Chapter 3 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

<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="3">・ 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]</td><td></td></tr>
<tr><td colspan="4">Accidents that are particularly rare and exceptional
[Ordinance 1-3]</td></tr>
<tr><td>Dedicated railway</td><td colspan="7">Accidents that are particularly rare and exceptional [Ordinance 1-4]</td></tr>
<tr><td rowspan="2">Tramway
[Ordinance 1-5]</td><td colspan="6">Accidents involving the death of a passenger, crewmember, etc., accidents involving five or more casualties with at least one of the casualties dead, and fatal accidents that occur at level crossings with no automatic barrier machines.
[Notice 1-1]</td><td></td></tr>
<tr><td colspan="7">Accidents that are particularly rare and exceptional [Notice 1-2]</td></tr>
</table>

*1 Except for derailment accidents that involve working snowplows.

*2: 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, 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 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, 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.]

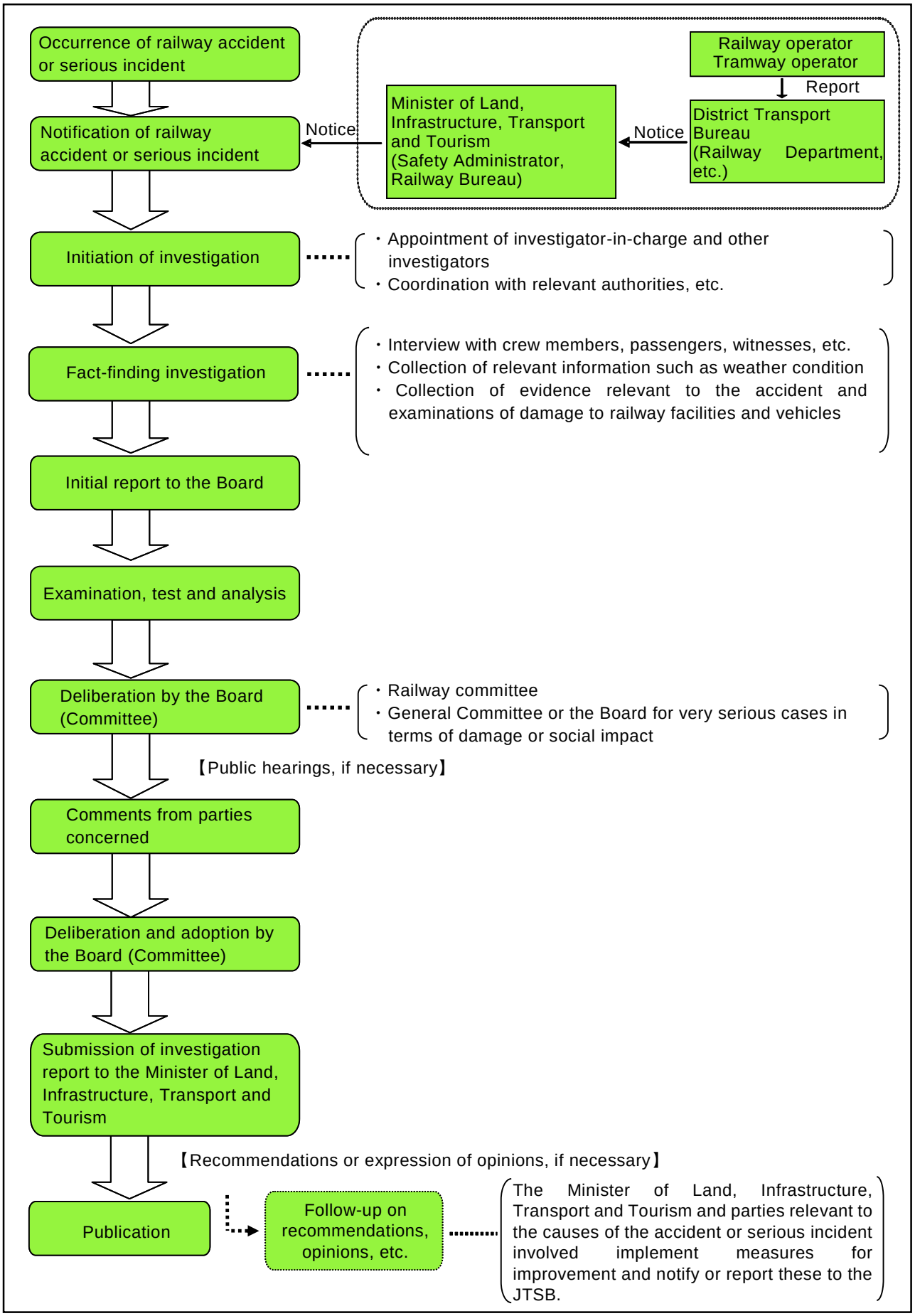
5 From among the situations occurring on a tramway operated under the application of the Ministerial Ordinances to provide Technical Regulatory Standards on Railways mutatis mutandis as specified in paragraph 1 of Article 3 of the Ordinance on Tramway Operations, the situations equivalent to those specified 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

<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 for the investigations of railway accidents and serious incidents

In 2014, the JTSB carried out investigations of railway accidents and serious incidents. The results are as follows. 21 accident investigations had been carried over from 2013, and 14 accident investigations were newly launched in 2014. 17 investigation reports and one interim report were published in 2014, and 28 accident investigations were carried over to 2015.

Five railway serious incident investigations had been carried over from 2013, and one railway serious incident investigation was newly launched in 2014. Four investigation reports were published in 2014, and two railway serious incident investigations were carried over to 2015.

There were 4 fatal accidents that occurred at level crossings with no automatic barrier machine (class 3 and class 4 level crossing), which should be investigated since April of 2014. One of the investigation reports was published.

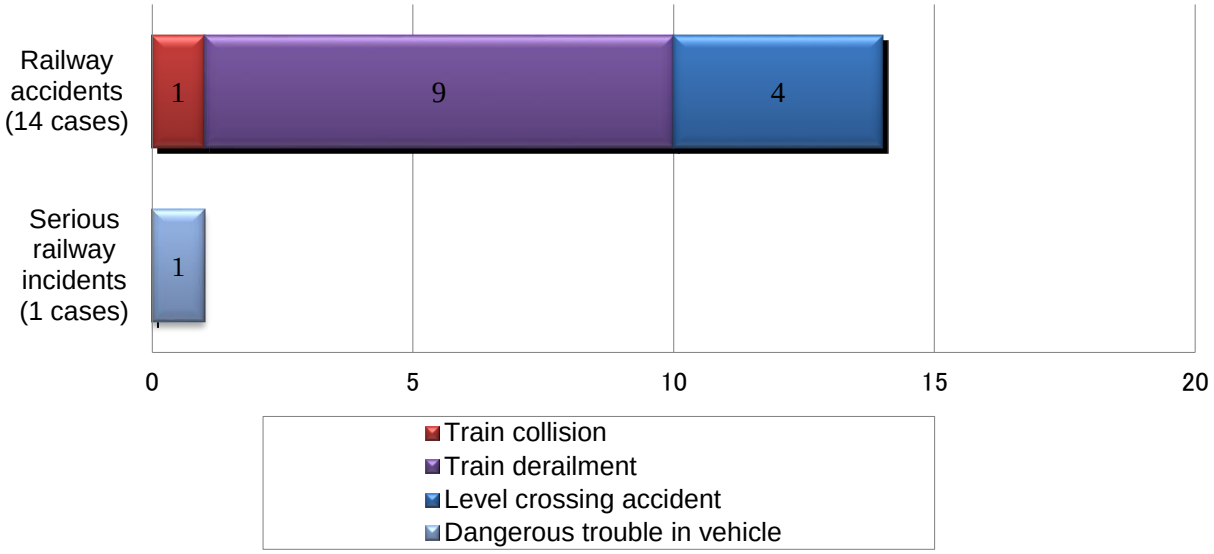
Category	Carried over from 2013	Launched in 2014	Total	Published investigation report	(Recommendations)	(Opinions)	Carried over to 2015	(Interim reports)
Railway accidents	21	14	35	17	(0)	(0)	18	(1)
Railway serious incidents	5	1	6	4	(0)	(0)	2	(0)

4 Statistics for investigations launched in 2014

The railway accidents and railway serious incidents that were newly investigated in 2014 consisted of 14 railway accidents (down by one from the last year associated with 15 accidents) and one railway serious incident (down by one from the last year associated with two incidents).

The breakdown by accident categories shows that the railway accidents are comprised of one train collision, nine train derailments, four level crossing accidents. The railway serious incident comprised of one dangerous trouble in vehicle.

Number of railway accidents and serious incidents by type



The number of casualties was 57 across the 14 accidents. These consisted of six death and 51 injured persons.

The number of casualties (in railway accidents)

(Persons)

2014							
Category	Dead			Injured			Total
	Crew	Passenger	Others	Crew	Passenger	Others	
Casualties	0	0	6	5	44	2	57
Total	6			51			

5 Summaries of railway accidents and serious incidents that occurred in 2014

The railway accidents and railway serious incidents that occurred in 2014 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)

1	Date and accident type	Railway operator	Line section (location)
	January 11, 2014 Train derailment	Choshi Electric Railway Co., Ltd.	In the premises of Kasagami-Kurohae Station, Choshi Electric Railway Line (Chiba Prefecture)
	Summary	While the train was entering Kasagami-Kurohae Station at about 20 km/h, the train driver noticed an abnormal sound from below. The driver applied the emergency brake to stop the train. A survey revealed that all of the axles in the rear bogie of the front vehicle and all of the axles in the front bogie of the second vehicle derailed. Out of the 9 passengers and the driver on board, no one was injured.	
2	Date and accident type	Railway operator	Line section (Location)
	February 13, 2014	Kyushu Railway Co.,	Between Amagase station and Sugikawach

	Train derailment	Ltd.	station, Kyudai Line (Oita Prefecture)
	Summary	See the "6 Publication of investigation reports" (P.65 No.12).	
3	Date and accident type	Railway operator	Line section (location)
	February 15, 2014 Train collision	Tokyu Corporation	In the premises of Motosumiyoshi Station, Tokyu Toyoko Line (Kanagawa Prefecture)
	Summary	The driver of the preceding train was stopped about 30m beyond the stop position in Motosumiyoshi Station. The driver of the following train was instructed by the operation dispatcher to immediately stop while traveling at about 80 km/h and applied the emergency brake; but the train collided with the preceding train. Out of about 80 passengers in the preceding train, about 60 passengers in the following train, and the driver and the conductor of each train on board, 16 people were injured.	
4	Date and accident type	Railway operator	Line section (location)
	February 23, 2014 Train derailment	East Japan Railway Company	In the premises of Kawasaki Station, Tokaido Line (Keihin-Tohoku Line) (Kanagawa Prefecture)
	Summary	While traveling on the premises of Kawasaki Station, the deadheading train collided with a construction vehicle. The first car and the second car became derailed, and the first car overturned to the side. The driver and the conductor of the deadheading train were injured.	
5	Date and accident type	Railway operator	Line section (Location)
	March 16, 2014 Train derailment accompanied with level crossing accident	Amagi Tetsudou Co., Ltd.	Jumonji level crossing, class one level crossing with automatic barrier machine and road warning device, in the premises of Nishi-Tachiarai station in Amagi line (Fukuoka Prefecture)
	Summary	See the "6 Publication of investigation reports" (P.66 No.14).	
6	Date and accident type	Railway operator	Line section (Location)
	April 12, 2014 Level crossing accident	Central Japan Railway Company	Yuzawa level crossing, class four level crossing without automatic barrier machine nor road warning device, between Ina-Kamisato station and Moto-Zenkoji station, Iida Line (Nagano Prefecture)
	Summary	See the "6 Publication of investigation reports" (P.67 No.15)and summaries of major railway accident and serious incident investigation reports (P.94).	
7	Date and accident type	Railway operator	Line section (location)
	June 9, 2014 Level crossing accident	Kanto Railway Co., Ltd.	Kita Daiho level crossing No. 8, class four level crossing without automatic barrier machine nor road warning device, between Daiho Station and Tobanoe Station, Joso Line(Ibaraki Prefecture)
	Summary	After passing Daiho Station on schedule, the train shifted to powering operation; and it shifted to coasting operation when the train speed reached 80 km/h. About 30 m before Kita Daiho No. 8 level crossing, the driver confirmed a compact car that was entering from the left side of the level crossing. The driver immediately blew the whistle and applied the emergency brake. However, it was too late, and the front of the train collided with the right side of the car. The train stopped after running for about 130 m while pushing the car. This accident resulted in the car driver's death.	
8	Date and accident type	Railway operator	Line section (location)
	June 21, 2014 Train derailment	Kyushu Railway Company	Between Satsuma-Imaizumi Station and Nukumi Station, Ibusuki Makurazaki Line (Kagoshima Prefecture)

	Summary	While traveling in the above section, the train driver confirmed a tree blocking the tracks. The driver immediately applied the emergency brake, but the train derailed after climbing up the tree and the pile of sand. 16 passengers (3 with serious injuries/13 with minor injuries) and 2 cabin attendants (2 with minor injuries) were injured.

9	Date and accident type	Railway operator	Line section (location)
	June 22, 2014 Train derailment	Japan Freight Railway Company	Between Soutaku Station and Satsukari Station, Esashi Line (Hokkaido Prefecture)
	Summary	While traveling on the premises of Satsukari Station, the train was automatically stopped due to the emergency brake. When the driver checked, all of the two axles in the rear bogie of the second wagon (19th freight wagon) from the last freight wagon (20th freight wagon) of the 21-wagon train derailed to the right, and the 20th freight wagon was stopped 17m away from the 19th freight wagon. No one was injured.	

10	Date and accident type	Railway operator	Line section (Location)
	July 11, 2014 Train derailment, accompanied by level crossing accident	Ryutetsu Co., Ltd.	The Dai-juichi-gou level crossing, class four level crossing without automatic barrier machine nor road warning device, between Kogane-Joshi Station and Koya Station, Nagareyama Line (Chiba Prefecture)
	Summary	See the "6 Publication of investigation reports" (P.68 No.17).	

11	Date and accident type	Railway operator	Line section (location)
	September 2, 2014 Train derailment, accompanied by level crossing accident	West Japan Railway Company	Tabe level crossing, class one level crossing with automatic barrier machine and road warning device, between Kinomoto Station and Takatsuki Station, Hokuriku Line (Shiga Prefecture)
	Summary	While traveling in the above section, the train collided with a truck in Tabe level crossing. All of the two axles in the front bogie of the front vehicle derailed. Out of about 180 passengers and three crew members on board, no one was injured. The truck driver was injured (serious injury).	

