BEATT

Bureau d'Enquêtes sur les Accidents
de Transport Terrestre

RÉPUBLIQUE
FRANÇAISE
Liberté
Égalité
Fraternité

ANNUAL REPORT 2019

Land Transport Accidents Investigations Board

ANNUAL REPORT

2019

Land Transport Accidents Investigation Board (BEA-TT)
Grande Arche – Paroi Sud
92055 La Défense cedex
Tel : 33 (0)1 40 81 21 72 – Fax : 33 (0)1 40 81 21 50
email: Bea-tt@developpement-durable.gouv.fr
web : http://www.bea-tt.developpement-durable.gouv.fr

TABLE OF CONTENTS

A word from the director

Dear Sir or Madam,

During 2019, BEA-TT concluded 11 investigations with 23 recommendations whose intent was to improve land transport safety. In addition, two progress notes were posted online on investigations not yet concluded 12 months after occurrence of the accident.

Among the published reports, four were for accidents at level crossings and, in particular, a very dramatic one that occurred in December 2017 in Millas. We presented the conclusions of our investigation to the victims' families in Saint-Féliu-d'Avall prior to publication of the report. We hope that effective implementation of the eight recommendations issued following these four accidents will contribute to reducing accidents occurring in these unique locations.

At the same time, 2,649 security events were reported to the office, in roughly equal numbers between road and river areas, on the one hand, and rail and guided transport on the other. Analysis of these events by technical investigators led to opening 17 investigations: Four in the road sector, six in the rail sector, including five on level crossings, five in the field of guided transport and two in inland navigation.

In addition to its investigative mission following incidents or accidents, the BEA-TT performed a study of the problem of railway trespassing, which is the leading cause of accidental mortality on the rail network, ahead of mortality at level crossings. As a result of this study, three recommendations were given to try to improve the situation.

Finally, the BEA-TT chaired plenary meetings of all European railway investigation offices (NIB: national investigations body) during which the basic items were adopted to create a real network of these organisations. The goal is to strengthen measures for exchanging information, survey methodologies and training.

I hope that you enjoy reading the 2019 edition of the BEA-TT annual report. We look forward to any comments that you may give.

Jean PANHALEUX

1 - Roles and organisation of BEA-TT

1.1 - Reasons for a technical investigation of accidents

The human dramas caused by transport accidents and the spectacular damage they can cause remind us that people, equipment and organisations are fallible despite the progress made in safety terms.

Public authorities, accident victims and travellers are constantly demanding that the lessons from the most serious or complex accidents or incidents should be learned independently.

This involves analysing the circumstances and causes of these accidents in order to establish safety recommendations that could prevent them happening again, in the form of a technical investigation and an in-depth and transparent approach. Since highly-qualified and independent investigators need to be mobilised and the lessons learned capitalised on, these technical investigations are assigned to a permanent specialised organisation. This has been the role of the Land Transport Accidents Investigations Board (BEA-TT) since 2004.

Its scope covers rail transport, guided urban transport systems (underground railway and tram), ski lifts, road transport (particularly goods and public passenger transport) and navigation on internal waterways, each of these sectors having its own regulations and economic, technical, professional and even cultural logic.

Decisions to open technical investigations are made by the director of BEA-TT on his/her own initiative or at the request of the minister of transport. In the rail transport area, investigations must be carried out for all serious accidents as defined by EU directive 2016/798 of 11 May 2016 on rail safety.

This technical investigation must be completely different from a judicial investigation, which has different objectives focused on establishing responsibility, and different constraints, particularly in terms of deadlines.

In order to carry out their work effectively, technical investigators are commissioned to access all useful documents, evidence and information, even if covered by judicial, professional or medical secrecy. These are legal prerogatives.

On conclusion of the investigations or studies carried out, BEA-TT publishes its reports on its website: www.bea-tt.developpement-durable.gouv.fr. It notifies the recipients of the safety recommendations it makes.

1.2 - Organisation and resources

BEA-TT is organised around its main role, i.e. conducting technical investigations on accidents and incidents. For this purpose it enlists three categories of participants:

- firstly, its own full-time investigators;
- secondly, temporary investigators commissioned by its director for the purposes of an investigation and who benefit from the legal status of technical investigators; these can be active or retired agents of a transport company, an infrastructure management agency or a body of civil servants in charge of inspection or monitoring assignments;
- finally, experts appointed to answer precise questions.

Thus in 2019, BEA-TT called on an investigator from outside the ministry to contribute to an investigation concerning the collision of a passenger boat with a bridge pier.

In addition, in accordance with its constitutive texts, BEA-TT may call on all competent State services in its field. This is specifically the case when reporting accidents.

On 1 January 2020 BEA-TT had 14 authorised agents: 2 executive staff, 9 permanent investigators and 3 administrative agents. One physician from the General Labour Inspectorate has also been seconded to it to deal with medical aspects.

Its 2019 budgetary allocation for operations and studies was €60,000.

2 - Feedback on the incidents of the previous year

2.1 - Accident and incident reporting

As stipulated by the Transport French legislation, land transport incidents and accidents are brought to the attention of BEA-TT at the earliest opportunity after they have occurred. In practice, this feedback is mainly provided through the bulletins and the reports from the Ministerial Center of Operational Intelligence and Warning (CMVOA) of the ministry for an ecological and solidary transition and the cohesion of the territories, from the daily reports of the Interdepartmental Crisis Management Operational Centre (COGIC) of the Ministry of the Interior, as well as alerts and daily reports from some major transport operators.

This consists of using this information in order to be able to determine whether an investigation is advised. Depending upon the number of victims, the conditions and social sensitivity of the accident, a brief analysis is performed in order to understand the circumstances and the value of opening an investigation. This daily task was not presented in the department's annual report. It now appears in tabular form below.

Note that for the road sector, the majority of reported events are related to accidents which occurred with at least one vehicle transporting goods or people. Personal vehicle accidents are not counted.

The summary of this analysis is as follows:

	Reported events	Analysed events	Selected events
Road and river transport division	1312	371	5
Rail and guided transport division	1347	314	12
Total	2649	685 *(25,7 %)*	17 *(0,6 %)*

** Events reported are those which led to opening an investigation.*

2.2 - Investigations opened in 2019

The BEA-TT initiated 17 investigations in 2019. They included:

- For the **road sector**, a bus fire, two overturns of heavy vehicles, and the collapse of a bridge when a heavy vehicle passed by;
- for the **railway sector**, an axle engagement and five collisions at a level crossing, one of which involved exceptional transport;
- for the **field of guided transport,** two collisions between two tram units, a collision between a tram unit and a bus, a pedestrian hit by a tram and the derailment of a cogwheel train;
- in the **field of river navigation,** the collision against a bridge pier by a passenger boat and the collision by a river-sea vessel into two bridges.

2.2.1 - Road and river transport division

1) Bus fire that occurred on 10 March 2019 on the A6 motorway in Coudray-Montceaux (91)

A fire broke out on a coach travelling on the A6 motorway towards Paris on Sunday 10 March 2019, near the town of Coudray-Montceaux (91). The driver parked his vehicle at a rest stop. The 50 passengers and two drivers managed to vacate the bus.

