# 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 accidents 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 Article 3, paragraph 1 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 Article 3, paragraph 1 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 any 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) 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 particularly 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 the operation 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]</td><td colspan="3">・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 colspan="2">Accidents that are particularly rare and exceptional [Ordinance 3-3]</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)

"Railway serious incident" is a situation prescribed by Order 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), which may obviously cause a railway accident.

**○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 tracks, safety facilities etc., 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 running device, braking device, electrical device, coupling device, train protection system 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, safety facilities, etc. that disrupts the safety of a vehicle operating on a main track, 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. of a vehicle, 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

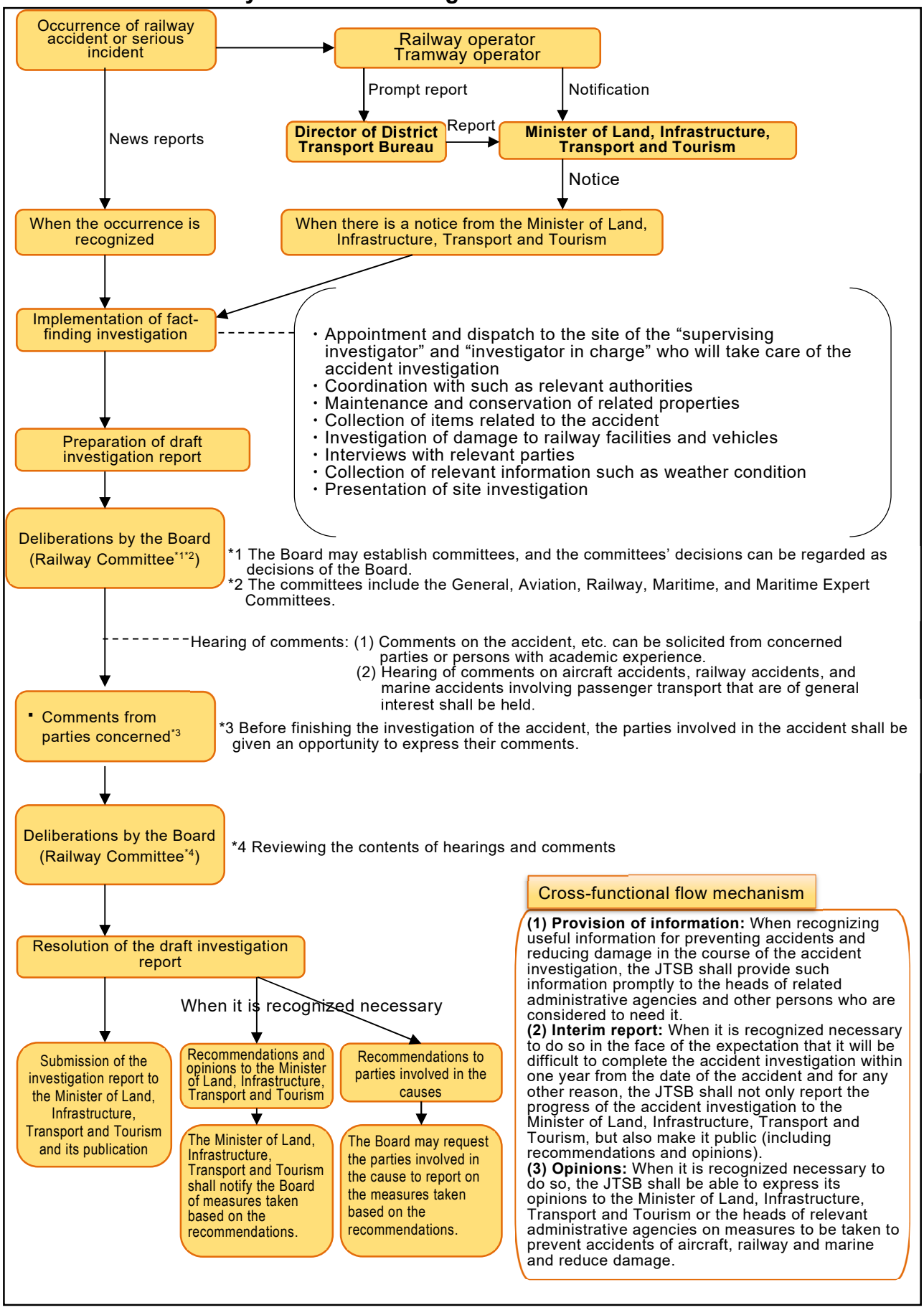
<table>
<tr><td>Category</td><td>Incorrect management of safety block</td><td>· Incorrect indication of signal<br>· Violating red signal</td><td>Dangerous damage in facilities</td><td>Dangerous trouble in vehicle</td><td>· Main track overrun<br>· Violating closure section for construction<br>· Vehicle 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<br>[Ordinance 4-1, 4-2, 4-3]</td><td colspan="2">Risk of collision, derailment or fire<br>[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 (Japanese)

## 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 2023 as follows:

From 2022, 16 accident investigations were carried over, and 11 were newly launched in 2023. Among these, 17 investigation reports were published in 2023, and 10 accident investigations were carried over to 2024.

Moreover, two railway serious incident investigations were carried over from 2022, and two serious incident investigations were newly launched in 2023. Among these, one investigation report was published in 2023, and three investigations were carried over to 2024.

Among the 18 investigation reports published in 2023, one was issued with recommendations, and none was issued with opinions.

Investigations of railway accidents and serious incidents in 2023

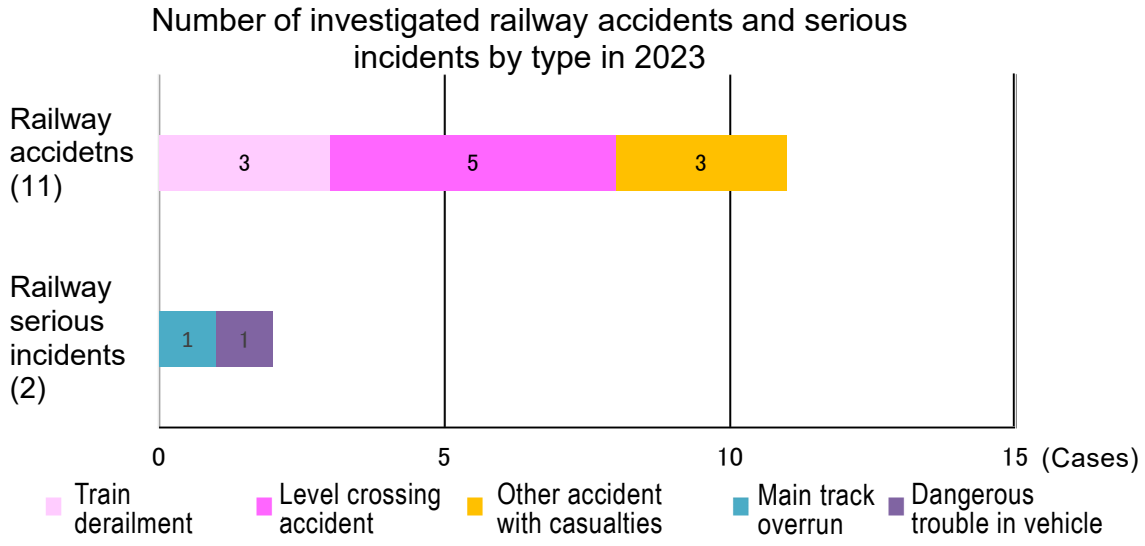
(Cases)

| Category | Carried over from 2022 | Launched in 2023 | Total | Published Investigation reports | (Recommendations) | (Opinions) | Carried over to 2024 | (Interim report) |
|---|---|---|---|---|---|---|---|---|
| Railway accident | 16 | 11 | 27 | 17 | (1) | (0) | 10 | (1) |
| Railway serious incident | 2 | 2 | 4 | 1 | (0) | (0) | 3 | (1) |

## 4 Statistics of investigated railway accidents and serious incidents in 2023

Regarding the number of railway accidents and incidents investigated in 2023, there were 11, a decrease of three from 14 in the previous year, and there were two serious railway incidents remained the same as the previous year.

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




There were 11 persons killed or injured in 11 accidents, seven of whom were killed and four were injured.