12	Date and accident type	Railway operator	Line section (location)
	October 3, 2014 Level crossing accident	Kyushu Railway Company	Takanosu level crossing, class three level crossing with no automatic barrier machine and installed road warning device, between Buzen-Kawasaki Station and Nishi Soeda Station, Hitahikosan Line (Fukuoka Prefecture)
	Summary	While traveling in the above section, the train collided with one pedestrian in Takanosu level crossing. Out of the 17 passengers and one crew member on board, no one was injured. The pedestrian, who collided with the train, died.	

13	Date and accident type	Railway operator	Line section (location)
	October 27, 2014 Level crossing accident	Kanto Railway Co., Ltd.	Kojima No. 1 level crossing, class four level crossing without automatic barrier machine nor road warning device, between Sodo Station and Shimotsuma Station, Joso Line (Ibaraki Prefecture)

	Summary	While traveling, the train collided with a motorcycle, which was crossing Kojima No. 1 level crossing. A rider of the motorcycle died.

14	Date and accident type	Railway operator	Line section (location)
	December 18, 2014 Train derailment, accompanied by level crossing accident	East Japan Railway Company	Tanigawa level crossing, class one level crossing with automatic barrier machine and road warning device, between Kuwanohara Signal Station and Inariyama Station, Shinonoi Line (Nagano Prefecture)
	Summary	While traveling in the above section, the train collided with a car in Tanigawa level crossing. One of the front axles in the front bogie of the first car became derailed.	

(Railway serious incidents)

1	Date and incident type	Railway operator	Line section (location)
	September 26, 2014 Dangerous trouble in vehicle	East Japan Railway Company	Between Igashima Station and Higashi-Gejo Station, Ban'etsu West Line (Niigata Prefecture)
	Summary	While the train was traveling in the above section at about 60 km/h, employees of the company who were on board confirmed that two of passenger doors had opened on the right side of the second car and then he notified to the train driver. The driver, who received the notification, immediately applied the emergency brake and stopped the train. Out of about 110 passengers and three crew members on board, no one was injured.	

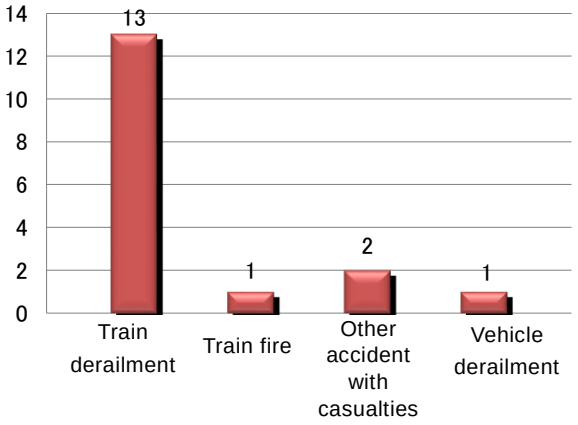
6 Publication of investigation reports

The number of investigation reports of railway accidents and serious incidents published in 2014 was 21. These consisted of 17 railway accidents and four serious incidents.

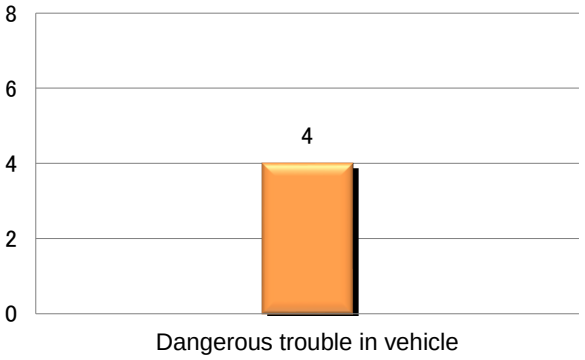
Breaking them down by category, the railway accidents contain 13 train derailment accidents, one train fire accidents, two level crossing accident and one vehicle derailment accidents. However, the serious railway incidents contain four dangerous trouble in vehicle.

In the 17 accidents, the number of casualties was 61, consisting of three death and 58 injured persons.

Railway accident reports (17 cases) published in 2014



Serious railway incident reports (one cases) published in 2014



The investigation reports for railway accidents and serious incidents published in 2013 are summarized as follows:

List of published investigation reports on railway accidents (2014)

1	Date of publication	Date and accident type	Railway operator	Line section (location)
	January 31, 2014	November 8, 2012 Train derailment	Sangi Railway Co., Ltd.	In the premises of Misato Station, Sangi Line (Mie Prefecture)
	Summary	Due to the fact that it did not pass the inbound train in Misato Station, the train driver thought that the down track starting signal was indicating the proceed signal. After closing passenger doors without confirming the signal indication of the starting signal, the driver departed from Misato Station on schedule without noticing the starting signal indicating the stop signal. During the powering operation at about 45 km/h, the train was shaken to the left side when the ATS (automatic train stop) alarm went off simultaneously. The driver immediately applied the emergency brake, but the train entered into the safety siding and stopped after destroying the car stop. All of the two axles in the front bogie of the front vehicle derailed passing through the car stop, and all of the two axles in the rear bogie derailed toward the left of the rail buried under gravel for the car stop. Out of the two passengers and one driver on board, no one was injured.		
	Probable Causes	It is highly probable that this accident occurred as follows: The driver of the outbound train assumed that the starting signal of the down line was indicating the proceed signal as usual, due to the fact that the train did not pass the inbound train in Misato Station. The driver did not confirm the signal indication of the starting signal of the down line, which was supposed to be confirmed before closing passenger doors, and the driver also did not perform thorough finger-pointing and call prior to the departure. Due to this, the driver departed the train without noticing the stop signal indicated on the starting signal of the downline, and ATS emergency brake was activated. However, the train entered into the safety siding and stopped after destroying the car stop. It is highly probable that the stop signal was indicated on the starting signal of the		

<table>
<tr><td></td><td></td><td colspan="3">down line due to the following reasons: The operation dispatcher of the CTC Center misread the train diagram, thought that trains were passing in Misato Station, and handled the train passing control button for the station by mistake. Due to this, the stop signal was indicated on the starting signal of the down line for the station.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-1-1.pdf</td></tr>
<tr><td rowspan="4">2</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>February 28, 2014</td><td>March 30, 2012
Train derailment</td><td>Toyama Chihou Tetsudou, Inc.</td><td>In the premises of Uchiyama Station, Main Line (Toyama Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The driver of the deadheading train felt unusual sounds and shocks before entering Uchiyama Station. Then the driver applied the emergency brake and stopped the train, and confirmed that the wheels of the front axle had become derailed to the left. The driver notified to the dispatcher regarding the derailment.
Out of the one driver and two railway workers on board, no one was injured.
  </td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that the wheel climb up the outside rail and became derailed to the left because the derailment coefficient on the outside (left) wheel for the front axle of the deadheading train (snow plow) increased while the critical derailment coefficient decreased in the 200m-radius right curve.
It is probable that the derailment coefficient increased because alignment was deformed in a direction that results in the reduction of the radius, the twist of the track increased by 5 m and the snow plow was running with excess of cant, and the increase in lateral force as well as a decrease in the wheel load. It is also somewhat likely that the fact that the front axle weight was lighter than the rear axle weight of the snow plow had affected the decrease in the wheel load of the front axle when traveling in a largely twisted section.
It is probable that the critical derailment coefficient decreased because a shifting of alignment, which was associated with a reduction of the radius, resulted in an increase in the angle of attack for the front axle of the snow plow.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-2-1.pdf</td></tr>
</table>

3	Date of publication	Date and accident type	Railway operator	Line section (location)
	February 28, 2014	February 8, 2013 Train derailment	East Japan Railway Company	Between Shimokita Station and Ominato Station, Ominato Line (Aomori Prefecture)
	Summary	While traveling near Sanbonmatsu level crossing at about 60 km/h, the driver of the train felt shocks; and immediately applied the service brake and stopped the train. After stopping the train, a check by the driver revealed that all of the axles in the front bogie of the front car had become derailed to the left. Out of the 11 passengers, one driver, and one track maintenance worker on board, no one was injured. 		
	Probable Causes	It is probable that this derailment accident has occurred due to the fact that the train shifted to the left after running over the snow, which had become hard likely ice, on the rail and in the flangeway of Sanbonmatsu level crossing. It is somewhat likely that the accident was affected by the facts that it had snow and a temperature change near the accident site while the operation was suspended due to strong wind and that ice-like hard snow had accumulated and packed down on the rail and in the flangeway by passing a number of dump trucks in Sanbonmatsu level crossing, where trains were not passing.		
	Report	http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-2-2.pdf		
4	Date of publication	Date and accident type	Railway operator	Line section (location)
	March 28, 2014	April 6, 2013 Train derailment	East Japan Railway Company	Between Myoko-Kogen Station and Sekiyama Station, Shinetsu Line (Niigata Prefecture)
	Summary	When the train was in coasting operation at about 65 km/h, the driver of the train felt that the car-body was rising up when the train entered a left curve. Then the driver applied the emergency brake to stop the train. When he checked the cars from the outside, all of the two axles in the front bogie of the front vehicle had become derailed to the right. Out of the 25 passengers and two crew members (driver and conductor) on board, no one was injured. 		
	Probable Causes	It is probable that this accident has occurred due to the fact that the train ran over a pile of earth, etc., which had come onto the tracks due to the landslide that occurred on a slope, resulting in the derailment. It is somewhat likely that the landslide on the slope was affected by the following factors: Part of the agricultural land, etc. (private land, etc.), which was locate higher than the slope, flooded, and the water mainly flowed into the top of the slope, which belongs to the railway operator. This and the increase of the underground water level in the foundation behind the retaining wall affected the percolating water pressure in around the foundation of the retaining wall. As a result, foundation around the area was destroyed, and the top soil layer on the slope collapsed.		
	Report	http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-3-1.pdf		
5	Date of publication	Date and accident type	Railway operator:	Line section (Location)
	April 25, 2014	March 2, 2013 Train derailment	East Japan Railway Company	Between Jinguji station and Kariwano station, Ou Line (Akita Prefecture)

	Summary	 While the train driver repeated on/off operation of the notch following the caution signal of the block signal and considering the train speed decline by the snow, between Jinguji station and Kariwano station at about 20 km/h, he felt the shock and irregular sound from the right bottom of the driving desk, and applied the maximum notch of the service brake and stopped the train. He checked the vehicles, after the train stopped, and found the first axle in the front bogie of the front vehicle had derailed to the left with respect to the direction of the train. It was found by the later inspection, the first axle in the front bogie derailed to the left by about 25 mm, and the second axle derailed to the left by about 20 mm. There were 125 passengers, 3 train crews and 2 cabin attendants were on board the train, but there is no casualty.
	Probable Causes	It is probable that the left wheels of the first and the second axles in the front bogie of the front vehicle derailed to the left by slip climbing up the standard gauge rail, due to the vehicle being lifted by a large amount of snow underneath it, respectively, while powering in the section of the three-rails track where much attention was necessary for the snowdrift. It is probable that the snowdrift grew large in a short time before the accident by the deep fallen snow compared to that of the average year and snowfall with strong wind in the accident day, moreover there were no snow fences around there. And the situation that much snows were likely to remain on the standard gauge rail side of the three-rail track due to narrower space between the track and side snow wall in the standard gauge rail side compared to the narrow gauge rail side of the track was effected to the background inducing the accident. In addition, it is probable that snow between the standard gauge rail and the narrow gauge rail were effected to the background inducing the accident.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-4-1e.pdf http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2014-4-1-p.pdf(Explanatory material)

6	Date of publication	Date and accident type	Railway operator	Line section (Location)
	May 30, 2014	October 14, 2012 Train derailment	Kyushu Railway Co., Ltd.	In the premises of Kagoshima-Chuo station, Kagoshima Line (Kagoshima Prefecture)
	Summary	The train passed the left curve at about 25 km/h after departure. The train driver noticed the scream of the passengers when the front of the train passed the No.79-Ro turnout. As the train driver checked rear of the train he found the gangway bellows leaned to right considerably, then he applied the brake to stop the train. The train driver checked the situation of the train and found that the rear bogie of the second vehicle was on the track different from the scheduled route and the second axle derailed to the right. There were 157 passengers and a crew on board the train but there was no injured person.		

	Probable Causes	 It is somewhat likely that the first axle in the rear bogie of the second vehicle of the train climbed up the outside rail, i.e., right rail, of the left curved track and derailed to the right of the outside rail, and the second axle dragged by the first axle derailed to the right, in this accident. It is probable that the train stopped after the first axle in the rear bogie of the second vehicle restored to the wrong track at the turnout. It is probable that the first axle in the rear bogie of the second vehicle derailed to the outside rail of the left curved track due to the following reasons. (1) The lateral force of the outside rail had increased because the alignment of the left curved track had exceeded the maintenance standard and the alignment was increased toward the right, i.e., outside direction. (2) The wheel weight of the outside wheel had decreased because the twist in the left curved track had exceeded the maintenance standard and became large in the direction to decrease wheel load of the outside wheels. In addition, it is probable that the mud pumping in the ballast, the loosen spikes, partial corrosion in the sleepers and the gaps between rail and tie plates, observed around the start point of flange climbing, were related to climb up of the first axle in the rear bogie of the second vehicle. In addition, it is somewhat likely that the increased spring coefficient of the axle spring of the vehicle by aging was related to climb up of the first axle in the rear bogie of the second vehicle. It is somewhat likely that the rear bogie of the second vehicle derailed because the lateral force acting on the outside wheel due to larger static wheel loads in the inside wheels, i.e., left wheels, of the rear bogie, while the static wheel loads in the outside wheels, i.e., right wheels, were larger than in the inside wheels of the front bogie, although the ratio of wheel load unbalance were within the managed values in the regulations of the company.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-5-2e.pdf

7	Date of publication	Date and accident type	Railway operator	Line section (Location)
	May 30, 2014	July 31, 2013 Vehicle derailment, accompanied by the accident against road traffic	Nagasaki Electric Tramway Co., Ltd.	Between Tsuki-Machi stop and Shiminbyoin-Mae stop, Oura branch line (Nagasaki Prefecture).

