Chapter 3 Railway accident and serious incident investigation

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);
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) an accident found to be likely to have been caused owing to a railway officer's error in handling or owing to malfunction, injury, 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 that causes five or more casualties;

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 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

<table>
<tr><th>Category</th><th>Train collision</th><th>Train derailment</th><th>Train fire</th><th>Level crossing accident</th><th>Accident against road traffic</th><th>Other accidents with casualties</th><th>Heavy property loss without casualties</th></tr>
<tr><td rowspan="2">Railway (including tramway operated as equivalent to railway)

[Notice 1-3]</td><td colspan="3" rowspan="2">All accidents
(These refer to train accidents and do not include vehicle accidents on railways.*1)
[Ordinance 1-1]</td><td colspan="4">・Accidents involving the death of a passenger, crew member, etc.
・Accidents involving five or more casualties
・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]</td><td></td></tr>
<tr><td colspan="5">Accidents that are particularly rare and exceptional [Ordinance 1-3]</td></tr>
<tr><td>Dedicated railway</td><td colspan="8">Accidents that are particularly rare and exceptional [Ordinance 1-4]</td></tr>
<tr><td rowspan="2">Tramway
[Ordinance 1-5]</td><td colspan="7">Accidents involving the death of a passenger, crewmember, etc., and accidents involving five or more casualties
[Notice 1-1]</td><td></td></tr>
<tr><td colspan="8">Accidents that are particularly rare and exceptional [Notice 1-2]</td></tr>
</table>

*1: Among vehicle collisions, derailments, and fires on railways, accidents that fall under the category of level crossing accident, accidents against road traffics , or other accidents with casualties and which involve the death of a passenger, crewmember, etc. [Ordinance 1-2] or which are particularly rare and exceptional [Ordinance 1-3] are to be investigated.

(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 Tramway 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, injury, 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, injury, 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 in 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))

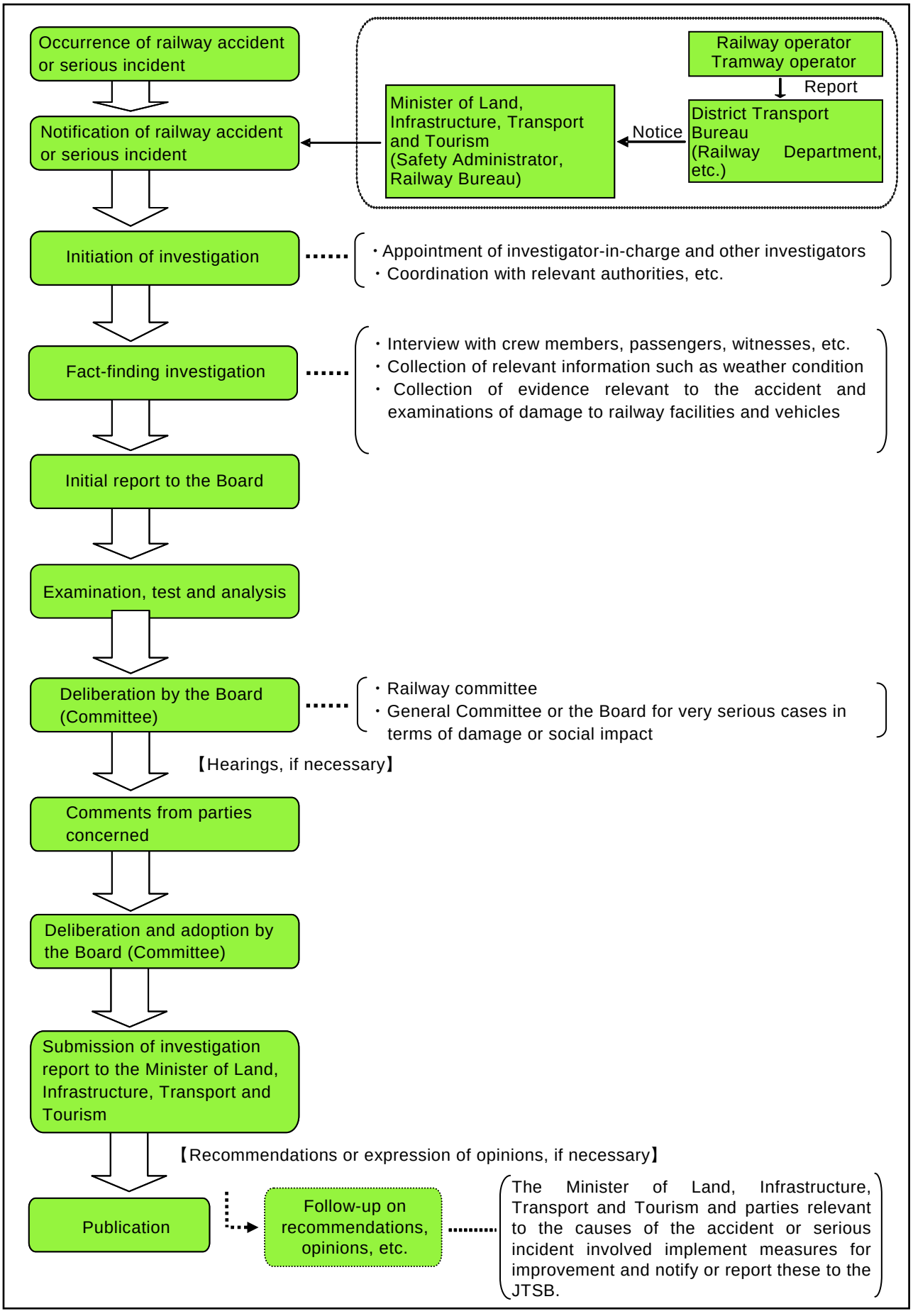
1. The situation specified in item 1 of Article 2 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), wherein another vehicle operating on the main track had existed in the zone specified in said item;
   [A situation where a vehicle is operating on the main track for the purpose 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, injury, 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, injury, 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 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 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

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

(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 2012 as follows:

Sixteen accident investigatons had been carried over from 2011, and 20 accident investigatons newly launched in 2012. Thirteen investigation reports were published in 2012, and thereby 23 accident investigations were carried over to 2013.

Two serious incident investigatons had been carried over from 2011, and five serious incident investigatons newly launched in 2012. One investigation report was published in 2012, and thereby six serious incident investigatons were carried over to 2013.

Among the 14 reports published in 2012, one was issued with recommendations and two with remarks.

Investigations of railway accidents and serious incidents in 2012

(Cases)

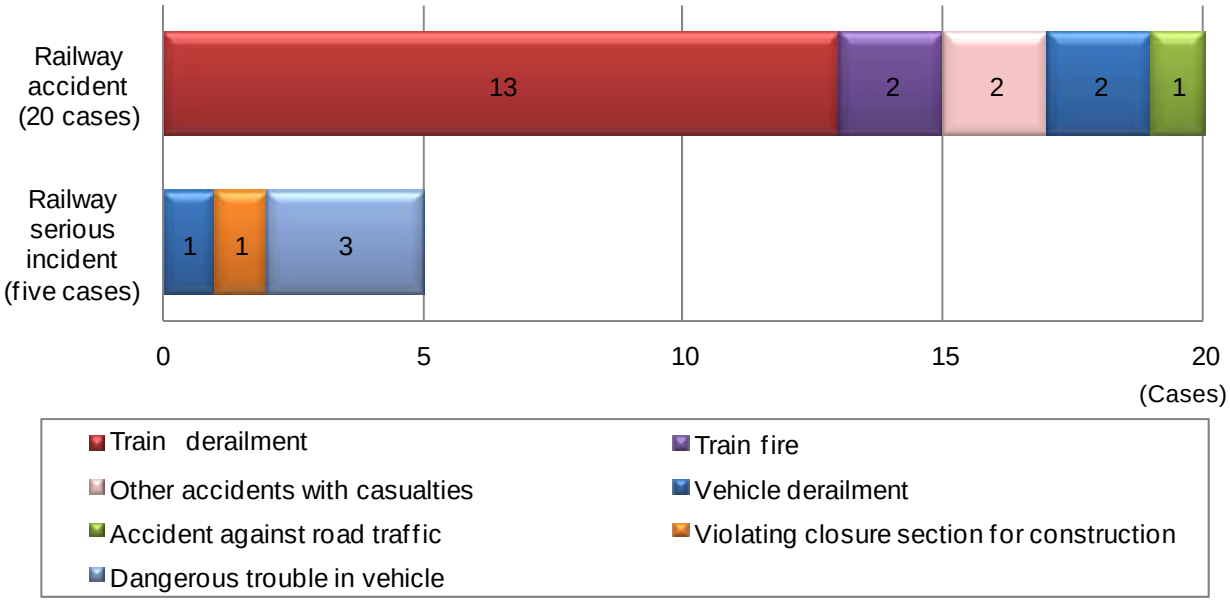
Category	Carried over from 2011	Launched in 2012	Total	Published investigation report	(Recommendations)	(Opinions)	(Remarks)	Carried over to 2013	(Interim report)
Railway accident	16	20	36	13	(0)	(0)	(2)	23	(1)
Railway serious incident	2	5	7	1	(1)	(0)	(0)	6	(0)

4. Statistics of investigations launched in 2012

The investigations launched in 2012 included 20 accidents, up six cases from 14 cases for the previous year, and five serious incidents, up three cases from two cases for the previous year.