The number of casualties (in railway accidents)

(Persons)

| 2023 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Category | Dead | | | Injured | | | Total |
| | Crew | Passenger | Others | Crew | Passenger | Others | |
| Casualties | 0 | 0 | 7 | 1 | 3 | 0 | 11 |
| Total | 7 | | | 4 | | | |

*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 2023

The railway accidents and railway serious incidents which occurred in 2023 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) |
| | March 2, 2023<br>Level crossing accident | TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd. | Between Hazama Station and Enai Station on the Kotohira Line (Kagawa Prefecture)<br>Shimomura-Kamisho Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | See “6 Publication of investigation reports” (No.16 on page 81). | |
| 2 | Date and accident type | Railway operator | Line section (location) |
| | March 23, 2023<br>Train derailment | West Japan Railway Company | Between Bingo-Yawata Station and Uchina Station on the Geibi Line (Hiroshima Prefecture) |
| | Summary | While the train was running between Bingo-Yawata and Uchina Station, the train hit fallen rocks, causing the front two axles of its four axles to derail. | |
| 3 | Date and accident type | Railway operator | Line section (location) |
| | April 10, 2023<br>Level crossing accident | WILLER TRAINS, Inc. | Between Shisho Station and Nishimaizuru Station on the Miyazu Line (Kyoto Prefecture)<br>Shimoyuri Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | See “6 Publication of investigation reports” (No.17 on page 82). | |
| 4 | Date and accident type | Railway operator | Line section (location) |
| | April 11, 2023<br>Other accident with casualties | TOYAMACHIHO RAILROAD CO., LTD. | Between Etchu-Ebara Station and Etchu-Sango Station, Main Line (Toyama Prefecture) |
| | Summary | The train driver recognized a maintenance worker working on the track while running in the section and initiated an emergency stop, but the train collided with the worker.<br>The death of the maintenance worker was later confirmed. | |
| 5 | Date and accident type | Railway operator | Line section (location) |
| | June 2, 2023<br>Train derailment | Tosa Kuroshio Tetsudo Co., Ltd. | Between Tosa-Shirahama Station and Ariigawa Station on the Nakamura Line (Kochi Prefecture) |
| | Summary | While the train was running between Tosa-Shirahama Station and Ariigawa Station, the train hit a landslide, causing the front two axles of its four axles to derail. | |

| | | | |
|---|---|---|---|
| 6 | Date and accident type | Railway operator | Line section (location) |
| | July 2, 2023<br>Level crossing accident | Kyushu Railway Company | Between Kubota Station and Ogi Station on the Karatsu Line (Saga Prefecture)<br>Niju-no-Tsubo Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | The driver of the train recognized a person entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the person.<br>The death of the person was later confirmed. | |
| 7 | Date and accident type | Railway operator | Line section (location) |
| | August 5, 2023<br>Other accident with casualties | East Japan Railway Company | In the premises of Ofuna Station on the Tokaido Line (Kanagawa Prefecture) |
| | Summary | While the train was running in the premises of Ofuna Station, the train collided with an electrification pole, injuring passengers and crew. | |
| 8 | Date and accident type | Railway operator | Line section (location) |
| | August 6, 2023<br>Train derailment | Konan Railway Company | Between Owani Station and Shukugawara Station on the Owani Line (Aomori Prefecture) |
| | Summary | While the train was running between Owani Station and Shukugawara Station, the fifth and sixth axles of the third bogie derailed. | |
| 9 | Date and accident type | Railway operator | Line section (location) |
| | September 3, 2023<br>Level crossing accident | West Japan Railway Company | Between Suo-Takamori Station and Yonekawa Station on the Gantoku Line (Yamaguchi Prefecture)<br>Nakahara Crossing (Class 3 level crossing without crossing gate, but with road warning device) |
| | Summary | The driver of the train recognized a light vehicle entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the vehicle.<br>The death of the person in the vehicle was later confirmed. | |
| 10 | Date and accident type | Railway operator | Line section (location) |
| | November 18, 2023<br>Level crossing accident | Kyushu Railway Company | Between Sashiu Station and Kozaki Station on the Nippo Line (Oita Prefecture)<br>Sekiden Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | The driver of the train recognized a person entering the crossing from the left side of the direction of travel and initiated an emergency stop, but the train collided with the person.<br>The death of the person was later confirmed. | |
| 11 | Date and accident type | Railway operator | Line section (location) |
| | December 5, 2023<br>Other accident with casualties | West Japan Railway Company | Between Satosho Station and Kasaoka Station on the Sanyo Line (Okayama Prefecture) |
| | Summary | The driver of this train initiated an emergency stop after hearing an unusual noise while running in this section.<br>Upon inspection, the train was found to have come in contact with a maintenance worker, whose death was later confirmed. | |

(Railway serious incidents)

| | | | |
|---|---|---|---|
| 1 | Date and accident type | Railway operator | Line section (location) |
| | November 28, 2023<br>Dangerous trouble in vehicle | Oigawa Railway Co., Ltd. | In the premises of Ieyama Station of Oigawa Main Line (Shizuoka Prefecture) |
| | Summary | After the train departed from Ieyama Station, the coupler between the locomotive and passenger car separated while running near the switch, causing the train to stop. | |
| 2 | Date and accident type | Railway operator | Line section (location) |

| | | | |
|---|---|---|---|
| | December 12, 2023<br>Main track overrun | Sapporo Transportation Service Promotion Corporation | Between Nakajima-Koen-Dori Stop and Yamahana-Ku-Jo Stop on the Yamahana Line (Hokkaido) |
| | Summary | When the train was stopped at the Nakajima-Koen-Dori Stop, the driver got off to communicate for business purposes.<br>While the driver was off, the tram was seen entering an intersection with a red signal. The driver immediately boarded the tram and tried to stop it, but it had run off about 20 meters. | |

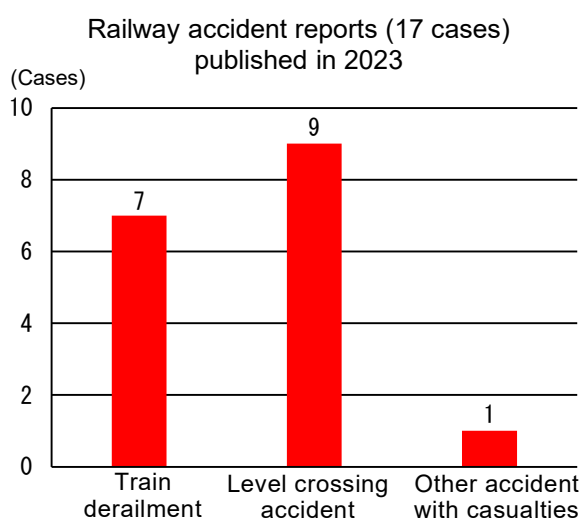
## 6 Publication of investigation reports

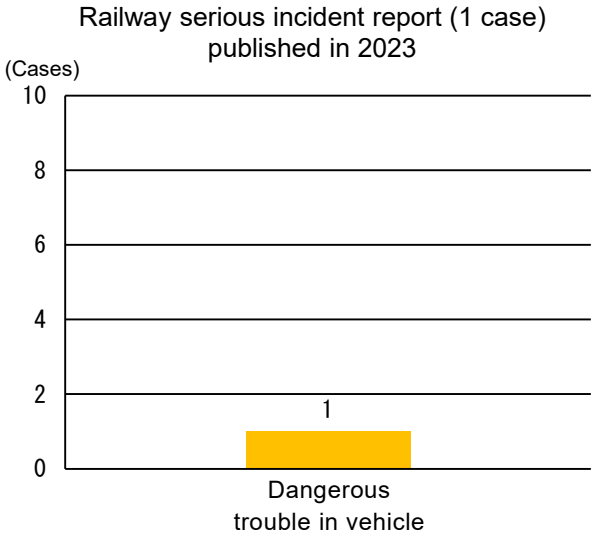
The number of investigation reports of railway accidents and serious incidents published in 2023 was 18, consisting of 17 railway accidents and one serious incident.

Breaking them down by type, the railway accidents contained seven train derailment accidents, nine level crossing accidents, and one other accident with casualties while the railway serious incidents contained one dangerous trouble in vehicle.

The number of casualties was 24, consisting of 10 deaths and 14 injuries.

The investigation reports on railway accidents and serious incidents published in 2023 are summarized as follows.




### Railway accident investigation reports published in 2023

| 1 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | January 19, 2023 | February 7, 2022<br>Train derailment | OHMI Railway Co., Ltd. | In the premises of Takamiya Station, Taga Line (Shiga Prefecture) |
| | Summary | The driver of the train stopped the train due to feeling an impact while passing through a right-hand curve with a radius of 160 m at the premises of Takamiya Station.<br>When the driver checked the train after stopping, he discovered that the lead axle of the lead bogie of the lead vehicle, the lead axle of the rear bogie of the lead vehicle, and the lead axle of the lead bogie of the rear vehicle had been derailed.<br>About 100 passengers and one driver were onboard the train, and there were no injuries. |  | |