	Summary	 The train driver found the bus entered into the track to turn right while powering the vehicle at about 21 km/h from Tsuki-Machi stop towards Shiminbyoin-Mae stop, immediately he sounded a whistle and applied an emergency brake, but the vehicle collided with the bus and stopped after derailed to right. There were about 60 passengers and a vehicle driver on board the vehicle, 11 passengers were injured. In addition, there were 6 passengers and a bus driver on the bus, among them, 5 passengers were injured. The front right part of the vehicle was damaged, and for the bus, the right side of the body was damaged but a fire did not outbreak.
	Probable Causes	It is probable that the tram driver applied an emergency brake immediately after he noticed the bus ahead, the tram derailed with the bus and the first axle in the front bogie derailed to the right because the bus driver moved the bus into the tramway track, without checking whether the tram approaches the intersection, to turn right crossing tramway track and obstructed the route of the tramway, in the situation that it was difficult to see the traffic condition by standing buses around the intersection.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-5-1e.pdf

8	Date of publication	Date and accident type	Railway operator	Line section (Location)
	June 27, 2014	February 12, 2013 Train derailment, accompanied with level crossing accident	Sanyo Electric Railway Co., Ltd.	Shinkomae level crossing, category one level crossing with automatic barrier machine and road warning device, between Iho station and Arai station, Main Line (Hyogo Prefecture)
	Summary	 The train driver noticed the obstacle at Shinkomae level crossing while the train was coasting at about 95 km/h between Iho station and Arai station. Immediately, he sound a whistle and applied an emergency brake, but the train collided with the rear of the car carrier trailer truck and the stretch board for loading. After that, the train ran with destroying poles planted in the left side of the up track and the block fence along the track, and collided with the platform of Arai station and stopped. The front part of the train was completely demolished. The front bogie of the front vehicle was separated from the vehicle body and its first axle derailed to the left of the rail and the second axle derailed inside the track. The all axles in the rear bogie of the front vehicle and the all axles of the front bogie of the second vehicle derailed to the right of rail. The all axles of the rear bogie of the second vehicle derailed as the left wheels were raised up from the rail. There were about 60 passengers, a train driver and a conductor on board the train. The train diver was seriously injured and 15 passengers were slightly injured. In addition,

		the drivers of the freight truck and a taxi collided with the freight truck were slightly injured.
	Probable Causes	It is probable that the accident occurred by the inbound through limited express train derailed to the left of the up-track because the train collided with the load carrying platform of the freight truck and ran onto its stretch board for loading, which was lowered to cross the railway track, at the same time, when the train passed the Sinkomae level crossing, in this accident. It is probable that the rear portion of the freight truck had been staying inside the level crossing because the the truck driver drove the truck into the level crossing road, without noticing that the sedan ahead his truck might stopped at the road between the level crossing and the intersection ahead, and the truck was obliged to stop behind the sedan stopped at the intersection. It is probable that the stretch board for loading was lowered to cross the railway track because the truck driver had lowered them in the level crossing road to forward the truck without damaged the crossing rod because the truck driver had considered if the truck had forwarded with the stretch board for loading was set at vertical position, the stretch board would fell down in the level crossing and would contact with the train, furthermore, he judged that the truck could be forwarded because the sedan stopped at the intersection in front of the truck seemed to move forward.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-6-1e.pdf

9	Date of publication	Date and accident type	Railway operator	Line section (Location)
	July 25, 2014	February 29, 2012 Train derailment	Hokkaido Railway Company	In the premises of Yakumo Station, Hakodate Line (Hokkaido)
	Summary	 The train driver left Yakumo station behind schedule after waited passing limited express operating behind schedule. After the train had departed, the train driver felt the swaying motion around the turnout, and he applied an emergence brake and stopped the train. After that, he checked the vehicle and found all two axles of the front bogie derailed to right of the turnout side track, after passed #10-Ro turnout located in the route to the up-track main line from the No.4 platform. There are 2 passengers and a train driver on board the train, but there is no casualty.		
	Probable Causes	It is probable that the wheels of the front bogie climbed up the right side lead rail and derailed because there were the hard frozen snow or ice were built up to the rail top in the flange way at the lead rail when the train ran into the branch line side route, in this accident. It is probable that there were the hard frozen snow or ice around the flange way because the snow removal work were insufficient. It is somewhat likely that the insufficient snow removal work was caused by the		

		insufficient comprehension about the status of snow removal in the station, because the employees contracted in winter season did not understand the importance about the snow and ice removal work around flange way due to lack of description about it in the education material used in Yakumo station, and the company had not determined how to grasp the status of snow removal work by the contract employees and how to report about the snow removal work.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-7-1e.pdf http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2014-7-1-p.pdf（Explanatory material）

10	Date of Publication	Date and accident type	Railway operator	Line section (Location)
	July 25, 2014	April 26, 2012 Train derailment	Japan Freight Railway Company	Between Izumisawa station and Kamaya station, Esashi Line (Hokkaido)
	Summary	The train departed from Aomori signal station, and arrived at Goryokaku station. The transport staff waiting for the train at Goryokaku station found smoke rose from the freight wagon, 18th car of the arrived train, and notified to the station office. The rushed station staffs fought the fire of the freight wagon that the smoke rose from around the bogie. On the other hand, the switching malfunction of the turnout occurred in the premises of Kamaya station, Esashi Line, on the same day. The track maintenance staffs of Hokkaido Railway Company checked track condition in the premises of Kamaya station, and found that the turnout was damaged and there were traces of derailment on the sleepers around it. The freight wagon emitting smoke at Goryokaku station was not derailed but judged as it had derailed once, by the results of the inspection about status of the wheels of the freight wagon. A train driver was onboard the train, but there was no injury.		
	Probable Causes	It is probable that the outside wheel climbed up to the top of outside rail, i.e., it was the flange climb derailment, by the increased derailment coefficient for the outside wheel, because the lateral force acting on the outside wheel had increased by the increased wheel load of the inside wheel, and the wheel load of the outside wheel had decreased, due to the large unbalance in the static wheel loads between right and left wheels of the freight wagon loaded containers, compared to the wagon with balanced static wheel load, while the train passed in the curved track of 300m radius, in this accident. It is highly probable that the uneven loading in the containers caused the large unbalance in the wheel loads in the derailed freight wagon. In addition, it is somewhat likely that the combination of track alignment and cross-level, which should be managed in the section where freight trains are operated, had relatively large at the point climbing up by the wheel started, promoted the decrease of wheel load of the outside wheel.		
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-7-2e.pdf http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2014-7-2-p.pdf（Explanatory material） See summaries of major railway accident and serious incident investigation reports (P.90).		

11	Date of publication	Date and accident type	Railway operator	Line section (Location)

	August 29, 2014	February 4, 2013 Train fire	East Japan Railway Company	Between Tsukuda station and Iwamoto station, Joetsu Line (Gunma Prefecture)
	Summary	The train driver felt as the train was dragged from the rear after the train passed the station. However, the driver did not find any malfunction by checking the instrument panels, and he continued to drive the train. After a while, when the train ran by powering operation at about 60 km/h, the train driver felt again as the train was dragged from the rear, but he could not find any malfunction from the instrument panels. However, when he checked the rear of the train, he found a fire broke out from the diesel locomotive of the second car that deadheads without its own power, and he applied an emergency brake to stop the train at the safe place. After that, the fire of the diesel locomotive was extinguished by fire fighting, but a part of the vehicle such as the transmission device were damaged by fire. There was a train driver alone on board the train, but he was not injured.		
	Probable Causes	 It is probable that the remaining converter oil in the torque converter was ignited by the high temperature fragments etc. of the converter which was broken and heated by missing cooling function of the converter because the coolant was drained, and the first stage converter rotated while the deadhead diesel locomotive were running, because the "neutral rock" of the forward/backward switching device was not correctly performed when a diesel locomotive was hauled as the deadhead operation without powering. It is probable that the reason why the neutral rock did not correctly performed was that the staff had set neutral rock without understanding the method to rock correctly and the staff in charge of checking also did not understand correctly the neutral rock. It is probable that the reason why the neutral rock operation had performed by the staff who did not understand the operation procedure and had been checked by the staff who did not understand correctly the neutral rock operation, was the poor recognition of the company about the importance of the neural rock operation, whose frequency is low because it was insufficient to prepare the operation manual and the prior education and training in advance were not performed or poor. Furthermore, it is probable that the automatic emergency brake did not operated when the velocity exceeded the permissible value, because the electric power of the speed detector was not supplied while the locomotive was in the deadhead operation without powering, due to the meter relay of the over speed detector was replaced to the new type which required power supply from independent batteries, was related to induce the accident.		
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-8-1e.pdf See summaries of major railway accident and serious incident investigation reports (P.92).		

<table>
<tr><td rowspan="4">12</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (Location)</td></tr>
<tr><td>August 29, 2014</td><td>February 13, 2014
Train derailment</td><td>Kyushu Railway Co., Ltd.</td><td>Between Amagase station and Sugikawachi station, Kyudai Line (Oita Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train driver found the fallen tree about 50m ahead on the track while the train was in powering operation at about 70 km/h, and immediately applied an emergency brake, however, the train collided with the fallen tree and stopped after running about 60m.
The train driver checked the train after it stopped, he found that all axles of the vehicle derailed and the vehicle leaned into the right.
There were two passengers and a train driver on board the train, one passenger was injured.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that because a cedar tree had fallen as to cross the track, the running train ran onto it and moved to the right and derailed, in this accident.
It is probable that the cedar tree had fallen by the root considering the followings.
(1) The position of the gravity center of the cedar tree became higher than as usual because the wet and adhesive snow stacked on the crown of the tree fallen on the accident day.
(2) The suspension force of the root was considered weak compared to the relatively strong strength of the trunk, because the fallen cedar tree was the tree in its prime and its trunk had sufficient diameter against its height.
In addition, it is somewhat likely that the tree had fallen by a little snowfall because the slope around the root of the tree had been in the water-rich state, because the landform of the slope around the fallen tree is ravine that the rainwater fell in the surrounded area will be concentrated, in addition, the water was leaking from the damaged sewerage system of the hot spring facility in the upper part of the slope.
  </td></tr>
<tr><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-8-2e.pdf</td></tr>
<tr><td rowspan="4">13</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (Location)</td></tr>
<tr><td>October 30, 2014</td><td>May 28, 2013
Train derailment</td><td>Kobe Electric Railway Co., Ltd.</td><td>In the premises of Arimaguchi station, Sanda Line (Hyogo Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train driver noticed an abnormal sound and the following big sound while operating coasting at about 25 km/h at the turnout in Arimaguchi station, and applied the emergency brake to stop the train. After that he found the front bogie of the second car entered into the route to Arima-Onsen station, different route from the predetermined route, and found all two axles in the front bogie of the second vehicle were derailed.
The first vehicle, the rear bogie of the second vehicle and the third vehicle had entered and stopped in the predetermined route to Dojyo-Minamiguchi station.
There were about 60 passengers and the driver on the train, but no one was injured.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that the front bogie of the second vehicle of train started at No.2 platform of Arimaguchi station, Sanda line, had entered into the unexpected route to Arima-</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">Onsenguchi station and derailed, because the flange of the right wheel of the first axle in the front bogie of the second vehicle had climb over the tongue rail around edge of the right tongue rail of the point in the double slip switch, followed after passing the symmetrical turnout in the premises of Arimaguchi station, in this accident. And, it is probable that the second axle of the front bogie had derailed to the right in the double slip switch following to the first axle entered into the wrong route, although it had entered into the predetermined route at the point in the double slip switch.
It is probable that the status of the track, the vehicles, the electric facilities and operating status were within the company's reference values or the limits to be operated, however, right wheel of the first axle of front bogie of the second vehicle had climbed up to the rail top, due to the combination of the following situations:
(1) The large lateral force had on the right wheel of the first axle of the front bogie of the vehicle while the vehicle was passing the S-shaped track where the shape of curvature changes in the distance between the first axle and the fourth axle of a vehicle, that is shorter than the length of a vehicle, i.e., 18.14m.
(2) It is possible that a relatively large lateral force is easy to occur because the track alignment increased as to decrease radius curvature near the tongue rail, which has the entrance angle, in the double slip switch at the accident site.
(3) It is possible that the wheel flange climbs up to a rail top by contacting with the tongue rail at its entrance portion, because the flange part of the wheel of the vehicle had worn vertical compared to the designed cross sectional shapes.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-9-1e.pdf
See summaries of major railway accident and serious incident investigation reports (P.91).</td></tr>
<tr><td>14</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (Location)</td></tr>
<tr><td></td><td>October 30, 2014</td><td>March 16, 2014
Train derailment accompanied with level crossing accident</td><td>Amagi Tetsudou Co., Ltd.</td><td>Jumonji level crossing, class one level crossing with automatic barrier machine and road warning device, in the premises of Nishi-Tachiarai station in Amagi line (Fukuoka Prefecture)</td></tr>
<tr><td></td><td>Summary</td><td colspan="3">When a train was travelling at about 65km/h in a straight section, the train driver found a commercial truck entering from the right side of the Jumonji level crossing. Although the train driver applied an emergency brake, the train collided with the truck and stopped after travelling about 14m.
Eight passengers on train were injured in this accident.</td></tr>
<tr><td></td><td>Probable Causes</td><td colspan="3">It is highly probable that the train driver applied the emergency brake as he found the commercial truck entered into the Jumonji level crossing, while the crossing rod of the automatic barrier machine had already set at its close position according to the approaching train, but the train collided with the truck and derailed, in this accident.
 
It is probable that the truck had entered into the Jumonji level crossing where the crossing rod had already set at its close position, because the truck driver noticing the existence of the level crossing and took braking operation just before the level crossing but</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">it was too late.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-9-2e.pdf</td></tr>
<tr><td rowspan="4">15</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (Location)</td></tr>
<tr><td>October 30, 2014</td><td>April 12, 2014
Level crossing accident</td><td>Central Japan Railway Company</td><td>Yuzawa level crossing, class four level crossing without automatic barrier machine nor road warning device, between Ina-Kamisato station and Moto-Zenkoji station, Iida Line (Nagano Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">A train departed from Ina-Kamisato station on schedule. When the train passed a curve track of 400m radius at 60 to 65km/h, the train driver found an agricultural tractor close to the right rail within Yuzawa level crossing located about 70m ahead of the train. Although the train driver immediately applied an emergency brake and use a whistle, the right side on the train collided with the agricultural tractor in the level crossing, and the train stopped after about 140m running.
The tractor driver was killed in this level crossing accident.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that the accident had occurred by the collision of the train and the tractor entered into and could not pass across the Yuzawa level crossing, where tractors are prohibited to enter.
It is somewhat likely that the tractor driver moved his tractor into the level crossing, without noticing that the train was approaching to the level crossing, because it might be effected that the tractor driver had concentrated his attention to driving the tractor while passing the level crossing, as the width of the level crossing road is narrow and he usually did not drive the tractor in the level crossing.
It is also somewhat likely that the reason because the tractor driver had moved his tractor into the level crossing where tractors are prohibited to enter, is that he usually passed the level crossing with the cart to transport farm products.</td></tr>
<tr><td></td><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-9-3e.pdf
http://www.mlit.go.jp/jtsb/railway/p-pdf/RA2014-9-3-p.pdf（Explanatory material）
See summaries of major railway accident and serious incident investigation reports (P.94).</td></tr>
<tr><td rowspan="3">16</td><td>Date of publication</td><td>Date and accident type</td><td>Railway operator</td><td>Line section (Location)</td></tr>
<tr><td>November 27, 2014</td><td>November 5, 2013
Level crossing accident</td><td>Kyushu Railway Co., Ltd.</td><td>Shinbori-Kendo level crossing, class one level crossing with automatic barrier machine and road warning device, in the premises of Takahashi station, Sasebo Line (Saga Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">The train driver noticed the obstacle at the Shinbori-Kendo level crossing in front of the train and applied an emergency brake immediately, but the train collided with the rear flap of the load carrying platform and the loaded iron plates of trailer truck, and the train stopped about 106m away from the level crossing.
 