One of the passengers injured his hand while trying to smash a window on the bus before the stop. The fire had no other bodily-injury consequences except that some passengers inhaled toxic gases, without lasting consequences.

In material terms, the entire coach burned down, including the luggage that it was carrying in the hold. The trailer it was towing was only slightly damaged by the flames.

2) The transfer of a mixer truck to a light vehicle that occurred on 13 August 2019 on the RD13 at Bazoches-sur-Guyonne (78)

On Tuesday 13 August 2019, a concrete mixer lorry travelling on the RD13 entered a relatively tight turn when a Citroen car arrived in the opposite direction. It contained a mother and her two children, aged 13 and 8.

The lorry rolled over on its left side in the middle of the turn and crushed the rear of the car, instantly killing the child in the back and seriously injuring the driver and front passenger. The lorry driver was also hospitalised.

3) Overturn of a Flixbus coach occurred on 3 November 2019 on the A1 motorway in Estrées-Deniécourt (80)

On Sunday 3 November 2019, a coach making the Paris-London connection for the Flixbus company took exit ramp no. 13 on the A1 motorway at the town of Estrées-Deniécourt at a speed of about 100 km/h. About 100 metres after the start of the ramp road, which is slightly uphill, the coach entered a portion of the ramp road at relatively high speed in a curve to the right. The coach left the road on the left and then overturned, making a three-quarter turn, causing it to lie on its right side.

This accident resulted in very serious injuries to one passenger and minor injuries to 32 others, some of whom had not fastened their seatbelts.

4) The collapse of a road bridge when a lorry passed, which occurred on 18 November 2019 in Mirepoix-sur-Tarn (81)

On Monday 18 Nov 2019 at around 8 am, a road assembly made up of a tractor and a trailer carrying a drilling machine with a weight of around 30 tons arrived at the bridge overhanging the Tarn at the point of the town of Mirepoix-sur-Tarn. At almost the same time, a Renault Clio car pulled onto the bridge at the other end. These two vehicles were travelling in the opposite direction. They each travelled about 50 metres when the deck of the bridge supporting the RD71 departmental road completely collapsed into the river and onto the banks, dragging the two vehicles into the water.

The lorry driver, trapped in the tractor cab, and the car passenger could not exit the vehicles in time. The car driver, who was seriously injured by the fall, managed to reach the shore.

5) The collision into the bridge pier by the "Burdigala II" passenger boat that occurred on 19 August 2019 in Bordeaux (33)

Departing from its pier, located at Quai des Queyries in Bordeaux on Monday 19 August 2019 at around 12:10 pm, the Burdigala II moved down the Garonne for a two-hour cruise with 97 people on board, including 89 passengers invited to a birthday lunch.

The captain could no longer control the boat at about 12:20 pm. It began to drift to the left, then struck the left pier of the Chabans-Delmas bridge from the front. It continued on its way, then veered to the right, crossed the Garonne, hit a docked barge and ended up coming to a stop, colliding head-on with the Quai de Brazza on the right bank.

The passengers were then evacuated by two boats that came to its assistance, and to secure the transboarding with the help of a fire-fighter's boat. Of the 10 injured, four were taken from the boat by the GRIMP team (hazardous environment response group) using a zip line device.

6) The collision into two bridges over the Rhone by the river-sea vessel "Aramis", occurring on 28 September 2019 in Donzère (26)

Having stopped for part of the night in Avignon, the Aramis sailed up the Rhone. As it was about to pass under the RN7 road bridge located at PK 174.680 on the Rhone canal near the town of Donzère, on Saturday 28 September 2019 at about 9:10 am.

The vessel struck the road bridge deck with its wheelhouse, the top of which was torn off and fell into the water. Then, its left front hull collided with the pier on the right bank of the railway bridge located 200 m further on. The crew managed to bring the vessel to a stop after 700 m. The driver (river) and captain (maritime) of the vessel were slightly injured. In the early afternoon, the ship was moved using a pusher craft and was brought to safety at a jetty located 2 km upstream.

2.2.2 - Rail and guided transport divisions

1) Collision between a light vehicle and an inter-city train which occurred on 11 April 2019 at level crossing no. 48 at Pavilly (76)

On Thursday 11 April 2019 at about 9:45 pm, a regional express train from Paris to Le Havre crashed into a light vehicle on a level crossing, no. 48, in the town of Pavilly.

The shock caused the light vehicle to be thrown onto level crossing equipment, partially damaging it and seriously injuring the two occupants of the light vehicle. Among the 150 people on the train, only one passenger was slightly injured. Two fire-fighters were also involved in rescue operations.

2) Collision between a TER [regional train] and a light vehicle which occurred on 7 May 2019 at level crossing no. 302 at Saint-Étienne (42)

On Tuesday7 May 2019 at about 3:10 pm, a regional express train from Boën-sur-Lignon which was bound for Saint-Étienne Chateaucreux station collided with a light vehicle on level crossing no. 302 in the town of Saint-Étienne after the light vehicle had made a right turn beyond a central island, leading it to take the opposite traffic lane.

No injuries occurred. The driver stopped early enough at the level crossing, only hitting the train light by a few centimetres. Material damage to the train and to the light vehicle was slight. Road and rail infrastructures were not damaged.

3) Collision between a TER [regional train] and a light vehicle which occurred on 15 July 2019 at level crossing no. 2 at Avenay-Val-d'Or (51)

On Monday 15 July 2019 at about 9:45 am, a regional express train from Epernay to Reims hit the back of a light vehicle at level crossing no. 2 in the town of Avenay-Val-d'Or.

The light vehicle was thrown by the violent impact several tens of meters away down the rails from the level crossing. All four of the light vehicle's occupants died instantly. Four occupants from among 22 people on board the train were slightly injured.

Damage to the train and several pieces of equipment at the level crossing was significant. The road infrastructure was not damaged.

4) The locking of an axle on a Europorte freight train occurred on 26 July 2019 between Romilly-sur-Seine and Troyes (10)

Friday 26 July 2019 at 4:45 pm, a Europorte France freight train, composed of 20 tank rail cars loaded with vegetable oil, triggered a "hot box" and "brake applied" hazard alarm, and was stopped near Troyes.

Extensive damage was noted on the train's fourth car. Two wheels literally melted. Several parts of the braking system linkage as well as the brake shoes were torn off. However, the car did not derail.

Embankment fires were noted in several places along the train's route. A residential house bordering the road was partially burnt down. Some railway infrastructure systems were affected.

5) Collision between a TER [regional train] and a light vehicle which occurred on 15 September 2019 at Level Crossing 8 at Roissy-en-Brie (77)

On Sunday 15 September 2019, at about 11:05 pm, a Transilien train from Paris-Gare de l'Est bound for Provins struck a light vehicle at level crossing no. 8 in the town of Roissy-en-Brie, which was stuck on the deck between the lowered half-gates.

Fortunately, the light vehicle's four occupants were able to quickly exit their vehicle, which was destroyed by the impact. Noone was injured. However, nine passengers among 44 train occupants were slightly injured.

The damage to the train and the level crossing equipment was significant.