| | | |
|---|---|---|
| | Probable causes | It is probable that the right wheels of the lead axle of the lead bogie of the lead vehicle, the rear bogie of the lead vehicle, and the lead bogie of the rear vehicle fell into the gauge due to the gauge widening significantly while the train was passing through a right-hand curve with a radius of 160 m.<br>It is more likely that the gauge widened significantly due to a large amount of static irregularity of gauge along this curve, and that a series of defective sleepers and poor rail fastening status resulted in lateral movement of the rails and rail tilt due to lateral force when the train was running, which caused the gauge to widen dynamically.<br>It is probable that the static irregularity of gauge was large due to the standard value for maintenance for irregularity of gauge being larger than the appropriate value.<br>The series of defective sleepers and poor rail fastening status is more likely because inspection methods and judgment criteria were not clarified, preventing proper maintenance from being performed.<br>It is more likely that this accident may have occurred because the slack*1 on this curve was relatively large, which resulted in a smaller margin for derailment by gauge widening, and there were places where the guard rail*2 was not fastened to the sleepers, causing rail tilt*3, etc. to occur from inward lateral force from the right wheel, etc., which dynamically increased the flangeway width, causing the derailment prevention function not to work sufficiently. Another factor probable to be involved was that the countermeasures implemented in response to the Japan Transport Safety Board UN-I-SAN No. 43, dated June 28, 2018, "Opinions Related to the Prevention of Train Derailment Accidents Caused by Gauge Widening*4," were insufficient.<br><br>*1 "Slack" means the amount to widen the gauge beyond the predetermined size in order to drive smoothly along a curve.<br>*2 "Guard rails" are rails installed on the insides of the gauges of the inner rails to prevent derailment.<br>*3 "Rail tilt" refers to a phenomenon where a rail is tilted due to the load exerted on it by wheels.<br>*4 "Gauge widening" means a state where the gauge has widened due to damage to the rail fastening device from lateral force (force where the wheels press on the rail in the lateral direction) or due to increased rail wear. When the gauge spreads beyond a certain point, it creates a state where either the left or right wheel cannot be supported by the rail head, resulting in derailment. In this context, gauge widening due to lateral force in conjunction with the train running means "dynamic gauge widening." |
| | Safety actions | **(1) Steady implementation of track maintenance**<br>(i) About the standard value for maintenance for track irregularity<br>It would be preferable to revise the standard value for maintenance for irregularity of gauge to make it the appropriate value and to have a clear deadline set for performing track maintenance as action to be taken when track irregularity reaches the standard value for maintenance.<br>(ii) About sleeper inspection<br>The inspection methods and judgment criteria manual for sleeper inspection need to be enhanced, and track maintenance needs to be performed along with this. It is also necessary to perform maintenance in a planned manner for locations that require it, regardless of which type of sleepers are installed there.<br>(iii) About rail fastening status inspection and maintenance<br>When inspecting track members, such as during a sleeper inspection, and when conducting a permanent way inspection tour, etc., it's necessary to check for things like wooden sleeper corrosion, floating dog spikes, cracked PC sleepers, and broken fastening devices, and replace or add dog spikes, adjust fastening torque, replace plate springs, replace sleepers, install gauge ties, etc. according to the status.<br>In addition, because the danger of derailment by gauge widening increases in particular when these issues occur in a series or when it happens on a sharp curve with a large amount of slack, care must be taken to prioritize maintenance in these status.<br>In addition, when it comes to managing sleepers, rail fasteners, etc., on curves, in general, more attention tends to be paid to the outer rail side where it's easy for large amounts of lateral force to occur, but because lateral force also occurs on the inner rail side in the direction in which the curve turning lateral force*5, etc., pushes the rails toward the outside, it needs to be managed with attention equal to that devoted to the |

outer rail side.

(iv) About rail fastening methods

It would be preferable to implement countermeasures such as double spikes while prioritizing locations where there are concerns about gauge widening on sharp curves, etc., to increase rail fastening force. Also, it would be preferable for them to establish the standard number of dog spikes to be driven in by curve radius, as well as the method for doing this.

**(2) Consideration of slack reduction**

It would be preferable to reduce slack as much as possible in conjunction with improving the track in order to increase the clearance for derailment by gauge widening.

**(3) Guard angle*6 installation**

It would be preferable to install guard angles instead of guard rails, which are impossible to fasten at locations with PC sleepers, so that the derailment prevention function is fully utilized.

*5 "Curve turning lateral force" means the lateral force generated on a bogie traveling on a curve when the wheels on the outer rail side of the front axle of the bogie are pushed against the inner rail side and the wheels on the inner rail side resist this due to friction.

*6 "Guard angles" are L-shaped steel guard devices installed on the insides of the gauges of the inner rails to prevent derailment.

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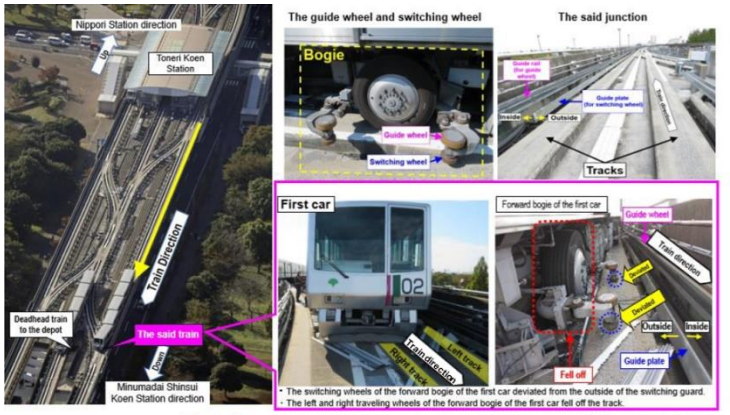
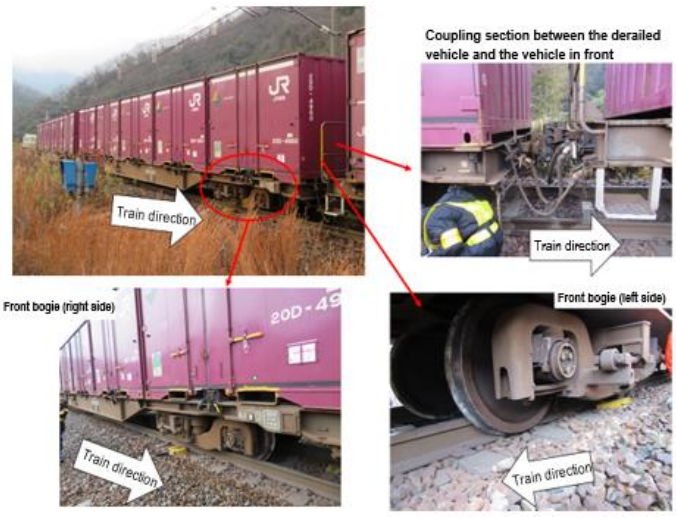
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-1-1.pdf (Japanese)<br>https://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2023-1-1e.pdf (English) | | |
| 2 | Date of publication | Date and accident type | Railway operator | Line section (location) |
| | February 16, 2023 | October 7, 2021<br>Train derailment | Bureau of Transportation Tokyo Metropolitan Government | In the premises of Toneri-Koen Station on the Nippori-Toneri Liner (Tokyo Metropolitan) |
| | Summary | The train departed Toneri-Koen Station on schedule. Shortly after, the dispatcher in the command center felt the earthquake tremor and pressed the button to stop all train departures, halting all trains at the stations. Immediately afterward, the Early Earthquake Warning System*1 confirmed the earthquake originating in the northwestern part of Chiba Prefecture, and the dispatcher pressed the emergency stop button, stopping all moving trains. As a result, this train stopped at the switch on the premises of Toneri-Koen Station. Upon inspection by staff on site, it was found that the front wheels of the first car (hereinafter, cars are counted from the front, and front, back, left, and right are based on the train's direction) had derailed to the right side of the track.<br>There were 29 passengers on the train, and eight of them were injured. | | |
| | Probable causes | It is probable that this accident was caused by the train derailing due to the seismic motion from the earthquake in the northwestern part of Chiba Prefecture.<br>It is probable that the derailment process was as follows: the seismic motion caused the train | | |




*The leftmost figure was created using a photo provided by Kyodo News.

Situation of the accident site

*1. The Early Earthquake Warning System alerts the dispatcher when forecast information from a disaster-prevention technology company (ANET) predicts an earthquake with a seismic intensity of 4 or higher on the Japanese scale of 7 along the Nippori-Toneri Liner. When this system activates, it performs an emergency stop of all trains.