There were 65 passengers and the train driver on board the train, among them 10 passengers were injured. There was the truck driver on board the truck but he was not</td></tr>
</table>

		injured. The iron plates loaded on the trailer truck were fell on the ground but there was no injury in the public. The front face and right side of the front vehicle were damaged, and a part of the load carrying platform of the trailer truck was damaged but the fire did not break out.
	Probable Causes	It is highly probable that the train, when passed the Shinbori-Kendo level crossing, collided with the rear part of the load carrying platform and the loaded iron plates of the trailer truck, which stood for the stop signal at the intersection ahead of the level crossing, staying inside the level crossing disturbing the train route. It is probable that the trailer truck stood keeping the rear part of the load carrying platform and the loaded iron plates remained in the level crossing because the truck driver did not suspect that distance between the stop line of the intersection and the level crossing might be shorter than the length of the trailer truck, while the truck driver had missed his way and his consciousness was concentrated how to return to the scheduled route. In addition, it is probable that the collision of the train with the trailer truck was induced by the effect of the late emergency brake timing due to the thin thickness of the iron plate covered by the sheets disturbing the train route at the level crossing, which was difficult to recognize as the obstacles by the train driver, and the position of the load carrying platform and the loaded iron plates could not be detected by the obstruction detecting device for the level crossing because they were out of detecting area.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-10-2e.pdf

17	Date of publication	Date and accident type	Railway operator	Line section (Location)
	November 27, 2014	July 11, 2014 Train derailment, accompanied by level crossing accident	Ryutetsu Co., Ltd.	The Dai-juichi-gou level crossing, class four level crossing without automatic barrier machine nor road warning device, between Kogane-Joshi Station and Koya Station, Nagareyama Line (Chiba Prefecture)
	Summary	The running train collided with a sedan at the class four level crossing, and all 2 axles in the front bogie of the first car of the train were derailed. The sedan driver and a fellow passenger were dead, and five passengers on the train got injured.		
	Probable Causes	 It is probable that all 2 axles of the front bogie of the first car of the train were derailed because the left side of the front bogie of the first vehicle of the train contacted with the sedan, that had entered into the Dai-juichi-gou level crossing, category four level crossing, and collided with left lower part of the front of the passing train and hit the pole planted in the left side of the track after dragged by the train, in this accident. Although it is probable that the sedan driver usually had confirmed the approaching train by the reflecting mirror, the reasons why the sedan driver moved his sedan into the level crossing just before the train passed there, could not be clarified.		
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RA2014-10-1e.pdf		

List of published investigation reports on serious railway incidents (2014)

<table>
<tr><td rowspan="4">1</td><td>Date of publication</td><td>Date and incident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>February 28, 2014</td><td>June 19, 2012
Vehicle accident</td><td>Fukui Railway Co., Ltd.</td><td>Sanjuhassha station premises, Fukubu Line (Fukui Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">When a train arrived at Sanjuhassha station, the train driver received a notification from a driver of the crossing train, which had stopped at the station. The notification was that when the train entered the station, a rear and right sliding door for passengers of the No.1 car was opened.
When the train driver checked all cars after receiving the notification, the rear and right sliding door of the No.1 car was open.
Although there were one passenger and the train driver on board, there was no injured passenger by falling from cars, etc.
  </td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that this serious incident has occurred as follows: One of the two installation bolts had fallen off and the other was loose where an arm to connect a door engine and a side sliding door was installed on the door engine in the mechanism to open and close the door. Due to this fact, the door would move regardless of the opening/closing function of the door engine, and the side sliding door opened in the forward direction due to inertia force of the train decelerating, etc. when arriving at the station.
It is somewhat likely that the bolts had fallen off/become loose due to lack of tightening or use of uneven bolts/nuts, based on the fact that there was no damage to the bolt and that it is considered that the bolts fell off/became loose over a short period of time.</td></tr>
<tr><td>Report</td><td colspan="3">http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2014-1-1.pdf</td></tr>
<tr><td rowspan="4">2</td><td>Date of publication</td><td>Date and incident type</td><td>Railway operator</td><td>Line section (location)</td></tr>
<tr><td>March 28, 2014</td><td>June 4, 2012
Vehicle accident</td><td>East Japan Railway Company</td><td>Between Koriyama Station and Mogi Station, Ban-etsu East Line (Fukushima Prefecture)</td></tr>
<tr><td>Summary</td><td colspan="3">When a train was in coasting on the bridge over Abukuma river, the train driver found an extinguished door-pilot lamp and trouble of a side sliding door for passengers at the place where the first car approached the other side of Abukuma river. Therefore the train driver immediately applied an emergency brake and stopped the train. After stopping the train, the train conductor checked around the train. Therefore the car side pilot lamp on the right side of No.3 car was lit and the rear sliding door for passengers (No.3 position) was fully opened.
Although there were about 300 passengers, one train driver, one train conductor, and one driver who was riding along on board, nobody was injured.</td></tr>
<tr><td>Probable Causes</td><td colspan="3">It is probable that this serious incident has occurred as follows: A coating of an electric wiring for a side sliding door control circuit was damaged and the electric wiring touched a carbody. Furthermore, as a power wire of an electric mirror touched the carbody of No.1 car, the sliding door of the No.3 car was opened due to voltage flowed to a door-closing solenoid valve via the carbody.
It is somewhat likely that the power wire on the electric mirror side was touching the car due to the following reasons: A circuit of an operation switch for remote control of the electric mirror short-circuited. As a result, an electric wire between the electric wire and the electric mirror connected electrically; and the coating of the electric wire on the electric mirror side was damaged; and the exposed part touched the carbody and short-circuited.
It is probable that the reason why an electric current ran between the power wire and the electric wire on the side of the electric mirror was that the electric circuit was formed on the circuit board due to wear of the electric wire, dirt on the circuit board.
It is probable that the reason why the coating of the electric wiring for the side sliding door control circuit was damaged due to friction by vibration of train. It is somewhat likely that the reason why coating of the electric wiring on the side of the electric mirror was damaged due to the faulty installation at reconstruction works for installing the electric mirror.</td></tr>
</table>

	Report	http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2014-2-2.pdf		
3	Date of publication	Date and incident type	Railway operator	Line section (location)
	March 28, 2014	November 26, 2012 Vehicle damage	Kyushu Railway Company	Between Sue Station and Sue-Chuo Station, Kashii Line (Fukuoka Prefecture)
	Summary	A train driver noticed a door-pilot lamp under coasting after accelerating up to about 40 km/h. Therefore the train driver immediately applied an emergency brake and stopped the train. When the train driver checked all cabins of the train, the train driver noticed that the front and right side sliding door in a front car was opened about 30cm. The train driver locked all sliding doors including the opened sliding door, and restarted the operation. After the train was travelling at Sue-Chuo station, the train stopped the operation.  Although there were about 150 passengers and a train crew in the train, nobody was injured by a fall from the cabin.		
	Probable Causes	It is highly probable that this serious incident is considered to have occurred as follows: An axial force of a fork and a joint screw decreased due to the fact that the fork and joint screw of the door-closing device were fastened with almost no overlap allowance. Due to this reason, the fork and the joint screw were separated, resulting in the door opening while traveling. It is probable that the axial force has decreased due to the following reasons: Since the fork and the joint screw were fastened with almost no overlap allowance, a shear stress to a thread in a fastened part significantly increased. Due to this reason, non-rotational looseness occurred from a plastic deformation in part of the thread. Rotational looseness occurred due to external force from doors opening/closing and vibration from the train traveling. It is probable that the joint screw and the fork were separated due to rotation of the piston rod as well as the inertia from the changes of acceleration from powering operation to coasting operation during an operation prior to this serious incident while the axial force was reduced due to the looseness mentioned above. It is probable that the overlap allowance was insufficient due to the following reasons: Changing the drawing as a measure against breakage could possibly affect the overlap allowance. The fact that attention must be paid at the time of installation was not sufficiently considered by the company or the manufacturer of the door-closing device, which proposed the change of the drawing. Due to this reason, necessary information for work was not notified to workers.		
	Report	http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2014-2-1.pdf		
4	Date of publication	Date and incident type	Railway operator	Line section (Location)
	July 25, 2014	January 7, 2013 Vehicle damage	Hokkaido Railway Company	Between Tsunetoyo signal station and Kami-Atsunai station, Nemuro Line (Hokkaido)
	Summary	The train driver noticed that the door pilot lamp was turned off while driving at about 90 km/h, he applied an emergency brake and stopped the train. After the train stopped, the conductor checked the doors of the fifth vehicle, and found that the front right door opened about 30 cm. The train operation was resumed after the door had been locked and the watchman had been posted. There were 37 passengers and two crews on boarded the train, but there was no fallen passenger and no injury.		
	Probable Causes	It is somewhat likely that the door was opened by the negative pressure and a jolt while the train ran in the Atsunai tunnel, because the closed door could not be held by the		

		door open/close device in which the compressed air was not supplied due to a frozen drainage in the air pipe for closing door in the front right, fourth position, of the fifth vehicle by the low temperature of the open air, in this railway serious incident. It is highly probable that a drainage was collected in the air pipe for closing door because the vapor contained in the compressed air was condensed, as the compressed air did not dehumidified because the dehumidify bypass cock in the compressed air pipe of the fifth vehicle was left open. In addition, it is somewhat likely that the dehumidify bypass cock, which should be fixed and locked at close position, was left open by mistakes due to some reasons, in the circumstances that the staffs in the section of periodical inspection of vehicles and in the section where management of vehicles was handed over were not informed that the dehumidify bypass cock should be fixed and locked at the close position, due to the insufficiency and impropriety of the order system and instruction transfer system when management of vehicles were transferred to another section in Hokkaido Railway Company.
	Report	http://www.mlit.go.jp/jtsb/eng-rail_report/English/RI2014-3-1e.pdf

7 Summaries of recommendations and opinions

There were no cases of recommendations and opinions issued in 2014.

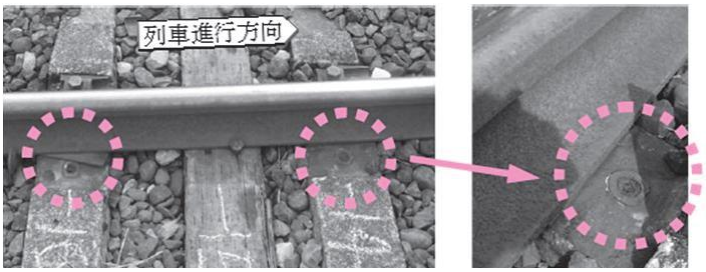
8 Actions taken in response to recommendations in 2014

Actions taken in response to recommendations were reported with regard to two railway accidents and two serious railway incidents in 2014. Summaries of these reports are as follows.

① Toyama Chiho Railroad Co., Ltd.; Train derailment accident between Kosugi Station and Kamihori Station, Kamitaki Line

(Recommendation issued on July 26, 2013)

On July 26, 2013, the Japan Transport Safety Board (JTSB) published an investigation report and issued a recommendation to Toyama Chiho Railroad Co., Ltd. as one of the parties relevant to the cause of the accident. The report and recommendation were in regards to the train accident that occurred between Kosugi Station and Kamihori Station on the Kamitaki Line on July 28, 2012. The JTSB received the answers (completion report) of Toyama Chiho Railroad Co., Ltd. against the JTSB's recommendation as follows:



Damage of inserts of rail fasteners on PC

○Summary of the accident

On July 28 2012, a driver was operating a Toyama Chihou Tetsudou No. 624 two-car local train from Iwakuraji Station to Dentetsu-Toyama Station. On the way, he noticed unusual sounds and shocks when stopping at Kamihori Station. He then applied the emergency brake to immediately stop the train. A check after the train stopped revealed that all eight of the axles were derailed.

There were 20 passengers and the driver on board the train. No one was injured.

○Probable Causes

It is probable that the lateral force associated with the running of the train extended the gauge, leading the left wheel inside the rail to derail to the right at the outlet-side transition curve of the left-hand curve, which is followed by a reverse right-hand curve, because the lateral displacement of the track (track irregularity) was larger than allowed under the maintenance criteria and decreased the fastening force of the rail fastening system.

It is probable that these are the result of the following factors:

(1) The looseness of the bolts of the line's rail fastening system, which was caused by repetitive lateral force under running of trains. This had not been re-fastened since the rail had been replaced two months before this accident.

(2) The excessive shifting of track that had not been maintained. However the track irregularity was larger than allowed under the criteria for maintenance at the time of rail replacement, the rails had been in use with this situation not being addressed. Also, the result of a regular inspection on the shifting of track after the rail replacement had remained unanalyzed.

○Description of the recommendation

(1) Toyama Chiho Tetsudou, Inc. (TCT) should establish a solid management system for maintenance of tracks. Within this system, the measurement results for the shifting of track should be analyzed and evaluated immediately after measurement. Any problems should be quickly resolved in accordance with the established repair plan.

(2) TCT should not only develop a detailed implementation plan regarding the following items, with the active involvement of its business administrations, including its safety management committee, but also properly manage an implementation status of such the plan.

① All the items of the preventive measures defined by TCT in response to the train derailment accident occurred on Nakakazumi station premises in 2008.

② Thorough checks after working on the tracks and management of a fastening system for PC sleepers, as well as the management system for the maintenance of tracks that was developed in (1).

○Measures taken based on the recommendation (completion report)

I. Measurement maintenance of track

(1) We changed a base-date for track inspections to base-date for each section as follows and conducted track inspections (measurement and analysis/evaluation).