6) Collision between a TER [regional train] and an exceptional load which occurred on 16 October 2019 at level crossing 70 at Boulzicourt (08)

On Wednesday 16 October 2019 at about 4:10 pm, a regional express train from Charleville-Mézières bound for the Champagne-Ardennes TGV station collided with a low-slung road assembly carrying an agricultural machine at level crossing no. 70 in the town of Boulzicourt.

11 train occupants were slightly injured following this collision. The tractor-trailer driver, outside the lorry as the train arrived, was only slightly injured, while the tractor unit and semi-trailer were destroyed. Luckily, the train did not strike the transported agricultural vehicle, which weighed about 30 tonnes. It did not derail, but damage to the train and rail infrastructure was significant.

7) Collision between two line T2 tramways that occurred on 11 February 2019 in Issy-les-Moulineaux (92)

Monday 11 February 2019 at 9:01 pm a tram collided into another tram stopped on the line along the Parisian network's T2 tram line. The collision occurred between Jacques-Henri Lartigue and Les Moulineaux stations.

The collision injured 11, including one seriously. The two trams partially derailed, and equipment damage was significant.

8) Pedestrian hit by a line B tram, occurring on 22 February 2019 in Bordeaux (33)

Friday 22 February 2019 at 9:22 pm, on the quays of the Garonne in Bordeaux, a tram running on line B between "Chartrons" and "Cours du Médoc" stations hit a woman. The accident occurred as the woman was taking the tram platform's pedestrian crossing.

The shock took place on the train's right front. The pedestrian was thrown forward 12 metres and slightly to the side of the platform. The train was stopped by the driver immediately after the impact.

The woman was unconscious in an extreme emergency state. She was taken by the ambulance service (SAMU). She was released by the hospital after a long coma and more than two months of recovery.

This accident occurred against a backdrop of an increase in accidents along the Bordeaux tram network.

9) Collision between a tram on the T7 line and a coach that occurred on 27 February 2019 in Paray-Vielle-Poste (91)

On Wednesday 27 February 2019 at about 1:20 pm, in the town of Paray-Vielle-Poste (91), a T7 tram line train, travelling in the direction of the "Villejuif-Louis Aragon" terminus, collided with a coach travelling north on rue Marcel Albert. The coach was operated as a part of the regular 91.10 line of the Paris regional bus network.

The shock caused two of the trainset's three bogies to derail, and the tram stopped against the edge of the central berm on rue Marcel Albert after travelling a dozen metres. The coach, running on compressed natural gas, was damaged on its right rear.

The injuries due to this accident include one person hospitalised for five days and six minor injuries among the coach passengers, as well as four minor injuries among the tram's passengers.

10) Derailment of the Montenvers cog train, occurring on 11 August 2019 in Chamonix (74)

On Sunday 11 August 2019, the cogwheel train from Montenvers to Chamonix derailed on a switch at the Planars side track as it descended in the direction of the valley.

All four drive axles and three of the four trailer axles derailed. The train slipped for about 40 metres and rolled onto its side. It did not overturn, however. The train was immobilised. A lifting device re-anchored it the next day.

No injuries occurred among the many travellers. Many were in shock.

11) Collision by overtaking two tram trains from line 1 that occurred on 2 December 2019 in Montpellier (34)

Monday 2 December 2019 at 3:10 pm, while disruptions were occurring on line 1 of the Montpellier tramway, a tram which was stopped was struck from behind by another tram near the “Hopital Lapeyronie” stop.

The two trains were full of travellers. The collision caused several minor injuries. The two trams did not derail, but suffered considerable hardware damage.

3 - Published reports

3.1 - Rail transport

3.1.1 - Investigations concluded in 2019

Seven investigations into rail transport accidents were concluded in 2019. The nature, dates and locations of these accidents are specified in the table below.

Three of these accidents constituted “serious” accidents for which a technical investigation was required, as set forth to Art. L1621-2 of the Transport Code relating to technical investigations. They are identified in blue in the table below.

Date	Nature and location of the accident	Number of deaths	Mode*
13/03/2017	Derailment of three ethanol cars in the Sibelin marshalling yard (69)	0	R
14/01/2017	Collision between a TER and a car in Bonneville-sur-Touques (14)	3	LC
14/12/2017	Collision between a TER and a coach in Millas (66)	6	LC
14/01/2018	Collision between a TER and a light vehicle in Auxerre (89)	2	LC
22/02/2018	A pedestrian hit by a train on a level crossing at Écommoy station (72)	1	R
03/04/2018	Collision between a TER and a light vehicle in Coulogne (62)	2	LC
24/08/2018	Derailment of a TGV at Marseilles Saint-Charles station (13)	0	R

3.1.2 - Recommendations issued

In conclusion for these seven reports, 16 distinct recommendations were formulated by BEA-TT.

Nature of the recommendations

- Six are related to improving the railway infrastructure facilities or the road infrastructure at level crossings;
- Three are related to the reinforcement of maintenance and surveillance operations on the rail network;
- Three aim to develop recording methods which can be used in case of an accident
- Two are related to improving standards and procedures;
- One aims to make the public aware of railway dangers;
- One relates to the development of risk analyses for improved safety.

Recipients

- Three of the above recommendations were sent, with the same wording, to several addresses. The total number of recommendations received by addresses with the surveys amounted to 19, including:
- 11 to the infrastructure manager of the national rail network;
- Four to the central departments of ministries which are responsible for regulations;
- Two to a railway company;
- Two to road managers for level crossings.

*R = rail; LC = level crossing

Follow-up action planned by recipients

The table below shows the follow-up action that the recipients of the above recommendations plan to carry out.

Investigation	Recommendations			
	Number	Accepted	Not accepted	No response
Sibelin	2	2	0	0
Bonneville-sur-Touques	2	1	0	1
Millas	7	7	0	0
Auxerre	1	1	0	0
Ecommoy	6	6	0	0
Marseilles	1	1	0	0
TOTAL	19	18	0	1

3.1.3 - Monitoring the implementation of the recommendations

Independently of the intentions expressed by the recipients and summarised in paragraph below, the National Rail Safety Authority (EPSF) monitors the effective implementation of the recommendations that BEA-TT sends to national rail network operators.

On the basis of this monitoring, the state of progress of operational implementation of the recommendations sent between 2004 and 2019 to these operators is as follows:

Year of publication of the report	Number of recommendations addressed			
	Total	Closed		In progress
		Completed	Not accepted	
2004-2006	30	29	0	1
2007-2009	64	62	2	0
2010	15	13	1	1
2011	10	10	0	0
2012	15	9	4	2
2013	12	11	0	1
2014	10	9	0	1
2015	14	7	0	7
2016	23	18	0	5
2017	17	11	0	6
2018	5	4	0	1
2019	17	1	0	16
Total 2004-2019	232	184	7	41

3.1.4 - General summaries of investigation reports published in 2018

Derailment and load loss for a freight train carrying ethanol which occurred on 13 March 2017 in the Sibelin marshalling yard in the town of Solaize (69)

Monday 13 March 2017 at 4:05 am: a hazardous goods train composed of 22 tank cars loaded with bioethanol; four cars derailed upon arrival on the north-south relay section of the Sibelin yard.