<table>
<tr><td></td><td></td><td colspan="4">to sway significantly in the roll direction[*2], causing the right switching wheel of the front bogie of the first car to ride up onto the guide rail, which then dislodged. As a result, the bogie traveled along the right side of the track, and the left switching wheel of the bogie deviated outside the fixed guide plate[*3] installed on the left side of the track, causing the derailment.<br><br>*2. The “roll direction” refers to the rotational movement around the axis in the direction of the train’s travel.<br>*3. The “fixed guide plate” is a stationary guide plate for switching wheels, installed at the switch and fixed to the track.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="4">The following measures need to be taken to prevent the recurrence of this accident:<br>(1) The emergency train stop operation should be automated when the Early Earthquake Warning System activates.<br>When the Early Earthquake Warning System activates, stopping the trains as quickly as possible is necessary to minimize earthquake damage. Therefore, the emergency train stop operation of this system should be automated.<br>(2) Measures to prevent train derailment near the accident site during an earthquake should be taken.<br>For the area near the accident site, where the natural frequency of the structures perpendicular to the train’s path likely matches the rolling natural frequency of the vehicle, and the rotational behavior of the structures during an earthquake is significant, measures should be taken to prevent the train's guide wheels and switching wheel from riding up onto the guide rail due to<br>seismic motion. It is also desirable to check for similar risks in other locations and take the same measures if necessary.<br>(3) Organize abnormal situation responses with passenger safety as the top priority.<br>In the event of an earthquake with a seismic intensity of 5 lower or higher, confirm the condition of all vehicles and facilities in the entire section. Do not re-electrify until the verification is complete. The evacuation guidance methods and procedures prioritizing passenger safety should be organized, included in the abnormal situation response manual, and thoroughly communicated to all relevant personnel.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-2-1.pdf<br>(Japanese)</td><td></td></tr>
<tr><td>3</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td colspan="2">Line section (location)</td></tr>
<tr><td></td><td>March 30, 2023</td><td>December 28, 2021<br>Train derailment</td><td>Japan Freight Railway Company</td><td colspan="2">Between Seno Station and Hachihommatsu Station on the Sanyo Line (Hiroshima Prefecture)</td></tr>
<tr><td></td><td>Summary</td><td colspan="4">Due to the snowfall in Shiga Prefecture the previous day, the train departed Hiroshima Freight Terminal 22 hours and 22 minutes behind schedule. After passing through Seno Station, the lead locomotive was set to notch 13, and the auxiliary locomotive at the rear was set to notch 12, running at approximately 52 km/h. The driver of the lead locomotive observed a sudden drop and rise in the brake pipe pressure[*1], and the brakes activated, stopping the train. Upon inspection, as directed by the transport dispatcher, the driver found that the front bogie of the 12th car (cars are counted from the front, including locomotives, with directions based on the train’s direction of travel) had derailed to the left.<br> 
</td></tr>
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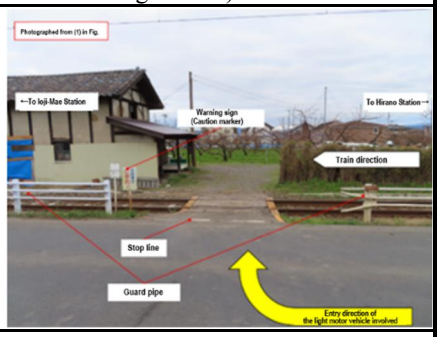
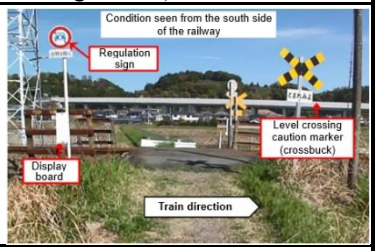
|---|---|---|
| | | The train had one crew member in the lead locomotive and one in the auxiliary locomotive, but there were no injuries.<br><br>*1. “Brake pipe pressure” refers to the air pressure in the brake pipe that controls the brake force. It is usually maintained at a constant pressure of 490 kPa, reducing the pressure applied to the brakes and increasing the pressure that releases them. |
| | Probable causes | It is probable that this accident occurred when the train passed through a right curve with a radius of 300 meters. Near the accident site, the weight on the outer rail side of the first axle of the front bogie of a Koki 106-type freight car decreased. Additionally, the weight on the inner rail side increased the lateral pressure on the outer rail side, causing the outer rail side wheel to climb onto the rail and derail.<br>It is probable that the reduction in the weight on the outer rail side was due to multiple loaded containers that significantly exceeded the left-right load imbalance rate of 10% for managing a single 12-foot container, resulting in an expanded imbalance of wheel load.<br>The occurrence of the left-right load imbalance is more likely due to:<br>(1) There was a lack of shared information about load imbalance among related companies, such as freight forwarders, shippers, and loading companies<br>(2) The system was insufficient for checking load imbalance after loading and sealing containers.<br>(3) The absence of a system to investigate causes and implement measures to prevent recurrence when load imbalance was detected led to these factors’ accumulation. |
| | Safety actions | It is probable that this accident occurred primarily due to container load imbalance. Although measures to prevent load imbalance, based on the Esashi Line derailment accident*2, have been implemented, they were insufficient. Therefore, the following measures are necessary:<br>(1) Although guidelines and manuals for container loading were created and disseminated to freight forwarders after the Esashi Line derailment accident, it is probable that there was low awareness of load imbalance among shippers and loading companies, and information about load imbalance was not shared. Therefore, Japan Freight Railway Company (“JR Freight” for short) and freight forwarders need to ensure that important information, such as the contents of the guidelines, is thoroughly shared and disseminated among all companies involved in cargo transportation. Additionally, JR Freight should establish a system to disseminate the contents of the guidelines among related companies, including loading companies, not only through requests to freight forwarders via the All Japan Railway-Freight Forwarders Association but also in cooperation with Nippon Express headquarters, a major freight forwarder.<br>(2) The method used to check the load during the accident made it difficult to detect load imbalance. Therefore, it is necessary to establish a system that can effectively and frequently check the loading status, thoroughly understand the actual loading methods and requests, and ensure that load imbalance is prevented in advance.<br>(3) In the past, there was no system to share information, investigate causes, and implement measures to prevent recurrence when load imbalance was detected. To prevent load imbalance in advance, JR Freight needs to establish a system to investigate causes and implement measures to prevent recurrence when load imbalance is confirmed, in cooperation with related companies such as freight forwarders and loading companies.<br>(4) The Otake Station, where the containers were loaded onto the freight train, did not have equipment to check for load imbalance, such as portable scales or wheel load measuring devices. Therefore, it is necessary to enhance hard measures that can detect load imbalance early by utilizing portable scales, top lifters, wheel load measuring devices, and truck scales. Furthermore, it is desirable to develop hard measures at all freight stations handling containers to prevent accidents caused by load imbalance. Additionally, freight forwarders transporting containers loaded with cargo to freight stations must be thoroughly informed about checking for load imbalance by measuring the height difference between the left and right sides of the truck before and after loading the containers onto the truck using the load imbalance prevention manual.<br><br>*2. The Esashi Line derailment accidents involved three JR Freight trains on the Esashi Line between April 2012 and June 2014. |

<table>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-1.pdf<br>(Japanese)</td></tr>
<tr><td rowspan="5">4</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>March 30, 2023</td><td>April 5, 2022<br>Level crossing accident</td><td>Fukushima Transportation, Inc.</td><td>Between Hirano Station and Iojimae Station on the Iizaka Line (Fukushima Prefecture)<br>6k961m crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">While the train ran approximately 50 km/h between Hirano Station and Iojimae Station, the driver recognized a light vehicle entering the crossing (Class 4 level crossing) from the left. The driver immediately sounded the horn and applied the emergency brake, but the train collided with the light vehicle.<br>The driver of the light vehicle involved in this accident was killed, and the passenger was seriously injured.<br>  </td></tr>
<tr><td>Probable causes</td><td colspan="3">It is certain that this accident occurred because the light vehicle entered the 6k961m crossing (Class 4 level crossing without gates or road warning devices) while the train was approaching, resulting in a collision.<br>It is probable that the light vehicle driver did not notice the approaching train, but the details could not be clarified as the driver was deceased.</td></tr>
<tr><td>Safety actions</td><td colspan="3">Class 4 level crossings, which lack crossing gates and road warning devices, should be abolished or equipped with proper safety equipment.<br>Railway operators and stakeholders such as orchard owners need to proceed with discussions to reach an agreement on abolishing or equipping this crossing with safety equipment and implementing safety measures.<br>Until these measures are implemented, it is desirable to restrict passage through the crossing only when necessary.<br>Furthermore, since the company has many other Class 4 level crossings, it is recommended that railway operators, landowners, municipalities, and residents conduct discussions to abolish or equip these crossings with safety equipment.</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-2.pdf<br>(Japanese)</td></tr>
<tr><td rowspan="5">5</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>March 30, 2023</td><td>April 5, 2022<br>Level crossing accident</td><td>Tenryu Hamanako Railroad Co., Ltd.</td><td>Between Gansuiji Station and Miyaguchi Station on the Tenryu Hamanako Line (Shizuoka Prefecture)<br>Kubota Crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">While running at approximately 70 km/h between Miyaguchi Station and Gansuiji Station, the driver of the train recognized a person at Kubota Crossing (Class 4 level crossing), sounded the horn, and applied the emergency brake, but the train collided with the person.<br>As a result of this accident, the person was killed.<br>  </td></tr>
<tr><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the person and the train collided at Kubota Crossing, Class 4 level crossing without crossing gate nor road warning device.</td></tr>
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<tr><td></td><td></td><td colspan="3">It is probable that the person was trying to cross the crossing on the way to work, but the details could not be clarified as the person was deceased.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">Class 4 level crossings, which lack crossing gates and road warning devices, should be abolished or equipped with proper safety equipment. The company has been working on abolishing or improving the safety of Class 3 and Class 4 level crossings since December 2018, and it is desirable to promote these efforts further.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-3-3.pdf<br>(Japanese)</td></tr>
<tr><td rowspan="5">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>May 25, 2023</td><td>July 19, 2022<br>Other accident with casualties</td><td>West Japan Railway Company</td><td>In the premises of Nada Station on the Tokaido Line (Hyogo Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train departed Rokkomichi Station about 31 minutes late.<br>The driver recognized a collision sound while passing through Nada Station at approximately 92 km/h and applied the emergency brake to stop. The train had collided with one passenger, and the passenger who was hit and thrown by the train collided with four other passengers on the platform, causing injuries. Approximately 750 passengers and two crew members were on board the train, but no injuries were reported. The death of the passenger who was thrown was later confirmed.<br>The train's left-side front window and the glass of the interconnecting door (front, back, left, and right are based on the train's direction of travel) were severely damaged.</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is highly probable that this accident occurred when a passenger entered the tracks of platform 3 at Nada Station from the down platform just before the train passed, collided with the train, and was thrown by the impact, subsequently hitting other passengers one after another on the platform.<br>It is possible that the passenger who collided with the train entered the tracks of the passenger's own accord, but the reason for this could not be determined.</td></tr>
<tr><td>Report</td><td colspan="3">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-4-1.pdf<br>(Japanese)</td></tr>
<tr><td rowspan="4">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>June 29, 2023</td><td>February 7, 2022<br>Train derailment</td><td>Iyo Railway Co., Ltd.</td><td>In the premises of Minara Station on the Yokogawara Line (Ehime Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train departed Ehime Univ. Hospital Station on the Yokogawa Line on Schedule.<br>The driver of the train confirmed the caution signal of the home signal*1 at Minara Station and entered the station, where they noticed that the right tongue rail*2 of switch 51, which is normally not attached to the right stock rail (front, back, left, and right are based on the derailed train's direction of travel), was attached to the right stock rail about 5 meters before the switching point. The driver immediately applied the brakes but felt a lateral shaking shortly afterward.<br>The front bogie of the first car (cars are counted from the front) had entered the down track instead of the up track that was scheduled, and the wheels of both axles of the front bogie had derailed, straddling the right rail of the down track.<br>The train had 13 passengers and two crew members on board, but there were no injuries.<br>  <br>*1. "Home signal" is a signal that indicates whether trains entering a station can proceed.<br>*2. "Tongue rail" is a pointed rail used at switching points to guide trains onto different tracks.</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the switch rod*4 of the spring switch machine*3 was broken, causing both tongue rails to adhere to the stock rails on the respective sides. When the driver confirmed the caution signal of the home signal, the train entered the</td></tr>
</table>