Furthermore, we decide that we hold a report conference, which consisted of the Safety General Manager, Engineering Manager, Management Section Leader (Engineering Manager), Manager in Inaricho Technical Center and the Manager for Track Maintenance Group, every 15 days, and the Manager for Track Maintenance Group reports the inspection update to the Safety General Manager via the Management Section Leader.

○Section (Base-date: 1st March)

Section	Extension	Measurement	Analysis/evaluation
Between Dentetsu-Toyama and Dentetsu-Kurobe, Main Line	37.3km	March 11 - March 27	March 12 - March 28
Between Terada and Iwakuraji, Tateyama Line	10.3km	March 24	March 25
Between Inaricho and Minami-Toyama, Fujikoshi Line	3.3km	March 25 - March 31	March 26 - April 1
Between Minami-Toyama and Iwakuraji, Kamitaki Line	12.4km		

○Section (Base-date: 1st April)

Section	Extension	Measurement	Analysis/evaluation
Between Dentsu-Kurobe and Unazuki Onsen, Main Line	16.0km	April 2 - April 8	April 3 - April 9
Between Iwakuraji and Tateyama, Tateyama Line	13.9km	April 15	April 16

2) With regard to track inspection and maintenance, an analysis/evaluation of a result was conducted within 15 days after the measurement. After a repair work plan is formulated in report meetings and get agreement in the meeting for each department, a track maintenance is implemented based on the plan.

(3) In order to grasp the progress of a track maintenance and the check of it, we decide to hold the report meetings every 15 days, and to share the situation of the progress of a track maintenance and the check of it between the head office and the field departments for the decision of measure.

(4) With regards to the maintenance progress, after the report meeting, we circulate the situation of the progress and minutes of the meeting internally with the aim of sharing information throughout the company.

II. Active involvement of business administrations in detailed implementation plan, etc.

In order to thoroughly implement following items, an implementation result of each items is thoroughly reported to the Safety General Manager. Summarized results are reported in the safety management committee to be evaluated.

1. Efforts with preventive measures

(1) Establishment of the management system for sleeper/rail fastening system

With regard to a sleeper and a fastening system, we conduct inspections based on the track maintenance plan approved by the safety management committee and repair any faulty parts swiftly. Furthermore, we make the system which the inspection results and the status of implementation for repair are reported to the Safety General Manager in report meetings.

(2) Establishment of the management system for track inspections

① We define the base-date of inspection and conduct the measurements of each item.

② After the measurement, we make the system that we analyze/evaluate the results within about 15 days.

③ With regard to analyze/evaluate, in order to share the results of analyze/evaluation, we hold the report meeting with the Safety General Manager, Engineering Manager, Management Section Leader (Engineering Manager), Manager in Inaricho Technical Center, and the Manager for Track Maintenance Group after finishing the analysis.

After we consider the repair contents based on the results in the report meetings, we define the repair work plans.

Furthermore, we circulate the results of inspections in a company. Any faulty parts are repaired sequentially.

④ We make a track maintenance plan, which is an annual plan, in report meetings. After the safety management committee approved the plan, we implement the maintenance.

⑤ With regard to a progress of track maintenance, we make a system that we hold the report meetings with the Safety General Manager every 15 days and confirm the progress of track management in report meetings.

(3) Training enhancement for technical staff

① We hold a training regarding track maintenance and inspection by inviting external lecturers. Furthermore, we will continue to hold the training to improve a technical skill approximately twice a year.

② In a training for young staff, we conduct the training to improve fundamental action of work and awareness toward safety work. We will continue to hold the training to improve a technical skill approximately twice a year.

③ In a meeting for leader and chief once a month, we confirm the progress reports of track maintenance and status in each workplace. Furthermore, we also evaluate the contents of near-miss information and share information in each workplace.

(4) Sharing information

We are summarizing the near-miss information in each workplace and are conducting preventive measures, which are evaluated in the monthly leader and chief meetings, in each

workplace. Furthermore, we are re-evaluating the results of the measures in leader and chief meetings and are posting the results in each workplace. Through these initiatives, we aim to prevent accidents and share information.

2. Management of the rail fastening system for PC sleepers

(1) Thoroughness of checks after working on the track

① Preparation of work instructions

With the aim of conducting thorough checks after working on the tracks, we decide to prepare work instructions for each work. The final check is done by the staff in charge of the work and assistant appointed by the Manager for Track Maintenance Group regarding whether or not checks for the entire work have been done. After the final check, the staff in charge of the work enters that the work has been completed; and the Group Manager reports it to the Manager in Inaricho Technical Center.

The Safety General Manager inspects work instructions at the Technical Center without deciding the date prior to the inspections, with the aim of confirming that they are appropriately implemented.

② Management of work instructions

We prepare the work instruction management manual and aim to prepare and manage work instructions based on the manual in each workplace.

(2) Management of the rail fastening system for PC sleepers

① Management of the rail fastening system

a. We replaced all of the sleepers and the rail fastening systems in the derailed section after the accident.

b. We inspected the condition of rail fastening system on 12 rail replacement points, which were installed at the same time as the above section, and we confirmed that there is no issue for running safety.

c. We checked the condition of rail fastening by re-fastening the bolts, etc. With regard to consecutive faulty sleepers, we replaced/inserted sleepers and replaced the rail fastening systems.

d. When we implement the construction to replace the rail fastening systems, the responsible staff for operation and the assistant, who are appointed by the Manager for Track Maintenance Group, check the condition of rail fastening system and confirmed looseness of bolts based on the work instruction.

In addition, we decide to re-fasten all bolts in replaced parts after 2 weeks. The responsible staff for operation and assistant conduct the final checks in the same rule as the replacement work.

e. With regard to the condition of rail fastening systems, we confirm faulty part based on the track maintenance plan and conduct an appropriate management.

Furthermore, we decide to hold the report meeting to check the results of inspection, and we report to the Safety General Manager.

In addition, we continuously confirm the looseness of bolts and we also write the condition of bolts in the inspection table with the aim of promoting appropriate management.

② Correction of inappropriate parts

a. We repaired consecutive faulty rail fastening system on sleeper.

b. We have been repairing other faulty rail fastening system on sleeper to the plan.

FY2013 result: About 4,500 sleepers were replaced

FY2014 plan: About 3,700 sleepers are to be replaced

(3) Management system for the maintenance of tracks

We promote maintenance as per the track management plan after the approval is given to the plan by the safety management committee.

With regard to the progress of track management, we hold report meetings involving the Safety General Manager every 15 days, and confirm the condition of maintenance in the meetings to appropriately manage.

*The completion report is published on the JTSB website:
http://www.mlit.go.jp/jtsb/railkankoku/railway-kankoku3re-1_20130809.pdf

② Hokkaido Railway Company; Train derailment accident on the premises of Seifuzan signal station, Sekisho Line

(Recommendation issued on May 31, 2013)

On May 31 2013, the Japan Transport Safety Board (JTSB) published an investigation report and issued a recommendation to Hokkaido Railway Company as one of the parties relevant to the cause of the accident. The report and recommendation were in regards to the train derailment accident that occurred on the Seifuzan Signal Station premises on the Sekisho Line, which was managed by Hokkaido Railway Company, on May 27, 2011. The JTSB then received the following report regarding the measures (interim plan) taken based on the recommendation.

○SUMMARY

The six-car of the inbound train limited express “Ki-4014D train” (Super Ozora 14), of Hokkaido Railway Company, starting from Kushiro station bound for Sapporo Station, departed Tomamu Station about 2 minutes behind schedule, on May 27, 2011.

Status of the burnt cars

The conductor, in the conductor's compartment of the fourth vehicle of the train, running toward Seifuzan signal station, have heard an abnormal sound and have felt irregular vibration, so he notified those events to the train driver. The train

driver applied braking operation immediately after notified from the conductor. The train stopped in Niniu No.1 tunnel in the premises of Seifuzan signal station.

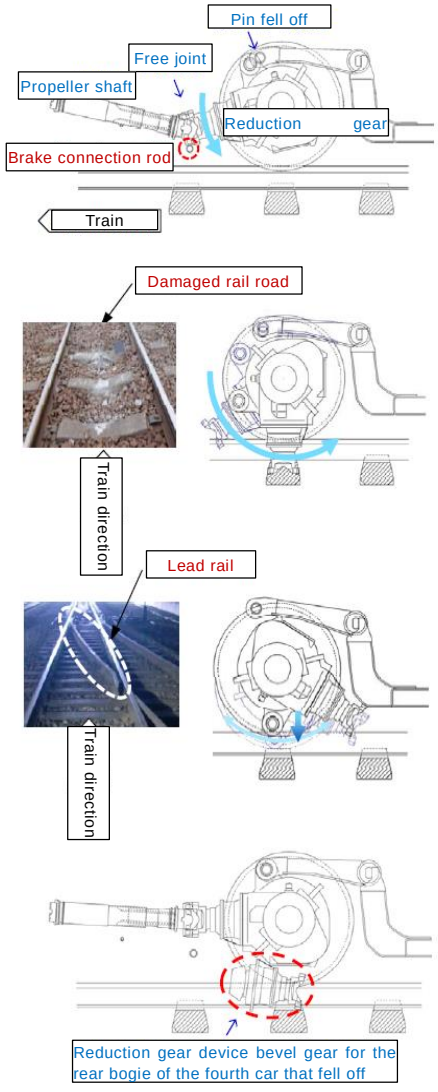
After that, the smoke of the fire which broke out from the train flowed into the train. The train driver tried to move the train halting in the tunnel to outside of the tunnel, but the train could not be moved.

There were 248 passengers, the train driver, the train conductor, and 2 cabin attendants on board the train. All members had evacuated outside the tunnel on foot, but 78 passengers and the conductor were injured.

It was found that the first axle of the rear bogie of the fifth vehicle of the train had derailed to the left. There were many parts of the dropped power transmission device, etc. scattered along the track for about 2 km length away from the halted point of the train. Moreover, all the 6 vehicles of the train were burnt by the fire.

○ PROBABLE CAUSES

It is probable that all 2 axles of the rear bogie of the forth vehicle and the first axle of the rear bogie of the fifth vehicle of the train were derailed as a results of the following steps, originated from the pin dropping out the reduction gear device on the rear part of the fourth vehicle fell down.



(1) When the reduction gear device was hung down forward as rotate around the axle, the propeller shaft was also hung down. As a result, the universal joint was broken and finally the reduction gear and the propeller shaft were separated.

(2) As the separated reduction gear device further rotated, the suspender of the reduction gear device hit the lead rail of the turnout No.12-Ro in the premises of Seifuzan signal station. At this moment, the rear bogie of the fourth vehicle was pushed to the left along the lead rail and the first axle derailed, the second axle of the rear bogie derailed following the first axle. The derailed 2 axles were restored at the turnout No.11-I.

(3) As the rear bogie of the fifth vehicle hit the bevel gear on the track fallen off from the hanged reduction gear device, the rear bogie was pushed up and the first axle was derailed.

It is probable that the pin suspending the reduction gear device fell down following the process described below. It is also probable that these process were related with huge vibration acting on the rear bogie of the fourth vehicle, due to the circular irregularity of the tread profile of the left wheel in the first axle of the rear bogie of the forth vehicle.

(1) There were local wear caused by contacts with other components in the split pin which fixed the grooved hexagonal nut for the suspension pin supporting the reduction gear device, and in the stopper split pin which was inserted at the head of the suspension pin to prevent fallen out.

(2) As the grooved hexagonal nut was loosened, the split pin inserted in the groove was exposed to the iterative tangential load and finally fell out of the groove of the hexagonal nut.

(3) The grooved hexagon nut loosened by missing the split pin and rotated still more until fell out.

(4) The stopper split pin which was inserted at the head of the suspension pin fell out by the iterative tangential load from the suspension pin.

(5) After the grooved hexagonal nut and the stopper split pin fell out, the suspension pin dropping out the reduction gear device fell out of the guide.

About the damage of the train by fire after the train derailment accident, it is probable that the fallen bevel gear of the reduction gear device hit and broke the fuel tank in the front part of the sixth vehicle, the light oil scattered on the track around the wooden sleeper had caught a fire ignited at around the generator or rear upper part of the engine and spread to the whole train.

According to the results of the overhaul inspection about the under floor equipments that were badly burnt and the equipments to get high temperature during operation, it is probable that all equipments caught fire by the external heat sources, then, the precise point where a fire was outbreak and the cause of outbreak fire were not identified.

○RECOMENDATIONS

Hokkaido Railway Co. should establish the proper inspection system, i.e., inspection period and methods for monitoring the condition of the wheel tread, and should manage the condition of the wheel tread throughout, and never use the wheel which should be treated as the wheel whose size of the tread defects or exfoliation are exceeded the limit to be used.

○ Measures taken based on the recommendation (interim report)

1. Measures taken with regard to "Establish a system to constantly check the wheels for states of tread defect and exfoliation. For example, using a procedure to record any discovered tread defects or exfoliations below the regulation value in the inspection book, which should be inspected again in order to understand how much the wheels have deteriorated."

Wheel tread exfoliation condition

(1) The vehicle planning division has made an agreement in October and December of 2013 with field managers, who are involved with car inspections and repair, regarding the promotion of activities to continue monitoring in case they find any wheel whose size of the tread defects or exfoliations is below the regulation value.

(2) The vehicle planning division has notified employees engaged in car inspections and repair involving wheel management via "Regarding the dimension regulation at the time of tread inspections" (Syakenshidou No.193, dated December 24, 2013) that continuous sets of defects and exfoliations on the tread, etc. are to be handled as a single tread defect/ exfoliation according to the conventional criteria used for wheel inspections.

(3) The vehicle planning division has notified employees engaged in car inspections and repair involving wheel management via "Regarding the program change and usage start of the car maintenance management system" (Syakenshidou No.164, dated July 30, 2014) that in case they find tread defects or exfoliations, etc. below the regulation value at the time of wheel inspections, they must enter the dimension, etc. in the "car maintenance management system" to leave a record; and that managers, etc. must confirm the entered dimensions, etc. and leave a record.

(4) The vehicle planning division has established a system in which they can continue inspecting the progress in case they find tread defects or exfoliations, etc. by comparing the dimensions with the dimensions at the time of the previous inspection, through the initiatives mentioned in 1. (1) – 1. (3).

(5) The vehicle planning division shall add the system mentioned in 1. (4) to the maintenance standard for each car type by the end of March, 2015, based on the situation of the wheel management and wheel inspections conducted in winter of 2014.

2. Measures taken with regard to "Employees of the vehicle planning division should visit each field twice a year to understand the status of wheel management and wheel inspections. They should also guide and review the inspection methods if necessary."