Two tanks tipped over. Another, which hit the overturned tanks, was pierced in two places. Its highly flammable contents began to spill on the ground.

The track was swept away by the derailment for about fifty metres.

Fire-fighters were notified immediately. Their intervention made it possible to secure the site against fire risks, and to seal the fuel leak within three hours. The securing of the site, with emptying of the derailed cars, ended the next day at 4:00 am.

There were no causalities from the accident. Hardware damage to the infrastructure and cars, on the other hand, was significant. There were no irreversible environmental consequences.

The cause of the accident was the double break of a rail section with the passage of this heavy train. The first failure was fatigue of the rail; its cracking had been quite advanced. The second fracture occurred as a result of the car’s guiding forces in the tight curve. These were exerted on a rail weakened by the first fracture, by development of cracking, and by weakened support of fasteners and sleepers in this area being in poor condition. The area isolated by the two fractures rotated sideways under the load, causing the axles passing over it to slip out of the way.

Several factors linked to infrastructure contributed to the double break:

- the advanced state of rail cracking, and lack of a crack inspection operation during maintenance;
- insufficient rail maintenance;
- the generally poor condition of the track which had not been corrected due to maintenance work being postponed.

Rescue operations took place in the context of non-compliance with two regulatory requirements, related to the performance of a hazards study and a specific intervention plan for on-site emergency services; this could have disrupted emergency services' intervention plan. It had no negative consequences.

BEA-TT issued two recommendations and an invitation covering the following areas:

- strengthening rules for monitoring the state of rails cracking on service tracks used by hazardous goods trains;
- improving track maintenance rules for better rail fastening efficacy in areas with tight radius curves;
- compliance with regulatory requirements relating to movement of hazardous goods at the Sibelin site.

BEA-TT does not make recommendations in regard to ageing of infrastructure and how its renovation is organised. This is a well-known problem for all of RFN, and has already been the subject of a recommendation in the report of the Bretigny-sur-Orge derailment.

http://www.bea-tt.developpement-durable.gouv.fr/sibelin-r259.html

Collision between a TER [regional train] and an automobile which occurred on 2 November 2017 on level crossing 8 at Bonneville-sur-Touques (14)

On Thursday 2 November 2017 at 13:52, the TER (Regional Express Train) no. 852429, coming from Lisieux and heading for Trouville-Deauville, collided with a car on level crossing no. 8 in the town of Bonneville-sur-Touques. This level crossing is an unguarded type with a Saint-Andre cross “STOP” sign.

During the impact, the TER, travelling at a speed of 135 km/h, derailed but did not overturn.

Three occupants were in the automobile, a couple and an 11-year-old child. All three were killed in the collision. No casualties were reported among the 95 people on the train.

The direct cause of the accident is that the driver of the road vehicle did not perceive the train’s arrival before crossing the level crossing.

The underlying cause is that the road vehicle driver entered a dead-end lane, possibly not knowing where he was. Then, just after crossing level crossing 8, the driver noticed the lack of road surface. He probably realised his confusion and started to reverse. He made a U-turn. He entered the level crossing again when the TER arrived on his right.

Associated factors can be considered:

- level crossing 8 safety diagnosis failed to identify risk factors related to the environment, including signalling access to a dead-end lane, and stopping of the road surface just after the level crossing;
- access to the marshes should only be possible for those who are authorised;
- when crossing the railway, the driver's attention was not captured by a physical light and sound device. Such a device would have been triggered by switching on lights and ringing at least 20 seconds before arrival of the TER at the level crossing, and therefore well before the sound alert of the TER's whistle, which only occurred eight seconds before the TER arrived.

Preventive actions should be researched for these areas.

However, it should be noted that the train traffic's high speed on this line (140 km/h) causes significant constraints for both modes of travel, both road and rail.

The departments in this prefecture, the departmental council and municipality have launched a procedure to remove level crossing 8. Pending implementation of the procedures to remove this level crossing, road signs have been supplemented at the entrance to the Chemin de la Liberation from departmental road 677.

BEA-TT makes two recommendations, one related to the installation near the level crossing of a device preventing access to the level crossing to anyone who is not entitled to do so. The other is related in a general way to automating the level crossing at the Saint-Andre crossing on lines which are travelling at 140 km/h.

Regarding the evolution of level crossing safety inspections, this issue has already been addressed by a recommendation in the report on the Millas accident on 14 December 2017. BEA-TT is not making a new recommendation.

http://www.bea-tt.developpement-durable.gouv.fr/bonneville-sur-touques-r263.html

Collision between a passenger train and a coach on 14 December 2017 in Millas (66)

On Thursday 14 December 2017 at about 4:07 pm, the passenger train connecting Villefranche Vernet-les-Bains to Perpignan collided with a school coach on level crossing no. 25, located on departmental road no. 612 in Millas in the Pyrénées-Oriental.

This violent collision resulted in the death of six teenagers and serious injuries to 18 more people on the bus, and minor injuries to a few passengers on the train. This caused extensive damage to the school bus as well as to railway equipment and infrastructure.

At the end of its investigations, BEA-TT considered that:

1. there was no malfunction in the rail traffic, nor in the triggering of the level crossing 25 equipment;
2. the direct cause of this accident is that the coach did not stop at the level crossing despite the flashing red lights and barrier;
3. the most likely scenario for this accident is that the coach driver did not perceive the closed state of the level crossing despite the signs there.

Several factors may have played a role in this accident occurring:

- reduced visibility of the positional light signals, in particular the right flashing red light;
- stop bells at the level crossing as the half-gates were lowered. Before completing its left turn, the coach driver therefore had no audible information indicating that the half-gates were down;
- the attention which the coach driver had to pay to turn in a constrained environment may not have allowed her to perceive the flashing red lights;
- the proximity of the road junction to the level crossing. Due to this reduced distance, the driver ended her left turn within one metre of the lowered half-gate. The half-gate was therefore in the coach's front blind spot, and therefore not visible to the driver;
- non-identification of the previous constraints in the level crossing 25 safety diagnosis.

BEA-TT made recommendations in view of these items relating to:

- the level crossings' position signalling are qualified as road equipment;
- the study to adapt intersections on either side of the level crossing 25 for turning of heavy vehicles;
- changes in the methods of performing safety diagnostics;
- The feasibility of installing surveillance cameras on the level crossing and frontal cameras on trains.
- The possibility to have a directional audible continuous alarm from the time that the barriers are lowered until they are lifted again;
- the feasibility of postponing a level crossing closure alert inside vehicles, coupled with the GPS system and on-board mapping.

http://www.bea-tt.developpement-durable.gouv.fr/millas-r264.html

Collision between a TER [regional train] and a light vehicle which occurred on 14 January 2018 at level crossing 19 at Auxerre (89)

On Sunday 14 January 2018 at about 5:34 pm, crossing the hamlet of Jonches, which is on Auxerre's municipal territory on the Yonne, a light vehicle travelling on the RN 77 with two people on board was stopped between the barriers at level crossing no. 19 at the railway line from Auxerre to Laroche-Migennes, was struck by a TER from the Auxerre Saint-Gervais station.

Both occupants of the light vehicle were killed in this collision.