switch facing[*5] it, causing the flanges of both front bogie wheels to be caught between the tongue rails. As a result, the first axle of the front bogie entered the down track, while the second axle entered the up track, leading to the derailment.

It is highly probable that the switch rod was broken because fatigue cracks developed from the boundary between the welded and unwelded sections at the weld ends on two upper corners of the fracture surface, extending to the center, eventually leading to a complete break without plastic deformation on the lower side of the fracture surface.

It is probable that the fatigue cracks in the switch rod were caused by the front end of the right tongue rail lifting and hitting a U-shaped protrusion welded to the iron plate of the switch rod every time a train passed over the switch in the trailing direction[*6], striking the upper surface of the right switch rod against the bottom of the right stock rail.

The company had conducted penetration inspections[*7] on all switch rods during regular inspections, but because the paint on the switch rods was not removed during these inspections, the penetrant did not sufficiently penetrate the cracks, and the indicators of the cracks did not appear, making it likely that the cracks were not detected.

Regarding the home signal displaying a caution signal, normally, it should display a stop signal unless the switch's tongue rails on both sides are set to the default position[*8]. However, due to the broken switch rod, both tongue rails adhered to the stock rails. The switch involved in the incident lacked a circuit controller to detect the right tongue rail's adherence to the right stock rail. As a result, it is highly probable that it failed to detect this, only detecting the left tongue rail's adherence, leading the home signal to display a caution signal.

*3. "Spring switch machine" uses the rebound force of a spring and is typically set to the default position, which is the mainline direction. However, if a train approaches from the reverse direction (against the mainline direction, in this case, the down track), the train's wheels push the tongue rail to the reverse position. After the train passes, the spring force returns the tongue rail to the default position.

*4. "Switch rod" is a component that transmits the switching force from the switch machine to the tongue rail via a switch adjuster.

*5. The term "facing" refers to approaching the switch from the diverging side, which in this case means from Yokogawara Station toward Matsuyama City Station.

*6. The term "trailing" refers to approaching the switch from the converging side, which in this case means from Matsuyama City Station toward Yokogawara Station.

*7. "Penetration inspection," a color check, is a widely used surface inspection method in the industrial field. This non-destructive testing method involves applying a penetrant to detect surface-breaking flaws, followed by a developer to draw the penetrant out of the flaw for observation.

*8. The term "default position" refers to the direction in which the switch is normally set, which is the up track.

**Safety actions**

The switch rod is a critical component connecting both tongue rails. If it breaks, the tongue rails can no longer move in unison, creating a dangerous situation that can cause a train derailment. Therefore, it is crucial to prevent fatigue cracks in the switch rod and, if they occur, detect them early and perform appropriate maintenance before they lead to a complete break.

It is advisable to inspect the upper surface of the switch rod during regular inspections to prevent fatigue cracks. If contact marks with the bottom of the stock rail, such as a peeled black oxide scale, are observed, the cause of the contact must be analyzed, and appropriate measures implemented.

Additionally, to reliably detect fatigue cracks in the switch rod, it is essential to carefully observe the surface for cracks during regular inspections and conduct penetration inspections. During penetration inspections, proper pre-treatment, such as removing paint from the switch rod to ensure the penetrant seeps into any cracks, is necessary.

**Report**

https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-3.pdf
(Japanese)

| 8 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | June 29, 2023 | September 26, 2022<br>Level crossing accident | West Japan Railway Company | Between Nakahama Station and Takamatsucho Station on the Sakai |

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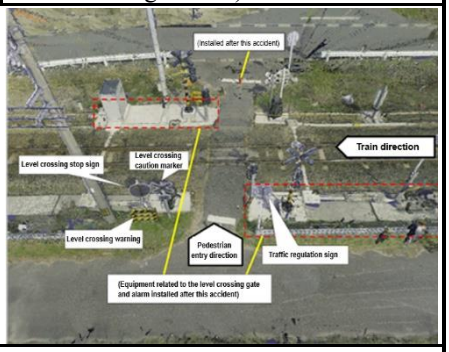
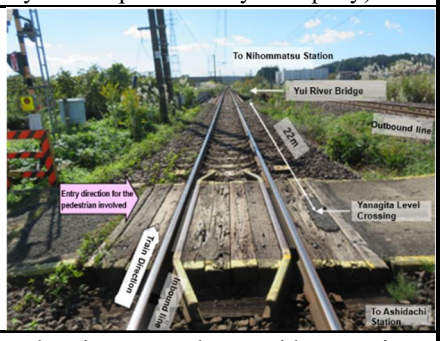
| | | | | Line (Tottori Prefecture)<br>Araya 4th Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | The driver of the train, traveling at approximately 55 km/h between Nakahama Station and Takamatsucho Station, recognized a pedestrian entering Araya 4th Crossing (Class 4 level crossing) from the left side and immediately applied the emergency brake, but the train collided with the pedestrian.<br>As a result of this accident, the pedestrian was killed. |  | |
| | Probable causes | It is certain that this accident occurred because the pedestrian entered Araya 4th Crossing (Class 4 level crossing without crossing gate nor road warning device) while the train was approaching, resulting in a collision.<br>The reason for the pedestrian entering the crossing while the train was approaching could not be clarified as the person was deceased. | | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-4.pdf<br>(Japanese) | | |
| 9 | Date of publication | Date and accident type | Railway operator | Line section (location) |
| | June 29, 2023 | October 17, 2022<br>Level crossing accident | Japan Freight Railway Company | Between Adachi Station and Nihonmatsu Station on the Tohoku Line (Fukushima Prefecture)<br>Yanagida Crossing (Class 3 level crossing without crossing gate, but with road warning device) (managed by East Japan Railway Company) |
| | Summary | The driver of the train, while traveling between Adachi Station and Nihonmatsu Station on the Tohoku Line managed by East Japan Railway Company, recognized a pedestrian entering Yanagida Crossing from the left side of the direction of travel and applied the emergency brake, but the train collided with the pedestrian.<br>As a result of this accident, the pedestrian was killed. |  | |
| | Probable causes | It is certain that this accident occurred because the pedestrian entered Yanagida Crossing, Class 3 level crossing equipped with a road warning device, while the train was approaching and the warning device was active, resulting in a collision.<br>The reason for the pedestrian entering the crossing while the warning device was active could not be clarified as the person was deceased. | | |
| | Safety actions | It is desirable to abolish Class 3 level crossings without crossing gates. If abolition is impossible, crossing gates should be installed to upgrade them to Class 1 level crossings. Until abolition or upgrading to Class 1 level crossings is implemented, it is recommended to promote various safety measures for Class 3 level crossings, such as strengthening traffic regulations and installing warning signs. | | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-1.pdf<br>(Japanese) | | |
| 10 | Date of publication | Date and accident type | Railway operator | Line section (location) |

