

Chapter 4 Railway accident and serious incident investigations

1 Railway accidents and serious incidents to be investigated

< Railway accidents to be investigated >

◎ Paragraph 3, Article 2 of the Act for Establishment of the Japan Transport Safety Board

(Definition of railway accident)

The term "Railway Accident" as used in this Act shall mean a serious accident prescribed by the Ordinance of Ministry of Land, Infrastructure, Transport and Tourism among those of the following kinds of accidents; an accident that occurs during the operation of trains or vehicles as provided in Article 19 of the Railway Business Act, collision or fire involving trains or any other accidents that occur during the operation of trains or vehicles on a dedicated railway, collision or fire involving vehicles or any other accidents that occur during the operation of vehicles on a tramway.

◎ Article 1 of Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board

(Serious accidents prescribed by the Ordinance of Ministry of Land, Infrastructure, Transport and Tourism, stipulated in paragraph 3, Article 2 of the Act for Establishment of the Japan Transport Safety Board)

- 1 The accidents specified in items 1 to 3 inclusive of paragraph 1 of Article 3 of the Ordinance on Report on Railway Accidents, etc. (the Ordinance) (except for accidents that involve working snowplows that specified in item 2 of the above paragraph);
- 2 From among the accidents specified in items 4 to 6 inclusive of paragraph 1 of Article 3 of the Ordinance, that which falls under any of the following sub-items:
 - (a) an accident involving any passenger, crew, etc. killed;
 - (b) an accident involving five or more persons killed or injured;
 - (c) a fatal accident that occurred at a level crossing with no automatic barrier machine;
 - (d) an accident found to be likely to have been caused owing to a railway officer's error in handling or owing to malfunction, damage, destruction, etc. of the vehicles or railway facilities, which resulted in the death of any person;
- 3 The accidents specified in items 4 to 7 inclusive of paragraph 1, Article 3 of the Ordinance which are found to be particularly rare and exceptional;
- 4 The accidents equivalent to those specified in items 1 to 7 inclusive of paragraph 1, Article 3 of the Ordinance which have occurred relevant to dedicated railways and which are found to be particularly rare and exceptional; and
- 5 The accidents equivalent to those specified in items 1 to 3 inclusive which have occurred relevant to a tramway, as specified by a public notice issued by the Japan Transport Safety Board.

[Reference] The accidents listed in each of the items of paragraph 1, Article 3 of the Ordinance on Reporting on Railway Accidents, etc.

Item 1: Train collision

Item 2: Train derailment

Item 3: Train fire

Item 4: Level crossing accident

Item 5: Accident against road traffic

Item 6: Other accidents with casualties

Item 7: Heavy property loss without casualties

◎Article 1 of the Public Notice of the Japan Transport Safety Board (Accidents specified by the public notice stipulated in item 5, Article 1 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board)

1 From among the accidents specified in items 1 to 6 inclusive of paragraph 1 of Article 1 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), that which falls under any of the following sub-items:

(a) an accident that causes the death of a passenger, crewmember, 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 machine;

2 The accidents specified in items 1 to 7 inclusive of paragraph 1 Article 1 of the Ordinance which are found to be particularly rare and exceptional; and

3 From among the accidents occurring on a tramway operated under the application of the Ministerial Ordinances to provide Technical Regulatory Standards on Railways mutatis mutandis as specified in paragraph 1 of Article 3 of the Ordinance on Tramway Operations, the accidents equivalent to those specified in items 1 to 3 of Article 1 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

[Reference] The accidents specified in the items of paragraph 1, Article 1 of the Ordinance on Reporting on Tramway Accidents, etc.

Item 1: Vehicle collision

Item 2: Vehicle derailment

Item 3: Vehicle fire

Item 4: Level crossing accident

Item 5: Accidents against road traffic

Item 6: Other accidents with casualties

Item 7: Heavy property loss without casualties

Railway accidents to be investigated

| Category | Train collision *2) | Train derailment *2) | Train fire *2) | Level crossing accident | Accident against road traffic | Other accidents with casualties | Heavy property loss without casualties |
|--|--|----------------------|----------------|---|-------------------------------|---------------------------------|--|
| Railway (including tramway operated as equivalent to railway) [Notice 1-3] | All accidents *1) [Ordinance 1-1] | | | <ul style="list-style-type: none"> • Accidents involving the death of a passenger, crew member, etc. • Accidents involving five or more casualties with at least one of the casualties dead • Fatal accidents that occur at level crossings with no automatic barrier machines • 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 [Ordinance 1-2] | | | / |
| | | | | Accidents that are particularly rare and exceptional [Ordinance 1-3] | | | |
| Dedicated railway | Accidents that are particularly rare and exceptional [Ordinance 1-4] | | | | | | |
| Tramway [Ordinance 1-5] | | | | <ul style="list-style-type: none"> • Accidents involving the death of a passenger, crewmember, etc. • Accidents involving five or more casualties with at least one of the casualties dead • Fatal accidents that occur at level crossings with no automatic barrier machines. [Notice 1-1] | | | / |
| | | | | Accidents that are particularly rare and exceptional [Notice 1-2] | | | |

*1 Except for derailment accidents of working snowplows. [Ordinance 1-1]

However, accidents that are particularly rare and exceptional are to be investigated. [Ordinance 1-3]

*2 If these categories occur on a tramway, the accident types shall each be renamed to “vehicle collision”, “vehicle derailment”, or “vehicle fire”.

(Note) “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 paragraph numbers.

< Railway serious incidents to be investigated >

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

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

◎Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (A situation prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism, stipulated in item 2, paragraph 4, Article 2 of the Act for Establishment of the Japan Transport Safety Board)

- 1 The situation specified in item 1 of paragraph 1 of Article 4 of the Ordinance on Reporting on Railway Accidents, etc. (the Ordinance), wherein another train or vehicle had existed in the zone specified in said item;
[A situation where a train starts moving for the purpose of operating in the relevant block section before completion of the block procedure: Referred to as “Incorrect management of safety block.”]
- 2 The situation specified in item 2 of paragraph 1 of Article 4 of the Ordinance, wherein a train had entered into the route as specified in said item;
[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: Referred to as “Incorrect indication of signal.”]
- 3 The situation specified in item 3 of paragraph 1 of Article 4 of the Ordinance, wherein another train or vehicle had entered into the protected area of the signal which protects the zone of the route as specified in said item;
[A situation where a train proceeds regardless of a stop signal, thereby obstructing the route of another train or vehicle: Referred to as “Violating red signal.”]
- 4 The situation specified in item 7 of paragraph 1 of Article 4 of the Ordinance, which caused malfunction, damage, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train;
[A situation that causes a malfunction, etc., of facilities: Referred to as “Dangerous damage in facilities.”]
- 5 The situation specified in item 8 of paragraph 1 of Article 4 the Ordinance, which caused malfunction, damage, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train;
[A situation that causes a malfunction, etc., of a vehicle: Referred to as “Dangerous trouble in vehicle.”]
- 6 The situation specified in items 1 to 10 inclusive of paragraph 1 of Article 4 of the Ordinance which is found to be particularly rare and exceptional; and
[These are referred to as: item 4 “Main track overrun”; item 5 “Violating closure section for

construction”; item 6 “vehicle derailment”; item 9 “Heavy leakage of dangerous object”; and item 10 “others,” respectively.]

- 7 The situations occurred relevant to the tramway as specified by a public notice of the Japan Transport Safety Board as being equivalent to the situations specified in the preceding items.

○Article 2 of the Public Notice of the Japan Transport Safety Board (A situation prescribed by the public notice stipulated in item 7, Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (Serious incident on a tramway))

- 1 The situation specified in item 1 of Article 2 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), wherein another vehicle operating on the main track had existed in the zone specified in said item;

[A situation where a vehicle is operating on the main track for the purpose of operating in the relevant safety zone before the completion of safety system procedures: Referred to as “Incorrect management of safety block.”]

- 2 The situation specified in item 4 of Article 2 of the Ordinance, which caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment of or fire in a vehicle operating on the main track;

[A situation that causes a malfunction, etc., of facilities: Referred to as “Dangerous damage in facilities.”]

- 3 The situation specified in item 5 of Article 2 of the Ordinance, which caused malfunction, damage, destruction, etc., bearing a particularly serious risk of collision, derailment or fire in a vehicle operating on the main track;

[A situation that causes a malfunction, etc., of a vehicle: Referred to as “Dangerous trouble in vehicle.”]

- 4 The situation specified in items 1 to 7 inclusive of Article 2 of the Ordinance which is found to be particularly rare and exceptional; and

[These are referred to as: item 2 “Violating red signal;” item 3 “Main track overrun;” item 6 “Heavy leakage of dangerous object;” and item 7 “others,” respectively.]

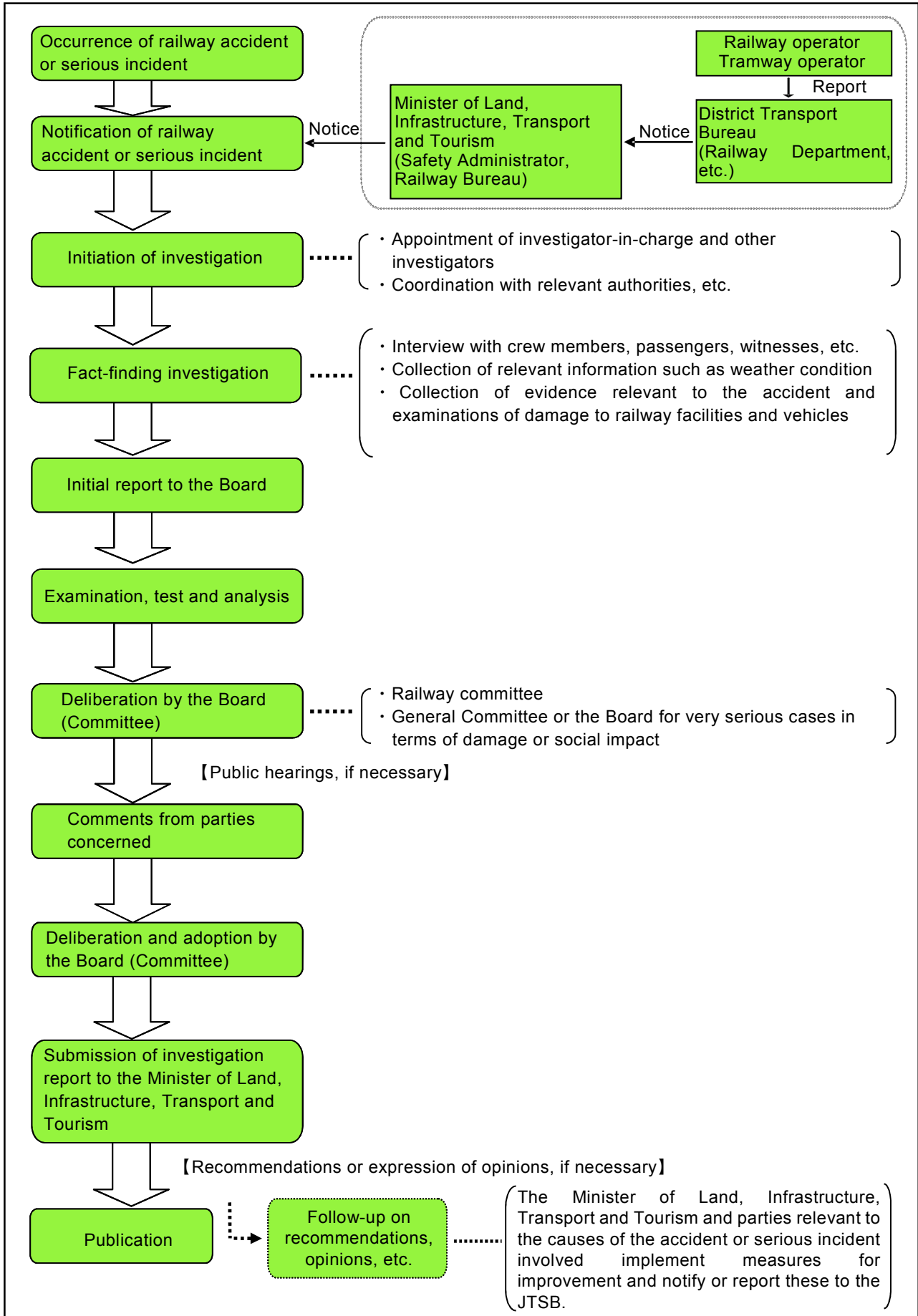
- 5 From among the situations occurring on a tramway operated under the application of the Ministerial Ordinances to provide Technical Regulatory Standards on Railways mutatis mutandis as specified in paragraph 1 of Article 3 of the Ordinance on Tramway Operations, the situations equivalent to those specified in items 1 to 6 of Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