The direct cause of the accident was the sudden restart of the light vehicle, moving forward when the train arrived. The vehicle had been stopped before between the railway track and the half-barrier without encroaching on the area where the train passed by.

Available information made it impossible to reconstruct with certainty the circumstances preceding the accident, in particular because it was not possible to collect useful data for analysis in the light vehicle's computers. However, BEA-TT believes that two factors probably contributed to the accident occurring:

- the telephone conversation held by the driver, which may have disrupted her perception of events, and her decision-making;
- reduced visibility of the tracks from the space at which the vehicle was stopped.

Analysis of this accident led BEA-TT to issue an invitation and recommendation related to:

- communication activities to remind people of the dangers of using the telephone while driving;
- equipping vehicles with an event data recorder that records some operating parameters in the moments before and after a collision; these should be used to improve safety.

http://www.bea-tt.developpement-durable.gouv.fr/auxerre-2018-r265.html

A pedestrian hit by a train on a level crossing on 22 February 2018 at Écommoy (72)

On Thursday 22 February 2018 at 8:06 pm, an empty passenger train on its way to Alençon via Le Mans arrived at high speed at Écommoy station. It crossed a TER which was leaving the station after having stopped there.

Three people crossed the tracks behind the TER on a level crossing. One of them was fatally struck by the empty train.

The level passage of the station was equipped with luminous pictograms which indicated that one may not cross when trains are passing.

The investigation established that there was no malfunction of this signage. The investigation concluded with assurance that the people were crossing without respecting the prohibition. Due to the lack of paying attention and only one testimony to the contrary, the assumption that the signage was functioning properly could not be established with certainty.

Investigators identified a lack of attention on the part of the victim as the cause of the accident. The latter should have complied with the signs on the one hand, and checked for the absence of a crossing train on the other. The victim may have felt protected by two other people who crossed in front of her with the same lack of attention.

It is common to observe a discrepancy between the actual behaviour of pedestrians when crossing, and the expectation that they will act with caution.

Several factors contributed to this lack of caution:

- the unfavourable configuration of trains stopping at the station involving the level crossing and hindering the observation of pictograms and crossing trains by pedestrians;
- the signs and displays were counselling caution were insufficiently perceptible;
- improving the effectiveness of public awareness of railway risks at stations;
- the growing discrepancy for pedestrians between the attention required related to railway hazards and that which they pay related to hazards in public spaces;
- the absence of any effective barrier to avoid collisions in the event of a pedestrian's lack of attention when taking the level passage.

BEA-TT issued five recommendations and an invitation related to deployment of track crossing signalling recorders, the choice of where trains stop at stations, improving safety signage on platforms, strengthening communications to the public about railway hazards, and studying safety barriers to physically block crossings.

http://www.bea-tt.developpement-durable.gouv.fr/ecommoy-r262.html

Collision between a locomotive and a light vehicle which occurred on 3 April 2018 at level crossing 82 in Coulogne (62)

On Tuesday 3 April 2018, at around 3:55 pm, a locomotive connecting Calais to Lille collided with a Citroen type C3 automobile at level crossing no. 82, which is located on departmental road no. 247E1 in Coulogne.

This violent collision caused the death of the car's two occupants when the locomotive, travelling at 75 km/h, struck the car on its right side. The locomotive driver was slightly injured. The shock destroyed the car. The railway equipment was undamaged.

The direct cause of this accident was failure to observe flashing red lights, and bypassing the lowered half-gate at the time that the locomotive arrived.

Testimonies collected and investigations did not permit determining factors that may have influenced the driver's manoeuvres.

Thus, BEA-TT has not issued a preventive recommendation in connection with this accident.

However, feedback from similar accident investigations leads the BEA-TT to stress the need for prior consultation between road and railway managers in the case of work near a level crossing, and to remind them of the recommendations for such a circumstance explained in the information note from the department for transport, roads and their improvements (SETRA), entitled "Road works near level crossings".

http://www.bea-tt.developpement-durable.gouv.fr/coulogne-r266.html

Derailment of a TGV
which occurred on 24 August 2018
at the station of Marseilles Saint-Charles (13)

Friday 24 August 2018, just before 6:00 pm, the TGV 6145 coming from Paris arrived at the Marseilles Saint-Charles station, its terminus. The TGV was made up of two elementary trainsets coupled in a multiple unit. As the train was travelling 28 km/h and the front already reached the platform, the rear train derailed with the last seven cars and the last power unit.

The TGV travelled 155 metres before stopping, causing extensive damage to the switches and crossings caused by the derailed wheels. The derailed cars and power unit suffered multiple damage to the lower parts. No passengers were injured. Evacuation procedures proceeded smoothly.

Four tracks on the station platform remained unusable until the infrastructure was fully repaired. The routes and timetables were rearranged for a week. Many trains were cancelled.

The root cause of the derailment was the break during passage of the train of a rail switch at the station entrance yard.

Investigations showed that this rail, located in the outer curve of the diverted track from the switch, was subject to a great deal of stress. Various signs that the switch had deteriorated, such as the appearance of play in the supports of the broken rail, and abnormal wear of an opposite guard rail, show the intensity of the stresses. These indicate insufficient maintenance of the rail resulted in these occurrences.

Three factors combined to cause the rail to break:

- the intensity of the guiding forces exerted by the wheels on the rail in the tight curve;
- the lateral mobility of the rail resulting from play increasing in the hitch system over time;
- the rail's strength weakened due to the start of a crack that originated in rail damage resulting from an old tamping operation.

Various signs of deterioration were seen on the switch. These included guard rail wear, creep of the rail support saddles, loosening of the chair screw, the notched state of the sleepers and rail damage, which had not been identified during maintenance operations. The infrastructure manager's instructions did not explicitly state that these items were critical.

Directives have been issued by the infrastructure manager since the accident in order to reinforce control and maintenance of the same model switches.

BEA-TT issued a single recommendation relating to reinforcing the fastening system or, failing that, reinforcing maintenance of external deflection rails for tight radius curves.

http://www.bea-tt.developpement-durable.gouv.fr/marseille-saint-charles-r271.html

3.2 - Road transport

3.2.1 - Investigations concluded in 201

Two reports dealt with road traffic accidents (not including level crossings and intersections with tramlines).

The table below sets out the locations and dates of the five accidents under consideration, which cost the lives of 2 people.

Date	Nature and location of the accident	Number of fatalities
10/02/16	A coach left the road on RD 437 in Montflovin (25)	2
25/01/18	Accident between a school bus and light vehicle in Manciet (32)	0

These accidents have highlighted the need to wear seat belts, have the vehicles in good condition, and adapt vehicle speeds to road conditions.

3.2.2 - Recommendation issued

A recommendation concerning information and compliance with wearing seat belts in coaches, particularly school transport, was sent to the General Directorate of School Education, which responded positively.

3.2.3 - General summaries of investigation reports published in 2019

A coach left the road on 10 February 2016 on the RD 437 in Montflovin (25)

On 10 February 2016 at about 7:30 am, a school bus travelling on the departmental road (RD) no. 437 in the direction of Pontarlier with 32 passengers, skidded on the snowy and icy road. It collided on the right of the road and ended in a field, tumbling to its left side.

