the axis part and the plate part of the rotating axis of the folding door was broken, because, it is probable that the strength had been lacked due to the poor welding when manufactured the folding door due to the existence of the poor fusion penetration in the groove weld and had not been implemented obeying to the design drawings when implemented the welding works, besides, the proper treatment had not been taken before broke, since the welded status of the rotating axis of the folding door had not been checked visually, because the welded part had been covered by the door frames, the outer boards and the ornamental boards, etc., in the periodic inspection by the operators implemented after that.

It could not be revealed the details of why the welding had not been conducted obeying to the design drawings, because few materials at that time were kept in each related operator and the company charged in the welding works had been closed, as the long time had passed from the time when the doors were manufactured.

**Safety actions**

**Measures taken by the vehicle division of the Company**

(1) Between November 23 to 24, 2021, an emergency visual inspection was undertaken to check the presence or absence of anomaly in the welded parts of the folding door rotating axes of all the folding doors and the presence of absence of anomaly at the time of the opening and closing operations (no anomaly was found as a result of the inspection).

(2) On November 24, 2021, an instruction was given to visually perform a general inspection of the site and no anomaly was found. Thereafter, an instruction was given to perform a visual inspection at the time of train inspection (checking the presence or

absence of looseness by opening and closing doors manually, checking the presence or absence of anomaly of the folding door rotating axes and checking the opening and closing state by switch operation by the conductor) (no anomaly has been found so far).

(3) On November 25, 2021, an instruction was given to visually to check the presence or absence of anomaly of closing state of the folding door when going back and forth through the aisles of the train (no anomaly has been found so far).

(4) On November 30, 2021, the vehicle manager who had received an instruction from the safety supervisor conveyed the instruction to the field operations department.

(5) Between November 30 and December 2, 2021, a general inspection of the upper part of the folding door rotating axes was visually performed to check the state of the welded parts (it was confirmed that there were several types of welding and the manufacturing companies were identified).

(6) On December 3, 2021, the folding door rotating axes of the accident door were newly manufactured and replaced.

(7) Between December 4 to 27, 2021, a magnetic particle testing[*1] and a welding re-repair were performed on all the doors with the welding types (A-, B, C, C+) (cracks were found in 15 out of 35 doors of the welding type C, but there was no crack in doors of the other welding types).

(8) On July 8, 2022, instructions on the measures against the serious incident were provided to parties concerned on site (to conduct a magnetic particle testing and a welding re-repair of the welded parts of the folding door rotating axes in a general inspection and inspection of important parts in the future, and to conduct a magnetic particle testing in a general inspection and inspection of important parts after the re-repairing). Additionally, between December 4, 2021 and the end of September 2022, the magnetic particle testing and welding re-repair of 153 out of 353 doors of the welding type A have been completed, and the present measures will be also applied to the remaining 200 doors in future.

(9) Other efforts

- On February 7, 2022, a weld strength analysis by the finite element method[*2] (the design strength and the strength of the accident product which caused the present serious incident, etc.) was performed and it was confirmed that the stress calculated from the design was larger than the evaluation standard value (the safety factor is greater than 1).
- On April 18 and 26, 2022, the actual stress of the folding door rotating axes (on the 18th: the current product, and on the 26th: the product after welding repair) was measured.
- On July 6, 2022, a weld strength analysis by the finite element method (strength analysis after welding repair) was performed, and it was confirmed that the stress calculated from the design was larger than the evaluation standard value (the safety factor is greater than 1).

**Measures taken by the transportation department of the Company**

(1) On November 24, 2021, the transportation department instructed conductors and conductors for passenger management to check the folding doors (when on duty onboard an express train equipped with folding doors, they shall check the state of the doors by necessarily touching them by hand when performing inspection tour of the train, and when an anomaly is found, they shall report accurately without hesitation to the train operation dispatcher and relevant parties) (no anomaly was found as a result of the inspection).

(2) Between November 25 and 28, 2021, at the study group of the train dispatchers, the details of the serious incident were made known to check the handling of radio communication commands and events which require hearing from a train crew and discussed the improvement of the vehicle failure procedure chart used by train dispatchers (it was decided to revise the procedure chart as a result of the discussion).

(3) On November 30, 2021, the vehicle manager who had received an instruction from the safety supervisor conveyed the instruction to the field operations department.

(4) On November 30, 2021, the Operation Liaison Council explained the events to the field operations department.

| | | |
|---|---|---|
| | | (5) On December 15, 2021, the Council of Railway Depot Directors instructed the workplace directors to thoroughly check the initial actions and ensure information transmission.<br>(6) On February 5, 2022, regarding the "handling at the time of a door failure" in the vehicle failure procedure chart used by train dispatchers, the description was changed from "when the door is not closed, the door-closed light is off" to "when the door is not closed, the door-closed light is off and the door opens during running) with the aim to unify the criteria for handling and prevent handling omissions by adding the response ability of each train dispatcher.<br><br>*1 "Magnetic particle testing" is the nondestructive test to detect flaws in the surface and in the neighborhood of surface by visualizing flaws by the leakage magnetic field. The proper test materials including magnetic powders are used.<br>*2 The "finite element method" is the numerical analysis technique in which a structure is finely divided into elements with simple shapes, the equation of each element is defined and the strain and stress occurring in parts of the element are estimated. |
| | Report | https://www.mlit.go.jp/jtsb/eng-rail_report/English/RI2022-1-1e.pdf(Synopsis)<br>https://www.mlit.go.jp/jtsb/railway/rep-inci/RI2022-1-1.pdf(Japanese)<br>https://www.mlit.go.jp/jtsb/railway/p-pdf/RI2022-1-1-p.pdf (Explanatory material) |