Serious incidents to be investigated

| Category | <ul style="list-style-type: none"> • Incorrect management of safety block | <ul style="list-style-type: none"> • Incorrect indication of signal • Violating red signal | <ul style="list-style-type: none"> • Dangerous damage in facilities | <ul style="list-style-type: none"> • Dangerous trouble in vehicle | <ul style="list-style-type: none"> • Main track overrun • Violating closure section for construction • Vehicle derailment • Heavy leakage of dangerous object • Others |
|--|--|--|--|--|---|
| Railway (including tramway operated as equivalent to railway) [Notice 2-5] | Certain conditions such as the presence of another train [Ordinances 2-1, 2-2, and 2-3] | | Risk of collision, derailment or fire [Ordinances 2-4 and 2-5] | / | |
| | Incidents that are particularly rare and exceptional [Ordinance 2-6] | | | | |
| | <ul style="list-style-type: none"> • Incorrect management of safety block | <ul style="list-style-type: none"> • Violating red signal | <ul style="list-style-type: none"> • Dangerous damage in facilities | <ul style="list-style-type: none"> • Dangerous trouble in vehicle | <ul style="list-style-type: none"> • Main track overrun • Heavy leakage of dangerous object • Others |
| Tramway [Ordinance 2-7] | Certain conditions such as the presence of a vehicle [Notice 2-1] | / | | Risk of collision, derailment or fire [Notices 2-2 and 2-3] | / |
| | Incidents that are particularly rare and exceptional [Notice 2-4] | | | | |

(Note) “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 paragraph numbers.

2 Procedure of railway accident/incident investigation



3 Statistics of investigations of railway accidents and serious incidents

The JTSB carried out investigations of railway accidents and serious incidents in 2017 as follows:

19 accident investigations had been carried over from 2016, and 19 accident investigations were newly launched in 2017. 23 investigation reports were published in 2017, and thereby 15 accident investigations were carried over to 2018.

Two serious incident investigations had been carried over from 2016, and one serious incident investigation was newly launched in 2017. Two investigation reports were published in 2017, and thereby one serious incident investigation was carried over to 2018.

Investigations of railway accidents and serious incidents in 2017

(Cases)

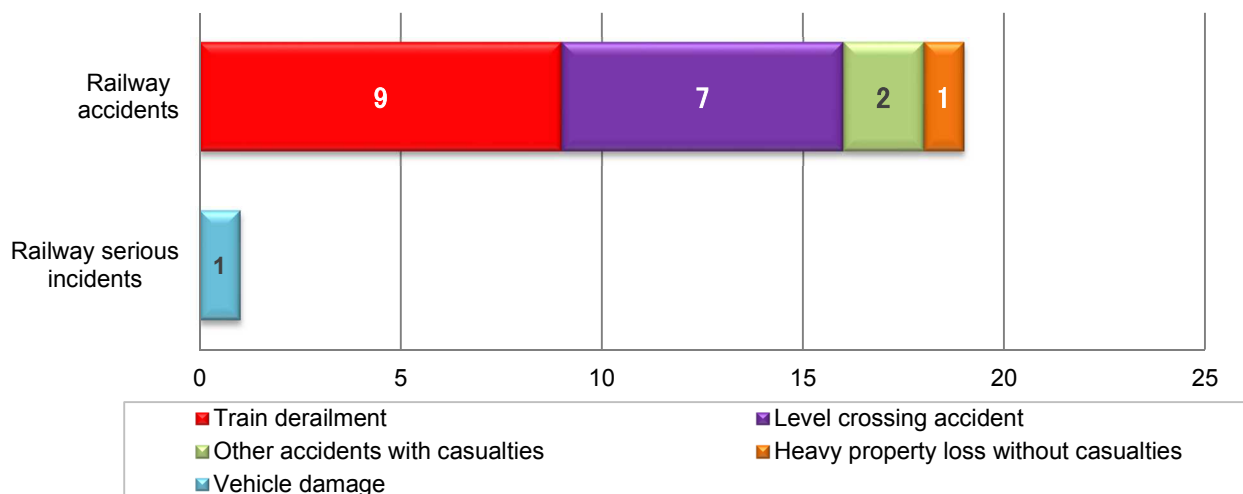
| Category | Carried over from 2016 | Launched in 2017 | Total | Published investigation reports | (Recommendations) | (Opinions) | Carried over to 2018 | (Interim report) |
|--------------------------|------------------------|------------------|-------|---------------------------------|-------------------|------------|----------------------|------------------|
| Railway accident | 19 | 19 | 38 | 23 | (0) | (0) | 15 | (0) |
| Railway serious incident | 2 | 1 | 3 | 2 | (0) | (0) | 1 | (0) |

4 Statistics of investigations launched in 2017

The railway accidents and serious incidents that were newly investigated in 2017 consisted of 19 railway accidents, down by four from 23 for the previous year, and one railway serious incident, down by one from two for the previous year.

The breakdown by type of accidents and serious incidents is as follows: The railway accidents included nine train derailments, seven level crossing accidents, two other accidents with casualties and one heavy property loss without casualties. The railway serious incidents included one vehicle damage.

Number of investigated railway accidents and serious incidents by type in 2017



In the 19 railway accidents, the number of casualties was 19, consisting of 10 death and nine injured persons.

The number of casualties (in railway accidents)

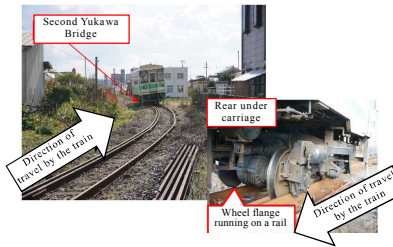
(Persons)



| 2017 | | | | | | | Total |
|------------|------|-----------|--------|---------|-----------|--------|-------|
| Category | Dead | | | Injured | | | |
| | Crew | Passenger | Others | Crew | Passenger | Others | |
| Casualties | 0 | 0 | 10 | 0 | 8 | 1 | 19 |
| Total | 10 | | | 9 | | | |

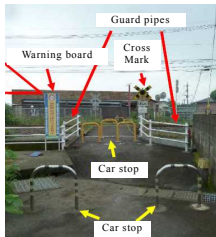
5 Summaries of railway accidents and serious incidents which occurred in 2017

The railway accidents and railway serious incidents which occurred in 2017 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)

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|---|--|--|---|
| 1 | Date and accident type | Railway operator | Line section (location) |
| | January 8, 2017 Level crossing accident | Kyushu Railway Company | Tekkoshu level crossing (class four level crossing without automatic barrier machine nor road warning device) between Obi station and Nichinan station, Nichinan Line (Miyazaki Prefecture) |
| | Summary | See “6 Publication of investigation reports” (P.76, No.13) | |
| 2 | Date and accident type | Railway operator | Line section (location) |
| | January 22, 2017 Train derailment | Kishu Railway | Between Gobo station and Gakumon station, Kishu Railway Line (Wakayama Prefecture) |
| | Summary | While the train was running approx. 500m ahead from Gobo station, the driver of the train heard abnormal sounds a number of times from under the floor of the vehicle and applied the emergency brake to bring the train to a halt. The driver got off the train and checked, finding all axels in the rear bogie of the vehicle derailed to right. While five passengers and the driver were aboard the train, none of them were injured. |  |
| 3 | Date and accident type | Railway operator | Line section (location) |
| | January 24, 2017 Train derailment | West Japan Railway Company | On the premises of Gokei station, Hakubi Line (Okayama Prefecture) |
| | Summary | See “6 Publication of investigation reports” (P.76, No.14) | |
| 4 | Date and accident type | Railway operator | Line section (location) |
| | February 11, 2017 Other accidents with casualties | West Japan Railway Company | On the premises of Itozaki station, Sanyo Line (Hiroshima Prefecture) |
| | Summary | Five workers engaging in construction work on the premises of the station and a lookout worker left the work site to escape from the approaching High Speed Freight 58 train, 25 vehicle train set, which started from Tosu Freight Terminal Station and was bound for Osaka Freight Terminal | |

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|---|--|---|---|
| | | <p>Station. When the train passed the passing place, the site foreman heard abnormal sounds and looked around for confirmation, finding the lookout lying on the track.</p> <p>The driver of the train passed Itozaki station on time at 68 km/h. The driver recognized the workers working ahead, but continued running the train as he saw a white light swinging from side to side, concluding that the retreat of the workers to the passing place had been completed. After passing Onomichi Station, the driver stopped the train according to the instruction by the train dispatcher.</p> <p>In the accident, the lookout worker died.</p> | |
| 5 | Date and accident type | Railway operator | Line section (location) |
| | February 22, 2017 Train derailment | Kumamoto Electric Railway | Between Fujisakigumae station and Kurokamimachi station, Fujisaki Line (Kumamoto Prefecture) |
| | Summary | <p>The train without conductors was running at approx. 20km/h near the 'Between Kurokami and Fujisaki Number8 level crossing' after leaving Fujisakigumae station for Kurokamimae station when the driver felt a shock and applied the emergency brake and brought the train to a halt.</p> <p>All axels of the front bogie of the first vehicle were found as detailed to the right when the train stopped. A subsequent investigation discovered that all axels of the rear bogie of the first vehicle had derailed to right but had gotten back on the track</p> <p>Some 50 passengers and the driver were aboard the train but none of them were injured.</p> | |
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| 6 | Date and accident type | Railway operator | Line section (location) |
| | February 23, 2017 Train derailment | Japan Freight Railway Company | On the premises of Kitairie signal station, Muroran Line (Hokkaido) |
| | Summary | <p>While the train was running in the section under review, the driver of the train heard abnormal sounds and stopped the train for checking, finding two axels of the third bogie of the locomotive derailed to the right in the direction of travel. The driver then informed the train dispatcher of the accident.</p> | |
| 7 | Date and accident type | Railway operator | Line section (location) |
| | March 2, 2017 Train derailment accompanied with level crossing accident | Central Japan Railway Company | Koyabu level crossing (class one level crossing equipped with automatic barrier machine and road warning device) between Nishiokazaki station and Anjo station, Tokaido Line (Aichi Prefecture) |
| | Summary | <p>While the train was running at approx. 120km/h between Nishiokazaki Station and Anjo Station, the driver of the train noticed a motor vehicle entering Koyabu level crossing (class one level crossing) and applied the emergency brake. But the train collided with the motor vehicle and all axels of the front bogie of the first vehicle derailed to right.</p> <p>Hit by the train, the motor vehicle crashed into objects, such as a power pole built along the railway, before smashing up and bursting into flames.</p> <p>In the accident, the driver of the motor vehicle died while three passengers aboard the train were injured.</p> | |
| 8 | Date and accident type | Railway operator | Line section (location) |
| | March 6, 2017 Level crossing accident | West Japan Railway Company | Senzoku Number 1 level crossing (class four level crossing without automatic barrier machine nor road warning device) between Kuga station and Suotakamori station, Gantoku Line (Yamaguchi Prefecture) |
| | Summary | <p>While the train was running between Kuga station and Suotakamori station, the driver of the train noticed a person riding on a bicycle on this side of Senzoku Number 1 level crossing (class four level crossing) and applied the emergency brake but the train hit the person.</p> <p>In the accident, the person died.</p> | |
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| 9 | Date and accident type | Railway operator | Line section (location) |
| | March 23, 2017 Level crossing accident | Matsuura Railway Co., Ltd. | Nakiri-cho level crossing (class three level crossing equipped with road warning device but without automatic barrier machine) between Kita-Sasebo station and Naka-Sasebo station, Nishi-Kyushu Line (Nagasaki Prefecture) |
| | Summary | See “6 Publication of investigation reports” (P.79, No.19) | |
| 10 | Date and accident type | Railway operator | Line section (location) |
| | May 22, 2017 Train derailment | Watarase Keikoku Railway Co., Ltd. | Between Hanawa station and Mizunuma station, Watarase Keikoku Line (Gunma Prefecture) |
| | Summary | While the train was running between Hanawa station and Mizunuma station, the driver of the train heard abnormal sounds and stopped the train, finding all axels of the second vehicle derailed to the left in the direction of travel. | |
| 11 | Date and accident type | Railway operator | Line section (location) |
| | June 20, 2017 Level crossing accident | Hokkaido Railway Company | Jinjadoro level crossing (class four level crossing without automatic barrier machine nor road warning device) between Owada station and Fujiyama station, Rumoi Line (Hokkaido) |
| | Summary | See “6 Publication of investigation reports” (P.80, No.22) | |
| 12 | Date and accident type | Railway operator | Line section (location) |
| | June 27, 2017 Level crossing accident | Kyushu Railway Company | Mukobara Number 2 level crossing (class four level crossing without automatic barrier machine nor road warning device) between Sakanoue station and Goino station, Ibusukimakurazaki Line (Kagoshima Prefecture) |
| | Summary | While the train was running between Sakanoue station and Goino station, the driver of the train noticed a pedestrian entering Mukobara Number 2 level crossing (class four level crossing). Though the driver immediately sounded a whistle and applied the emergency brake, the train hit the pedestrian. In the accident, the pedestrian died. |  |
| 13 | Date and accident type | Railway operator | Line section (location) |
| | July 9, 2017 Train derailment accompanied with level crossing accident | Nagoya Railroad Co., Ltd. | Hirato-bashi Number 1 level crossing (class one level crossing equipped with automatic barrier machine and road warning device) on the premises of Sanage station, Mikawa Line (Aichi Prefecture) |
| | Summary | See “6 Publication of investigation reports” (P.80, No.21) | |
| 14 | Date and accident type | Railway operator | Line section (location) |
| | September 7, 2017 Level crossing accident | West Japan Railway Company | Iwasakinoichi level crossing (class four level crossing without automatic barrier machine nor road warning device) between Michinoue station and Managura station, Fukuen Line (Hiroshima Prefecture) |
| | Summary | While the train was running between Michinoue Station and Managura Station, the driver of the train noticed a motorized bicycle entering the Iwasakinoichi level crossing (class four level crossing). Though the driver sounded a whistle and applied the emergency brake, the train hit the motorized bicycle. In the accident, the rider of the motorized bicycle died. | |
| 15 | Date and accident type | Railway operator | Line section (location) |
| | September 18, 2017 | Kyushu Railway | Ebe level crossing (class three level crossing |