With regard to railway accident cases, there were 13 cases of train derailment, two cases of train fire, two cases of other accidents with casualties, two cases of vehicle derailment and one case of accident against road traffic. With regard to railway serious incidents, there were one case of vehicle derailment, one case of violating closure section for construction and three cases of dangerous trouble in vehicle.

Number of railway accidents and serious incidents by type



In the 20 railway accidents, the number of casualties was 82, consisting of one death and 81 injured persons. These accidents included an accident in July 2012 in which a train watchman was hit to death by a limited express train entering the platform, and another accident in September in which a train ran onto the pile of earth and sand, and the front three cars of the train were derailed and the front four cars came to a halt in a tunnel, and 53 persons were injured (nine seriously injured and 44 slightly injured).

Number of casualties (railway accidents)

(Persons)

2012							
Category	Dead			Injured			Total
	Crew	Passenger	Others	Crew	Passenger	Others	
Casualties	0	0	1	2	72	7	82
Total	1			81			

5. Summaries of railway accidents and serious incidents which occurred in 2012

Railway accidents and serious incidents which occurred in 2012 are summarized as follows. The summaries are based on the information available at the start of the investigations, and therefore may change depending on the course of investigations and deliberations.

(Railway accidents)

No.	Date and accident type	Operator and line section (location)	Summary
1	Jan. 04, 2012 Train fire	Toyama Chihou Tetsudou, Inc. On the premises of Tateyama station, Tateyama Line (Toyama Prefecture)	After the passengers got off the train which arrived at Tateyama station, the driver of the train noticed smoke emitting from under the floor. The fire was extinguished after spreading to the inside of the car.
2	Feb. 04, 2012 Accident against road traffic	Nagasaki Electric Tramway Co., Ltd. Between Oura Kaigan-dori and Shimin Byoin Mae stops, Oura Branch Line (Nagasaki Prefecture)	Refer to "6. Publication of investigation reports" (No.11 on page 45).
3	Feb. 16, 2012 Train derailment	Japan Freight Railway Company On the premises of Higashi-Oiwake station, Sekisho Line (Hokkaido Prefecture)	Although the driver of the train applied the brake to stop the train at Higashi-Oiwake station, the train ran into the safety siding without slowing down, and ran over the car stop. The train was derailed and penetrated the snow shelter.
4	Feb. 17, 2012 Other accidents with casualties	West Japan Railway Company On the premises of Nishi-Akashi station, San-yo Line (Hyogo Prefecture)	The train collided with a truck entering the level crossing on the service road in the premises of Nishi-Akashi station. Nine passengers and the truck driver were injured.
5	Feb. 29, 2012 Train derailment	Hokkaido Railway Company On the premises of Yakumo station, Hakodate Line (Hokkaido Prefecture)	After leaving Yakumo station, both axles of the front bogie were derailed near the turnout.
6	Mar. 07, 2012 Train derailment	Hokkaido Railway Company Between Hashibetsu and Mashike stations, Rumoi Line (Hokkaido Prefecture)	While coasting at about 55 km/h, the train ran onto the pile of earth and sand which had flown onto the railway track, and both axles of the front bogie were derailed.
7	Mar. 30, 2012 Train derailment	Toyama Chihou Tetsudou, Inc. On the premises of Uchiyama station, Main Line (Toyama Prefecture)	Hearing an abnormal sound when the train was running along a down and rightward curved track before the turnout, the driver stopped the train near the turnout. It was found that the front axle was derailed to the left.
8	Apr. 04, 2012 Train fire	East Japan Railway Company On the premises of Kujira-nami station, Shin-etsu Line (Niigata Prefecture)	When entering Kujira-nami station, the train driver noticed an abnormal value of the trolley voltage indicator in the driver's cab. After arriving at the station, the driver noticed smoke emitting from around the pantograph of the second car from the front, and evacuated about fifty passengers from the train. It was found that the roof of the car was burning.

No.	Date and accident type	Operator and line section (location)	Summary
9	Apr. 26, 2012 Train derailment	Japan Freight Railway Company Between Izumisawa and Kamaya stations, Esashi Line (Hokkaido Prefecture)	After the train arrived at Goryokaku station, the assistant master of the station noticed smoke emitting from the bogie of the third freight car from the rear, and used a fire extinguisher. On the other hand, it was found that a turnout could not be switched at Kamaya station. Furthermore, it was found that there were continuous marks along the track in the direction to Izumisawa station which indicated that a train ran with derailed cars.
10	Jun. 11, 2012 Vehicle derailment	Okayama Electric Tramway Co., Ltd Between Kencho-dori and Saidaiji-cho stops, Higashiyama Main Line (Okayama Prefecture)	A tram passing through the intersection collided with a passenger car which was turning right in the intersection from the opposite direction. All of the four axles of the tram were derailed.
11	Jun. 19, 2012 Train derailment	Hakone Tozan Railway Co., Ltd. Between Deyama Signal station and Ohiradai station, Train Line (Kanagawa Prefecture)	The train running at about 20 km/h with powering ran onto a chunk of rock, and the first axle of the first car's front bogie was derailed.
12	Jun. 25, 2012 Train derailment	Shikoku Railway Company Between Konokawa and Iyo-Kaminada stations, Yosan Line (Ehime Prefecture)	The train ran onto the pile of earth and sand caused by the landslide on the railway track, and all of the four axles were derailed.
13	Jul. 24, 2012 Other accidents with casualties	Central Japan Railway Company On the premises of Higashi-Shizuoka station, Tokaido Line (Shizuoka Prefecture)	A train watchman walking along the railway track on his way to the designated lookout place was hit by the train. The train watchman was killed in the accident.
14	Jul. 28, 2012 Train derailment	Toyama Chihou Tetsudou, Inc. On the premises of Kamihori station, Kamidaki Line (Toyama Prefecture)	While entering Kamihori station, the train driver noticed abnormal sound and shock. He immediately operated the emergency brake. It was found that all of the eight axles of the 2-car train were derailed.
15	Sep. 11, 2012 Train derailment	Japan Freight Railway Company Between Kamaya and Izumisawa stations, Esashi Line (Hokkaido Prefecture)	While running through the premises of Izumisawa station at about 60 km/h, the emergency brake of the train was activated at a location near the up starting signal and the train came to a halt. When the driver reported the situation to the train dispatcher and checked the condition of the cars, it was found that the brake hose joining the 8th and 9th freight cars was disconnected, and the two cars were derailed.
16	Sep. 15, 2012 Vehicle derailment	Tosa Electric Railway Co., Ltd Between Nagasaki and Kogome-dori stops, Gomen Line (Kochi Prefecture)	A tram passing through the intersection collided with a truck which entered the intersection from the left. Both axles of the tram's front bogie were derailed. Eight persons (six passengers, the tram driver and the truck driver) were injured.

No.	Date and accident type	Operator and line section (location)	Summary
17	Sep. 24, 2012 Train derailment	Keikyu Corporation Between Oppama and Keikyu-Taura stations, Main Line (Kanagawa Prefecture)	While the train was coasting at about 75 km/h, the train driver noticed earth and sand piled up on the railway track 30 to 40 meters ahead, and applied the emergency brake. However, the train ran onto the earth and sand, and the front three cars were derailed to the right. The earth and sand contained a concrete block and fallen trees. The front four cars halted inside the tunnel, and the front three cars were derailed to the right. Nine persons were seriously injured (passengers), while forty-four persons were slightly injured (forty-three passengers and one driver).
18	Oct. 14, 2012 Train derailment	Kyushu Railway Company On the premises of Kagoshima Central station, Kagoshima Line (Kagoshima Prefecture)	After departing from Kagoshima Central station on schedule, the driver of the local train (2-car train set) noticed something abnormal with the passengers, and stopped the train by applying the service brake. It was found that both axles of the second car's rear bogie were derailed (both axles of the front bogie got back on the rails after derailment). 156 passengers and the driver on board were not injured.
19	Nov. 08, 2012 Train derailment	Sangi Railway Co., Ltd On the premises of Misato station, Sangi Line (Mie Prefecture)	The local train (3-car train set) ran into the safety siding of Misato station, and all of the four axles of the first car were derailed. Two passengers and one driver were on board the train, but they were not injured.
20	Dec. 15, 2012 Train derailment	Kyushu Railway Company Between Setoishi and Kaiji stations, Hisatsu Line (Kumamoto Prefecture)	While running at about 65 km/h, the driver of the limited express train (2-car train set) found a fallen rock about 30 meters ahead, and applied the emergency brake. However, it was too late, and the train collided with the fallen rock. The second axle of the second car's front bogie was derailed. Forty-five passengers and two crew members were on board the train, but they were not injured.