## 7 Provision of factual information in 2022 (railway accidents and serious incidents)

The information (on serious railway incidents) provided in 2022 was 1 case and the details thereof is as follows:

**The information provided on the serious railway incident (dangerous trouble in vehicle) that occurred on Hohi Line of Kyushu Railway Company**

**(Information provided on November 4, 2022)**

The Japan Transport Safety Board is currently conducting investigations and analyses on the serious railway incident (dangerous trouble in vehicle) occurred on Hohi Line of Kyushu Railway Company on October 17, 2020, and On November 4, 2022, information was provided to the Railway Bureau of the Ministry of Land, Infrastructure, Transport and Tourism on the factual information revealed in the investigation.

**1. Summary of the serious railway incidents (dangerous trouble in vehicle)**

Date and time of occurrence: Around 6:30 on Monday, October 17, 2022

Place of occurrence: Between the Bungo Ogi Station and Bungo Taketa Station, Taketa City, Oita Prefecture

Summary: When the train arrived at Bungo-Taketa Station, the driver of the local train 4427 leaving Bungo-Ogi Station for Bungo-Taketa Station received a report from a passenger that “one of the doors had been opening and closing while the train had been running”. When Kyushu Railway Company checked the train traveling data recorder, order to open the side sliding door on the right side of the train direction was recorded.

No passenger fell outside of the train through the open door.

**2. Details of the information provided to the Railway Bureau**

The details of the information provided are as attached.

The JTSB is currently investigating the relationship between this serious incident and the details of the information provided, and the JTSB plans to conduct a detailed investigation into the causes of this serious incident in the future.

*The details of the information provided, including the attachment, are available on the website of the JTSB.

https://www.mlit.go.jp/jtsb/iken-teikyo/JRkyuusyuu20221104.pdf

Column

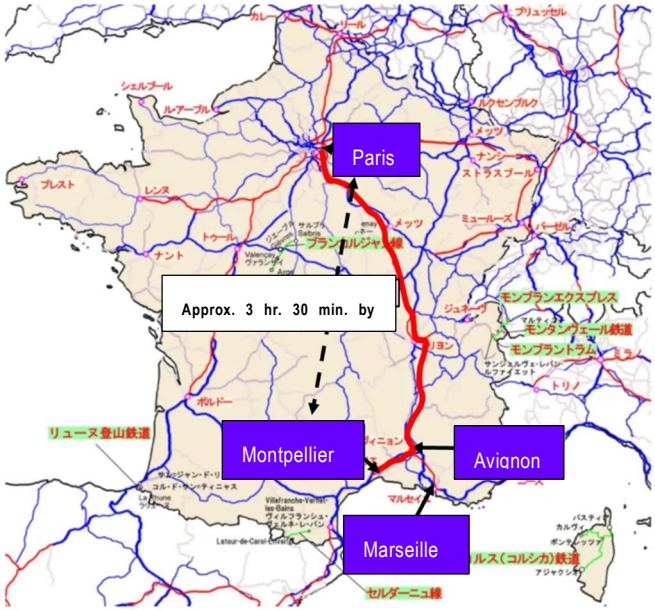
## Participation in the Fifth International Conference on Railway Technology

**Railway Accident Investigator**

The International Conference on Railway Technology (Railways 2022: The Fifth International Conference on Railway Technology: Research, Development and Maintenance) is an international conference on railway technology held every two years. However, since the conference was postponed for two years due to the effect of COVID-19, this conference was held for the first time in four years from the previous conference. The Fifth International Conference was held in Montpellier, France, and we used the High-Speed Train TGV to travel between Paris and Montpellier. Montpellier facing the Mediterranean Sea has been an academic city since the Middle Ages. It has beautiful streets and an old city area leading to a triumphal arch, and many tourists both France and outside France were visiting the city. The city of Montpellier has a total of four lines of streetcars which are operated frequently and used as a means of transportation by common people.

A total of 489 people from 47 countries participated in the International Conference, where a total of 314 presentations were made. In addition to participants from Western Europe, China, and Japan, many people from Eastern Europe participated. Many presentations were made by university-related people, railway operators and manufacturers' engineers. Due to the effect of COVID-19, there were also a few online presentations. Railway accident investigators of the JTSB participated from the third conference, not only to endeavor to transmit information on Japanese knowhow on accident investigations and recurrence prevention measures, but also to collect the latest knowledge on railway safety and share information and exchange opinions with people concerned of each country.

Presentations were made on aerodynamic issues, noise and vibration, wheel-rail boundary issues, maintenance, accident analysis, state monitoring technologies, simulations and others in the main sessions of the conference. In particular, there was an active debate on various state monitoring technologies and data analysis technologies. In addition to new technologies, we were able to learn about overseas trends that are directly relevant to our accident investigations. We will endeavor to make use of the knowledge and information obtained through the conference to further improve our technologies for accident investigations in the future.




Traveling route from Paris to Montpellier

Streetcars in the city of Montpellier