The accident toll was two young children killed. They were thrown from the bus and crushed under it. Four were injured: three children plus the bus driver. The other 26 passengers were unharmed.

The root cause of this accident was loss of control of the coach.

Several factors, which are difficult to rank, may have contributed to this. These include the speed, which was certainly too high in view of poor road grip reduced by the presence of snow, observed tyre wear and reduced visibility of the road's edges due to their being covered by snow.

The heavy toll of this accident, in particular the death of two children, is also the consequence of most of the coach passengers not wearing their seat belts.

In view of these items, without issuing a new recommendation, BEA-TT invites the Director General for Infrastructure, Transport and the Sea and the Road Safety Delegation to continue their activities in line with recommendations made to them. These were sent by the BEA-TT in its technical investigatory report on the departure of a school bus on 3 February 2014 on the RD 160 in Einville-au-Jard (54). BEA-TT asks, if necessary, to use regulatory means to ensure promotion to all coaches providing school transport, regular interurban lines or occasional medium- or long-distance service, of pre-recorded messages, audio or video, informing passengers of the importance and obligation to wear seat belts.

http://www.bea-tt.developpement-durable.gouv.fr/montflovin-r244.html

Accident between a school bus and a light vehicle which occurred on 25 January 2018 in Manciet (32)

On Thursday 25 January 2018 at about 12:30 pm, a coach transporting students of the third grade, accompanied by teachers, travelled on the 524 towards the town of Eauze. It arrived at the junction with municipal road no. 6, and collided on the front left with a light vehicle which had started to cross the national road just in front of it.

Surprised by this manoeuvre, the coach could not avoid the car, and, with this shock, propelled the light vehicle into the left ditch and swerved to the right with a trajectory which slightly deviated from the road, heading towards the bordering field. As the difference in level between the side of the road and the field alongside increased as the vehicle moved forward, the right wheels gradually lowered in relation to the left, which remained at road height. The coach leaned over, rolled onto its right side, struck the wet grown, and slid for about 20 metres before coming to a stop.

This accident injured 29 people, seven of them seriously, resulting in extensive damage to the vehicles.

The direct and immediate cause of this accident was the sudden and impromptu start of the light vehicle in front of the coach, making any avoidance impossible.

Despite a clear and barrier-free environment, several students were thrown inside the bus. None were thrown out of the vehicle.

The main factor that led to such a toll is, for one-third of passengers, the fact that they did not wear their seat belts.

Analysis of this accident lead the BEA-TT to again remind people of the usefulness of this safety equipment. It issued a recommendation and three invitations in the following areas:

- regulatory actions to ensure that wearing seat belts is in effect for all students;
- disseminating messages on the importance and obligation of wearing seat belts;
- transposing to private transport services using the existing model contract for occasional public transport services;
- reinforcing training of secondary school students on the hazards of not wearing seat belts.

http://www.bea-tt.developpement-durable.gouv.fr/manciet-r260.html

3.3 - Guided transport

3.3.1 - Investigation concluded in 2019

An investigation concerning a guided transport accident was completed in 2019.

Date	Nature and location of the accident	Number of fatalities
02/12/16	Train derailment, line 2 of the Paris metro at Barbes-Rochechouart station.	0

This accident highlights the risks incurred by loss of a piece of rolling stock along the way. The consequences can be significant and hazardous derailments. Equipment designs must exhaustively analyse the risks of each part falling off, assess stresses to which these parts are subjected, and correctly resist these forces. The precursors of an operating incident should include exhaustive checks, which were insufficient in the case of this accident.

3.3.2 - Recommendations issued

Following this investigation, three separate recommendations were given by BEA-TT.

Nature of the recommendations

Of these 3 recommendations:

- Two relate to the process for handling anomalies that may impact safety, including managing monitoring and exchange of information between the operator and the manufacturer;
- One is related to developing a standard relating to the sizing of various rolling stock constituent parts.

They were sent to the following:

- Two to the authorities charged with standardisation and regulation in public transport (BNF and DGITM);
- One to the operator

3.3.3 - Follow-up action planned by recipients

The table below shows the follow-up action that the recipients of the above recommendations plan to carry out.

Investigation	Recommendations			
	Number	Accepted	Not accepted	No reply
Barbès Rochechouart	3	3	0	0

3.3.4 - *Monitoring the implementation of the recommendations*

On the basis of monitoring carried out by the Ski Lift and Guided Transport Technical Department (STRMTG), the state of progress of the operational implementation of the recommendations made between 2013 and 2019 following guided transport accidents is as follows:

Year of publication of the report	**Number of recommendations addressed**			
	total	closed		In progress
		completed	Not accepted	
2013-2014	0	0	0	0
2015	3	0	0	3
2016	7	5	0	2
2017	14	0	2	12
2018	6	0	0	6
2019	3	0	0	3
Total 2013-2019	33	5	2	26

3.3.5 - General summaries of investigation reports published in 2019

Derailment of a metro train running on line 2, Paris metro that occurred on 2 december 2016 at Barbes-Rochechouart in Paris

On Friday 2 December 2016 at 12:01 pm at the Barbes-Rochechouart station on line 2 of the Paris metro, the fourth and fifth cars of a train travelling in the direction of the Porte Dauphine derailed when entering the station. Damage to infrastructure and rolling stock was significant. No passengers were injured in the accident, nor during evacuation of the train.

The direct cause of the derailment was the inverter box, which fell from the fourth car, located under the chassis, during the La Chapelle-Barbes-Rochechouart passage. This car's bogie axles moved to the boot, which then led to the derailment.

The separation of the box from the train is the result of its four fixing lugs breaking. The two front legs broke first, due to fatigue, then the two hind legs broke as they met the limit of their resistance.

The causes leading to fatigue failure are:

- the presence of residual mounting stresses in the boot legs, which value had not been measured;
- the addition of more constraints related to self-vibration generated by the fan attached to the boot. This self-vibration was considerably amplified by the long-term breakage of the bindings' damping pads. The fracture of the shock absorber pads was initiated by mounting stresses on these pads which degenerated into cracks during use.

A year earlier, the operator and manufacturer had experienced the start of a similar incident, with more limited consequences. Checks had not been sufficiently exhaustive.

Analysis of this incident led BEA-TT to make three recommendations in the following areas:

- the change of the sizing standard for various parts constituting rolling stock, taking self-vibration into account;
- exchange of information between the manufacturer of the rolling stock, owners, operators and maintainers in the even of a risk of a safety impact;
- organisation of RATP verification and control projects.

It also issued an invitation to complete the process of maintaining the inverter box's ventilation.

http://www.bea-tt.developpement-durable.gouv.fr/paris-barbes-r251.html

3.4 - Ski lifts

3.4.1 - Investigations concluded in 2019

One investigation on an accident that occurred during the operation of ski lifts was completed in 2019.

Date	Nature and location of the accident	Number of fatalities
25/03/18	Fall of a cabin on the Costebelle gondola lift in Pra Loup (04)	0

This accident during operation involved a cabin falling. Fortunately, it had no passengers. Two safety issues were highlighted. The first issue is of a technical nature. It concerns the particular sensitivity of an old, “end of life”, detachable fastener, now replaced on new devices with safer technologies. The second issue is related to organisational and human risk factors surrounding the processing of safety alarms. The frequency of certain alarms, the risk that they could be ignored by operators, and insufficient risk management by the operator, can lead to an accident.