(Railway serious incidents)

No.	Date and incident type	Operator and line section (location)	Summary
1	Jun. 04, 2012 Dangerous trouble in vehicle	East Japan Railway Company Between Koriyama and Mougi stations, Ban-etsu East Line (Fukushima Prefecture)	When the door-pilot lamp in the driver's cab was extinguished while running the train, the driver immediately stopped the train by applying the emergency brake. After stopping the train, it was found that the right rear door of the third car was open.
2	Jun. 19, 2012 Dangerous trouble in vehicle	Fukui Railway Co., Ltd On the premises of Sanju-Hassha station, Fukubu Line (Fukui Prefecture)	When the train slowed down to the station, it was found that the right rear door of the first car was open.

No.	Date and incident type	Operator and line section (location)	Summary
3	Jun. 27, 2012 Vehicle derailment	Sangi Railway Co., Ltd On the premises of Higashi-Fujiwara station, Sangi Line (Mie Prefecture)	While the freight train was passing the turnout, the first axle of the second locomotive derailed near the turnout.
4	Jul. 13, 2012 H24.7.13 Violating closure section for construction	East Japan Railway Company On the premises of Takasaki station, Shin-etsu Line (Gunma Prefecture)	The train entered the section where preparation work for replacing the turnout parts was going on. Recognizing a worker inside the railway track, the driver stopped the train before the working site.
5	Nov. 26, 2012 Dangerous trouble in vehicle	Kyushu Railway Company Between Sue and Sue Central stations, Kashii Line (Fukuoka Prefecture)	When the door-pilot lamp in the driver's cab was extinguished while running the train, the driver immediately stopped the train by applying the emergency brake. It was found that the right front door of the first car was opened by about 30 cm.

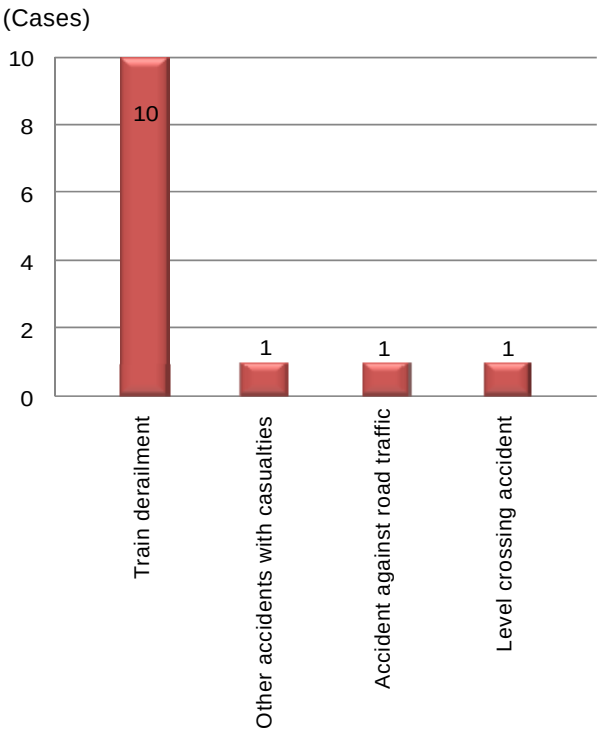
6. Publication of investigation reports

The number of investigation reports of railway accidents and serious incidents published in 2012 was 14, consisting of 13 railway accidents and one serious incident.

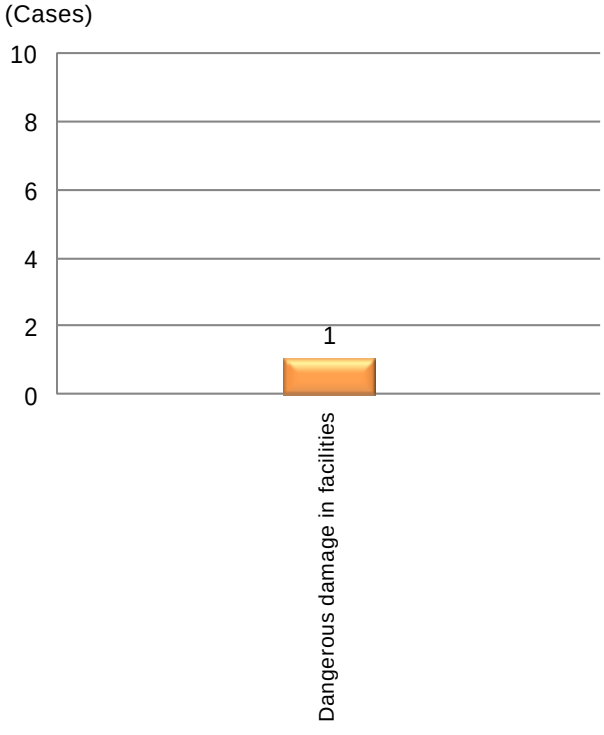
Looking those accidents and serious incident by type, the accidents involved 10 cases of train derailment (including three cases due to level crossing accident), one case of other accidents with casualties, one case of accident against road traffic and one case of level crossing accident. The serious incident was a case of dangerous damage in facilities.

In the 13 accidents, the number of casualties was 21, consisting of two deaths and 19 injured persons.

Railway accident reports (13 cases) published in 2012



Railway serious incident reports (one case) published in 2012



The investigation reports for railway accidents and serious incidents published in 2012 are summarized as follows:

List of published investigation reports on railway accidents (2012)

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
1	Jan.27, 2012	Dec.17, 2010 Train derailment (due to level crossing accident)	Konan Railway Co., Ltd Between Ishikawa-Pool-mae and Ishikawa stations, Owani Line (Aomori Prefecture)	The westbound train (2-car train set) left Ishikawa-Pool-mae station on schedule. While the train was coasting over Hirakawa bridge at 40 to 45 km/h, the driver of the train noticed a mini passenger car entering Ishikawa-Yagishi level crossing from the right. The driver immediately blew the horn and applied the emergency brake, but it was too late. The train collided with the mini passenger car and came to a halt at about 72 meters past the level crossing. The first axle of the first car's front bogie was derailed to the right. Among the 26 passengers and two crew members (a driver and a conductor) on board the train, one passenger and the conductor were injured. The driver who was the only person in the mini passenger car was injured. The train suffered damage to the front and side surface of the first car. The mini passenger car was severely damaged, but no fire occurred.
2	Jan.27, 2012	Dec.17, 2010 Other accidents with casualties	West Japan Railway Company On the premises of Maiko station, San-yo Line (Hyogo Prefecture)	The eastbound rapid train (12-car train set) left Maiko station on schedule. After leaving the station, the conductor of the train noticed a man waving something white on the platform at a location near the stop position for the train's 5th or 6th car. The conductor operated an emergency switch in the conductor's cabin to bring the train to a halt. The train came to a halt after running about 76 meters from the departure position. It was found that a woman had fallen on the railway track, who was later confirmed dead. A woman who got off the train with the dead woman and was on the platform tried to save the fallen woman. She had her leg injured at that time. About 600 passengers, one driver and one conductor were on board the train, but there were no deaths or injuries. *** The report included remarks**

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
3	Feb.24, 2012	Feb.01, 2011 Level crossing accident	East Japan Railway Company Between Morimiyanohara and Ashidaki stations, Iiyama Line (Niigata Prefecture)	The eastbound train (1-car train set) left Morimiyanohara station behind schedule. While the train was coasting at about 60 km/h, the driver of the train noticed a compact truck (station wagon) entering Daikonbara level crossing ahead from the left. The train driver immediately applied the emergency brake and blew the horn, but it was too late. The train collided with the compact truck, and came to a halt about 75 meters past the level crossing. Seven passengers, one driver and two track maintenance workers were on board the train, but there were no deaths or injuries. The truck driver who was the only person in the truck was killed in the accident. The train suffered damage to the lower cover plate, but it was not derailed. The truck was severely damaged, but no fire occurred. *** The report included remarks**
4	Apr.27, 2012	Jan.01, 2011 Train derailment	West Japan Railway Company Between Higashiyama-Koen and Houki-Daisen stations, San-in Line (Tottori Prefecture)	The eastbound snow-plow train (1-car train set) left Yonago station behind schedule in order to rescue a limited express train which had stopped due to fallen trees between Shimoichi and Mikuriya stations. While powering the snow-plow train at about 10 km/h between Higashiyama-Koen and Houki-Daisen stations, the driver noticed a stop signal indicated on the obstruction warning signal at a level crossing, and stopped the train before the signal. Then, the driver tried to advance the train closer to the level crossing in order to confirm the safety at the level crossing, but the train did not move. When the snow removal crew who were on board the train to rescue the limited express train removed the snow from around the plow head, it was found that the first axle of the plow head was derailed to the left. The driver and four snow removal crew members were on board the train, but there were no deaths or injuries.