(1) Employees of the vehicle planning division visited the field, where the cars are, at least twice a year between October of 2013 and March of 2014 according to "Regarding comprehending the changes in the conditions of diesel railcars taken for periodic inspections" (Syakenshidou No.128, dated October 15, 2013) and "Regarding comprehending the changes in the conditions

of diesel railcars that have undergone periodic inspections (expanded scope)" (Syakenshidou No.156, dated November 6, 2013) to measure the actual dimensions of tread defects and exfoliations, etc. and to check them with the results measured by the employees in the field. They also comprehended the actual situation regarding wheel management and wheel inspections by confirming the entry status in the car maintenance management system, etc. Through this initiative, we have confirmed that the wheel management and wheel inspection contents, which were notified in 1. (2) and 1. (3), have been implemented, that there is no issue with the operation of wheel management, and that there is no need to revise the wheel inspection method.

(2) Employees of the vehicle planning division visit each field twice between October of 2014 and March of 2015 according to "Regarding intelligence exchanges with the head office and comprehension of the actual situation" (Unkan No.174, dated October 30, 2013 notified jointly by the general manager of transport department and general manager of rolling stock department) to comprehend the actual situation of wheel management and wheel inspections to determine whether or not we must review the wheel inspection method.

3. Measures taken with regards to "Introduction at a system should be discussed as early as possible in order to continuously and quantitatively detect heat cracking and defects (including exfoliationss) on the wheel. The system should be able to be executed while the train is operated and should be able to detect issues."

(1) With regard to the "wheel flat detection system", which can continuously and quantitatively detect heat cracking and defects (including exfoliations) on the wheel while the train is operated, the vehicle planning division has decided to introduce the system in November of 2014 after considering the specifications and installation location, etc. The division has decided to install the system on all trains in the Sapporo area and locations where all limited express diesel railcars pass in June of 2015.

After the installation, we will conduct the test-run until June of 2016 with the aim of comprehending the conditions in summer and winter. We will investigate the correlation between the detection data and wheel defect/ exfoliation, etc. and plan the full-scale operation, which will start in July of 2016.

(2) With regard to the expansion of installation of "wheel flat detection system" for cars that do not pass the areas where the system was installed in 3. (1), the vehicle planning division will consider the matter based on the actual situation in 2. (2) and the test-run in 3.(1).

*The interim report is published on the JTSB website:
http://www.mlit.go.jp/jtsb/railkankoku/railway-kankoku3re-2_20141222.pdf

③ Hokkaido Railway Company; Serious railway incident on the premises of Oiwake Station, Sekisho Line (dangerous damage in facilities)

(Recommendation issued on November 30, 2012)

On November 30, 2012, the Japan Transport Safety Board (JTSB) published an investigation report and issued a recommendation to Hokkaido Railway Company as one of the parties relevant to the cause of the serious incident, regarding the serious railway incident that occurred on the premises of Oiwake Station in Sekisho Line between June 14 and June 16, 2011. JTSB then received the following report regarding the measures (completion plan) taken based on the recommendation.

○SUMMARY

The first incident:

The outbound train composed of one vehicle, starting from Oiwake station bound for Yubari station of Hokkaido Railway Company, departed from the No.1 track of Oiwake station on schedule, Tuesday, June 14, 2011.

A signaler in the signal cabin of Oiwake staion, noticed that even though the train departed from Track No. 1, the indicator lamp of the No.1 track starting signal on the display panel, kept lighting in green and did not light off to show the stop indication. According to the records of the interlocking device, the No.1 track starting signal did not indicate the stop signal at this time.

The second incident:

The outbound train composed of 4 vehicles, starting from Sapporo station bound for Obihiro station of the Company, departed from the No.1 track of Oiwake station on schedule, June 14, 2011.

The same signaler involved in the first incident noticed that even though the train departed from Track No. 1, the indicator lamp of the No.1 track starting signal on the display panel, kept lighting in green and did not light off to show the stop indication. According to the records of the interlocking device, the No.1 track starting signal did not indicate the stop signal at this time.

The third incident:

The outbound train composed of 5 vehicles, starting from Sapporo station bound for Obihiro station of the Company, departed from the No.1 track of Oiwake station on schedule, Wednesday, June 15, 2011.

A signaler, different from the one involving the first and the second incidents, noticed that even though the train departed from No.1 track, the indicator lamp of the No.1 track starting signal on the display panel, kept lighting in green and did not light off to show the stop indication. An employee in charge of construction confirmed that the No.1 track starting signal did not indicate the stop signal at this time.

The fourth incident:

The outbound train composed of one vehicle, starting from Chitose station bound for Yubari station of the Company, departed from the No.4 track of Oiwake station two minutes behind the schedule, Thursday, June 16, 2011.

A signaler, different from the one involving the first to the third incidents, noticed that even though the train departed from No.4 track, the indicator lamp of the No.4 track starting signal on the display panel, kept lighting in green and did not light off to show the stop indication. According to the records of the interlocking device, the No.4 track starting signal did not indicate the stop signal at this time.

○PROBABLE CAUSES

It is probable that the starting signal for the down track of Sekisho Line did not change from the proceed signal to the stop signal when the departed train entered into the protection area of the starting signal, for the plural times, because the wiring works in the existing signal control circuit was mistaken, so that the signal current flows into the signal control circuit for the down track starting signal indicating the proceed signal when the down track starting signals of Sekisho Line and Muroran Line are routed at the same time, in the construction works to introduce the CTC and PRC system in the future.

It is probable that the signal current flowed into the relays in the signal control circuit of the starting signal in the routed track through the cathodes of the new relays connected with each other, when the routes of Sekisho Line and Muroran Line are set at the same time, considering the following situations.

(1) The anodes of the new relays were connected directly to the existing facilities, without using any switching plug.

(2) The cathodes of the new relays were connected with each other.

(3) New relay devices had been inserted into the electric circuit in the relay rack.

It is probable that the followings were related to induce the above situations.

(1) The Company's regulation that a switching plug should be inserted into both the positive and the negative terminals of the existing facilities when the switching plugs are used to replace the existing facility by the new one, did not be obeyed.

(2) It is not enough informed to the related staffs that the wiring works connected to the existing facilities should be treated as the work to effect the train operation, in the improving works of the interlocking device that is a signaling system.

(3) The prior check for the wiring works were not performed using the wiring diagrams in which the switching plugs are indicated, even though the electric connection diagrams were double-checked.

(4) The wiring works were performed before the wiring diagram had been approved.

(5) The management of the progress of the wiring works was not properly performed.

It is somewhat likely that both the supervisor and the subcontractor of the wiring work were too busy with other construction work performed at the same time, then the prior check was

performed for only a part of them due to their overcrowded jobs.

It is probable that the plural incidents occurred in relation with that the phenomena were not recognized as the incident, the communication network for an emergency were not organized, and the information was not transferred properly between the related employees, when the stop signal did not indicated by the signal device which should indicate the stop signal.

○RECOMMENDATIONS

(1) Hokkaido Railway Company has defined the preventive measures that would not effect safety operation of the existing signaling system during the construction works, such as to determine the appropriate position where the switching plug should be inserted, and the checking rules for the various wiring diagrams or electric connection diagrams, furthermore, the company defined clearly the procedures to be performed when a staff recognized that the indicator lamp to be changed to the stop signal did not light off to indicate stop signal in the operation manual. These measures are considered effective for the prevention of reoccurrence. However, it is essential to educate the company's employees continuously so that they fully understand the points of these measures and can take the appropriate measures against malfunctions.

(2) The company experienced a serious incident, i.e., a block signal that should have indicated a stop signal did not changed to the stop signal in the Hakodate Line on January 15, 2009, and the company had taken the preventive measures after the serious incident. However, the same kind of serious incident occurred this time, then the company should examine again about the system for construction and the management methods, and train the staffs engaged in the construction works, including subcontractors, so that they can acquire the basic operations for construction related to the signaling system, and should discuss about safety measures and take all necessary measures to prevent any more serious events.

○Measures taken based on the recommendation (completion report)

I. Ask that preventive measures be understood and undertake continuous training of employees

We have conducted the following educational training, which relates to the purposes of the preventive measures, and we will continue the initiative in the future.

1. Educational training for those engaging in signal work

(1) In the group training, which is performed on our employees and group company employees, we perform practical training relating to the approval of drawings and wiring work, including lecture education as well as hands-on training for wiring in training facilities. This is so we can enable anyone to perform wiring work in accordance with the rules for wiring. We also grasp the degree of understanding through end-of-course examinations.

(2) In the lecture about the qualifications that signal work technicians are required to finish once every three years by the Hokkaido Branch of the Railway Electrical Construction Association on Safety, lectures on the purposes of the preventive measures are added to the curriculum. Qualification is given by reflecting the degree of understanding.

2. Education and training for station attendants

We have added how to respond to failures in an interlocking device to the curricula for the general training, signalers, and transport officers. We grasp the degree of understanding through end-of-course examinations.

3. Education and training for dispatchers

The section in charge of the operation management involving in the electric blocking section added this serious incident as part of the education for employees in charge of operation management and educated them accordingly.

II. Safety measures for construction of the signaling systems

Education and training have been undertaken for those engaging in the construction of signaling systems in various training sessions, such as for preventing serious incidents like this one. In addition to this, the staff members of the electricity planning division in the head office have also visited the office of the contractor to recheck whether the defined rules are being correctly performed.

We have also rechecked for discrepancies in the related regulations to determine whether or not they include expressions that may cause misunderstanding as well as insufficient content in the preventive measures for case studies of past accidents. We have revised regulations that required revisions by changing expressions and reflecting instruction documents, etc.

We immediately took safety measures against any problems identified in these checks. We have also taught these problems in our education.

Furthermore, we have also revised our operation manual by standardizing the inspection methods and response to results, etc. by re-assessing the inspection items based on inspection results, so that field managers in charge of constructions and employees of the electricity planning division in the head office inspect continuously whether or not the defined rules and basic operations are being adhered to in the progress management of wiring work and wiring check after wiring, etc.

*The completion report, including materials, is published on the JTSB website:
http://www.mlit.go.jp/jtsb/railkankoku/railway-kankoku2re-2_20140625.pdf

④ Sangi Railway Co., Ltd.: Serious railway incident on the premises of Higashi-Fujiwara Station on the Sangi Line

(Recommendation issued on October 25, 2013)

On October 25, 2013, the Japan Transport Safety Board (JTSB) published an investigation report and issued a recommendation to Sangi Railway Co., Ltd. as one of the parties relevant to the cause of the serious incident, regarding the serious railway incident that occurred on the premises of Higashi-Fujiwara Station on the Sangi Line on June 27, 2012. JTSB then received the following report

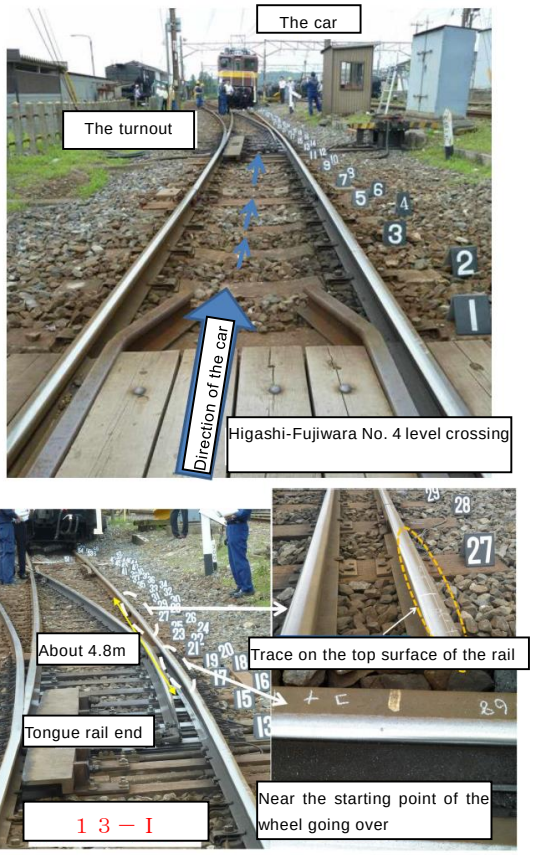
regarding the measures (interim report) taken based on the recommendation.

○Summary of the serious incident

At about 3:00 P.M. on June 27 2012, one of Sangi Railway Co., Ltd.'s 18-car shunting train (two electric locomotives and 16 freight cars) sets started from the private siding of a cement factory for the downbound main line in Higashi-Fujiwara Station.

The driver of the train set, noticing an abnormal condition when it was passing the Higashi-Fujiwara No. 13-I turnout, immediately applied the emergency brake to stop the train. The first axle in the front bogie of the second locomotive was derailed to the right.

A driver was working in the second locomotive, and two guides were in the first one, as well as a switchman in the third one. None of them were injured.



Derailment site

○Probable causes

This serious incident occurred when the set of 18-car shunting train (two electric locomotives and 16 freight cars) was running along the section of the base line side of a turnout that goes in the same direction as the curve. The turnout was in a section that contained four consecutive curves. The situation was attributable to an increase in the derailment coefficient, which occurred at the same time as a decrease in the threshold derailment coefficient. As a result, the right wheel in the first axle of the second locomotive's front bogie subsequently ran up the outside rail and derailed to the right.

It is probable that the increase in the derailment coefficient is a result of the increase in lateral force, as well as a decrease in the wheel weight. This situation can be deduced from the following factors: the track was deformed in a direction that results in the reduction of the radius; the twist of the track increased so that the train leaned to the front right, and; it is probable that that the train was running with excess of cant, which was due to its low-speed. It is somewhat likely that the shift of the axle load due to the power running at an ascent was also a contributing factor.

It is probable that the decrease in the threshold derailment coefficient results from a shifting of track, which is associated with an excessive reduction of the radius, resulting in an increase in the angle of attack for the first axle of the front bogie.

It is probable that the rapid shifting of track and the increase in twists resulted from their poor management of the shapes and shifts of the tracks. They did not understand the specification of plain curves, or did not inspect the shifts of the tracks in the turnouts. As a result, they were not able to recognize that the state of the tracks exceeded the allowances of its maintenance criteria.

○Description of the recommendation to Sangi Railway Co., Ltd.

Sangi Railway Co., Ltd. should make sure that their tracks are well maintained. They should do so by grasping the design values for maintenance and management and by inspecting shifts properly in accordance with the "Practice Criteria for construction works" in sections involving curves and/or turnouts.

○Measures taken based on the recommendation (interim report)

Since specifications of curves have been clarified for curves of our Sangi main line between each station, we have utilized them for track maintenance. However, some specifications of curves were not clarified in the main line, side lines, and curves with turnouts on the premises of each station. We had depended on the "long experience" and "review" of field workers.