| | | | |
|----|--|--|--|
| | Level crossing accident | Company | equipped with road warning device but without automatic barrier machine) between Uto station and Midorikawa station, Misumi Line (Kumamoto Prefecture) |
| | Summary | While the train was running between Uto station and Midorikawa station, the driver of the train noticed a bicycle entering Ebe level crossing (class three level crossing). Though the driver immediately applied the emergency brake and sounded a whistle, the train hit the bicycle. In the accident, the rider of the bicycle died. | |
| 16 | Date and accident type | Railway operator | Line section (location) |
| | September 18, 2017 Heavy property loss without casualties | Kyushu Railway Company | On the premises of Nogata Station (Nogata Rolling Stock Center), Chikuho Line (Fukuoka Prefecture) |
| | Summary | While the train was entering the east No. 1 lead track from the No. 15 storage track on the premises of Nogata Station, it collided with the buffer stop on the east No. 1 lead track and derailed to the right in the direction of travel, obstructing the clearance of the adjacent main track. Another inbound train, which left Nogata Station thereafter, passed the place under review on the inbound track before the adoption of train protection. | |
| 17 | Date and accident type | Railway operator | Line section (location) |
| | October 22, 2017 Train derailment | Nankai Electric Railway Co. Ltd. | Between Tarui station and Ozaki station, Nankai Main Line (Osaka Prefecture) |
| | Summary | While the train was running on Onosatogawa Bridge, the driver noticed the down track curving to the left in the direction of travel and sinking at about the middle of the bridge roughly 50m on this side and immediately took braking action. The train stopped around 270m after passing the place. As a result, five passengers were injured (minor injuries). | |
| 18 | Date and accident type | Railway operator | Line section (location) |
| | December 6, 2017 Train derailment | Hokkaido Railway Company | On the premises of Zenibako station, Hakodate Line (Hokkaido) |
| | Summary | The driver of the train heard abnormal sounds and confirmed a sign showing trouble in the brake when the train ran roughly 30 km/h on the Track No. 2 at Zenibako Station and resorted to emergency braking action to stop the train. After the train came to a halt, damage was discovered in parts in the bottom of the vehicle and in a point machine on the premises of the station. As a subsequent in-depth investigation into the vehicle concerned found traces of contact on its wheels, an additional examination of the rail track on the premises of Zenibako station was conducted and found traces showing that the train had derailed from Zenibako Seibu level crossing within the premises and gotten back on the track at a point roughly 68m in the direction of Otaru. | |
| 19 | Date and accident type | Railway operator | Line section (location) |
| | December 16, 2017 Other accidents with casualties | Japan Freight Railway Company | On the premises of Chihaya Station, Kagoshima Line (Fukuoka Prefecture) |
| | Summary | While the train was running on the premises of Chihaya station, the driver of the train heard abnormal sounds and looked around, finding a worker in charge of signals lying there. It is probable that the worker was hit by the train while lighting a snow melting machine to prevent a point machine within the premises of the station from becoming unworkable because of such factors as snow and ice. The worker was later confirmed dead. | |

(Railway serious incidents)

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|---|---|--|---|
| 1 | Date and incident type | Railway operator | Line section (location) |
| | December 11, 2017 Dangerous trouble in vehicle | West Japan Railway Company | On the premises of Nagoya station, Tokaido Shinkansen Line (Aichi Prefecture) |
| | Summary | As a conductor of the train smelled an abnormal odor near Kyoto station, workers of the Nagoya Rolling Stock Depot were dispatched to Nagoya station and confirmed abnormal sounds from under the floor of the train when it was arriving at Nagoya station. | |

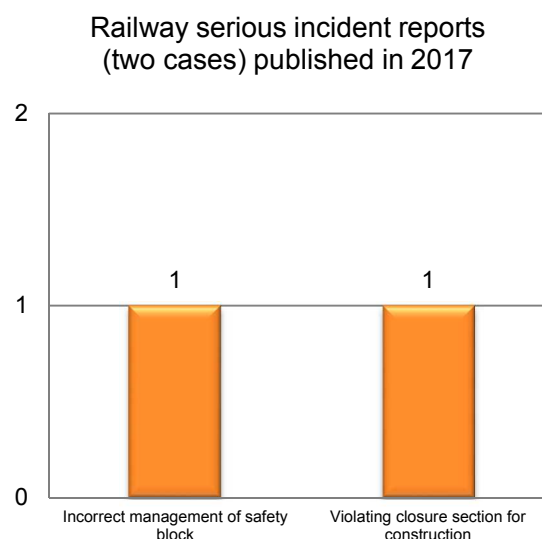
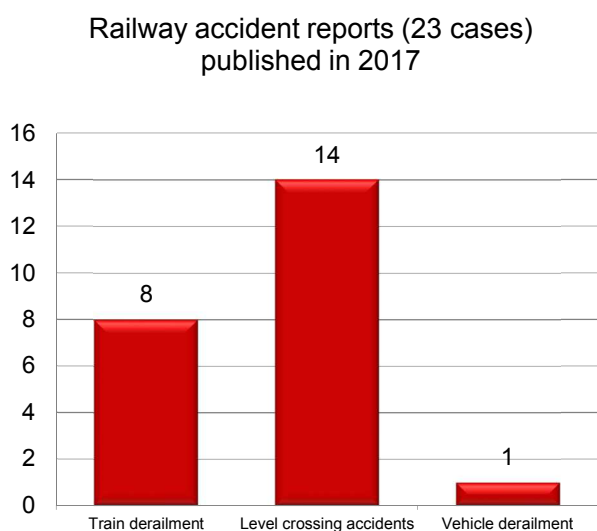
An underfloor investigation at Nagoya station found an oil leak near the gearbox, leading to a conclusion that the vehicle was inoperable. The operation of the train was suspended. When the vehicle was about to be moved to the Nagoya Rolling Stock Depot, a crack in the bogie frame of the second bogie of the No. 13 vehicle was found. In addition, the gear coupling was found discolored.

6 Publication of investigation reports

The number of investigation reports of railway accidents and serious incidents published in 2017 was 25, consisting of 23 railway accidents and two serious incidents.

Breaking them down by type, the railway accidents contained eight train derailment accidents, 14 level crossing accidents, and one vehicle derailment. The railway serious incidents contained one incorrect management of safety block and one violating closure section for construction.

In the 23 accidents, the number of casualties was 34, consisting of 14 death and 20 injured persons.




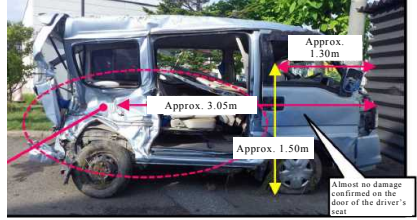
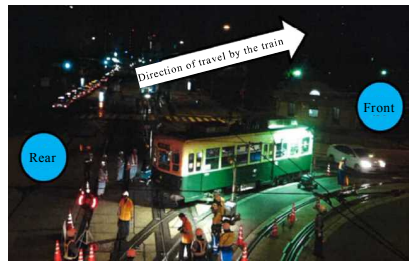
The investigation reports of railway accidents and serious incidents published in 2017 are summarized as follows.