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
5	May 25, 2012	Jan.27, 2011 Train derailment	West Japan Railway Company On the premises of Nagahara station, Kosei Line (Shiga Prefecture)	The northbound train (8-car train set) arrived at Nagahara station almost on schedule. When the train arrived, the driver found a snow bank on the track at the stop sign, and the driver stopped the train before the sign. When the driver started up the train to depart on schedule as a turn back operation, the train did not move. He reported the situation to the train dispatcher. When workers sent by the train dispatcher arrived and removed the snow, it was found that both axles of the 8th (rearmost) car's rear bogie were derailed to the left. Four passengers and two crew members were on board the train, but there were no deaths or injuries.
6	Jun.29, 2012	Mar.10, 2011 Train derailment	Japan Freight Railway Company Between Kuzumi and Namegawa stations, Narita Line (Chiba Prefecture)	The northbound high-speed freight train (10-car train set) passed Kuzumi station on schedule. When entering the premises of Namegawa station while coasting, the emergency brake of the train was activated, and the train stopped in the premises of the station. As the emergency brake could not be released after the train stopped, the driver inspected the train by order of the train dispatcher. It was found that the 8th and 9th freight cars of the train were separated from each other, the 9th freight car was derailed and overturned to the right, and the 10th freight car was derailed to the right. The train was scheduled to pass by a southbound passenger train at that station. There were marks on the sleepers, etc., indicating that the train was running with derailed cars before entering the station. One driver was on board the train, but the driver was not injured.
7	Jun.29, 2012	Mar.11, 2011 Train derailment	Japan Freight Railway Company On the premises of Nagamachi station, Tohoku Line (Miyagi Prefecture)	The southbound high-speed freight train (21-car train set) left Miyagino station on schedule. When passing Nagamachi station at about 45 km/h, the driver of the train received a train protection radio and an emergency stop radio, and at the same time, felt a shake. The driver applied the service brake to stop the train. When the driver inspected the train by order of the train dispatcher after the train stopped, it was found that the second axle of the 14th freight car's front bogie was derailed to the right. One driver was on board the train, but the driver was not injured.

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
8	Jun.29, 2012	Jul.14, 2011 Train derailment	East Japan Railway Company On the premises of Tokusawa station, Ban-etsu West Line (Fukushima Prefecture	The eastbound local train (3-car train set) left Kanose station on schedule. When the train was coasting in the Nishikawa tunnel on the premises of Tokusawa station at about 35 km/h, the driver of the train noticed a chunk of rock between the rails at about 27 meters ahead of the tunnel's exit. The driver immediately applied the emergency brake, but it was too late, and the train ran onto the rock. Both axles of the first car's front bogie were derailed to the right while both axles of the rear bogie were derailed to the left. Twelve passengers and two crew members (a driver and a conductor) were on board the train, but there were no injuries.
9	Aug.31, 2012	Nov.01, 2011 Train derailment (due to level crossing accident)	Chichibu Railway Co., Ltd Between Higuchi and Nogami stations, Chichibu Main Line (Saitama Prefecture)	The eastbound one-man-operated local train (3-car train set) left Nogami station a minute behind schedule. While the train was coasting at about 78 km/h, the driver of the train noticed a large truck standing inside Higuchi No.3 level crossing when the train came about 200 meters before the crossing. The driver blew the horn and applied the emergency brake, but it was too late. The train collided with the large truck. While both axles of the first car's front bogie were derailed to the right and both axles of the rear bogie were derailed to the left, the train came to a halt about 30 meters past the crossing. About forty passengers and the driver were on board the train, and four passengers and the driver were injured. Having got off before the accident occurred, the driver of the large truck was not injured. The train suffered damage to the front surface and underfloor equipment of the first car. The large truck was severely damaged, but no fire occurred.

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
10	Aug.31, 2012	Dec.27, 2011 Train derailment	Japan Freight Railway Company On the premises of Gifu Freight Terminal station, Tokaido Line (Gifu Prefecture)	The westbound high-speed freight train (27-car train set) departed from Track No.1 at Gifu Freight Terminal station. After passing the switches at about 35 km/h while keeping the master controller at powering notch, the driver of the train noticed that the trouble indication lamp in the driver's cab was lighted, and at the same time the emergency brake was activated. A duty station master in the station office heard a large sound and found a train running while raising a cloud of dust. The duty station master immediately set the simultaneous stop signal mode on, reported the derailment to the train dispatcher and requested train protection. After stopping the train, the driver of the train was informed by the train dispatcher that the train was derailed. The driver found that the 12th and 13th freight cars of the train were separated from each other, and both axles of the 12th freight car's rear bogie as well as both axles of the 13th freight car's front bogie were derailed. One driver was on board the train, but the driver was not killed or injured.
11	Aug.31, 2012	Feb.04, 2012 Accident against road traffic	Nagasaki Electric Tramway Co., Ltd. Between Oura Kaigan-dori and Shimin Byoin Mae stops, Oura Branch Line (Nagasaki Prefecture)	While powering the single-car tram at about 33km/h, the driver noticed a compact passenger car standing while leaving the rear right side of the body inside the tramway on the left side of the direction of travel inside the intersection between Oura Kaigan-dori and Shimin Byoin Mae stops. The driver blew the horn and applied the emergency brake, but the tram collided with the passenger car, and came to a halt about 16.7 meters past the collision point. The passenger car was pushed out forward by the collision, and was made to collide with a compact passenger car which was standing ahead. About thirty-five passengers and one driver were on board the tram, and five passengers were injured. There were two persons in the compact passenger car which collided with the tram, and three persons in the other compact passenger car which was standing ahead. All of the five persons were injured. The tram suffered damage to the front left side of the body, and both of the compact passenger cars were damaged.

No.	Date of publication	Date and accident type	Operator and line section (location)	Summary
12	Sep.28, 2012	Mar.11, 2011 Train derailment	Japan Freight Railway Company Between Hamayoshida and Yamashita stations, Joban Line (Miyagi Prefecture)	The southbound high-speed freight train (21-car train set) was powering at about 80 km/h after passing Hamayoshida station behind schedule, and the driver of the train received a train protection radio, and stopped the train by applying the emergency brake. The driver felt large shaking during the time before the train came to a halt after applying the emergency brake. Just before the train stopped, the driver received a message by radio informing that an earthquake occurred. A tsunami attacked the train about 20 to 25 minutes after the train stopped. When the driver checked the hauling container wagons, it was found that 20 container wagons except the locomotive were derailed and washed away to the right. One driver was on board the train, but the driver was not injured.
13	Nov.30, 2012	Nov.29, 2011 Train derailment (due to level crossing accident)	West Japan Railway Company Between Kaga-Onsen and Daishoji stations, Hokuriku Line (Ishikawa Prefecture)	The westbound limited express train (9-car train set) passed Kaga-Onsen station on schedule. While decelerating the train speed along the straight line section, the driver of the train noticed a compact passenger car at Shinsuganami level crossing, and immediately applied the emergency brake and blew the horn, but it was too late. The train collided with the passenger car, and came to a halt about 300 meters past the level crossing. The train suffered damage to the lower front section of the first car, and the front bogie's first axle was derailed to the left. The compact passenger car was severely damaged, but no fire occurred. About ninety passengers, one driver, two conductors and one cabin attendant were on board the train, but there were no deaths or injuries. The driver who was the only person in the compact passenger car was safe as the driver left the car before the accident.

List of published investigation reports on railway serious incidents (2012)

No.	Date of publication	Date and inccident type	Operator and line section (location)	Summary
1	Nov.30, 2012	Jun.14 to 16, 2011 Dangerous damage in facilities	Hokkaido Railway Company On the premises of Oiwake station, Sekisho Line (Hokkaido Prefecture)	・The first case occurred on June 14, 2011 The westbound local train (1-car train set) departed from Track No.1 at Oiwake station on schedule. A signaller at the station's signal cabin noticed that although the train departed from Track No.1, the indication lamp of the track's starting signal on the indication panel kept lighting green without being extinguished to give a stop signal indication. According to the sequence recorder of the interlocking device, the starting signal did not indicate a red stop signal at that time. ・The second case occurred on June 14, 2011 The westbound limited express train (4-car train set) departed from Track No.1 at Oiwake station on schedule. The same signaller in the first incident noticed that although the train departed from Track No.1, the indication lamp of the track's starting signal on the indication panel kept lighting green without being extinguished to give a stop signal indication. According to the sequence recorder of the interlocking device, the starting signal did not indicate a red stop signal at that time. ・The third case occurred on June 15, 2011 The westbound limited express train (5-car train set) departed from Track No.1 at Oiwake station on schedule. A signaler, different from the signaller in the first and second incidents, noticed that although the train departed from Track No.1, the indication lamp of the track's starting signal on the indication panel kept lighting green without being extinguished to give a stop signal indication. An employee in charge of work confirmed that the starting signal did not indicate a red stop signal at that time. ・The fourth case occurred on June 16, 2011 The westbound local train (1-car train set) departed from Track No.4 at Oiwake station behind schedule. A signaler, different from the signallers in the first to third incidents, noticed that although the train departed from Track No.4, the indication lamp of the track's starting signal on the indication panel kept lighting green without being extinguished to give a stop signal indication. According to the sequence recorder of the interlocking device, the starting signal did not indicate a red stop signal at that time. *** The report included recommendations**

7. Summary of recommendations and opinions

There was one case of recommendations in 2012, which is summarized below:

○ In view of the results of the investigation of an railway serious incident which occurred on the premises of Oiwake station on the Sekisho Line of Hokkaido Railway Company, the Japan Transport Safety Board made the following recommendations to Hokkaido Railway Company on November 30, 2012.