As a result of investigations, we have clarified that stations, in which the specifications of curves were unclear, are 10 stations, including Tomida Station, Oyachi Station, Heizu Station, Hobo Station, Umedoi Station, Misato Station, Nyugawa Station, Ise-Hatta Station, Higashi-Fujiwara Station, and Nishi-Fujiwara Station. We have taken measurements in order to clarify the specifications in these stations, in which the specifications of curves are unclear, along Sangi Line. We are now promoting the work to define specifications of curves one by one by reading the current curves from the survey maps.

With regard to turnouts in each station, we will also report the work progress of the 3 locations, including Tomida Station Sa No. 60 turnout, No. 91 turnout, and Higashi-Fujiwara Station No. 60 turnout, which are adjusted on site due to the fact that there are no specifications (hereinafter referred to as "similar turnout").

・Tomida Station

We have started taking measurements on April 2, 2013, and field measurements have been completed on March 11, 2014. We are currently preparing the survey. We plan to promote work to define specifications of curves after the completion of the production of these measurements. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Oyachi Station

We have started taking measurements on January 10, 2014, and field measurements have been completed on January 18. We are currently preparing the survey, and we will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Heizu Station

While we have not taken field measurements at the moment, we will swiftly take measurements within this FY. We will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Hobo Station

We have started taking measurements on March 4, 2014, and field measurements have been completed on April 4. We are currently preparing the survey, and we will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Umedoi Station

We have started taking measurements on April 2, 2013, and the field measurements have been completed on April 22.

Based on these measurement results, we have prepared line survey maps including the specifications of curves in accordance with the Practice Criteria for construction works. We have applied for approval of application for modification of relevant railway facilities (Sangi tetsu No.80, dated November 14, 2013) regarding the new track shapes and received the approval by the Director-General of the Chubu District Transport Bureau (Chu-untetsugi No.157, dated December 12, 2013).

In response to this, we have implemented the construction to replace turnouts with heavy tracks within the station in accordance with the defined track shape (37kg→50kgN) (a total of 4 turnouts, including No. 11-I turnout, No. 11-Ro turnout, No. 12-I turnout, and No. 12-Ro turnout) as well as the curve improvement construction along with it by March 20, 2014.

Due to these constructions, all 4 curves have been improved to the new track shapes.

We will appropriately store the line survey maps and appropriately maintain and manage the tracks in accordance with the allowances of the maintenance criteria included in the Practice Criteria for construction works.

・Misato Station

We have started taking measurements on April 5, 2014, and field measurements have been completed on January 15. We are currently preparing the survey, and we will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Nyugawa Station

We have started taking measurements on January 20, 2014, and field measurements have been completed on February 10. We are currently preparing the survey, and we will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Ise-Hatta Station

We have started taking measurements on February 25, 2014, and field measurements have been completed on March 3. We are currently preparing the survey, and we will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification

is defined by using the current figures as the criteria.

・Higashi-Fujiwara Station

We have started taking measurements on May 22, 2012, and the field measurements have been completed on August 7 of 2012.

Based on these measurement results, we have prepared line survey maps for 5 curves, which required improvement, including the specification of curves in accordance with the Practice Criteria for construction works. We have applied for approval of application for modification of relevant railway facilities (Sangi tetsu No.50, dated September 21, 2012) regarding the new track shapes and received the approval by the Director-General of the Chubu District Transport Bureau (Chu-untetsugi No.148, dated November 21, 2012). In response to this, we have implemented the construction to replace turnouts with heavy tracks within the station in accordance with the defined track shape (37kg→50kgN) (a total of 5 turnouts, including No. 13-I turnout, No. 13-Ro turnout, No. 17-I turnout, No. 17-Ro turnout, and No. 14-Ro turnout) as well as the curve improvement construction along with it by March 13, 2013.

We have also prepared line survey maps for the other 17 curves including the specifications of curves in accordance with the Practice Criteria for construction works, and we have included the specifications for each curve. (Work completed on May 22, 2014)

We will appropriately store the line survey maps and appropriately maintain and manage the tracks in accordance with the allowances of the maintenance criteria included in the Practice Criteria for construction works.

・Nishi-Fujiwara Station

While we have not taken field measurements at the moment, we will swiftly take measurements within this FY. We will define specifications of curves after the completion of the survey. We will promote the maintenance until the specification is defined by using the current figures as the criteria.

・Tomida Station Sa No. 60 turnout

We have started taking measurements on April 2, 2013, and field measurements have been completed on March 11, 2014. We are currently preparing the survey, and we will promote work to define specifications of curves after the completion of the production of these measurements. We will plan curve improvement constructions in accordance with this.

・Tomida Station No. 91 turnout

We have started taking measurements on April 2, 2013, and field measurements have been completed on March 11, 2014. We are currently preparing the survey, and we will promote work to define specifications of curves after the completion of the production of these measurements. We will plan curve improvement constructions in accordance with this.

・Higashi-Fujiwara Station No. 60 turnout

We have started taking measurements on May 22, 2012, and field measurements have been completed on August 7, 2014. We are currently preparing the survey, and we will promote work to define specifications of curves after the completion of the production of these measurements. We will plan curve improvement constructions in accordance with this.

Regarding the transitional and appropriate maintenance for these Tomida Station Sa No. 60 turnout, Tomida Station No. 91 turnout, and Higashi-Fujiwara Station No. 60 turnout until the fundamental improvement construction is completed, we have requested the Railway Technical Research Institute to conduct a field check on December 12, 2013, and give us instructions on the maintenance method. We have decided to conduct the inspections, which are normally conducted once a year, once a month based on the advice regarding the maintenance method by the Railway Technical Research Institute until the major curve improvement is completed. We will promote the management by using the current management figures with the aim of ensuring safety.

*The interim report, including materials, is published on the JTSB website:
http://www.mlit.go.jp/jtsb/railkankoku/railway-kankoku5re-2_20140625.pdf

9 Provision of factual information in 2014

There were no cases of provision of factual information in 2014.

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

Derailment due to decrease of wheel load of the outside wheel caused by uneven loading in the containers

Japan Freight Railway Company; Train derailment accident between Izumisawa station and Kamaya station, Esashi Line

Summary: On Thursday, April 26, 2012, the freight train composed of 20 car departed from Aomori signal station on schedule, and arrived at Goryokaku station. The transport staff waiting for the train at Goryokaku station found smoke rose from the freight wagon, 18th car of the arrived train, and notified to the station office. The rushed station staffs fought the fire of the freight wagon that the smoke rose from around the bogie.

On the other hand, the switching malfunction of the turnout occurred in the premises of Kamaya station, Esashi Line. The track maintenance staffs of Hokkaido Railway Company checked track condition in the premises of Kamaya station, and found that the turnout was damaged and there were traces of derailment on the sleepers around it.

The freight wagon emitting smoke at Goryokaku station was not derailed but judged as it had derailed once, by the results of the inspection about status of the wheels of the freight wagon.

A train driver was onboard the train, but there was no injury.

Findings

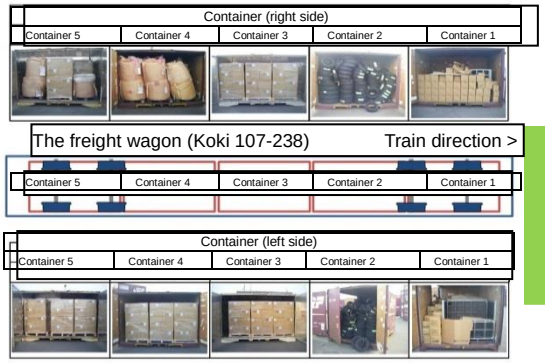
It is probable that the freight wagon became derailed as follows. Due to the large unbalance in the static wheel loads, in which the outside (right) wheel of each axle of the rear bogie was light, the wheel load of the outside (right) wheel was lighter than the wheel load of the inside (left) wheel while the train passed the curved track. Due to this, the lateral force for the outside (right) wheel had increased.

It is highly probable that the large unbalance in the static wheel loads, in which the outside (right) wheel of each axle of the freight wagon's rear bogie was light, occurred due to the uneven loading, in which a heavier load was on the left side compared to the right side, in containers (container 4 and 5) that were loaded on the freight wagon's rear bogie.

Loading situation of container 4
1. 48 cardboard boxes on the right side of the direction (about 540kg)
2. 6 flexible container bags boxes on the left side of the direction (about 3,600kg)

Loading situation of container 5
1. 48 cardboard boxes on the right side of the direction (about 540kg)
2. 16 cardboard boxes (about 180kg) and 3 flexible container bags (about 1,800kg) on the left side of the direction (1,980kg total)

*Left side had heavier loading than the right side's.



Loading situation in container

Due to the fact that there was a relatively large combination of track alignment and cross-level (*1) before the point where the wagon climbed over the rail, it is somewhat likely that the force to roll the wagon increased the decrease of the wheel load of the outside (right) wheel, resulting in a situation in which the wagon was prone to climbing over the right rail.

*1 "Combination of track alignment and cross-level" is one of the parameters of track irregularity maintenance. When a cross level occurs in which the track surface tilts according to track alignment, a value 1.5 times the size of the cross level is subtracted from or added to the alignment to increase the absolute value of the combination of alignment and cross levels. As the combination of alignment and cross levels increases, freight wagons can roll or hunt more easily.

It is probable that the first axle of the rear bogie of the freight wagon became derailed to the right when the outside (right) wheel climbed over the right rail due to the derailment coefficient for the first axle of the rear bogie increasing when the train passed the curve.

Probable causes: It is probable that the outside wheel climbed up to the top of outside rail, i.e., it was the flange climb derailment, by the increased derailment coefficient for the outside wheel, because the lateral force acting on the outside wheel had increased by the increased wheel load of the inside wheel, and the wheel load of the outside wheel had decreased, due to the large unbalance in the static wheel loads between right and left wheels of the freight wagon loaded containers, compared to the wagon with balanced static wheel load, while the train passed in the curved track of 300m radius, in this accident.

It is highly probable that the uneven loading in the containers caused the large unbalance in the wheel loads in the derailed freight wagon.

In addition, it is somewhat likely that the combination of track alignment and cross-level, which should be managed in the section where freight trains are operated, had relatively large at the point climbing up by the wheel started, promoted the decrease of wheel load of the outside wheel.

For details, please refer to the investigation report. (Published in Japanese on July 25, 2014)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-7-2.pdf

Derailment due to entering into a different track from the predetermined track after climbing up the tongue rail of a turnout

Kobe Electric Railway Co., Ltd.; Train derailment accident in the premises of Arimaguchi Station, Sanda Line

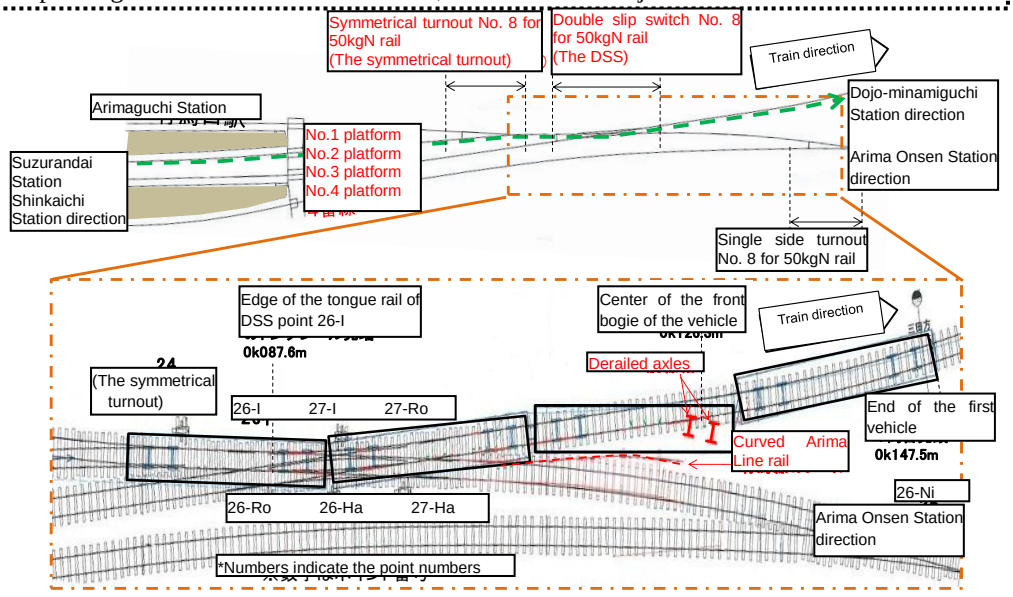
Summary: On Tuesday, May 28, 2013, the train composed of four vehicles had started on schedule at No.2 platform of Arimaguchi station, Sanda line. The train driver noticed an abnormal sound and the following big sound while operating coasting at about 25 km/h at the turnout in the station, and applied the emergency brake to stop the train. After that he found the front bogie of the second car entered into the route to Arima-Onsen station, different route from the predetermined route, and found all two axles in the front bogie of the second vehicle were derailed.

The first vehicle, the rear bogie of the second vehicle and the third vehicle had entered and stopped in the predetermined route to Dojo-Minamiguchi station.

There were about 60 passengers and the driver on the train, but no one was injured.

Findings

Lateral force tends to increase on the first axle of the front bogie of the car when a train, which leaves from No.2 platform, travels, compared to when a train, which leaves from No.1 platform, travels. It is probable that the tolerance against derailment was reduced due to the fact that the vehicle was passing the S-shaped track where the shape of curvature changes in the distance between the first axle and the fourth axle, which is shorter than the length of a vehicle.



Lines and sketch of the accident site

It is somewhat likely that a relatively large lateral force was easy to occur due to the facts that the double slip switch (*1) had an entrance angle (about 0.38 degrees) in the design near the Point 26-I tongue rail edge and that the track alignment based on the moving average method (*2) including the alignment in the design had changed as to decrease the radius curvature where the wheel is considered to have climbed over the rail.

*1 “Double slip switch (DSS)” refers to a type of special turnout. It refers to a track with connecting lines (track structure to connect 2 neighboring tracks) on both sides of a diamond crossing (track structure where 2 tracks cross each other on the same surface)

*2 “Track alignment based on the moving average method” refers to the value gained from subtracting the average measurement value of a certain distance near the measurement point from the measurement value at the time of the track alignment inspection.

There was wear of about 4-6mm in the thickness direction of the wheel flange and about 1-2mm in the height direction. Each of the flange part had been worn vertically compared to the designed cross sectional shapes, and the flange angle was larger than the designed cross sectional shapes of the wheels. Due to this, it is probable that the area near the edge of the flange of the right wheel was prone to be close to the right tongue rail of point 26-I of the double slip switch and climb over it.