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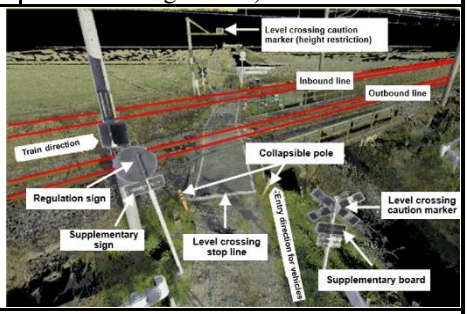
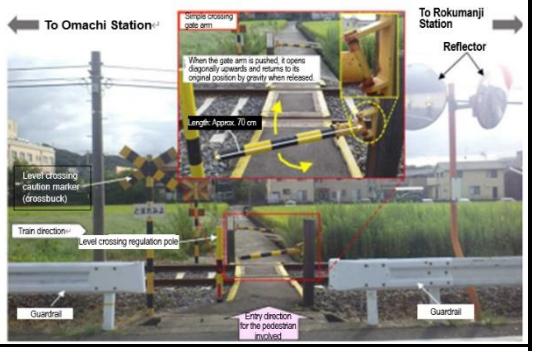
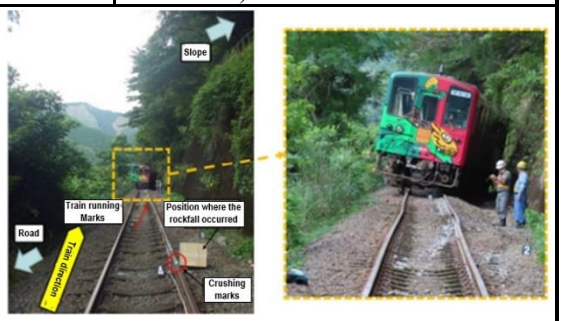
|---|---|---|---|---|
| | June 29, 2023 | October 31, 2022<br>Level crossing accident | Kyushu Railway Company | Between Saga Station and Igaya Station on the Nagasaki Line (Saga Prefecture)<br>Ipponyanagi Crossing (Class 4 level crossing without crossing gate nor road warning device) |
| | Summary | While traveling between Saga Station and Igaya Station, the train driver recognized a car entering Ipponyanagi Crossing (Class 4 level crossing) from the right side and applied the emergency brake, sounding the horn, but the train collided with the car.<br>As a result of this accident, the driver of the car was killed. |  | |
| | Probable causes | It is highly probable that this accident occurred because the car entered Ipponyanagi Crossing, Class 4 level crossing without crossing gate nor road warning device, just before the train, traveling at approximately 85 km/h, reached the crossing. The collision could not be avoided despite the train driver applying the emergency brake.<br>It is probable that the car entered the crossing while the train was approaching because the driver did not notice the approaching train. It is possible that this was due to the driver not performing safety checks or being inaccurate.<br>It is possible that the safety check was ultimately inaccurate, preventing the driver from noticing the approaching train. Several factors might have contributed to the difficulty in seeing the train if the driver of the vehicle had performed a safety check near the right-side entrance of the crossing: The crossing angle caused the train to approach from behind the vehicle, the train's direction nearly coincided with the sun's position, and if the safety check was brief, the vehicle's structure might have obstructed the view.<br>However, the detailed reasons could not be clarified as the driver of the vehicle was deceased. | | |
| | Safety actions | Class 4 level crossings without crossing gates nor road warning devices should be abolished or equipped with proper safety equipment.<br>To prevent the recurrence of crossing accidents, it is crucial for crossing users to obey traffic laws, but fundamental measures are also important. After the accidents at Ipponyanagi Crossing in April 2021 and this incident, the company and Saga City proposed abolishing the crossing for residents. It held discussions, but no agreement had been reached as of January 2023. The company and the city should continue discussions using the Local Level Crossing Improvement Council and strive for early agreement and cooperation from residents.<br>As an urgent and provisional measure, the company and the city should collaborate with the police and other authorities to conduct awareness campaigns for drivers to obey traffic laws and, where traffic regulation enforcement is difficult, to encourage avoiding the crossing. The company should continue measures such as laying weed control sheets, spraying herbicides, and mowing grass to ensure crossing users can easily notice approaching trains.<br>On the other hand, crossing users should carefully perform safety checks and accurately grasp the situation. | | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-5-2.pdf<br>(Japanese) | | |
| 11 | Date of publication | Date and accident type | Railway operator | Line section (location) |
| | July 27, 2023 | September 20, 2022<br>Level crossing accident | TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd. | Between Omachi Station and Rokumanji Station on the Shido Line (Kagawa Prefecture)<br>Nakadai 1st Crossing (Class 4 level crossing without crossing gate nor road warning device) |

| | | |
|---|---|---|
| | Summary | The driver of the train, coasting at approximately 55 km/h between Omachi Station and Rokumanji Station, recognized a pedestrian entering Nakadai 1st Crossing from the right side, sounded the horn, and applied the emergency brake, but the train collided with the pedestrian.<br>As a result of this accident, the pedestrian was killed.<br>  |
| | Probable causes | It is certain that this accident occurred because the pedestrian entered Nakadai 1st Crossing (Class 4 level crossing without crossing gate nor road warning device) while the train was approaching, resulting in a collision.<br>The reason for the pedestrian entering the crossing while the train was approaching is likely the pedestrian was crossing the crossing while looking at a mobile phone and did not notice the approaching train until just before the collision. However, the details could not be clarified as the pedestrian was deceased. |
| | Safety actions | Class 4 level crossings without crossing gates nor road warning devices should be abolished or upgraded to Class 1 level crossings.<br>Since no discussions had been held about abolishing or upgrading this crossing to a Class 1 level crossing before this accident, the company and Takamatsu City need to conduct discussions to agree with residents and implement concrete measures to abolish or upgrade the crossing.<br>Until concrete measures are implemented, the company and Takamatsu City should cooperate and promote various safety measures for Class 4 level crossings by installing warning signs and conducting awareness campaigns about the dangers of Class 4 level crossings. |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-6-1.pdf<br>(Japanese) |

| 12 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | August 25, 2023 | August 25, 2022<br>Train derailment | Shikoku Railway Company | Between Hage Station and Ekawasaki Station on the Yodo Line (Kochi Prefecture) |
| | Summary | While the train was traveling at approximately 70 km/h on a straight section between Hage Station and Egawasaki Station, the driver saw a stone about 70 cm in size ahead and applied the emergency brake. However, the train collided with the stone and continued running for about 65 meters before stopping.<br>After stopping, the driver inspected the train and found that all axles of the front bogie and the rear axle of the rear bogie had derailed.<br>Five passengers and one driver were on the train, and one passenger was slightly injured.<br>  |
| | Probable causes | It is highly probable that this accident occurred because the train collided with a stone that had fallen onto the tracks from the slope, causing the right wheel of the front axle of the front bogie to ride over the rail to the right and derail.<br>It is possible that the stone fell from the slope due to the gradual weathering of the stones over time. |
| | Safety actions | (1) Removal of sediment accumulation and restoration of the tree utilization fence<br>It is necessary to restore the tree utilization fence to a functional state by removing the accumulated sediment and repairing the fence to ensure its effective height.<br>(2) New installation of a tree utilization fence<br>If it is difficult to remove the sediment accumulation from the existing tree utilization fence, it is necessary to install a new tree utilization fence. |

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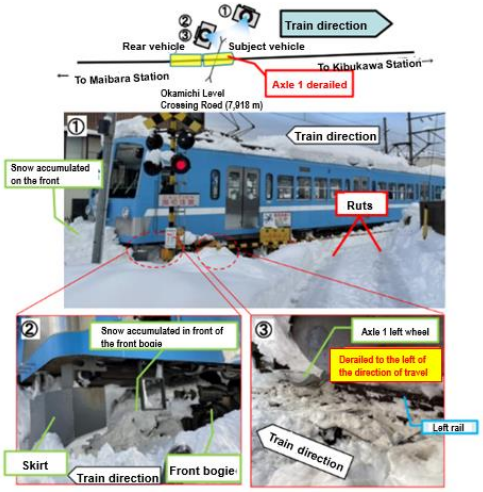
| | | (3) Raising the height of the rockfall prevention fence and rockfall detection wire<br>The height of the rockfall prevention fence near the accident site was insufficient, so it is necessary to raise the height of the rockfall prevention fence and the position of the rockfall detection wire.<br>(4) Inspection and measures for slopes similar to the accident site<br>Based on this accident, the company should identify slopes along the tracks similar to the accident site that have tree utilization fences, rockfall prevention fences, or rockfall detection wires installed, inspect whether these facilities are functioning effectively, and take measures such as removing sediment accumulation or repairing the facilities to prevent accidents. | | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-7-1.pdf<br>(Japanese) | | |
| 13 | Date of publication | Date and accident type | Railway operator | Line section (location) |
| | October 26, 2023 | December 27, 2021<br>Train derailment | OHMI Railway Co., Ltd. | In the premises of Hikoneguchi Station, Main Line (Shiga Prefecture) |
| | Summary | Due to heavy snowfall, train operations were suspended between Hikone Station and Yokaichi Station. However, as the snow had stopped, this train departed from Hikone Station as a test run train before resuming operations.<br>When the train was traveling at about 10 km/h through Okamichi Crossing, the driver heard an abnormal noise and applied the emergency brake to stop the train.<br>After the train stopped, the staff got off and checked, finding that the first axle of the front bogie of the lead car had derailed to the left.<br>One driver, four staff members responsible for clearing snow from the switches south of Takamiya Station, three drivers working at Yokaichi Station and other locations, and two station staff members were on board, but no one was injured. | | |
| | Probable causes | It is possible that this accident occurred when the front bogie of the lead car swiveled to the left, reducing the wheel load on the front bogie, and the first axle of the front bogie rode up on the compacted snow on the rails and flange way[*1] of the crossing, leading to derailment.<br>It is possible that the reduction in the wheel load on the front bogie of the lead car was caused by the accumulation of snow entering from both the lower and upper parts of the skirt, increasing the upward load on the front bogie of the lead car as the train pushed through a large amount of snow on the tracks.<br>The front bogie of the lead car likely swiveled to the left due to the snow accumulating in front of the lead car and the front bogie pushing the front parts of the car body and bogie.<br>A large amount of snow on the tracks is likely due to the snow that fell before the train's passage not melting due to low temperatures and heavy snowfall, in addition to the snow that remained on the tracks from the last train passage the previous day.<br>It is possible that the compacted snow on the crossing was caused by vehicles repeatedly compacting the snow as they passed over the crossing between the last train passage the previous day and the train's passage under low temperatures and heavy snowfall. Additionally, the snow on the tracks and the compacted snow on the rails and flangeway of the crossing were not cleared before the train passed.<br>It is probable that the decision to operate the train without a snowplow[*2]-equipped vehicle and without conducting snow removal have been based on the assumption by the Chief Safety Management Officer that the snow accumulation on the tracks and the compacted snow conditions at the crossing were similar to those on January 24, 2017, when the train had previously run without issues. However, it is highly probable that the snow accumulation and compacted snow conditions differed at the time of the accident. It is probable that the final decision on the necessity of snow removal and whether to operate the train was made based on | | |