1. In order to prevent occurrence of a similar accident, Hokkaido Railway Company (the "Company") indicated its intention to establish construction work procedures, such as requiring prior checking of a change-over plug's insertion position and various drawings, which would not influence the existing signalling systems, and to specify in its operation manual a method to be adopted by signallers when they confirmed a situation in which a signal indication lamp which should have given a stop signal indication was not extinguished to give a stop signal indication. While these measures are considered to be effective in preventing a similar accident, it is necessary for the Company to continue providing its employees with proper education and training so that they can understand the meaning of these measures correctly to take proper measures in case of emergency.
2. In view of the fact that the serious incident occurred although preventive measures were implemented after the occurrence of a serious incident on Hakodate Line on January 15, 2009 in which a block signal which should have given a stop signal indication failed to do so, it is necessary for the Company to reexamine the implementation and management system for the construction and maintenance of the signalling systems, make all the workers including those from outside the Company master the basic operation procedures, and adopt additional safety measures as necessary for preventing a similar incident.

8. Remarks

The JTSB made remarks on the following two railway accidents in 2012.

(I) Railway accident on the premises of Maiko station on the San-yo Line of West Japan Railway Company (Accident with casualties)

(Published on January 27, 2012)

1. Improvement in the safety awareness of the railway users and their familiarization with the emergency button usage

This is an accident caused by the falling from the platform of a passenger who got off from the train. It is somewhat likely that alcohol drinking was involved in the falling.

In order to decrease the number of similar accidents, it is considered important that the railway users and operators should pay attention to the following;

(1) Each of the railway users should recognize the danger involved when falling on a railway track, and raise their awareness for protecting their own safety so that their behavior may not put themselves in a dangerous situation.

(2) The railway operators should pay special care so that passengers on the platform equipped with emergency buttons can press them without hesitation when noticing any passenger fallen on the railway track and finding it necessary to stop the train, and should obtain the understanding and cooperation of the railway users in this regard.

For this reason, it is considered also important that the railway operators should not only raise the safety awareness of the railway users but also familiarize them with the purpose of emergency buttons installed on the platform and their operation method. It is desirable that such a safety activity should be implemented in the form of a simultaneous campaign by railway operators' associations, rather than by a single operator, or even in the form of awareness-raising activities beyond the scope of the railway operators, so that such a movement will gain further understanding among the entire society, let alone the railway users.

2. Effective utilization of emergency buttons when a train is standing at a station or departing from a station

While unrelated to the occurrence of the accident, it has become clear in the process of investigating the accident that a crew on board a train may not be made aware of the occurrence of an emergency according to which of the emergency buttons installed in the station has been pressed when the train is standing at the station or departing from the station.

It is probable that installation of emergency buttons by the Company after the notice was issued from Railway Bureau, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) as a result of an accident with casualties at Shin-Okubo station was intended to notify a crew on board a train approaching to a station of the falling of a passenger, etc., and not necessarily to notify a crew on board a train standing at a station or departing from a station. It is also probable that the Company installed a rotating lamp and a buzzer close to each emergency button to make it easy to identify the location of the pressed emergency button, although the notice did not require installation of such devices.

However, a similar accident may occur at any station during the time between the arrival and departure of a train, and in such a case it is probable that installation of emergency buttons will be all the more effective if operating emergency buttons can make the crew on board the train aware that an abnormal event has occurred.

The railway operators have been promoting the railway users for these several years to press emergency buttons without hesitation when it is necessary to stop the train, and it is probable that the railway users expect, by pressing emergency buttons, a crew on board a train standing or beginning to move will be made aware of the occurrence of an abnormal event, and the train will be stopped. For this reason, with respect to those stations equipped with emergency buttons, it is recommended that some alerting device should be installed at a location where a crew of a departing train can easily be made aware of the occurrence of an abnormal event, according to the circumstances of each station like the platform is unstaffed or trains made up of a lot of cars make a stop.

In this connection, in a notice of "Safety measures to prevent falling accidents from the platform (supplement)" dated November 21, 2011 issued on the basis of the information from the JTSB, the Railway Bureau, MLIT requested the stations equipped with emergency buttons to adopt effective safety measures while taking account of "when a train is departing from the station" according to the type of operation. Therefore, it is recommended that the railway operators should give consideration to the arrangement of such facilities and their functions in accordance with the notice.

(II) Railway accident between Morimiyanohara and Ashidaki stations on the Iiyama Line of East Japan Railway Company (Level crossing accident)

(Published on February 24, 2012)

The accident occurred at a level crossing, a railway facility which is important to not only the railway operators but also the passersby and requires the utmost attention while being crossed.

It is necessary for the Company to strengthen its efforts for preventing occurrence of a similar accident on the basis of the following views.

(1) Bearing in mind that safety awareness should only be acquired by receiving education on a daily basis and getting through practical field work, it is necessary for the Company to ensure that the maintenance workers should fully master the safety procedures by making them practice the applicable procedures repeatedly at their education or training course and on the occasion of regular meetings, as well as by making use of training facilities and giving them on-the job-training from time to time. At the same time, it is necessary for the Company to consider introducing a safety mechanism like a human error prevention system which will enable a pair of level crossing guards to mutually confirm that they have checked the existence of any oncoming train.

(2) Considering that the level crossing is a type of safety equipment which needs prompt countermeasures when it should fail, it is desirable that the Company should consider adopting such measures as reducing disturbance to the passersby by means of shortening the time for the maintenance workers to arrive at the site and ensuring a rapid recovery from the failure.

9. Actions taken in response to recommendations in 2012

Actions taken in response to recommendations were reported with regard to one railway serious incident in 2012. The summary of this report is as follows:

(I) Railway serious incident between Oura Kaigan-dori and Oura Tenshudo-shita tram stops on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd (Incorrect management of safety block)

(Recommended on September 30, 2011)

As a result of the investigation of a railway serious incident which occurred between Oura Kaigan-dori and Oura Tenshudo-shita tram stops on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd. on October 21, 2010, the Japan Transport Safety Board published an investigation report and made recommendations to the Company as one of the parties relevant to the cause of the accident, on September 30, 2011. The Board received the following completion report on the implementation of measures in response to the recommendations.

<Summary of accident>

On October 21 (Thursday), 2010, at about 14:15, when the tablet and ticket system was in place in a single track section between Oura Kaigan-dori and Oura Tenshudo-shita tram stops, the driver of tram No. 1505 started the tram from Oura Kaigan-dori tram stop after confirming that tram No. 503 had come out of the single track section. When the driver stopped the tram at the stop line for the track leading to Ishibashi at the Matsugaebashi intersection, he saw that a 1-car tram, No. 1203 from Ishibashi stop bound for Hotarujaya tram stop, was stopped at No.1 stop line at the Matsugaebashi intersection.

At this time, the distance between tram No. 1505 and tram No. 1203 was about 46 m.

Subsequently, upon orders from a staff dispatched to Oura Kaigan-dori tram stop for operating the tablet and ticket system, tram No. 1203 backed up to Ishibashi tram stop, and then tram No. 1505 continued to Ishibashi tram stop.

<Recommendations made by the JTSB and the status of measures taken in response to the recommendations>

(1) Recommendations made by the JTSB

Based on the results of the investigation into this serious incident, the JTSB issues the following recommendations to Nagasaki Electric Tramway Co., Ltd. pursuant to paragraph 1, Article 27 of the Act for Establishment of the Japan Transport Safety Board in order to ensure transportation safety:

1. Concerning the education on regulations, standards, etc.

1) Examine whether the work standards, etc., related to the operation of the safety system (safety blocks) are appropriate and check the actual state of the operators including their response capability, etc.

2) Conduct appropriate education and training for the relevant employees, and periodically and continuously check the achieved level to ensure that the education

and training are put into practice.

3) Ensure that the relevant employees thoroughly understand and comply with the regulations, internal standards, etc.

2. Concerning the enhancement of the safety management system and the promotion of effective measures

1) Verify the effectiveness of current measures for safety management, and abolish or review systems and/or measures that are no longer effective.

2) Review the safety management system driven by the head office, and implement measures to establish an organization where field personnel are motivated to learn and make improvements on their own without ignoring problems.

(2) The content of the completion report by Nagasaki Electric Tramway Co., Ltd. for actions taken in response to the recommendations by the Board (December 26, 2012)

1. Concerning the education on regulations, standards, etc.

1) Examine whether the work standards, etc., related to the implementation of the safety system (safety blocks) are appropriate and check the actual state of the operators including their response capability, etc.