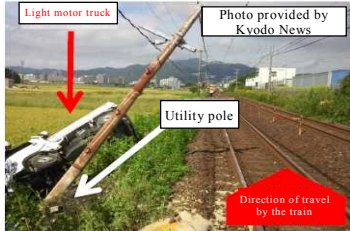

Railway accident reports published in 2017

| 1 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
|---|---------------------|--|------------------------------|--|
| | February 23, 2017 | April 15, 2016 Train derailment | Nagaragawa Railway Co., Ltd. | Between Han-no station and Suhara station, Etsumi-nan Line (Gifu Prefecture) |
| | Summary | <p>The train departed from Han-no station on schedule, by one-man operation.</p> <p>While the train was running in cruising operation at about 50 km/h in Suhara tunnel between Han-no station and Suhara station, the driver of the train felt violent shock accompanied with abnormal sound, and applied an emergency brake immediately to stop the train. After the train had stopped, the driver got off the train and checked around the train, and found that all two axles in the rear bogie were derailed to left.</p> <p>There were two passengers and the driver onboard the train. The driver of the train was injured in the accident.</p> | | |
| | | <p>Photographed from the Han-no station side</p> <p>Rear train cars inclined to the left</p> | | |

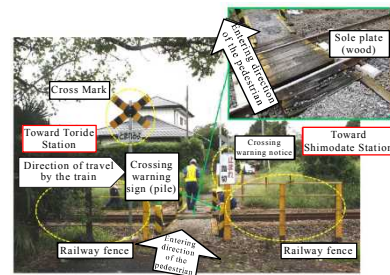
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| | Probable Causes | <p>It is somewhat likely that, while the train was running in the curved track section in the tunnel, the accident had occurred as the left wheel of the third axle in the rear bogie climbed over the rail and derailed due to the increased derailment coefficient by the significantly decreased wheel load, which were caused by the followings.</p> <p>(1) Lateral force, usually acted on wheels in outer rail of the curved track, increased larger than as usual due to the existence of relatively large irregularity of line alignment.</p> <p>(2) The irregularity of cross level increased still more by the passage of trains because there were loosed fastening bolts of rail fastening device and fallen away rail pads in the track continuously along the track, where relatively large irregularity of cross level, to promote decrease of wheel load.</p> <p>(3) In addition, the irregularity of cross level increased still more when the rear bogie of the train had passed, because the left rail, i.e., outer rail, had been broken.</p> <p>It is somewhat likely that the rail in the tunnel was broken in relation with that the reducing ratio of cross section of the rail by corrosion had been exceeded substantially the criteria to decide rail replacement, and cracks considered to be caused by corrosion of rail or continuous existence of loosed fastening bolts of the rail fastening device and fallen away rail pads along the track, could not be recognized in the track inspection implemented periodically by the company.</p> | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-1-1.pdf | | |
| 2 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | February 23, 2017 | June 17, 2016 Level crossing accident | Chichibu Railway Co., Ltd. | Ishihara Number 12 level crossing (class four level crossing without automatic barrier machine nor road warning device) on the premises of Hirosegawara station, Chichibu Main Line (Saitama Prefecture) |
| | Summary | <p>While the train was running on the premises of Hirosegawara station, the driver of the train found a pedestrian in Ishihara Number 12 level crossing, class four level crossing, and then sounded an emergency whistle and applied an emergency brake, but the train hit the pedestrian. The pedestrian was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the right side of front face of the train hit a pedestrian because the pedestrian went into Ishihara Number 12 level crossing, class four level crossing, in the situation that the train was approaching.</p> <p>It is somewhat likely that the pedestrian went into the level crossing in the situation that the train was approaching, because the pedestrian did not notice the approaching train. But it could not be determined the precise situations because the pedestrian was dead in the accident.</p> | | |
| Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-1-2.pdf | | | |
| 3 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | February 23, 2017 | August 22, 2016 Level crossing accident | Kyushu Railway Company | Number 2 Motoyashiki level crossing (class four level crossing without automatic barrier machine nor road warning device) between Ei station and Irino station, Ibusuki-Makurazaki Line (Kagoshima Prefecture) |
| | Summary | <p>While the train was running at about 44 km/h between Ei station and Irino station, the driver of the train noticed a light motor vehicle entered to Number 2 Motoyashiki level crossing, class four level crossing, then applied an emergency brake, but the train collided with the light motor vehicle.</p> <p>The driver of the light motor vehicle was dead, and a fellow passenger was injured in the accident.</p> | | |



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| <p>Probable Causes</p> | <p>It is highly probable that the accident had occurred as the train collided with a light motor vehicle, because the light motor vehicle entered to Number 2 Motoyashiki level crossing, class four level crossing, in the situation that the train was approaching.</p> <p>It could not be determined why the driver of the light motor vehicle drove the vehicle into the level crossing where the train was approaching, because the driver of the light motor vehicle was dead in the accident.</p> | | |  |
| <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-1-3.pdf</p> | | | |
| <p>4</p> | <p>Date of Publication</p> | <p>Date and accident type</p> | <p>Railway operator</p> | <p>Line section (location)</p> |
| <p>February 23, 2017</p> | <p>September 6, 2016 Level crossing accident</p> | <p>Tsugaru Railway Company</p> | <p>Goshogawara Kiten 6k100m level crossing (class four level crossing without automatic barrier machine nor road warning device) between Tsugaru-Iizume station and Bishamon station, Tsugaru Railway Line (Aomori Prefecture)</p> | |
| <p>Summary</p> | <p>While the train was running between Tsugaru-Iizume station and Bishamon station, the driver of the train noticed a light motor vehicle entering to Goshogawara Kiten 6k100m level crossing, class four level crossing, and applied an emergency brake immediately, but the train collided with the light motor vehicle.</p> <p>The driver of the light motor vehicle was dead in the accident.</p> | | | |
| <p>Probable Causes</p> | <p>It is highly probable that the accident had occurred as the train collided with a light motor vehicle, because the light motor vehicle entered to Goshogawara Kiten 6k100m level crossing, class four level crossing, in the situation that the train was approaching.</p> <p>It could not be determined why the light motor vehicle entered to the level crossing in the situation that the train was approaching, because the driver of the light motor vehicle was dead in the accident.</p> <p>However, it is somewhat likely that the poor visibility in the direction of the approaching train due to the copse beside the track was related to obstructing sufficient confirmation of safety in right and left direction by the driver of the light motor vehicle just before the level crossing.</p> <p>Also, it is somewhat likely that the rainy weather when the accident had occurred and the upward steep slope just before the level crossing in right curved road between fields were related to declining attention to the approaching train of the driver of the light motor vehicle.</p> | | |  |
| <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-1-4.pdf</p> | | | |
| <p>5</p> | <p>Date of Publication</p> | <p>Date and accident type</p> | <p>Railway operator</p> | <p>Line section (location)</p> |
| <p>March 30, 2017</p> | <p>June 2, 2016 Vehicle derailment</p> | <p>Nagasaki Electric Tramway Co. Ltd.</p> | <p>Between Suwajinja-Mae tram stop and Kokaido-Mae tram stop, Sakuramachi Branch Line (Nagasaki Prefecture)</p> | |
| <p>Summary</p> | <p>While the vehicle was passing the right curved branch line for Nagasaki Eki-Mae tram stop, in the turnout at Kokaido-Mae intersection, the driver of the vehicle felt abnormal situation as if the vehicle was heaved up accompanied with abnormal sound, then the driver applied an emergency brake and stopped the vehicle. The driver got off the vehicle to check the situation, and found that all two axles in the rear bogie were derailed to left of rail.</p> <p>There were a passenger and the driver onboard the vehicle, but there was no casualty. The accident site was in the intersection of the road together with tramway, but the derailed vehicle did not contact nor collide with automobiles, etc., before and after the derailment.</p> | | |  |


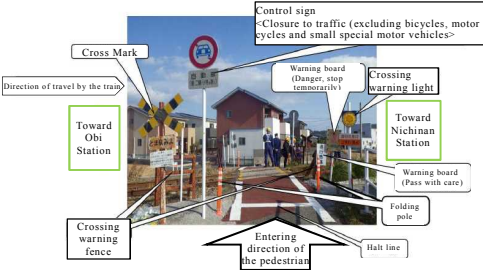
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| | Probable Causes | <p>It is probable that the accident had occurred as the vehicle running right curve in the turnout in the intersection, as the backside of right wheel of the first axle of the rear bogie had been contacting with the side surface of the portion which had the function of guard rail in the diamond crossing, the back side of right wheel climbed up around the tip of the nose rail and started derailment, and after the wheel flange ran on the upper part of the side surface of the portion, the left wheel of the axle ran onto the left rail and the axle derailed to left, then followed the derailments of the second axle in the rear bogie to left.</p> <p>It is probable that the right wheel of the first axle in the rear bogie ran onto the rail and derailed caused by the effects of increased lateral force acting on backside of the wheel due to the abrupt contact of the wheel and the deformed tip of the nose rail, and decreased contact angle between backside of the wheel and the deformed tip of the nose rail.</p> <p>It is probable that the tip of nose rail was deformed by the repeating shocks by backside of right wheels of the front axle of bogies of plural vehicles, acting on the tip of the nose rail in the state of being easily deformed, caused by the effects of the lowered height of the tip of the nose rail by the design modification, in the diamond crossing existed in very small radius curve where wheels always contact with tip of the nose rail structurally.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-2-1.pdf See summaries of major railway accident and serious incident investigation reports (P.87).</p> | | |
| 6 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | March 30, 2017 | October 8, 2016 Level crossing accident | West Japan Railway Company | Nakada Number 1 level crossing (class four level crossing without automatic barrier machine nor road warning device) between Yotsutsuji station and Shin-Yamaguchi station, San-yo Line (Yamaguchi Prefecture) |
| | Summary | <p>While the train was running between Yotsutsuji station and Shin-Yamaguchi station, the driver of the train noticed a light motor truck entered to Nakada Number 1 level crossing, class four level crossing, and applied an emergency brake immediately, but the train collided with the light motor truck.</p> <p>The driver of the light motor truck was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train collided with a light motor truck, because the light motor truck entered to Nakada Number 1 level crossing, class four level crossing, in the situation that the train was approaching.</p> <p>It is somewhat likely that the light motor truck entered to the level crossing in the situation that the train was approaching because the driver did not notice the approaching train, but it could not be determined the precise situations because the driver of the light motor truck was dead in the accident.</p> | | |
| Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-2-2.pdf</p> | | | |
| 7 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | April 27, 2017 | December 11, 2015 Train derailment | East Japan Railway Company | Between Hiratsuto station and Matsukusa station, Yamada Line (Iwate Prefecture) |
| | Summary | <p>The train departed from Hiratsuto station on schedule. While the train was running at about 55 km/h between Hiratsuto station and Matsukusa station, the driver of the train found the trees fell on the track ahead, and applied an emergency brake, but the train hit and ran over the fallen trees and earth and sands, etc., flowed into the track, and stopped.</p> <p>It was found in the later investigation that all four axles of the train were derailed and the vehicle body was tilted to right. In addition, the slope in left side of the stopped train was collapsed, and earth and sand, etc., flowed onto the track.</p> <p>There were 22 passengers and 2 train crews, i.e., the driver and the conductor, were onboard the</p> | | |
| | | | |  <p>Light motor truck Utility pole Photo provided by Kvido News Direction of travel by the train</p> |
| | | | |  <p>Direction of travel by the train</p> |

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| | | train. Among them, 15 passengers and the driver were injured. | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train was derailed by hit and ran onto the fallen trees or earth and sand, etc., flowed into railway track due to the collapse of the slope in track side.</p> <p>It is somewhat likely that the slope collapsed by the increased weight of the surface layer of the slope due to rainfall and melting snow, where the surface layer of the slope had been unstable by the steep slope and weathering.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-3-1.pdf See summaries of major railway accident and serious incident investigation reports (P.85).</p> | | |
| 8 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | April 27, 2017 | July 7, 2016 Level crossing accident | Shikoku Railway Company | Miyaji level crossing (class four level crossing without automatic barrier machine nor road warning device) between Iyo-Yokota station and Torinoki station, Yoson Line (Ehime Prefecture) |
| | Summary | <p>While the train was running between Iyo-Yokota station and Torinoki station, the driver of the train noticed a pedestrian went into Miyaji level crossing, class four level crossing, and applied an emergency brake, but the train hit the pedestrian.</p> <p>The pedestrian was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train hit a pedestrian because the pedestrian went into Miyaji level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the pedestrian went into the level crossing, because the pedestrian was not able to judge properly due to the effects of deteriorated function of the brain, but it could not be determined the precise situations because the pedestrian was dead in the accident.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-3-3.pdf</p> | | |
| 9 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | April 27, 2017 | September 12, 2016 Level crossing accident | Kanto Railway Co., Ltd. | Inoue Number 1 level crossing (class four level crossing without automatic barrier machine nor road warning device) between Kurogo station and Otago station, Joso Line (Ibaraki Prefecture) |
| | Summary | <p>While the train was running between Kurogo station and Otago station, the driver of the train noticed a person riding bicycle went into Inoue Number 1 level crossing, class four level crossing, then sound a whistle and applied an emergency brake immediately, but the train hit the person riding bicycle.</p> <p>The person riding bicycle was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train hit a person riding bicycle because the person riding bicycle went into Inoue Number 1 level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the person riding bicycle went into the level crossing, in the situation that the train was approaching, related with that the person riding bicycle could not find the approaching train until he approached beside the prop of crossing warning sign due to trees, but it could not be determined the precise situations because the person riding bicycle was dead in the accident.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-3-4.pdf</p> | | |
| 10 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | April 27, 2017 | September 27, 2016 Level crossing | East Japan Railway | Nakahara level crossing (class four level crossing without automatic barrier machine nor |