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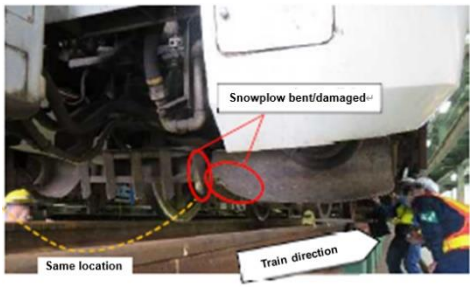
<tr><td></td><td></td><td colspan="3">past experiences rather than the actual conditions at the time of the accident. Additionally, the company's internal regulations did not provide objective criteria or conditions for determining the necessity of snow removal, the use of snowplow-equipped vehicles, or the operation of trains under varying snow conditions. The company also did not check the compacted snow conditions at the crossings. This lack of objective standards and insufficient information gathering likely contributed to inadequate decision-making regarding snow removal and train operation.<br>*1. The "flangeway" refers to the space provided for the wheel flanges to pass through.<br>*2. The "snowplow" is a snow removal device attached to the lead car to clear snow from the tracks within the vehicle's clearance.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">Accurate information collection regarding snowfall, snow accumulation, and compacted snow conditions is necessary to clearly define objective criteria and conditions for determining the need for snow removal on the tracks and crossings, snowplow-equipped vehicles, and the feasibility of train operations.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-8-1.pdf<br>(Japanese)</td><td></td></tr>
<tr><td>14</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>December 21, 2023</td><td>September 6, 2022<br>Train derailment</td><td>West Japan Railway Company</td><td>In the premises of Mukomachi Station on the Tokaido Line (Kyoto Prefecture)</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">The train departed from the departure track of the Mukomachi Station train depot (Kyoto Branch of the Suita General Rolling Stock Office). The driver did not notice that a wheel chock*1 was attached to the second axle of the rear bogie of the seventh car (cars are counted from the front, with front, back, left, and right based on the train's direction of travel). The train departed, and the wheel rode up on the wheel chock, leading to derailment. The derailed wheel subsequently rode over concrete blocks laid on the staff passage within the station premises, re-railing itself.<br>There were no passengers on the train, and one driver was on duty, who was not injured.<br><br>*1. "Wheel chock" is a wedge-shaped object between the wheel and rail to prevent the vehicle from moving when parked at a station or depot.<br>  <br></td></tr>
<tr><td></td><td>Probable causes</td><td colspan="3">It is probable that this accident occurred because the train driver did not notice that a wheel chock was attached to the second axle of the rear bogie of the seventh car when the train departed. As a result, the wheel rode up on the wheel chock and derailed shortly afterward. The derailed wheel then rode over concrete blocks laid on the staff passage within the station premises, re-railing itself.<br>The train departed without the driver noticing the wheel chock attached to the second axle of the rear bogie of the seventh car because the yard driver had attached the wheel chock after the temporary coupling operation before departure. However, it is probable that the train and yard drivers did not communicate the wheel-chock attachment status. It is likely that a contributing factor to this lack of communication was the unclear confirmation procedures between the vehicle operation duty officer and the crew operation duty officer when planning and executing vehicle or crew operation changes or temporary yard work.</td></tr>
<tr><td></td><td>Safety actions</td><td colspan="3">It is probable that this accident occurred because the wheel chock handling and the implementation of the departure inspection were unclear when temporary work was performed, which led to the train departing with the wheel chock still attached. Therefore, it is necessary to establish a system that clarifies the items to be mutually confirmed by the relevant parties (the vehicle operation duty officer and the crew operation duty officer) to prevent omissions or discrepancies in the work content when planning and executing changes in vehicle or crew operations or temporary yard work.<br>Additionally, the company should implement necessary measures to prevent similar incidents in the future, considering that the wheel chock usage tag*2 did not function effectively during</td></tr>
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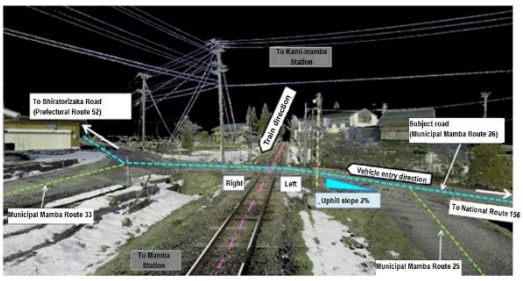
<tr><td></td><td></td><td colspan="3">this accident.<br><br>*2. The “wheel chock usage tag” is a tag placed on the master controller handle of the operating cab to indicate that a wheel chock is in use.</td></tr>
<tr><td></td><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-2.pdf<br>(Japanese)</td><td></td></tr>
<tr><td rowspan="5">15</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>December 21, 2023</td><td>December 21, 2022<br>Level crossing accident</td><td>Nagaragawa Railway Co., Ltd.</td><td>Between Kamimamba Station and Mamba Station on the Etsumi-Nan Line (Gifu Prefecture)<br>Nakamamba Crossing (Class 3 level crossing without crossing gate, but with road warning device)</td></tr>
<tr><td>Summary</td><td colspan="3">The driver of the train, traveling at approximately 50 km/h between Kamimamba Station and Mamba Station, recognized a regular car entering Nakamamba Crossing (Class 3 level crossing) from the left side (based on the train’s direction of travel), sounded the horn, and applied the emergency brake, but the train collided with the car.<br>As a result of this accident, the driver of the car was killed.<br> 
</td></tr>
<tr><td>Probable causes</td><td colspan="3">It is higly probable that this accident occurred because the car entered Nakamamba Crossing, Class 3 level crossing equipped with a road warning device, while the train was approaching, leading to a collision between the train and the car.<br>The car likely entered the crossing while the train was approaching because the driver did not notice the approaching train, but the detailed reasons could not be clarified as the driver was deceased.</td></tr>
<tr><td>Safety actions</td><td colspan="3">This crossing is Class 3 level crossing without crossing gate, and it is desirable to abolish the crossing for safety improvement. If abolition is impossible, the crossing should be upgraded to Class 1 level crossing by installing crossing gates.<br>Until these safety measures are implemented, it is desirable to install highly visible red flashing lights that can be confirmed from all directions to ensure that crossing users can reliably recognize the operation of the road warning device when a train is approaching. Furthermore, the company and Gujo City should cooperate with the police and other authorities to conduct awareness campaigns and install warning signs to encourage crossing users to perform safety checks when crossing.</td></tr>
<tr><td>Report</td><td colspan="2">https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-1.pdf<br>(Japanese)</td><td></td></tr>
<tr><td rowspan="2">16</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>December 21, 2023</td><td>March 2, 2023<br>Level crossing accident</td><td>TAKAMATSU-KOTOHIRA ELECTRIC RAILROAD Co., Ltd.</td><td>Between Hazama Station and Enai Station on the Kotohira Line (Kagawa Prefecture)<br>Shimomura-Kamisho Crossing (Class 4 level crossing without crossing gate nor road warning device)</td></tr>
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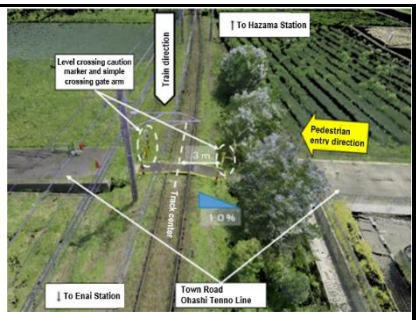
| | Summary | While the driver of the train was traveling at approximately 68 km/h between Hazama Station and Enai Station, they noticed a pedestrian entering Shimomura-Kamisho Crossing (Class 4 level crossing) from the left side (front, back, left, and right are based on the train's direction of travel). The driver immediately sounded the horn and applied the emergency brake, but the train collided with the pedestrian.<br>As a result of this accident, the pedestrian was killed.<br>  |
| | Probable causes | It is certain that this accident occurred because the pedestrian entered Shimomura-Kamisho Crossing, Class 4 level crossing without crossing gate nor road warning device, while the train was approaching, resulting in a collision.<br>The reason for the pedestrian entering the crossing while the train was approaching, it is possible that the pedestrian did not check for the approaching train before entering the crossing. However, the detailed reasons could not be clarified as the pedestrian was deceased. |
| | Safety actions | The company and Manno Town should implement the planned upgrade of this crossing to a Class 1 level crossing as scheduled to improve the safety of this crossing.<br>Additionally, since there are other Class 4 level crossings besides this one, the company and related parties from municipalities along the line should continue discussions to agree on abolishing or upgrading these Class 4 level crossings.<br>Until concrete measures are implemented, the company and related parties from municipalities along the line should cooperate in promoting various safety measures for Class 4 level crossings, such as installing warning signs and conducting awareness campaigns about the dangers of Class 4 level crossings to encourage crossing users to perform safety checks. |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-3.pdf<br>(Japanese) |

| 17 | Date of publication | Date and accident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | December 21, 2023 | April 10, 2023<br>Level crossing accident | WILLER TRAINS, Inc. | Between Shisho Station and Nishimaizuru Station on the Miyazu Line (Kyoto Prefecture)<br>Shimoyuri Crossing (Class 4 level crossing without crossing gate nor road warning device) (managed by Kitakinki Tango Railway Co., Ltd.) |