[Concrete actions taken on the basis of the implementation plan]

(a) Implementation of the safety system (safety blocks) education at training workshops. (Reported in December 2012)

(b) Review of the tablet and ticket system operation manual, followed by dissemination of the related information to all the operation staff. (Reported in May 2012)

(c) Creation of a pilot system operation manual, followed by provision of training workshops based on the new manual. (Reported in May 2012)

2) Conduct appropriate education and training for the relevant employees, and periodically and continuously check the achieved level to ensure that the contents of the education and training are put into practice.

[Concrete actions taken on the basis of the implementation plan]

(a) Holding training workshops by creating an annual training plan. (Reported in December 2012)

(b) Implementation of written tests at training workshops to check the level of understanding, and review the contents of the training as necessary. (Reported in December 2012)

(c) Implementation of demonstrations and individual interviews to check the achieved level at training workshops. (Reported in December 2012)

(d) Implementation of on-board inspection twice a year for each crew member to check the performance of the basic operation procedures. (Reported in December 2012)

(e) Review of the on-board inspection check sheet to make sure that basic operation procedures are consistently and correctly performed. (Reported in May 2012)

3) Ensure that the relevant employees thoroughly understand and comply with the regulations, internal standards, etc.

[Concrete actions taken on the basis of the implementation plan]

(a) Implementation of customer surveys by installing a customer survey box in each tramcar. (Reported in December 2012)

(b) Implementation of education and training to learn lessons from past accident cases by analyzing them and working out preventive measures. (Reported in December 2012)

(c) Implementation of an individual-based education method to check the level of understanding with regard to changes in operation procedures to be made for improving safety measures. (Reported in May 2012)

2. Concerning the enhancement of the safety management system and the promotion of effective measures

1) Verify the effectiveness of current measures for safety management, and abolish or review systems and/or measures that are no longer effective.

[Concrete actions taken on the basis of the implementation plan]

(a) Participation of field personnel and crew members in the near-accident review committee and accident prevention committee to hear opinions from the field personnel. (Reported in December 2012)

(b) Improvement of safety awareness by newly establishing an accident prevention study workshop on the basis of reviewing the activities of the accident eradication committee which are no longer effective. (Reported in December 2012)

(c) Installation of a monitoring system at Oura Kaigan-dori tram stop in order to check the presence of a tram in the safety block. (Reported in May 2012)

2) Review the safety management system driven by the head office, and implement measures to establish an organization where field personnel are motivated to learn and make improvements on their own without ignoring problems.

[Concrete actions taken on the basis of the implementation plan]

(a) Implementation of a safety meeting every two months. (Reported in December 2012)

Implementation of an annual emergency drill. (Reported in December 2012)

10. Information dissemination in the process of investigations

There was no case of information dissemination in 2012.

Column

Making a solitary decision in a cold rain

Railway transportation is part of the public transportation system which is indispensable for the daily life of the general public. As the railway users will be seriously affected once a railway accident occurs and several trains are made to stop operating for many hours, we should always keep in mind the necessity of resuming the train service as fast as possible after the initial stage of the investigation is over. For this reason, a railway accident investigator-in-charge who is responsible for the investigation will be put in a situation where he has to make a solitary decision on many occasions. The following is an example of such cases.

In the evening of a winter day, a train derailment accident occurred in which a train collided with an automobile at a level crossing. For implementing the initial investigation of the accident, a team of the three investigators headed by the investigator-in-charge took the Shinkansen, a conventional train and a taxi cab to get to the accident site after leaving their office. They arrived at the site after 21:30 on that day. It had started raining from the evening at the accident site. As the spring was still far away, it was very cold with a cold rain.

In the case of a derailment accident, it is necessary to check the condition of the railway track and other ground facilities by moving the affected cars after checking the condition of the accident site. Therefore, checking the condition of the accident site precisely, promptly and efficiently is very important. For that reason, accident investigators always try to plan their investigation procedures on the basis of relatively limited information available within a limited period of time moving to the accident site, so that they can undertake their investigation immediately after arriving at the site. At this stage, the investigator-in-charge is put in a critical situation where he has to decide on the investigation procedures and instruct the parties concerned accordingly. This is a moment when the investigator-in-charge keenly feels the weight of his responsibility, as the decision for settling the investigation procedures determines the course of the investigation.

For this particular accident in which the affected cars of the train were derailed largely and damaged, giving an indication that it would take many hours for the restoration work, the investigator-in-charge decided to keep checking the condition of the accident site all night in order to undertake the restoration work smoothly. During the rainy and cold night, the investigators continued checking the condition of the accident site while keeping records in their notebooks drenched with the cold rain, with a pen in their numb hands. It was past 2 o'clock around midnight when it became possible to remove the derailed cars. As it was unable to check the condition of ground facilities while removing the derailed cars, the investigator-in-charge decided to resume the investigation the next morning. It was past 3 o'clock when they left the site. They took an hour-long nap after that, and returned to the site at 6 o'clock in the morning to resume the investigation.

As it was relatively convenient to get to the accident site this time, it was not so burdensome to move to the site or make lodging arrangements. However, they had to continue with their investigation work virtually all night keeping in mind the necessity of resuming the train service. As a result, they could complete the initial stage of the investigation safely without catching a cold, but they keenly felt it necessary again to keep in good shape to be ready for any possibility.

11. Summaries of major railway accident and serious incident investigation reports

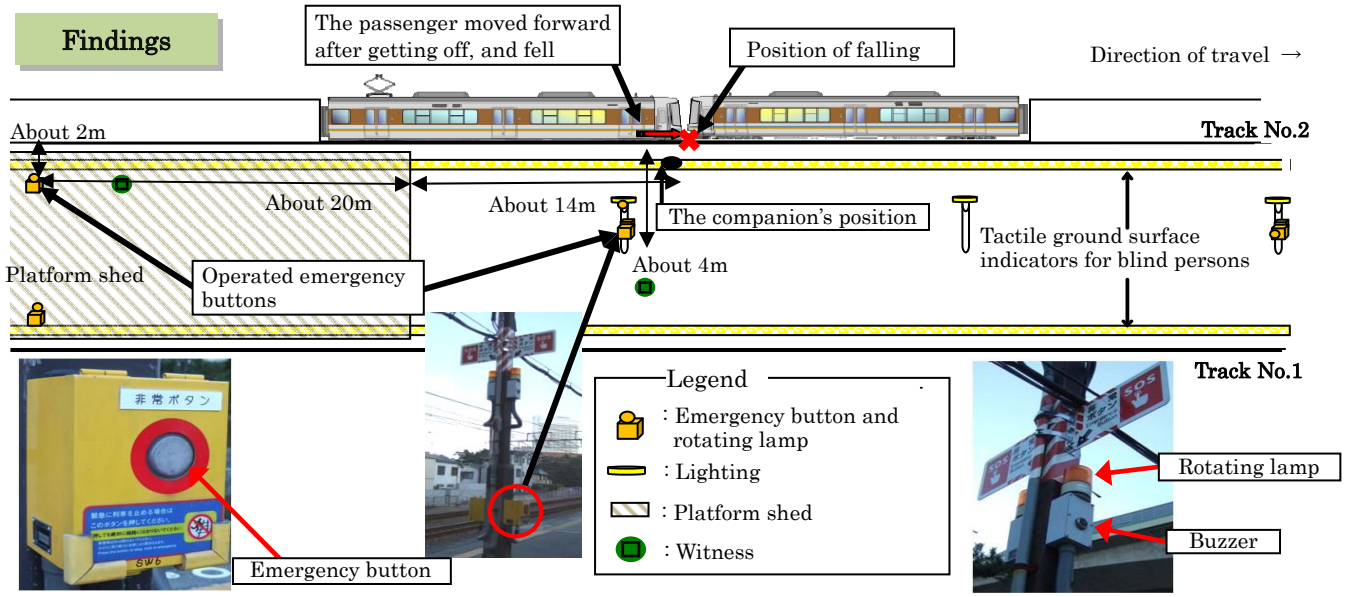
A passenger on the platform fell down into the space between the cars without a vestibule diaphragm

Other accidents with casualties on the premises of Maiko station, San-yo Line, West Japan Railway Company

Summary: On December 17, Friday, 2010, the eastbound rapid train (12-car train set) left Maiko station at 21:44 on schedule. After leaving the station, the conductor of the train noticed a man waving something white on the platform at a location near the stop position for the train's 5th or 6th car. The conductor operated an emergency switch in the conductor's cabin to bring the train to a halt. The train came to a halt after running about 76 meters from the departure position. It was found that a passenger had fallen on the railway track, who was later confirmed dead. The companion who got off the train with the dead passenger and was on the platform had her leg injured when trying to save the fallen passenger.

About 600 passengers, one driver and one conductor were on board the train.

Findings



Schematic drawing of the accident site

It is highly probable that the passenger walked along the train in the direction of travel after getting off the train, and fell from the platform into the space between the 4th and 5th cars (without a vestibule diaphragm for falling protection). It is somewhat likely that alcohol drinking was involved in the falling from the platform.

There is a possibility that the passenger fell from the platform four to six seconds after getting off. However, it is somewhat likely that it was before the conductor of the train got down on the platform (it took about five to six seconds) to check the situation.