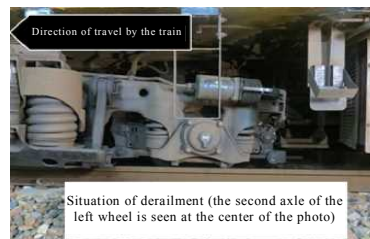


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| | | accident | Company | road warning device) between Minamihara station and Chitose station, Uchibo Line (Chiba Prefecture) |
| | Summary | <p>While the train was running between Minamihara station and Chitose station, the driver of the train noticed a motorized bicycle entered to Nakahara level crossing, class four level crossing, then sound a whistle and applied an emergency brake immediately, but the train collided with the motorized bicycle.</p> <p>The driver of the motorized bicycle was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train collided with a motorized bicycle, because the motorized bicycle entered to Nakahara level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the motorized bicycle entered to the level crossing where the train was approaching, related with the restricted visibility of the track by hedges and overgrown weeds, but it could not be determined the precise situations because the driver of the motorized bicycle was dead in the accident.</p> | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-3-2.pdf | | |
| 11 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | June 29, 2017 | June 23, 2016 Train derailment | West Japan Railway Company | Between Seno station and Hachihommatsu station, San-yo Line (Hiroshima Prefecture) |
| | Summary | <p>The train departed from Seno station about 31 minutes behind the scheduled time. The driver of the train, while operating the train at about 80 km/h between Seno station and Hachihommatsu station, found earth and sand, etc., on the front track, and applied an emergency brake immediately. But the train hit and went onto the earth and sand etc., flowed onto the railway track, and stopped.</p> <p>It was found that the all 2 axles in the front bogie of the first vehicle of the train derailed to right, in the investigation implemented after the train had stopped.</p> <p>There were 124 passengers and 2 train crews, i.e., the driver and the conductor. Among them, the driver of the train was injured.</p> | | |
| | Probable Causes | <p>It is highly probable that the train derailed because the train ran onto the earth and sand, etc., flowed onto the railway track from the collapsed slope by rain water, in the accident.</p> <p>It is probable that the slope collapsed because the slope became unstable as the rain water around the slope, by the rain fall around the accident site, flowed and concentrated into the road transverse drain, was guided to the slope, due to the drainage in downstream side of the road transverse drain was not installed.</p> | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-4-1.pdf | | |
| 12 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | June 29, 2017 | July 14, 2016 Train derailment | West Japan Railway Company | Between Nishi-Miyoshi station and Shiwachi station, Geibi Line (Hiroshima Prefecture) |

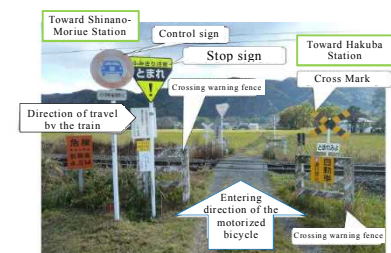


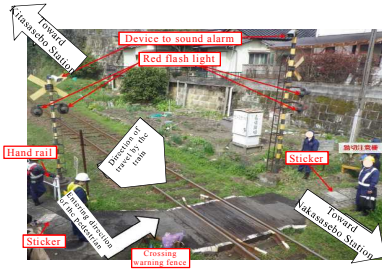
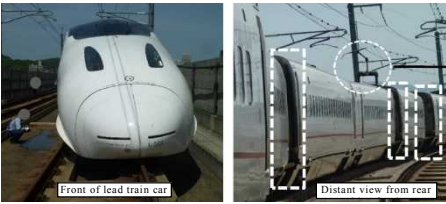
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| | <p>Summary</p> | <p>The train departed from Nishi-Miyoshi station on schedule. The driver of the train, while driving the train in powering operation at about 70 km/h, noticed the earth and sand disturbing the front track near the exit of Aoga tunnel, and applied an emergency brake, but the train ran onto the earth and sand containing cluster of rocks, and stopped the train. It was found that the second axle in the front bogie and the second axle in the rear bogie of the first vehicle were derailed to right, by the check implemented after the train had stopped. There were 24 passengers, 2 train crews, i.e., the driver and the conductor, and a facility maintenance staff onboard the train, but there was no casualty.</p>  | | |
| | <p>Probable Causes</p> | <p>It is highly probable that the train was derailed because the train hit and ran onto earth and sand containing cluster of rocks flowed into the track, which were transported by the water flowed from swamp in the slope above the longitudinal drain in left side of the track, and overflowed the longitudinal drain, in the accident. It is probable that earth and sand overflowed the longitudinal drain because the inlet of the longitudinal drain was filled up by the earth and sand, that were transformed from the eroded sediments in the riverbed of downstream of the swamp and transported to upper part of the longitudinal drain, when the rain water by the local heavy rain around the accident site flowed downward along the swamp.</p> | | |
| | <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-4-2.pdf</p> | | |
| <p>13</p> | <p>Date of Publication</p> | <p>Date and accident type</p> | <p>Railway operator</p> | <p>Line section (location)</p> |
| | | | | <p>July 27, 2017 January 8, 2017 Level crossing accident Kyushu Railway Company Tekkosho level crossing (class four level crossing without automatic barrier machine nor road warning device) between Obi station and Nichinan station, Nichinan Line (Miyazaki Prefecture)</p> |
| | <p>Summary</p> | <p>While the train was running between Obi station and Nichinan station, the driver of the train noticed a pedestrian went into Tekkosho level crossing, class four level crossing, then applied an emergency brake immediately, but the train hit the pedestrian. The pedestrian was dead in the accident.</p>  | | |
| | <p>Probable Causes</p> | <p>It is highly probable that the accident had occurred as the train hit a pedestrian, because the pedestrian went into Tekkosho level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching. It could not be determined why the pedestrian went into the level crossing in the situation that the train was approaching, because the pedestrian was dead in the accident.</p> | | |
| | <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-5-4.pdf</p> | | |
| <p>14</p> | <p>Date of Publication</p> | <p>Date and accident type</p> | <p>Railway operator</p> | <p>Line section (location)</p> |
| | | | | <p>July 27, 2017 January 24, 2017 Train derailment West Japan Railway Company On the premises of Gokei station, Hakubi Line (Okayama Prefecture)</p> |
| | <p>Summary</p> | <p>When the train departed from Gokei station on schedule, the driver of the train noticed the fire came out from around the turnout of up track in right side of the front track. Then the driver stopped the train about 15 m beyond the predetermined stop position, and communicated with the conductor and the train dispatcher, then got off the train for firefighting. After the firefighting was finished, the driver communicated with the train dispatcher and the conductor again, and started the train according to the departure sign from the conductor. Immediately after the train had started, the emergency brake was acted and the train was stopped again after running about 7 m ahead.</p> | | |

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| | | <p>After that, the driver was informed about the situation from the conductor, and got off the train to check the vehicles. It was found that the second axle in the front bogie of the third vehicle was derailed to right.</p> <p>There was no casualty in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the second axle in the front bogie of the third vehicle of the train was derailed to right because the left wheel of the second axle ran onto the wheel stopper that was set by the conductor at the left wheel of the second axle when the driver got off the train for firefighting, and forgot to remove it before the train was restarted, in the accident.</p> <p>It is probable that the conductor set the wheel stopper, in relation with that he thought as wheel stopper should be set when asked measures to prevent rolling wheels from the driver, according to his experiences up to that moment, even though it was not conductor's mission. Also, it is probable that the conductor forgot to remove the wheel stopper before restarting the train, in relation with that his attention was focused on early restart of the train, in the process of communication with the driver after finishing firefighting.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-5-3.pdf</p> | | |
| 15 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | July 27, 2017 | November 6, 2016 Level crossing accident | East Japan Railway Company | Hacchonome level crossing (class four level crossing without automatic barrier machine nor road warning device) between Kogota station and Kitaura station, Rikuu-To Line (Miyagi Prefecture) |
| | Summary | <p>While the train was running between Kogota station and Kitaura station, the driver of the train noticed a light motor truck entered to Hacchonome level crossing, class four level crossing, then sound a whistle and applied an emergency brake immediately, but the train collided with the light motor truck.</p> <p>The driver of the light motor truck was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train collided with a light motor truck because the light motor truck entered to Hacchonome level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the light motor truck entered to the level crossing in the situation that the train was approaching, in relation with that the eyes of the driver of the light motor truck was turned opposite to the approaching train, but it could not be determined the precise situations because the driver of the light motor truck was dead in the accident.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-5-1.pdf</p> | | |
| 16 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | July 27, 2017 | November 10, 2016 Level crossing accident | East Japan Railway Company | Number 2 Shinmachi level crossing (class three level crossing equipped with road warning device but without automatic barrier machine) between Nakagomi station and Otabe station, Koumi Line (Nagano Prefecture) |
| | Summary | <p>While the train was running between Nakagomi station and Otabe station, the driver of the train noticed a pedestrian staying in Number 2 Shinmachi level crossing, class three level crossing, and then sound a whistle and applied an emergency brake immediately, but the train hit the pedestrian.</p> <p>The pedestrian was dead in the accident.</p> | | |



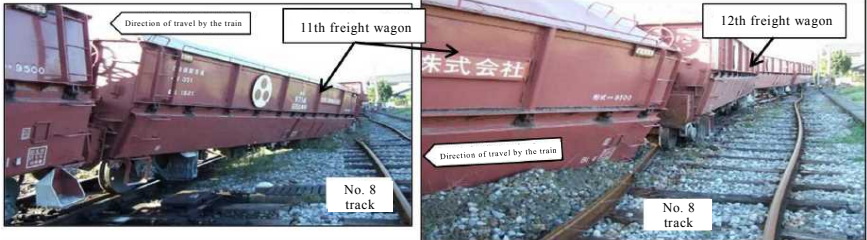
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| | Probable Causes | <p>It is probable that the accident had occurred as the train hit a pedestrian, because the pedestrian went into Number 2 Shinmachi level crossing, class three level crossing equipped with road warning device, in the situation that the road warning device was in warning operation.</p> <p>It is somewhat likely that the pedestrian entered to the level crossing where the road warning device was in warning operation, related with the deterioration of hearing ability of both ears of the pedestrian.</p> <p>In addition, it is somewhat likely that the pedestrian could not recognize red flash lights when the pedestrian went into the level crossing, but it could not be determined the precise situations because the pedestrian was dead in the accident.</p> | | |
| | Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-5-2.pdf</p> | | |
| 17 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | August 31, 2017 | October 16, 2016 Level crossing accident | Kumamoto Electric Railway | Between Hakenomiya and Horikawa Number 8 level crossing (class four level crossing without automatic barrier machine nor road warning device) between Horikawa station and Hakenomiya station, Kikuchi Line (Kumamoto Prefecture) |
| | Summary | <p>While the train was running between Horikawa station and Hakenomiya station, the driver of the train noticed a sedan entering to Between Hakenomiya and Horikawa Number 8 level crossing, class four level crossing, and applied an emergency brake, but the train collided with the sedan. The driver of the sedan was dead in the accident.</p> | | |
| | Probable Causes | <p>It is highly probable that the accident had occurred as the train collided with a sedan because the sedan entered to Between Hakenomiya and Horikawa Number 8 level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the driver of the sedan moved the sedan into the level crossing in the situation that the train was approaching, in relation with the bad visibility for trains from the seated driver in the sedan, but it could not be determined the precise situations because the driver of the sedan was dead in the accident.</p> | | |
| Report | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-6-1.pdf</p> | | | |
| 18 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | August 31, 2017 | November 2, 2016 Level crossing accident | East Japan Railway Company | Takami-Kita level crossing (class four level crossing without automatic barrier machine nor road warning device) between Shinano-Moriue station and Hakuba station, Oito Line (Nagano Prefecture) |
| | Summary | <p>While the train was running between Shinano-Moriue station and Hakuba station, the driver of the train noticed a motorized bicycle entering to Takami-Kita level crossing, class four level crossing, and applied an emergency brake immediately, but the train hit the motorized bicycle. The driver of the motorized bicycle was dead in the accident.</p> | | |
| | Probable Causes | <p>It is probable that the accident had occurred as the train hit a motorized bicycle because the motorized bicycle entered to Takami-Kita level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching.</p> <p>It is somewhat likely that the motorized bicycle entered to the level crossing in the situation that the train was approaching, in relation with the situation</p> | | |