3.4.2 - Recommendations issued

Following this investigation, three separate recommendations were given by BEA-TT.

Nature of the recommendations

Here are the 3 recommendations:

- 1 is related to strengthening safety management by the operator;
- 1 is related to regulations, namely improvement of device recordings for the purposes of feedback and operational analysis;
- 1 relates to the operator performing evacuation drills;

The three recommendations were sent as follows:

- 1 to STRMTG;
- 2 to the operator

3.4.3 - Follow-up action planned by the recipients

The table below shows the follow-up action that the recipients of the above recommendations plan to carry out.

Investigation	Recommendations			
	Number	Accepted	Not accepted	No response
Costebelle	3	3	0	0

3.4.4 - Monitoring the implementation of the recommendations

On the basis of monitoring carried out by the Ski Lift and Guided Transport Technical Department (STRMTG), the state of progress of operational implementation of the recommendations made between 2013 and 2019 following accidents affecting the operation of ski lifts is as follows:

Year of publication of the report	**Number of recommendations addressed**			
	Total	Closed		In progress
		Completed	Not accepted	
2013	3	2	0	1
2014	8	3	1	4
2015	2	1	0	1
2016	0	0	0	0
2017	8	5	0	2
2018	3	1	0	2
2019	1	0	0	1
Total 2013-2019	25	12	1	12

3.4.5 - General summaries of survey reports published in 2019

Fall of a cabin on the Costebelle gondola lift on 25 March 2018 in Pra Loup (04)

The incident was with the Costebelle gondola lift located in the Pra Loup ski resort, in Uvernet-Fours in the Alps of the Haute-Provence.

On Sunday 25 March 2018 at 1:33 pm, cabin 7 of the Costebelle gondola lift fell a dozen metres shortly after leaving the lower station. It hurtled slowly down the slope before stopping at the nets below. The cabin was empty, and there were no casualties. The system came to a standstill after the emergency stop push-button was actuated by the driver, who was informed of the fall of the cabin by radio.

A user evacuation plan was implemented at 3:35 pm: 62 people on the ascent and 10 on the descent were counted. They were rescued up to 4:55 pm.

Finally, the operators stopped operating the gondola lift, and a prefectural order was issued on 12 April 2018 to suspend operating the system.

The initiating event for the cabin falling is failure of the cabin's attachment to the cable.

This coupling could not be done when passing the hitch over the clutch ramp at the station, due to a lateral shift of the cable in the clutch area. This was caused by the displacement of the pylon at the exit from the station. The clutch system has been shown to be very sensitive to this displacement.

The non-coupling safety device, which is placed at the clutch area outlet, did stop the system, but the operators' actions led to poor diagnosis of the situation, and they restarted the gondola lift without identifying the cause or making a correction.

Organisational and human factors involved were, in particular:

- it was usual to have many alarms triggered which had no purpose;
- lack of awareness of the risks, linked to the lack of reminders of essential safety points in training in order to reinforce knowledge and skills;
- a lack of suitable tools to identify causes of a shut-down and instructions to assist in diagnosis;
- the driver placed too much confidence in the lookout's diagnosis, and did not warn the technician about this type of alarm.

BEA-TT issued three recommendations and three invitations in the following areas:

- the stability of the pylons with "full excavation" foundations located in front of the teleport stations (upstream and downstream);
- the end-of-life issue with old technologies, in particular the "S" type coupling clamps on the Costebelle gondola lift;
- operator emphasis on safety management;
- the wording of the PLC safety alarm messages, and how long the recordings were kept;
- formalisation of the actions to be implemented following a safety trigger;
- and passenger evacuation training.

http://www.bea-tt.developpement-durable.gouv.fr/pra-loup-r267.html

4 - Studies and notes on progress

Study

BEA-TT published a study on fatal trespassing accidents with railways.

Trespassing means any presence of a person in the railway rights-of-way when such a presence is prohibited. This is the leading cause of accidental death on the rail network, greater than the use of level crossings, and far greater than train travel.

Faced with the lack of progress over time in deaths by trespass over the past ten years, contrasting with other accident categories which are declining, BEA-TT performed a study analysing in particular the 65 deaths by trespass for the years 2015 and 2016.

The study led to the issuance of three recommendations which are specific to the predominant problem of line accidents. These relate to management of the risk of line collisions, and developing knowledge on how the operator can close systems, as well as the improving regulations in order to oblige systematic closing of rights-of-way in urban areas.

This study can be viewed on the BEA-TT website.

Progress notes

Depending on the nature of some accidents, publishing notes aims to inform stakeholders and the public of investigation progress, and to announce the first preventive actions.

A progress note was published on 8 October 2019 related to a teenager who was hit at a guarded and closed level crossing that occurred on 3 September 2018 in Nouan-le-Fuzelier (41).

A second note, published on 18 December 2019, relates to the derailment of a metro train that occurred on 21 December 2018 in Marseilles (13).

These notes are available on the BEA-TT website until the final reports are published.

5 - Summary of the recommendations

5.1 - Global overview

Eleven investigations were completed in 2019. The 11 accidents to which they are related claimed the lives of 16 people and caused 21 serious injuries. Four occurred at level crossings. Apart from one of them, all ended with the issuance of recommendations and invitations to the attention of those involved: operator, infrastructure managers, regulatory and standards authorities, and recommendations aimed at preventing disasters with the same causes.

One investigation into a level crossing accident in September 2018 could not be completed in 2019. A progress note was created, and can be viewed on the BEA-TT website.

In parallel, BEA-TT analysed fatal railway trespassing cases in order to issue recommendations for their prevention.

5.2 - Nature of the recommendations

In conclusion in the 11 reports, the BEA-TT made 23 specific recommendations.

For these 23 recommendations:

18 were related to the **railway sector.**

- Two recommendations are related to fences on the rail network: strengthen surveillance, and assess the advisability of extending these systems to lines installed in urban areas;
- Three are aimed at developing recording devices: recording the situation on vehicles, whether train or road vehicles, and operation of level crossing equipment;
- Two are related to the application of risk analysis methods to prevent accidents at level crossings;
- Three aim to prevent accidents during pedestrian crossings: improve signage, physical obstacles and risk awareness;
- Three recommend ad-hoc improvements to the level crossings environments;
- One is aimed at regulating equipment performance at level crossings;
- Focus on developing audible alarms and in connected vehicles during the times that level crossings are closed;
- Finally, three are related to improving design, monitoring and maintenance of certain sections of railway infrastructure subject to severe constraints.

The only recommendation for **road transport** is to inform students in buses and coaches about the penalties for not wearing seat belts.

There are three recommendations for **guided transport:**

- the first is related to technical regulations for the design of fasteners for on-board electromechanical equipment.
- the second aims to make exchanges between the participants compulsory: manufacturer, operator, maintainer, when a risk is identified in rolling stock, and the manufacturer’s proposal for a solution;
- the third is to strengthen checks on rolling stock.