It is somewhat likely that although the companion shouted for help on the platform while looking downward after the passenger fell, her voice did not reach the conductor because of the distance between them and the traveling sound of the train.

It is probable that although the witness on the platform pressed the emergency button about two seconds after the train departed, the conductor did not notice the rotating lamp lighted and the buzzer ringing as the conductor had not stopped the train by that time by operating the emergency switch.

It is somewhat likely that it is difficult for the crew on board a train standing at a designated position of the station to recognize that the station's "Platform Support Warning System" has been activated, depending on the location of the pressed emergency button.

Probable causes: It is highly probable that the accident occurred because the passenger walked along the train in the direction of travel after getting off the train, the train departed after the passenger fell from the platform at a position between the 4th and 5th cars, and the head of the passenger who was standing with the upper body straight got caught between the train and the platform.

For details, please refer to the investigation report. (Published in Japanese on January 27, 2012)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2012-1-2.pdf

A train collided with an automobile entering a failed level crossing following guidance of track maintenance workers

Level crossing accident at Daikonbara level crossing, Iiyama Line, East Japan Railway Company

Summary: On February 1, Tuesday, 2011, while the eastbound local train (1-car train set) left Morimiyanohara station about 10 minutes behind the scheduled time of 12:00 and was coasting at a speed of about 60 km/h, the driver of the train noticed a small truck entering Daikonbara level crossing ahead from the left. The train driver immediately applied the emergency brake and blew the horn, but it was too late. The train collided with the truck and came to a halt about 75 meters past the level crossing.

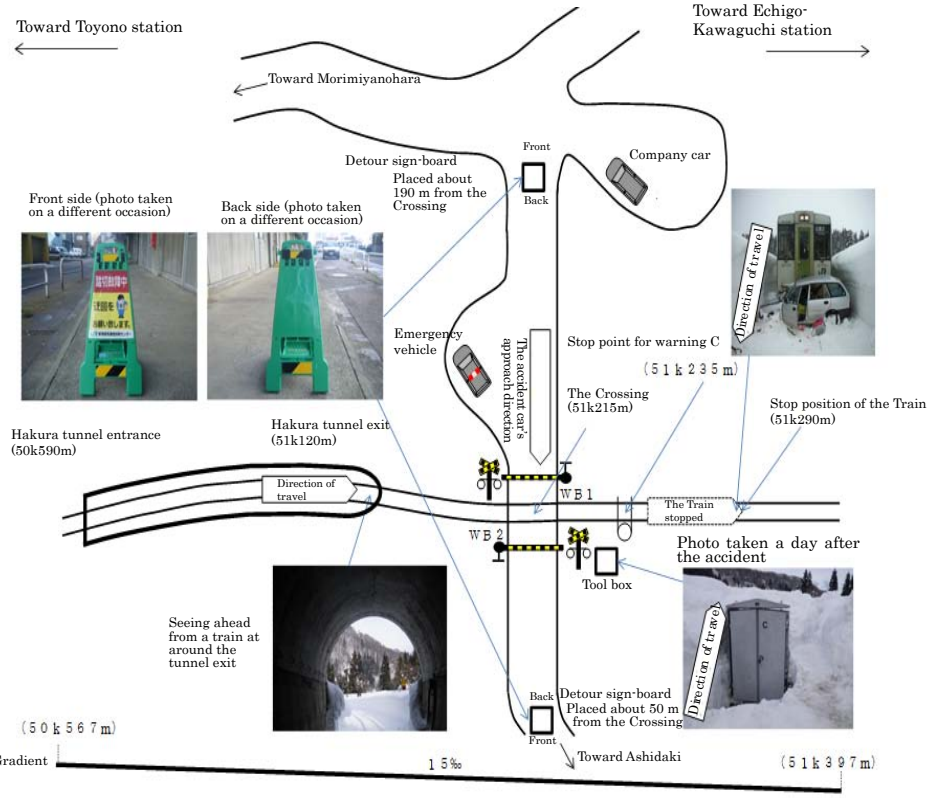
Seven passengers, one driver and two railway track maintenance workers were on board the train, but there were no deaths or injuries. The driver who was the only person in the truck was killed in the accident.

Findings

It is highly probable that because level crossing guard A raised the crossing rod immediately before the train came to the crossing, the truck entered the crossing and collided with the train.

It is highly probable that the existence of any oncoming train was not checked before the crossing rod was raised.

It is probable that the existence of any oncoming train was not checked because (i) level crossing guard A assumed that there would be an interval of more than 10 minutes in the operation schedule between westbound and eastbound trains, and (ii) level crossing guard B assumed from the work schedule given by A that the train would come at about 12:30.



Schematic drawing of the accident site

It is probable that the tall heaped snow around the level crossing obstructed the visibility for noticing a train approaching and absorbed the traveling sound of a train.

It is highly probable that the driver of the train was not informed of the failure of the level crossing because of the decision made by the train dispatcher not to warn against the failure of the crossing.

The Company did not provide for a regulation about cancelling a level crossing failure warning, and when two or more level crossing guards were assigned at a level crossing, the practice of cancelling such a failure warning was followed unless asked by the field staff to continue the warning. It is probable that such a practice followed by the Company is not appropriate from the viewpoint that a level crossing failure warning will be cancelled even when the field staff has missed asking for the continuation of the warning.

Probable causes: It is highly probable that the accident occurred because when the level crossing guards, without checking the existence of any oncoming train, raised the crossing rods which had been at closing position due to failure, the truck entered the crossing and collided with the train.

For details, please refer to the investigation report. (Published in Japanese on February 24, 2012)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2012-2-1.pdf

Derailed by flange climbing while running along a circular curved track due to a decrease of the wheel load

Train derailment accident between Kuzumi and Namegawa stations, Narita Line, Japan Freight Railway Company

Summary: On March 10, Thursday, 2011, when the northbound freight train (10-car train set) passed Kuzumi station at the scheduled time of 12:19 and entered the premises of Namegawa station while coasting, the emergency brake of the train was activated, and the train stopped on the premises of the station. When the driver inspected the train as the emergency brake was not released after the train stopped, it was found that the 8th and 9th freight cars of the train were separated from each other, the 9th freight car was derailed and overturned to the right, and the 10th freight car was derailed to the right. One driver was on board the train, but the driver was not injured.

Findings

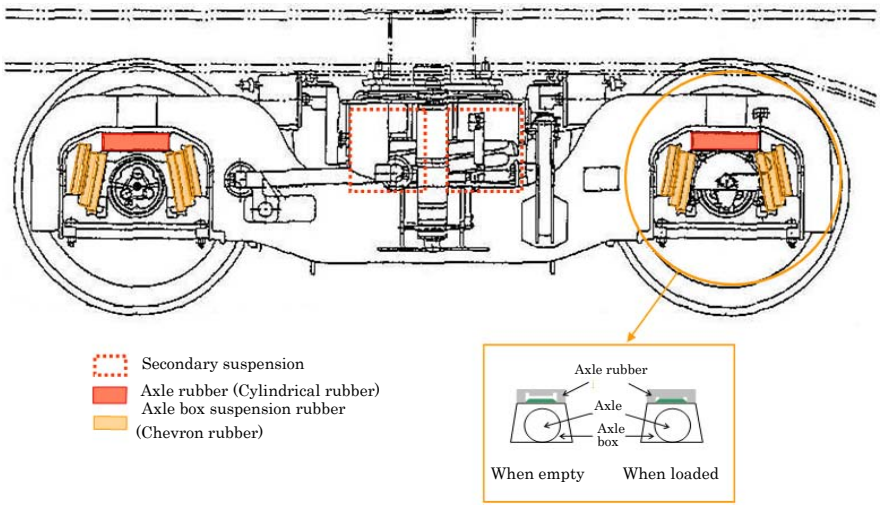
It is somewhat likely that the twist* at the derailment point (at around 9k560m) was larger than other points, according to the findings that 5.0 m twist at around the derailment point was 22.9 mm (loaded value) at the regular inspection immediately before the accident, a 6.5 mm increase from a year before, 5.0 mm out of which increased during the three months before February 11, 2011.

* "Twist" is the difference in cross level between two longitudinally separate points on a rail, and indicates the torsion of the track relative to a plane.

Although the combination of alignment and cross levels* at around 9k553m was relatively small with -5.9 mm for the outside rail and -5.4 mm for the inside rail, it was large at around the derailment point which was 5.0 m ahead (at around 9k558m), with 22.9 mm and 23.0 mm, respectively. It is somewhat likely that the relatively large combination of alignment and cross levels was involved in the decreased load of the outside wheel of the first axle in the rear bogie of the derailed freight car.

* "Combination of alignment and cross levels" is one of the parameters of track irregularity maintenance, taking account of a possible influence on the rolling and hunting motion of a freight car, which tends to occur easily as the combination of alignment and cross levels increases.