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| | | that the approaching train was difficult to see for the driver of the motorized bicycle due to the overgrown weeds until he approached the level crossing beyond the fence of warning level crossing. But it could not be determined the precise situations because the driver of the motorized bicycle was dead in the accident. | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-6-2.pdf | | |
| 19 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | September 28, 2017 | March 23, 2017 Level crossing accident | Matsuura Railway Co., Ltd. | Nakiri-cho level crossing (class three level crossing equipped with road warning device but without automatic barrier machine) between Kita-Sasebo station and Naka-Sasebo station, Nishi-Kyushu Line (Nagasaki Prefecture) |
| | Summary | The train was running between Kita-Sasebo station and Naka-Sasebo station, the driver of the train noticed a pedestrian went into Nakiri-Cho level crossing, class three level crossing, and applied an emergency brake immediately, but the train hit the pedestrian. The pedestrian was dead in the accident. | | |
| | Probable Causes | <p>It is probable that the accident had occurred as the train hit a pedestrian because the pedestrian went into the Nakiri-Cho level crossing, class three level crossing equipped with road warning device, in the situation that the road warning device was in warning operation according to the approaching train.</p> <p>It is somewhat likely that the pedestrian went into the level crossing in the situation that the road warning device was in warning operation, in relation with the situation that the pedestrian had been lost hearing sense. Also, it is somewhat likely that the pedestrian could not recognize red flashing lights when the pedestrian entered to the level crossing, but it could not be determined the precise situations because the pedestrian was dead in the accident.</p> | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-7-1.pdf | | |
| 20 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | November 30, 2017 | April 14, 2016 Train derailment | Kyushu Railway Company | Between Kumamoto station and Kumamoto General Train Depot, Kyushu Shinkansen (Kumamoto Prefecture) |
| | Summary | <p>The train arrived at Kumamoto station. After that, the train departed from Kumamoto station on schedule, in the deadhead operation. While the train was running at about 78 km/h, the driver of the train felt vertical jolts as if the earth were heaving upward, then turned off the powering notch and applied emergency brake immediately. There were large swaying shakes after the vertical jolts. After the train had stopped at around 99,461 m from the origin at Hakata station, the driver got off the train and checked underfloor condition of the vehicles, and found that all 6 vehicles were derailed.</p> <p>Only the driver was onboard the train, conductors were not boarded, between Kumamoto station and Kumamoto General Train Depot, but there was no casualty.</p> <p>Here, the earthquake of magnitude 6.5, one of the 2016 Kumamoto Earthquakes, that the hypocenter was in depth of about 11 km in Kumamoto district, Kumamoto Prefecture, had occurred at about 21:26, April 14, 2016. The maximum seismic intensity 7 was observed in Mashiki Town, Kumamoto Prefecture.</p> | | |
| | Probable Causes | <p>It is probable that the accident occurred as the train was derailed due to being acted by the ground motion of the earthquake occurred on about 21:26, April 14, 2016, which was one of the 2016 Kumamoto Earthquakes.</p> <p>As for the process to the derailment, it is probable that many axles were derailed almost the same timing, because each vehicle in the train rolled significantly and wheel flanges of left or right wheels jumped on the rail, due to the amplified rolling motion in the frequency range to promote rolling of vehicles acted in the structures, in</p> | | |
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| | | addition to the violent shakes in lateral direction to the track acted on just under the structure around the accident site, caused by the amplified ground motion. | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-8-2.pdf http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2017-8-2-p.pdf (Explanatory material) See summaries of major railway accident and serious incident investigation reports (P.86). | | |
| 21 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | November 30, 2017 | July 9, 2017 Train derailment accompanied with level crossing accident | Nagoya Railroad Co., Ltd. | Hirato-bashi Number 1 level crossing (class one level crossing equipped with automatic barrier machine and road warning device) on the premises of Sanage station, Mikawa Line (Aichi Prefecture) |
| | Summary | While the train was in cruising operation at about 45 km/h and just before to approach Hirato-bashi Number 1 level crossing, the driver of the train noticed a sedan went into the level crossing from right side, and applied an emergency brake immediately, but the train collided with the sedan. The second axle in the front bogie of the front vehicle of the train was once derailed to left, and restored during running operation after that. The driver of the sedan was slightly injured in the accident. | | |
| | Probable Causes | It is probable that the train collided with a sedan and derailed as the sedan went into Hirato-bashi Number 1 level crossing where automatic barrier machine and road warning device were in operation according to the approaching train, because the driver of the sedan did not notice operation of the warning system in the level crossing and entered to the level crossing without temporary stop. It is probable that the driver of the sedan entered to the level crossing without noticing the operation of warning system in the level crossing, in relation with that the driver was handling displayed map of the car navigation device and hearing music in large volume while closing all windows during driving of the sedan. | | |
| | Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-8-1.pdf | | |
| 22 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | December 21, 2017 | June 20, 2017 Level crossing accident | Hokkaido Railway Company | Jinjadoro level crossing (class four level crossing without automatic barrier machine nor road warning device) between Owada station and Fujiyama station, Rumoi Line (Hokkaido) |
| | Summary | While the train was running between Owada station and Fujiyama station, the driver of the train noticed a motor vehicle entering to Jinjadoro level crossing, class four level crossing, and applied an emergency brake immediately, but the train collided with the motor vehicle. The driver of the motor vehicle was dead in the accident. | | |
| | Probable Causes | It is highly probable that the accident had occurred as the train collided with a motor vehicle because the motor vehicle entered to Jinjadoro level crossing, class four level crossing without automatic barrier machine nor road warning device, in the situation that the train was approaching. It is somewhat likely that the motor vehicle entered to the level crossing in the situation that the train was approaching, in relation with that the approaching train was difficult to see for the driver seated in the motor vehicle. But it could not be determined the precise situations because the driver of the motor vehicle was dead in the accident. | | |
| Report | http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-9-1.pdf | | | |
| 23 | Date of Publication | Date and accident type | Railway operator | Line section (location) |
| | December 21, 2017 | October 6, 2016 Train derailment | Seino Railway Co., Ltd. | Between Otomezaka station and Mino-Akasaka station, Ichihashi Line (Gifu Prefecture) |

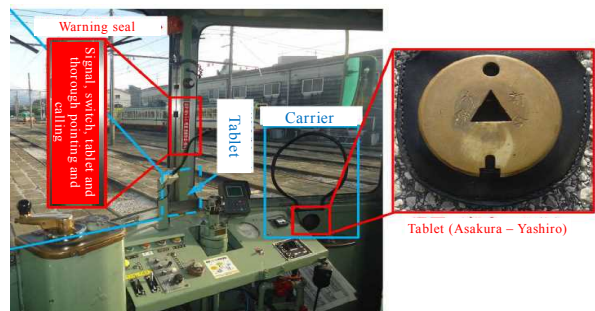


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| <p>Summary</p> | <p>The driver of the train, while the train was running before reaching Mino-Akasaka station, felt that the velocity decelerated quickly than as usual, then he checked backward of the train and found that the freight wagons were tilted. The driver applied an emergency brake immediately to stop the train.</p> <p>The driver checked the train and found that freight wagons were derailed, then he communicate with the related staffs such as the station master of Mino-Akasaka station, etc. Station master of Mino-Akasaka station checked the status of the accident site, and found that all 2 axles in the rear bogie of 11th freight wagon and all 4 axles of 12th freight wagon were derailed to left.</p> <p>There were the driver, the station staff and 2 yard guidance staffs onboard the diesel locomotive, but there was no casualty</p>  |
| <p>Probable Causes</p> | <p>It is probable that the accident had occurred as the right wheel of the front axle in the front bogie of the 12th freight wagon derailed to inside of track, and after running as widening gauge, left wheel of the axle climbed up left rail and derailed, then the front and rear axles in the rear bogie of the 11th freight wagon and the rear axle in the front bogie and front and rear axles in the rear bogie of the 12th freight wagon were derailed, while the train was running in right curved track of 201 m radius.</p> <p>It is somewhat likely that the right wheel of the front axle in the front bogie of the 12th vehicle derailed inside the track, because the right wheel of the front axle in the front bogie came out of the inside rail, i.e., right rail, and dropped, as the irregularity of gauge was widened by running trains, by the weakened support force of rail due to the deteriorated sleepers and the floated loosed rail spikes existed continuously, in addition to wider irregularity of gauge.</p> <p>It is probable that the larger irregularity of gauge and enlarged irregularity of gauge due to passage of trains were related with the lack of the definite management standard to implement proper maintenance about irregularity of gauge, and understanding of maintained status about rail flow, sleepers, rail spikes etc., and the maintenance based on the understandings were not implemented well.</p> |
| <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-9-2.pdf See summaries of major railway accident and serious incident investigation reports (P.88).</p> |

Railway serious incidents reports published in 2017

| 1 | Date of Publication | Date and incident type | Railway operator | Line section (location) |
|-------------------------------|---|---|-----------------------------------|--|
| | May 25, 2017 | July 27, 2016 Violating closure section for construction | Keisei Electric Railway Co., Ltd. | Between Keisei-Usui station and Keisei-Sakura station, Keisei Main Line (Chiba Prefecture) |
| <p>Summary</p> | <p>The assistant manager of Sogo Branch Office of the Conductor's Office received the request to start construction work in the down track between Keisei-Usui station and Sogosando station, from the person in charge of the track closing work. The assistant manager confirmed that the outbound 2345 train, the last train bound for Keisei-Narita station departing from the down track of Sogosando station, had departed from Sogosando station, and approved to start the work.</p> <p>On the other hand, the outbound 2373K train, the last train bound for Keisei-Sakura station, departed from Keisei-Usui station about one minute behind schedule, and went into the closed track section after the start of the work was approved.</p> | | | |
| <p>Probable Causes</p> | <p>It is highly probable that the serious incident had occurred as the 2373K train ran in the closed track section after the approval of the track closing work that should be implemented to stop train operation, because the request to start the work was approved without confirmed arrival of the 2373K train at Keisei-Sakura station, the last train bound for Keisei-Sakura station.</p> <p>It is probable that the approval to start the track closing work without confirmation of arrival of the 2373K train at Keisei-Sakura station, was related the situation that it has been usual situation</p> | | | |