Probable causes (excerpt): It is probable that the front bogie of the second vehicle of train started at No.2 platform of Arimaguchi station, Sanda line, had entered into the unexpected route to Arima-Onsenguchi station and derailed, because the flange of the right wheel of the first axle in the front bogie of the second vehicle had climb over the tongue rail around edge of the right tongue rail of the point in the double slip switch, followed after passing the symmetrical turnout in the premises of Arimaguchi station, in this accident. And, it is probable that the second axle of the front bogie had derailed to the right in the double slip switch following to the first axle entered into the wrong route, although it had entered into the predetermined route at the point in the double slip switch.

For details, Please refer to the investigation report. (Published in Japanese on October 30, 2014)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-9-1.pdf

Oil in the torque converter was ignited when the temperature of a diesel locomotive converter became high, damaging it

East Japan Railway Company; Train fire accident between Tsukuda station and Iwamoto station, Joetsu Line

Summary: On Monday, February 4, 2013, the train driver of the train composed of an electric locomotive and a diesel locomotive deadhead as a car felt as the train was dragged from the rear after the train passed Shikishima Station. However, the driver did not find any malfunction by checking the instrument panels, and he continued to drive the train. After a while, when the train ran by powering operation at about 60 km/h after passed the Tonegawa No.2 Bridge, the train driver felt again as the train was dragged from the rear, but he could not find any malfunction from the instrument panels. However, when he checked the rear of the train, he found a fire broke out from the diesel locomotive, and he applied an emergency brake to stop the train at the safe place.

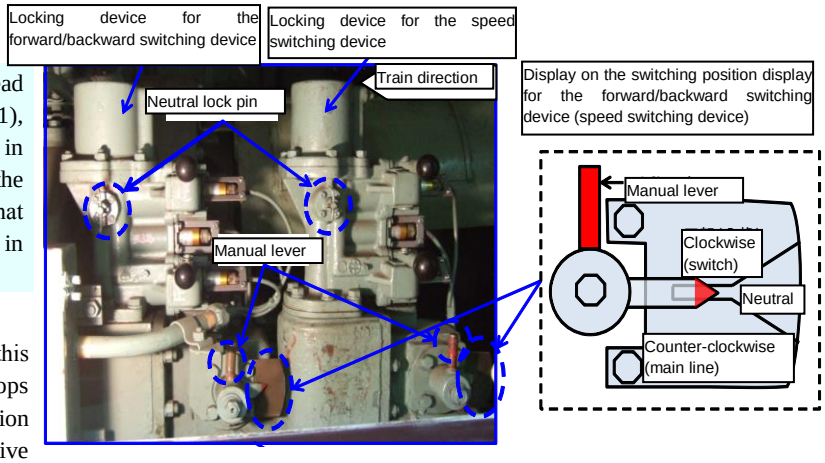
After that, the fire of the diesel locomotive was extinguished by fire fighting, but a part of the vehicle such as the transmission device were damaged by fire.

There was a train driver alone on board the train, but he was not injured.

Findings

When a diesel locomotive is in the deadhead operation without powering (*1), forward/backward switching device must be in "neutral lock". However, it is probable that the shifter was not in the "neutral" position and that the forward/backward switching device was not in "neutral lock".

*1 "Deadhead operation without powering " in this report refers to when a diesel locomotive stops its functions and is deadhead to the destination while being towed by an electric locomotive without using the power of the diesel locomotive.



The locking device for the forward/backward switching device and the high speed/low speed switching device

Due to the fact that the forward/backward switching device was not in "neutral lock", it is probable that the rotation of the car's wheel was conducted to the turbine axle of the first stage converter due to the fact that the car was being towed by an electric locomotive, resulting in the turbine blade wheel rotating inside of the first stage converter and the temperature of the turbine blade became high.

Under normal circumstances, the converter is cooled by the coolant that is circulated by the engine. However, the coolant was drained due to the fact that this was in the deadhead operation without powering. Due to this, it is probable that the remaining converter oil (oil used to conduct power) in the torque converter was ignited by the high temperature fragments etc. of the converter which was broken and heated by missing cooling function of the converter.

It is probable that the forward/backward switching device did not correctly switch to "neutral" in the "neutral lock" operation because the staff did not know how to operate it due to the facts that it was the first time for the staff to operate the "neutral lock" operation for the car, that the staff did not have prior education and training, and that there was no operation manual to explain the specific operation method.

Although the emergency brake was supposed to function in case the velocity exceeded the permissible value even if "neutral lock" was forgotten during deadhead operation without powering, the meter relay had been replaced: due to this, the power for the new meter relay was also cut off if the battery switch was turned off. It is somewhat likely that the emergency brake did not operate when the velocity exceeded the permissible value because the battery was turned off in the deadhead operation without powering and the electric power was not supplied to the emergency brake circuit in the new meter relay.

Probable causes (excerpt): It is probable that the remaining converter oil in the torque converter was ignited by the high temperature fragments etc. of the converter which was broken and heated by missing cooling function of the converter because the coolant was drained, and the first stage converter rotated while the deadhead diesel locomotive were running, because the "neutral rock" of the forward/backward switching device was not correctly performed when a diesel locomotive was hauled as the deadhead operation without powering.

For details, please refer to the investigation report. (Published in Japanese on August 29, 2014)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-8-1.pdf

Derailment caused by collision with the rear portion of the freight truck, which could not cross the intersection ahead of the level crossing

Sanyo Electric Railway Co., Ltd.; Train derailment accident in Shinkomae level crossing, main line

Summary: On Tuesday, February 12, 2013, the inbound six vehicle train set departed at Oshio station on schedule. The train driver noticed the obstacle at Shinkomae level crossing while the train was coasting at about 95 km/h between Iho station and Arai station. Immediately, he sounded a whistle and applied an emergency brake, but the train collided with the rear of the car carrier trailer truck and the stretch board for loading. After that, the train ran with destroying poles planted in the left side of the up track and the block fence along the track, and collided with the platform of Arai station and stopped.

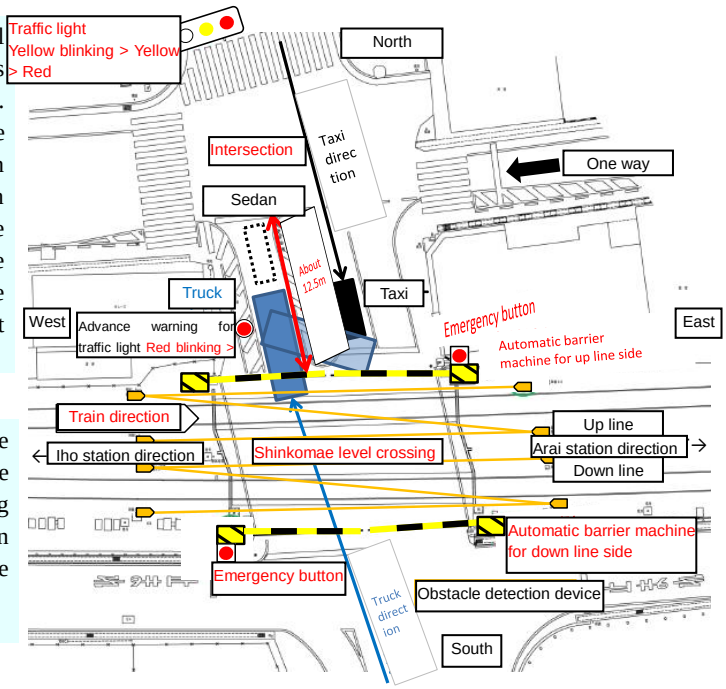
The front part of the train was completely demolished. The front bogie of the front vehicle was separated from the vehicle body and its first axle derailed to the left of the rail and the second axle derailed inside the track. The all axles of the rear bogie of the front vehicle and the all axles of the front bogie of the second vehicle derailed to the right of the rail. The all axles of the rear bogie of the second vehicle derailed as the left wheels were raised up from the rail.

There were about 60 passengers, a train driver and a conductor on board the train. The train diver was seriously injured and 15 passengers were slightly injured. In addition, the drivers of the freight truck and a taxi collided with the freight truck were slightly injured.

Findings

As for the road to the intersection ahead of the level crossing, the distance from where the crossing rod comes down to the stopping line of the intersection is about 12.5m. If the truck stops behind one sedan, which is stopped before the stopping line, it is probable that there was more than about 1.7m of the rear portion of the freight truck, which was stopped behind a sedan that had stopped before the stopping line of the intersection, on the inside of the crossing rod of the level crossing, due to the fact that the sedan length is about 4. 6m and the truck length is about 9.6m.

It is probable that the truck driver left the rear portion of the truck inside of the level crossing due to the fact that he entered the truck inside of the level crossing without pausing before the level crossing, without thinking that the sedan ahead of his truck might stop at the intersection; because he was not familiar with the road circumstances.



Sketch of the area near the level crossing

It is probable that the truck driver was trying to move forward with the stretch board lowered in order to avoid colliding with the train. However, it is somewhat likely that the train became derailed because the wheels of the first axle of the front bogie of the train's first car climbed over the stretch board due to the fact that the stretch board was lowered.

Probable causes (excerpt): It is probable that the accident occurred by the inbound through limited express train derailed to the left of the up-track because the train collided with the load carrying platform of the freight truck and ran onto its stretch board for loading, which was lowered to cross the railway track, at the same time, when the train passed the Sinkomae level crossing, in this accident.

It is probable that the rear portion of the freight truck had been staying inside the level crossing because the truck driver drove the truck into the level crossing road, without noticing that the sedan ahead his truck might stopped at the road between the level crossing and the intersection ahead, and the truck was obliged to stop behind the sedan stopped at the intersection.

For details, please refer to the investigation report. (Published in Japanese on June 27, 2014)

http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-6-1.pdf

Collision with a farming tractor that entered into a level crossing without automatic barrier machine
Central Japan Railway Company; Level crossing accident in Yuzawa level crossing, Iida Line

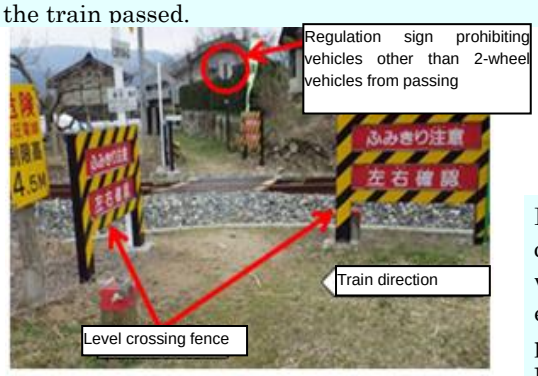
Summary: On Saturday, April 12, 2014, while performing coasting operation along the 400m-radius curve at 60-65km/h after departing Ina-Kamisato station on time, the 2-car outbound train noticed a farming tractor facing right near the right side rail in Yuzawa level crossing, which was about 70m ahead. The driver immediately applied the emergency brake and blew the whistle, but it was too late. The right side of the train collided with the farming truck and came to a stop after running about 140m.

The tractor driver died by the accident.

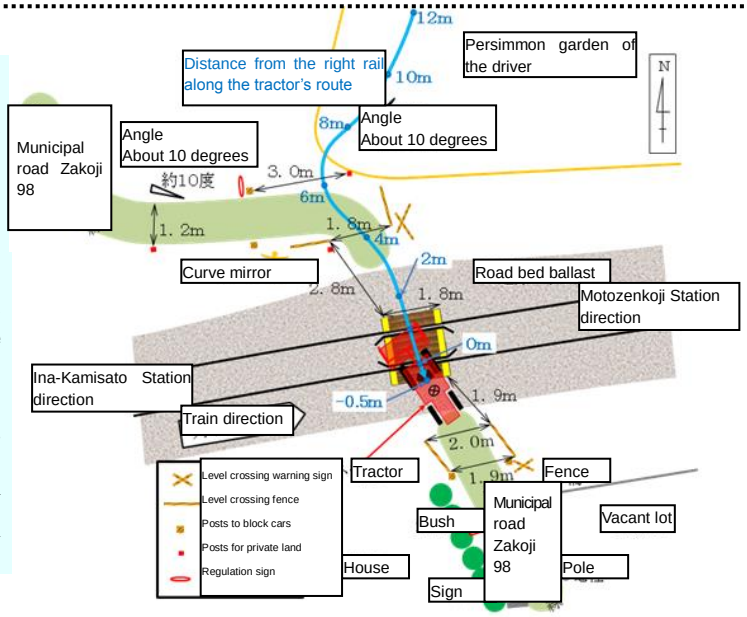
Findings

It is probable that the driver entered the tractor, which is stored in a shed in a persimmon garden to the left of the track of Yuzawa level crossing, in the level crossing to use it in the garden on the other side of the track.

When carts, etc. passed the level crossing, two people were always involved, and one of them checked for approaching trains by using the alarm sound, etc. of the nearby Zakoji level crossing, etc. However, due to the fact that the driver was crossing the level crossing without paying attention to the time when the train passes the level crossing, it is somewhat likely that the driver was not aware of the time when the train passed.



Level crossing from where the tractor entered



Sketch of the accident site

It is somewhat likely that the driver did not use the road that connected to the level crossing due to the following reasons. The road was an unpaved and narrow (minimum width of about 1.2m) embankment, and it was difficult to drive with the tractor. It was not possible to enter with a truck to transport products, etc. It was also a longer route to the garden on the other side of the track. Due to this, the driver chose the route to pass the level crossing, where he normally passed carts, and passed the level crossing with the tractor.

Due to the facts that the width of the level crossing is narrow and that the driver was attempting to cross the level crossing, where tractors do not normally pass, with a tractor, it is somewhat likely that the driver did not notice the train approaching until the driver of the train blew the whistle because he was concentrating on operating the tractor when passing the level crossing.

Probable causes: It is probable that the accident had occurred by the collision of the train and the tractor entered into and could not pass across the Yuzawa level crossing, where tractors are prohibited to enter.

It is somewhat likely that the tractor driver moved his tractor into the level crossing, without noticing that the train was approaching to the level crossing, because it might be effected that the tractor driver had concentrated his attention to driving the tractor while passing the level crossing, as the width of the level crossing road is narrow and he usually did not drive the tractor in the level crossing.

It is also somewhat likely that the reason because the tractor driver had moved his tractor into the level crossing where tractors are prohibited to enter, is that he usually passed the level crossing with the cart to transport farm products.

For details, please refer to the investigation report. (Published in Japanese on October 30, 2014)
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2014-9-3.pdf