It is somewhat likely that due to aged deterioration for having been used since it was newly made, the spring of the axle suspension (axle rubber and axle box suspension rubber) for the freight cars became stiffened and the track followability was decreased. On the other hand, it is somewhat likely that the cars of the train were shaking at the curbed section at around the derailment point where a large track irregularity was observed. It is probable that the large track irregularity observed between 9k553m and 9k558m had largely changed the load and lateral force of the outside wheel of the first axle in the rear bogie of the derailed freight car, and contributed to the occurrence of derailment by making the derailment coefficient larger at around a point with a relatively large track irregularity.



Axle box suspension of the derailed freight cars

Probable cause: It is probable that the accident occurred because after running along a 406-m-radius left circular curved track, the outside (right) wheel of the first axle in the rear bogie of the 9th freight car of the train ran on the rail and was derailed to the right due to the decreased wheel load at first, and the second axle also ran on the outside (right) rail and was derailed. It is highly probable that the reason for the overturning of the 9th freight car which entered the premises of Namegawa station in a state of being derailed was that the front bogie and the derailed rear bogie of the 9th freight car ran on different tracks after passing the turnout, and the car body became unbearable to running. It is probable that the front bogie of the 10th freight car was derailed after running into wrong track because it was pulled by the rear bogie of the 9th freight car which ran into wrong track.

For details, please refer to the investigation report. (Published in Japanese on June 29, 2012)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2012-5-3.pdf

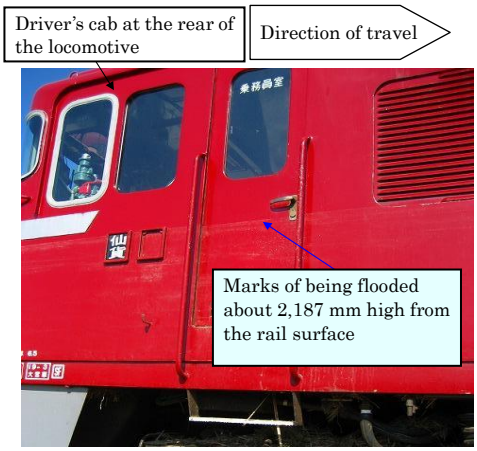
Train derailment by a tsunami caused by a huge earthquake

Train derailment accident between Hamayoshida and Yamashita stations, Joban Line, Japan Freight Railway Company

Summary: On March 11, Friday, 2011, after passing Hamayoshida station about 40 minutes behind the scheduled time of 14:06, the driver of the southbound freight train (21-car train set) received a train protection radio while powering the train, and the driver stopped the train by applying the emergency brake. The driver felt large shaking during the time before the train came to a halt after applying the emergency brake. Immediately before the train stopped, the driver received a message by radio informing that an earthquake occurred. A tsunami (tidal wave) attacked the train about 20 to 25 minutes after the train stopped. When the driver checked the condition of the train afterward, it was found that 20 freight cars except the locomotive were derailed and washed away. One driver was on board the train, but the driver was not injured.

Findings

According to the findings that the train hit by the tsunami had marks of being flooded on the surface of the locomotive at a position about 2,187 mm from the rail surface, it is somewhat likely that the freight cars were flooded to the level almost half as high as the height of the loaded containers. It is probable that for that reason, 20 freight cars (all container cars) were derailed by the force of the tsunami and buoyancy, and were scattered around while some of the freight cars were disconnected as their couplers became disengaged, and others were washed away to the right (mountain side).



Marks of being flooded left on the locomotive

The 4th freight car and the track as seen from around the right rear of the locomotive

The locomotive and the railway track as seen from Hamayoshida station

It is probable that the reason for the locomotive not being derailed was that the mass of the locomotive was larger than that of the freight car when fully loaded, that there were houses on the left of the locomotive (seaward), and that the disconnected freight cars weakened the force to derail the locomotive.

In the absence of bylaws for evacuating the crew on the basis of assuming that an extraordinary disaster has occurred in which freight cars of a train are carried away by a tsunami caused by a large earthquake like the Great East Japan Earthquake, it is desirable to provide for bylaws for evacuation procedures to ensure the safety of the crew when struck by an extraordinary disaster. In view of the statement by the driver of the train that it was unable to contact the train dispatcher by using the train radio or business cellular phone, it is also desirable to establish procedures for making the crew carry with them equipment which will enable access to information related to the occurrence of an earthquake or tsunami, as well as operation procedures for the crew when it is unable to contact the train dispatcher.

Probable cause: It is probable that the accident occurred because after the driver stopped the train by applying the emergency brake upon receiving a train protection radio, the train was hit from the left (seaward) by the tsunami caused by the earthquake, and all of the freight cars were washed away and derailed to the right (mountain side) by the force of the tsunami and buoyancy.

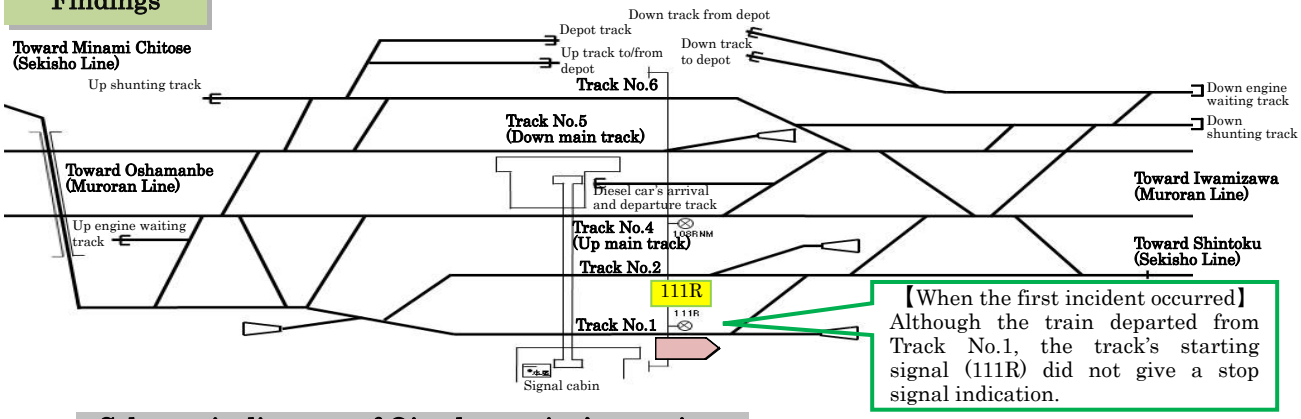
For details, please refer to the investigation report. (Published in Japanese on September 28, 2012)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2012-7-1.pdf

Plural events occurred in which a start signal's indication did not change after a train departed

Serious incident (Dangerous damage in facilities), Sekisho Line, Hokkaido Railway Company

Summary: On June 14, Tuesday, 2011, the eastbound local train (1-car train set) departed from Track No.1 at Oiwake station at 20:50 on schedule. Although the train departed from Track No.1, the indication lamp of the starting signal on the indication panel in the station's signal cabin kept lighting green without being extinguished to give a stop signal indication. A similar event occurred three more times before June 16.

Findings



Schematic diagram of Oiwake station's premises

All of the four incidents were caused by the work to improve signal facilities, and from the aspect of signal facilities, they all have an almost identical occurrence mechanism. To be precise, with respect to the wiring work for adding a new relay circuit to the existing signal facility, adoption of an improper work method created a circuit which allowed the electric current to flow to the signal control relay of the starting signal when setting a route for Sekisho Line and Muroran Line at the same time, which then created a situation in which the starting signal did not give a stop signal indication even when the train entered the track circuit in the protection area of the signal.

The adopted work method was improper because (i) minus side terminals of each cradle of the newly added relays were connected with each other by the wiring, (ii) each of the newly added relay devices was inserted into cradles, and (iii) a change-over plug was not inserted during the wiring work in the signal relay room to connect a plus side of each of the newly added relays to the plus side of the power source for the existing facility, which resulted in keeping the circuit always connected.

It is probable that it was not appropriate to implement the wiring work for the existing facility without ensuring a supervisor's attendance or without taking measures not to use the interlocking device temporarily during the hours when trains were in service, based on the judgment that the wiring work for the existing facility would not influence the operation of trains. It is probable that such types of wiring work as may influence the existing facility should be implemented only after getting approval for the wiring diagram as there may be a safety problem to the operation of trains.

It is probable that the reason for the occurrence of an almost identical incident for several times was that the event in which the indication lamp of the starting signal on the indication panel was not extinguished was considered to be due to a temporary failure of the indication panel, that the indication lamp was extinguished when operating the control console, that necessary measures were not taken immediately because the relevant persons were not informed of the event on the understanding that the wiring work would not involve much danger as the next train would not come until the next morning, and that the work transfer between the signallers was not properly done.

Probable cause: It is probable that the serious incident occurred because during the improvement work for Centralized Traffic Control system (CTC) and Programmed Route Control system (PRC), a new circuit was created so that the electric current could flow the signal control relay of the starting signal for eastbound trains when setting a route for Sekisho Line and Muroran Line at the same time, which caused the indication of the starting signal not to change from proceed to stop even when the train entered the protection area of the starting signal for eastbound trains on Sekisho Line.

For details, please refer to the investigation report. (Published in Japanese on November 30, 2012)
http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2012-1-1.pdf