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| | <p>that the regulation, that the track closing procedures should be implemented based on the mutual consensus in the related station masters, was not obeyed, because it was the situation that the absence of trains in the closed track section was confirmed by the departure of the 2345 train from Sogosando station, in the serious incident.</p> <p>Here, it is somewhat likely that the 2373K train entered to the closed track section in the background that the company had treated as the measure not to enter trains into closed track section, only to confirm absence of trains etc., in the closed track section, in the decision of approval to start the track closing work.</p> |  <p>The images show two baskets: Basket 1 (grey) with dimensions approx. 37cm x 48cm x 26cm, weight approx. 760g, material plastic; and Basket 2 (green) with dimensions approx. 39cm x 53cm x 31cm, weight approx. 1700g, material plastic. Other photos show the front of a train with a 'Trace of contact' and damage to a metal net of a traction motor below the train floor.</p> | | |
| <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-inc/RI2017-1-1.pdf See summaries of major railway accident and serious incident investigation reports (P.89).</p> | | | |
| <p>2</p> | <p>Date of Publication</p> <p>November 30, 2017</p> | <p>Date and incident type</p> <p>November 17, 2016 Incorrect management of safety block</p> | <p>Railway operator</p> <p>Tosaden Traffic Co., Ltd.</p> | <p>Line section (location)</p> <p>Between Asakura tram stop and Yashiro tram stop, Ino Line (Kochi Prefecture)</p> |
| <p>Summary</p> | <p>While the tablet instrument block system had been applied in the single track section between Sakura tram stop and Yashiro tram stop, the driver of the 317 vehicle being stopped at Asakura tram stop, received the sign as getting on and off of passengers were completed, from the staff dispatched to Asakura tram stop to control a party of passengers, then started the vehicle from the tram stop.</p> <p>After that, when the vehicle moved about 85 m, the driver of the vehicle noticed that he had no tablet, then decelerated the vehicle, but he found the 316 vehicle, composed of one railway vehicle, started from Ino tram stop bound for Monju-Dori tram stop, in about 90 m ahead, then he stopped the 317 vehicle.</p> <p>On the other hand, the driver of the 316 vehicle, while operating between Asakurajinja-Mae tram stop and Asakuraeki-Mae tram stop, noticed the 317 vehicle stopped at about 60 m ahead, then stopped the 316 vehicle at about 5 m before Asakuraeki-Mae tram stop.</p> <p>There were about 70 passengers and the driver were onboard the 317 vehicle, and about 25 passengers and the driver were onboard the 316 vehicle, but there was no casualty.</p> | | | |
| <p>Probable Causes</p> | <p>It is highly probable that the serious incident had occurred as the 317 vehicle ran in the safety section where the 316 vehicle had existed, because the driver of the 317 vehicle started the vehicle from Asakura tram stop without carrying the tablet, in the single track section between Asakura tram stop and Yashiro tram stop where the tablet instrument block system had been applied.</p> <p>It is highly probable that the driver started the vehicle without carrying the tablet because he did not confirm to carry tablet and forgot the transferring tablet before starting the vehicle.</p> <p>It is somewhat likely that the driver started the vehicle without carrying the tablet, because the driver judged simplistically that he could start the vehicle when he received sign of completion of getting on and off of passengers, from the staff to control passengers.</p> <p>It is probable that these situations were related with that the driver was lacking sense for the company's rule that the driver should start operation of vehicle after confirming that there was no hindrance to start vehicle such as completion of getting on and off of passengers, the safety system, etc.</p> | | | |
| <p>Report</p> | <p>http://www.mlit.go.jp/jtsb/railway/rep-inc/RI2017-2-1.pdf</p> | | | |



7 Actions taken in response to recommendations in 2017

There were no actions taken in response to recommendations in 2017.

8 Provision of factual information in 2017

There were no cases of provision of factual information in 2017.

Column

On Investigation into Kyushu Shinkansen Derailment Accident

Railway Accident Investigator

A major earthquake with a magnitude of 6.5 (maximum seismic intensity of 7) occurred beneath the Kumamoto area in Kumamoto Prefecture at 21:26 on April 14, 2016, which was followed by another shock with a magnitude of 7.3 (maximum seismic intensity of 7) at 1:25 on April 16. The two earthquakes (foreshock and mainshock of the 2016 Kumamoto earthquakes) caused train derailment accidents on the Kyushu Shinkansen Line and the Hoho Line. But no human damage was caused because the two trains were deadheading and were carrying no passengers. In this report, I will recall the initial investigations into the Shinkansen bullet train derailment accident, conducted amid the continuation of aftershocks, and a simulation-based analysis of what happens to a train when a large-scale earthquake occurs.

Three accident investigators, who were appointed to investigate the accident in the dead of night on April 14, arrived at Kumamoto Airport before 10 a.m. on April 15 (the airport was then closed until April 19). As the secretariat in Tokyo began necessary work immediately after the initial quake, including collection of information, coordination with organs concerned and arrangement of transportation, we, the investigators, could smoothly start investigations after our arrival in Kumamoto.

At the accident site, no major damage to the viaduct was confirmed but many wheelsets of the train were derailed, seriously damaging the track. As investigations into the train at the accident site had to be done in a manner enabling the investigators and others involved to evacuate for fear of a possible collapse of the train when an aftershock occurred, close-up checking of the train was avoided. Visual records taken by video cameras from distant positions proved highly useful for subsequent fact checking and analyses.

Before dawn on April 16, the bigger “2016 Kumamoto Earthquake (mainshock)” occurred and dealt serious blows to railway networks in Kumamoto Prefecture and its vicinity, including a derailment accident on the Hoho Line. Although we moved by car for our investigation of the Kyushu Shinkansen on April 16, we eventually had no other choice but to abandon the day’s investigation because we were stuck in heavy traffic congestion in the city of Kumamoto.

The analysis of the accident based on factual information gathered through subsequent investigations at the accident site, collection of information and other activities went smoothly. But a simulation-based analysis was necessary to surmise and estimate jolts on the surface of the ground near the site of derailment and movements of the train while in motion until its derailment. We therefore invited expert members and listened to them and advanced the analytical work, receiving cooperation from the Railway Technical Research Institute and others. For the means of estimating jolts on the surface of the ground directly under the viaduct near the place of derailment from records logged by the Japan Meteorological Agency’s seismometers, we conducted careful studies, using seismological records taken at the time of the mainshock and many aftershocks. We carried out the analytical work as fast as we could and completed it in around March 2017, finding that the time, place, situation and others of the derailment generally corresponded to results of analyses based on factual information. As an analytical conclusion we obtained, the installation of anti-derailment guards prevents the occurrence of derailment.

A series of deliberations were held on a railway accident report (draft) describing the abovementioned results and others and the report was released on November 30, 2017, roughly one year and a half after the accident. Taking the risks of earthquake and derailment occurrence, large-scale damage that may be caused by the post-derailment running of trains and other factors into consideration, we proposed in the report the further installation and advancement of anti-derailment guards and other measures to prevent accident recurrence. We hope that the report will contribute to the further safety improvement of Shinkansen trains when a large-scale earthquake occurs.

We would like to take this opportunity to thank expert members and the Railway Technical Research Institute for their great contribution to our investigation.

9 Summaries of major railway accident and serious incident investigation reports (case studies)

Train derails after hitting and running over fallen trees, earth, etc. that flowed onto track

East Japan Railway Company: Train derailment between Hiratsuto station and Matsukusa station on the Yamada Line

Summary: On December 11, 2015, the inbound local 645D train, composed of one railway vehicle, started from Miyako station bound for Morioka station, Yamada Line of East Japan Railway Company, departed from Hiratsuto station on schedule at 19:24. While the train was running at about 55 km/h between Hiratsuto station and Matsukusa station, the driver of the train found the trees fell on the track ahead, and applied an emergency brake, but the train hit and ran over the fallen trees and earth and sands, etc., flowed onto the track, and stopped.

It was found in the later investigation that all four axles of the vehicle were derailed and the vehicle body was tilted to right. In addition, the slope in left side of the stopped train was collapsed, and earth and sand, etc., flowed onto the track.

There were 22 passengers and 2 train crews, i.e., the driver and the conductor, were onboard the train. Among them, 15 passengers and the driver were injured.

Findings

It is highly probable that the accident occurred as the train derailed after hitting and running over fallen trees and earth, sand and others that flowed onto the track due to the collapse of the slope, derailing all four axles of the front and rear bogies of the vehicle.

The slope is steep, having a gradient of about 60 degrees at the cut earth part near the railway track and of around 35 degrees above it.

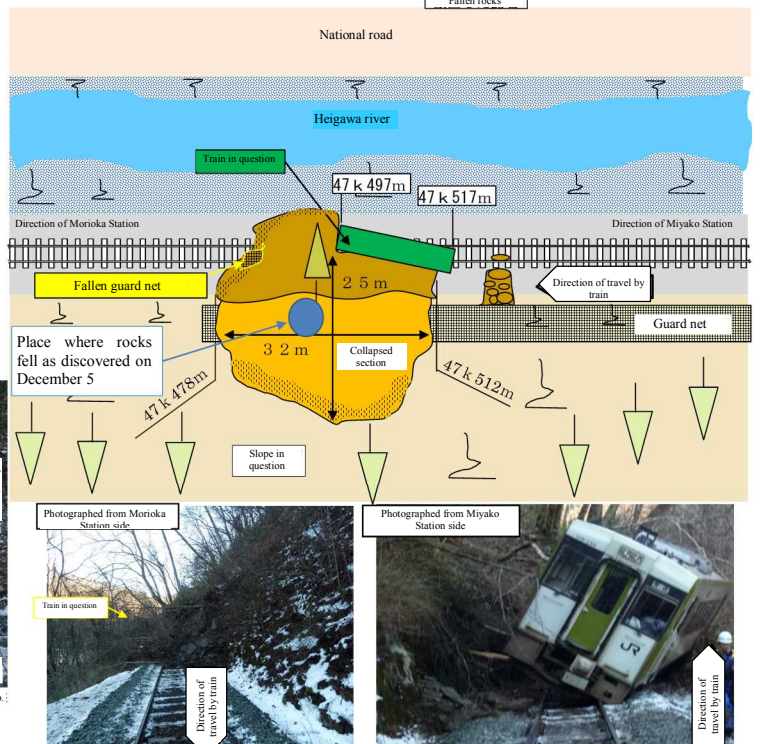
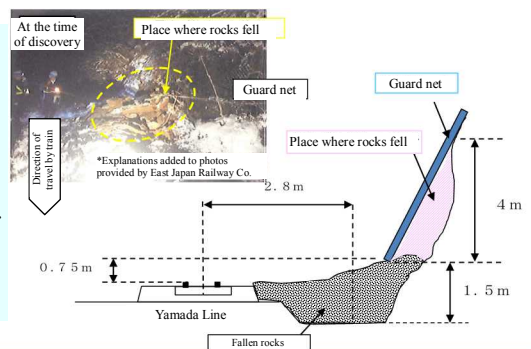
It is somewhat likely that there was a layer of weathered clayslate to a depth of around 10m from the surface of the ground and the surface of the slope was destabilizing.

It is somewhat likely that rainwater, etc. permeated into the slope due to stoppage of rainfall and snow melting and made the surface of the slope heavier.



On December 5, 2015, before the accident, rocks used to reinforce the slope fell under the guard net placed over the collapsed section of the slope.

It is somewhat likely that rocks fell in a situation almost identical with the collapse of the slope. It is also somewhat likely that the phenomenon was a predictor of the collapse of the slope.



Probable Causes: It is highly probable that the accident had occurred as the train was derailed by hit and ran onto the fallen trees or earth and sand, etc., flowed into railway track due to the collapse of the slope in track side.

It is somewhat likely that the slope collapsed by the increased weight of the surface layer of the slope due to rainfall and melting snow, where the surface layer of the slope had been unstable by the steep slope and weathering.

For details, please refer to the accident investigation report. (Published on April 27, 2017)

<http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-3-1.pdf>

Train derails after large side-to-side sways caused by strong jolts

Kyushu Railway Company: Train derailment between Kumamoto station and Kumamoto General Train Depot on the Kyushu Shinkansen

Summary: On April 14, 2016, the 5347A train, composed of six vehicles, started from Hakata station bound for Kumamoto station, Kyushu Shinkansen of Kyushu Railway Company, arrived at Kumamoto station. After that, the train departed from Kumamoto station on schedule at 21:25, in the deadhead operation. While the train was running at about 78 km/h, the driver of the train felt vertical jolts as if the earth were heaving upward, then turned off the powering notch and applied emergency brake immediately. There were large swaying shakes after the vertical jolts. After the train had stopped at around 99,461 m from the origin at Hakata station, the driver got off the train and checked underfloor condition of the vehicles, and found that all 6 vehicles were derailed.

Only the driver was onboard the train, conductors were not boarded, between Kumamoto station and Kumamoto General Train Depot, but there was no casualty.

The earthquake of magnitude 6.5, one of the 2016 Kumamoto Earthquakes, that the hypocenter was in depth of about 11 km in Kumamoto district, Kumamoto Prefecture, had occurred at about 21:26, April 14, 2016. The maximum seismic intensity 7 was observed in Mashiki Town, Kumamoto Prefecture.