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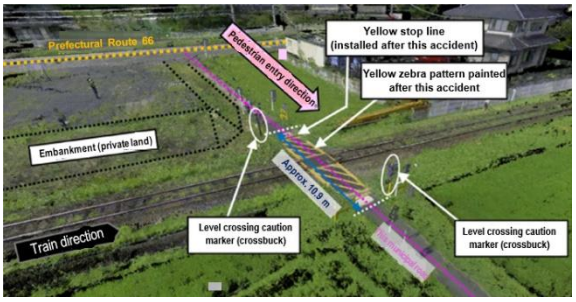
| | Summary | While the driver of the train was traveling at approximately 70 km/h between Shisho Station and Nishimaizuru Station, they noticed a pedestrian in a handle-operated electric wheelchair[*1] entering Shimoyuri Crossing (Class 4 level crossing) from the left side (front, back, left, and right are based on the train's direction of travel). The driver applied the emergency brake and sounded the horn, but the train collided with the pedestrian.<br>  <br>As a result of this accident, the pedestrian was killed.<br>*1. The "handle-operated electric wheelchair" refers to an electric wheelchair that can change direction using a handle and includes similar structures. Handle-operated electric wheelchairs are also known as "electric carts" or "senior cars" and are recognized as vehicles used by older people. |
| | Probable causes | It is highly probable that this accident occurred because the pedestrian in the handle-operated electric wheelchair (senior car) entered Shimoyuri Crossing, Class 4 level crossing without crossing gate nor road warning device, from the left side. At the same time, the train approached, leading to a collision.<br>The pedestrian entered the crossing while the train was approaching, and it is possible that the pedestrian did not notice the approaching train when entering the crossing. Possible reasons |

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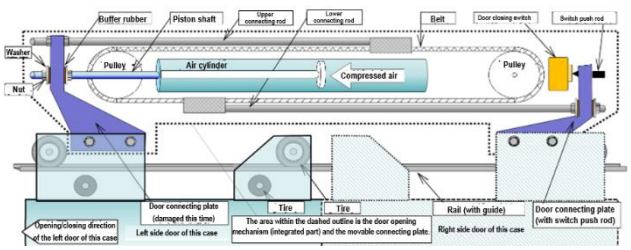
| | | include the pedestrian not stopping temporarily near the crossing warning sign and not performing safety checks. However, the detailed reasons could not be clarified as the pedestrian was deceased. | |
| | Safety actions | Abolishing Class 4 level crossings without crossing gates nor road warning devices to enhance safety is desirable. If abolition is impossible, they should be upgraded with safety equipment to become Class 1 level crossings. Given that a fatal accident occurred at this crossing in 2004 and there is an alternative route through Class 1 level crossing, the railway operator and road administrator should abolish this crossing for safety improvement. If abolition is not feasible, the crossing should be upgraded to Class 1 level crossing. Therefore, the railway operator and road administrator need to work on gaining the understanding and cooperation of crossing users and residents, establish a policy early, and implement concrete safety measures.<br>Until concrete safety measures are implemented, the railway operator and road administrator should encourage the users to use the alternative Class 1 level crossing actively and promote safety measures such as installing warning signs and stop lines. Furthermore, considering this accident may have occurred because the pedestrian did not stop and perform a safety check, the railway operator and road administrator should raise awareness among crossing users to ensure that safety checks are performed when crossing. | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-acci/RA2023-9-4.pdf<br>(Japanese) | |

Published investigation report on a serious railway incident (2023)

| 1 | Date of publication | Date and incident type | Railway operator | Line section (location) |
|---|---|---|---|---|
| | December 21, 2023 | July 24, 2022<br>Dangerous trouble in vehicle | Enoshima Electric Railway Co., Ltd. | In the premises of Shonan-kaigan-koen Station on the Enoshima Electric Railway Line (Kanagawa Prefecture) |
| | Summary | The conductor of this train was informed by a passenger that a door was open just before arriving at Kugenuma Station. Upon checking inside the train, the conductor confirmed that one of the two-panel passenger doors (each panel sliding in opposite directions) at the front right side of the rear car (based on the train's direction of travel) was open. The conductor reported this to the train driver after stopping.<br>The train driver reported the situation to the operations control center, restricted passenger access to the affected car, and continued the commercial operation of the train in the order of Fujisawa Station, Kamakura Station, and finally, Gokurakuji Station, where the train was taken to the depot.<br>The train had approximately 50 passengers and two crew members (one driver and one conductor) on board, but there were no injuries from falling, etc.<br>Subsequent investigation revealed that the door was also open at Shonan-kaigan-koen Station just before the incident was discovered. However, the door status indicator light*1 was off, and the train departed with the door open.<br><br>*1. The "door status indicator light" is a light that informs crew members of the door's open/close status. One is installed on outside of left and right of each car, and it lights up on the side where any door is open. | | |
| | Probable causes | It is certain that this serious incident occurred because the door coupling plate on one side of the two-panel passenger door broke, causing the door to remain open while the train was running.<br>It is certain that the train ran with one door open because the door coupling plate on the other door, functioning normally, pressed the door-close switch, detecting the door as closed.<br>It is probable that the breakage of the door coupling plate was caused by fatigue failure due | | |



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| | | to repeated stress on the welded area near the stress concentration from the opening and closing of the two-panel door.<br>Additionally, the damage to the door coupling plate was not discovered until it broke, more likely due to the insufficient inspection of the door coupling plate during regular inspections, such as not opening the inspection cover above the passenger door for inspection.<br>Furthermore, regarding the fact that the open door was not noticed until a passenger reported it while the train was running, it is more likely related to the continuation of operations without taking appropriate measures, despite multiple unexplained door operation abnormalities being confirmed at several stations before this serious incident occurred. | |
| | Safety actions | The company needs to ensure thorough inspections of the door coupling plates on the same type of vehicles, considering the possibility of fatigue failure due to the opening and closing of passenger doors. Additionally, as observed in this incident, the company should review and update the operational handling standards to account for failures on one side of the two-panel door. | |
| | Report | https://www.mlit.go.jp/jtsb/railway/rep-inci/RI2023-1-1.pdf<br>(Japanese) | |

## 7 Provision of factual information in 2023 (railway accidents and serious incidents)

The JTSB provided no factual information in 2023.

Column

## Utilization of Drones and 3D Scanners in Railway Accident Investigation

### Railway Accident Investigators

Railways that run through mountainous areas can sometimes experience derailment accidents caused by landslides from the slopes beside the tracks, especially after heavy rain. These landslides can flow onto the tracks, causing trains to run over the debris and derail. Investigating such accidents is challenging due to the narrow and often extensive areas of collapsed slopes, making it difficult to grasp the entire terrain of the site. An accurate understanding of the terrain is crucial for improving analysis accuracy.

In the investigation of the train derailment accident on June 2, 2023, on the Tosa Kuroshio Railway, drones and 3D scanners were used to recreate a 3D model of the site's terrain, including the collapsed slopes.

In accident investigations, drones and 3D scanners are differentiated based on their capabilities. 3D scanners capture images from the ground, which means they cannot capture narrow, inaccessible areas or shadows of objects.

In contrast, drones can capture images from the air, allowing them to photograph areas that 3D scanners cannot reach. Additionally, 3D scanners directly measure objects in three dimensions, whereas drones require converting captured 2D images into 3D models using software.

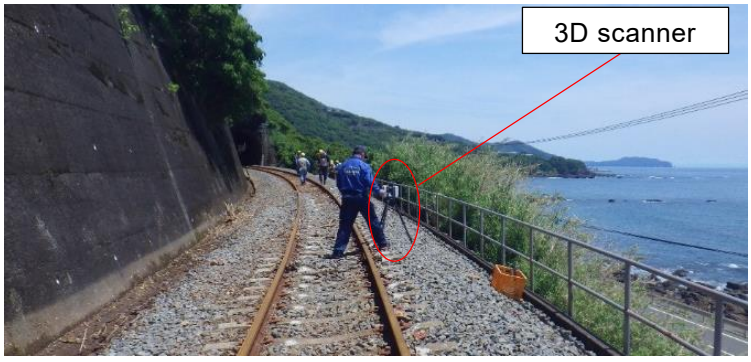
Given the distinct characteristics of drones and 3D scanners, it is necessary to combine these technologies.

We will strive to produce objective and scientific investigation reports using drones and 3D scanners for advanced analysis.

Drone


Drone footage in progress

3D scanner




3D scanner footage in progress