Findings

Observation records logged at the Japan Meteorological Agency's seismic station in Kasuga, Nish Ward, Kumamoto City, which is the closest to the accident site, showed steep accelerations in north-south and east-west directions at about 21:26.41 on April 14, 2016.

It is probable that the derailment started before 21:26.44 due to the instantaneous blackout of the ATC device and a plunge in the axle speed of the brake control unit records.

It is highly probable that frequency factors at around a frequency of 1Hz were amplified due to the influence of subsurface ground.

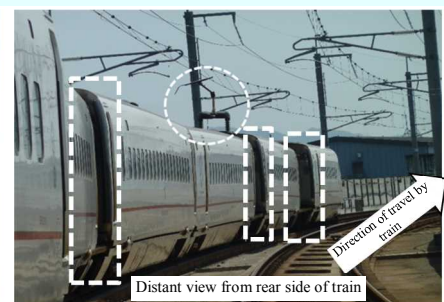
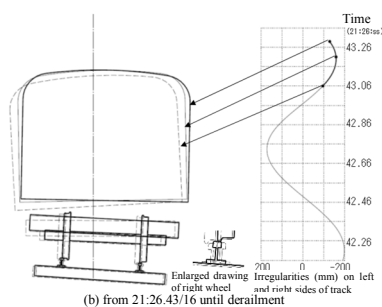
It is probable that wheelsets were pushed side-to-side by lateral force created by large side-to-side shakes of the railway track, causing the wheels to rise by more than 30mm (height of flange), and as a result, the flange of either the left or right wheels jumped on a rail before derailment.

According to records, the inner pressure of the air spring of each vehicle began to vibrate at around 21:26.42, possibly suggesting that the train started large side-to-side sways. The vibration of the train occurred roughly about 1 second after the left-mentioned time when the large acceleration was recorded at the left-mentioned seismic station.

While the train was running some 150m after derailment, 22 of all 24 axles derailed, creating a situation unthinkable under normal operating conditions.

It is probable that vibrations were amplified at the structure's frequency of around 1.3Hz, affected by the natural frequency of the structure.

It is probable that vehicles derailed on both the left and right sides of the direction of travel because structural differences in the positions of individual vehicles running on the viaduct at the same time caused moderate differences in the vibrations each vehicle received from the track so that each vehicle showed different movements.



Probable Causes: It is probable that the accident occurred as the train was derailed due to being acted by the ground motion of the earthquake occurred on about 21:26, April 14, 2016, which was one of the 2016 Kumamoto Earthquakes. As for the process to the derailment, it is probable that many axles were derailed almost the same timing, because each vehicle in the train rolled significantly and wheel flanges of left or right wheels jumped on the rail, due to the amplified rolling motion in the frequency range to promote rolling of vehicles acted in the structures, in addition to the violent shakes in lateral direction to the track acted on just under the structure around the accident site, caused by the amplified ground motion.

For details, please refer to the accident investigation report. (Published on November 30, 2017)
<http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2017-8-2.pdf>

Train derails after running on rails on deteriorated sleepers and those with flaws such as loosened rail spikes

Seino Railway Co., Ltd.: Train derailment between Otomezaka station and Mino-Akasaka station on the Ichihashi Line

Summary: On October 6, 2016, the inbound 1022 train, composed of total 25 vehicles, i.e., a diesel locomotive and 24 freight wagons, started from Otomezaka station bound for Mino-Akasaka station, departed from Otomezaka station at 08:08. The driver of the train, while the train was running before reaching Mino-Akasaka station, felt that the velocity decelerated quickly than as usual, then he checked backward of the train and found that the freight wagons were tilted. The driver applied an emergency brake immediately to stop the train.

The driver checked the train and found that freight wagons were derailed, then he communicate with the related staffs such as the station master of Mino-Akasaka station, etc. Station master of Mino-Akasaka station checked the status of the accident site, and found that all 2 axles in the rear bogie of 11th freight wagon and all 4 axles of 12th freight wagon were derailed to left.

There were the driver, the station staff and 2 yard guidance staffs onboard the diesel locomotive, but there was no casualty.

Findings

The last inspection into track irregularities, made on April 5, 2016, before the accident in question near the place where the derailment started found gauge irregularities and cross-level irregularities in excess of maintenance standards.

Before the accident, the last track maintenance work near the place where the derailment started was conducted on April 2, 2014. It is probable that no other track maintenance work had been done until the occurrence of the accident.

As there were differences equivalent to rail flaws between gauge data measured by the inspection and the actual track, it is probable that the actual track with an abraded rail flaw was larger than the measured figure.

It is probable that a rail flaw had dropped off the right rail (inner rail) near the place where the derailment started, further enlarging the gauge.

Seino Railway Co. had not set the period of implementing track improvements in its track-related maintenance standards in the case of irregularities exceeding the maintenance standards.

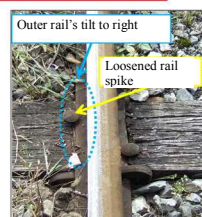
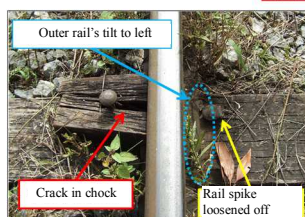
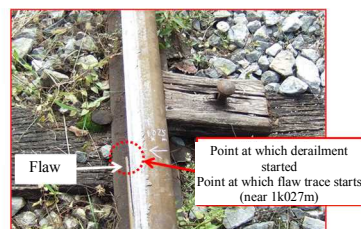
Before the accident, the last inspection into sleepers and the rail fastening device near the place where the derailment started was conducted on May 10, 2016, recording that four sleepers and one sleeper needed to be continuously monitored and replaced, respectively.

It is probable that the sleeper considered involved in the derailment was not among the sleepers that were subjected to continuous monitoring as a result of the company's regular inspection.

It is somewhat likely that spikes were less effective in fastening rails due to the successive deterioration of six sleepers at the time of the accident or a broken chock made the function of gauge irregularity prevention unworkable.

It is probable that the company neither grasped the maintenance condition of the sleepers and rail fastening devices nor adopted sufficient necessary actions.

"Flaw" in the circle means "rail flaw."



Probable Causes (excerpt): It is probable that the accident had occurred as the right wheel of the front axle in the front bogie of the 12th freight wagon derailed to inside of track, and after running as widening gauge, left wheel of the axle climbed up left rail and derailed, then the front and rear axles in the rear bogie of the 11th freight wagon and the rear axle in the front bogie and front and rear axles in the rear bogie of the 12th freight wagon were derailed, while the train was running in right curved track of 201 m radius.

It is somewhat likely that the right wheel of the front axle in the front bogie of the 12th vehicle derailed inside the track, because the right wheel of the front axle in the front bogie came out of the inside rail, i.e., right rail, and dropped, as the irregularity of gauge was widened by running trains, by the weakened support force of rail due to the deteriorated sleepers and the floated loosed rail spikes existed continuously, in addition to wider irregularity of gauge.

For details, please refer to the accident investigation report. (Published on December 21, 2017)
<http://www.mlit.go.jp/jtsb/railway/rep-acc/RA2017-9-2.pdf>

Train enters closed track section after approval for start of construction in the section

Keisei Electric Railway Co., Ltd.: Serious Incident between Keisei–Usui station and Keisei–Sakura station, Keisei Main Line (Violating closure section for construction)

Summary: On July 27, 2016, the assistant manager of Sogo Branch Office of the Conductor's Office accepted the request to start track closing work in the down track between Keisei-Usui station and Sogosando station, from the person in charge of the track closing work. The assistant manager confirmed that the outbound 2345 train, the last train bound for Keisei-Narita station departing from the down track of Sogosando station, had departed from Sogosando station, and approved to start the work at about 00:51. On the other hand, the outbound 2373K train, the last train bound for Keisei-Sakura station, departed from Keisei-Usui station about one minute behind schedule, at about 00:55, and went into the closed track section after the start of the work was approved.

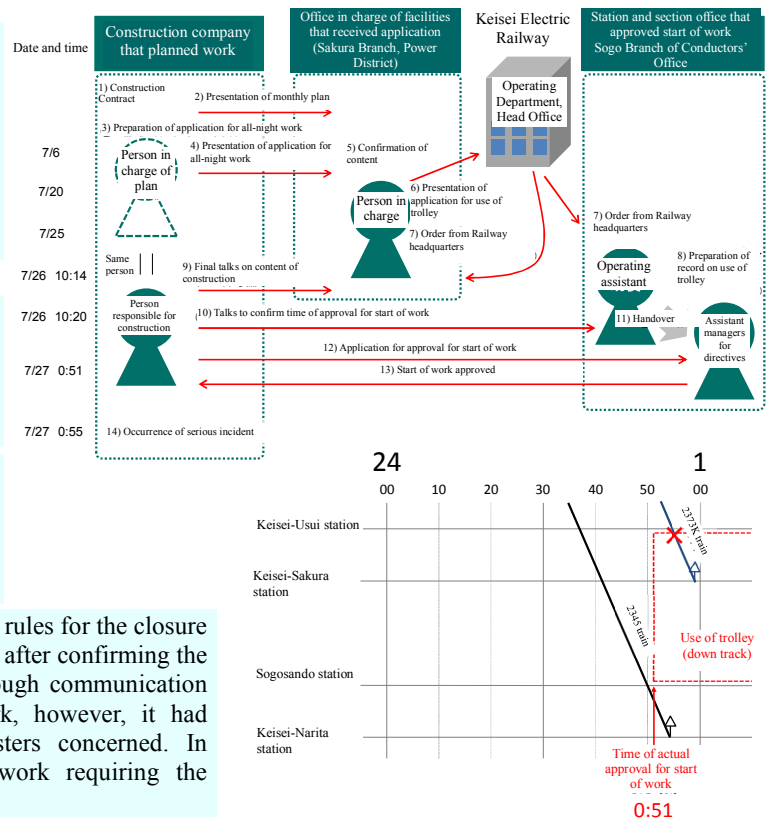
Findings

A person responsible for closing a track submitted an application for all-night work based on misunderstanding that the departure of the last train from Sogosando Station was the time of approval for starting closed-track work, although the person should have confirmed the time of arrival by the last train, bound for Keisei-Sakura Station, at Keisei-Sakura Station.

An official concerned at an office in charge of facilities in the track section concerned, who received the application, failed to inform the correction of time to approve the start of the closed-track work.

The assistant manager for directives, who approved the start of the closed-track work, approved the start without confirming the presence or absence of any train in all sections closed for the work.

According to Keisei Electric Railway Co., Ltd.'s rules for the closure of tracks, approval for the start of work is issued after confirming the absence of trains in a closed track section through communication with stationmasters concerned. In actual work, however, it had become customary not to inform stationmasters concerned. In addition, there had been little closed-track work requiring the confirmation of multiple trains.



The company has rules banning the entry of any train, etc. into a closed track section. In the implementation of the rules, however, it is highly probable that the ban on entry of any train, etc. into a closed track section was effectuated only by confirming the presence of no train, etc. in the closed section after the end of operations in the section. As judging the end of train services in this method exclusively relies on confirmation by stationmasters concerned, it is highly probable that the entry of a train into a closed section was possible in case of an error in confirmation by any stationmaster. It is probable that this kind of handling by the company was inadequate in preventing any train from entering a closed section.

Probable Causes (excerpt): It is highly probable that the serious incident had occurred as the 2373K train ran into the closed track section after the approval of the track closing work that should be implemented to stop train operation, because the request to start the work was approved without confirmed arrival of the 2373K train at Keisei-Sakura station, the last train bound for Keisei-Sakura station.

It is probable that the approval to start the track closing work without confirmation of arrival of the 2373K train at Keisei-Sakura station, was related the situation that it has been usual situation that the regulation, that the track closing procedures should be implemented based on the mutual consensus in the related stationmasters, was not obeyed, because it was the situation that the absence of trains in the closed track section was confirmed by the departure of the 2345 train from Sogosando station, in the serious incident.

For details, please refer to the serious incident investigation report. (Published on May 25, 2017)
<http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2017-1-1.pdf>