For **ski lifts**, the recommendations includes:

- for a ski area, improving the management of system safety, and the need to perform annual breakdown and passenger evacuation simulations,
- strengthening the regulation of data records for safety PLCs.

Some of the above recommendations were sent to different addresses with the same wording. The total number of recommendations received by them totals 28, divided into 21 for rail transport, one for road transport, three for guided transport and three for ski lifts.

5.3 - Follow-up action planned by the recipients

Art. R. 1621-9 of the Transport Code specifies that recipients of the recommendations inform the BEA-TT director within 90 days of the actions they intend to take and, where applicable, the deadline for their implementation. The responses were made public, as well as the recommendations.

Of the 25 recommendations issued in 2019:

- 22 were accepted and their implementation confirmed, sometimes giving a deadline;
- Two have not resulted in a response from the receiver;
- One was considered to already have been implemented

It should be remembered that BEA-TT does not have the authority to monitor follow-up to the recommendations issued.

Monitoring this implementation, beyond simple collection of the recipients' intentions done by BEA-TT, de jure or de facto, is ensured by an external authority.

With regard to the main railway participants, this monitoring is performed by the EPSF, in accordance with European Directive 2016/798 of May 11, 2016 and national implementing texts.

For other recommendation recipients, implementation is generally monitored either by the DGITM, the central administrative directorate of the Ministry of Transport, or by the STRMTG, a department attached to the DGITM.

APPENDICES

Appendix 1: EPSF table showing monitoring of the implementation of rail transport recommendations issued by BEA-TT

Appendix 2: STRMTG table showing monitoring of the implementation of guided transport recommendations issued by BEA-TT

Appendix 3: STRMTG table showing monitoring of the implementation of ski lifts recommendations issued by BEA-TT

Appendix 4: BEA-TT organisational chart and institutional texts

Appendix 5: Glossary

Appendix 1: EPSF (National Rail Safety Authority) table showing monitoring of the implementation of rail transport recommendations issued by BEA-TT

Recommendations issued in 2006

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
12/2006	Collision between a regional express train and a heavy goods vehicle on a level crossing at Saint-Laurent-Blangy (62) on 09/06/2005	R1	To continue studying the solutions (an underpass on location or a new route) to eliminate this level crossing in order to reach a decision and implementation as soon as possible.	SNCF Réseau General Council 62	The study on the feasibility of removing level crossing 83 from Saint-Laurent-Blangy and creating a rail bridge has been completed. The pre-project phase contract, scheduled for the end of the first quarter of 2019, was not implemented. Both the technical solution adopted in the preliminary draft and the funding to be provided by SNCF Reseau on behalf of AFIFT for the level crossing registered in the national safety plan were called into question. A new demolition project must be proposed during 2020. Its implementation will be subject to SNCF Réseau's participation. Action in progress	O
11/2006	Corail train derailment at Saint-Flour (15) on 25/02/2006	R4	To draft a program to bring lines open to passenger traffic equipped with DC rails up to standard. In the longer term, to organise the gradual replacement of DC rails with Vignole rails in view of the aging of this equipment, its increasing maintenance costs and the high risk of derailing in the event of rail failure.	SNCF Réseau	The replacement of the DC rails is being implemented gradually as part of the renovation of the relevant lines. This work requires co-financing between the Transport Organising Authority and the State. For lines not yet implemented, operational measures are being taken in the meantime in order to avoid the risk of derailment. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2009

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
12/2009	Collision with a group of people at the Stade de France at Saint-Denis (93)	R5	The policy for locating signs prohibiting access to railway areas and warning of the dangers related to doors and gates giving access to railway platforms should be reviewed. Procedures for implementing this policy should be established.	SNCF Réseau	The document describing the policy to monitor the risk of collisions by unauthorised persons has been updated, and been in force since 01/08/2019. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2010

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
09/2010	Collision between a coach and a regional express train at LC no. 4 in Nevers (58) on 03/02/2009	R1	Evaluate and study the LC no. 4 fire control system (as well as LC no. 5) to search for simple optimisation measures (duration of fire cycles, possible coordination of upstream and downstream lights, activation delay for upstream fire after detection, effectiveness of the detection loop, etc.) to reduce the risk of an immobilised vehicle at the tail end of the queue downstream of the crossing encroaching on the railway.	Nevers municipality	A follow-up letter was sent in February 2019 in order to obtain information on implementation of measures responding to this recommendation. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2011

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
10/2011	Collision between a regional express train and a heavy goods vehicle on an unmanned level crossing at Gimont (32) on 27/09/2010	R3	Pending the removal of the level crossing no. 76 or the installation of a light and sound signalling on this LC, heavy vehicles should opt for access to the Julias hamlet via the route crossing the railway by a lower passage.	Gimont municipality	The level crossing has been removed. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2012

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
01/2012	Goods train derailment in the station at Neufchâteau (88) on 22/05/2010	R2	Address the European Railway Agency (directly in the case of EPSF, through the Joint Sector Group [JSG] in the case of SNCF and through the European Railway Wheels and Wheel Sets Association [ERWA] in the case of Valdunes) in order to promote a set of studies and tests to assess the actual forces exerted on the running gear of tank wagons on the line and in marshalling yards and the interactions between these forces with a view to taking them into account in wheel design standards.	BNF	Action in progress	O
06/2012	Collision between a goods train and a lorry carrying an abnormal load of metal girders stopped by LC 222 at Balbigny (42) on 25/01/2011	R3	Arrange for the French rail network (RFF) and SNCF to draft information on the special hazards involved when abnormal loads pass through level crossings and disseminate it among professional road transport organisations, in particular drawing attention to the precautions to be taken to avoid immobilisation on level crossings and situations for which the rail infrastructure managing agent must be asked to provide protection.	DGITM	In addition to the actions performed for the attention of road transport organisations, the order of May 4, 2006 relating to the exceptional transport of goods, machinery, vehicles and combinations of vehicles comprising more than one trailer has been modified, in particular Art. 12. The conditions for crossing railway lines and consequent prohibitions for exceptional transport using level crossings were specified there. Action closed	C
11/2012	Catch-up collision of two goods trains at Maillé (37) on 01/02/2012	R1	Ensure that safety communications between the regulators and signalmen on their service landline telephones are recorded and traceable. *In addition, BEA-TT calls on rail operators on the national rail network to remind their drivers of the safety requirements attached to travelling at restricted speed, particularly in terms of vigilance and controlling the speed of their train, so as to be able to stop before any signal or obstacle.*	SNCF Réseau	The deployment of recorders is underway in workstations. The completion schedule was revised in 2019 with an expected end in 2025. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2013

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
06/2013	Collision between a regional express train and an automobile at Le Breuil (69) on 04/12/2011	R1	Establish and implement the national unmanned level crossing safety programme as soon as possible at Croix de Saint-André.	DGITM	The national programme for securing unguarded level crossings at St. Andre crossing decided in 2014 was the subject of follow-up by two railway safety monitoring committees. It was taken up as measure 6 of the ministerial action plan of May 2019. Monitoring its implementation is ensured through follow-up to this ministerial action plan, which was the subject of a first meeting on November 29, 2019. Action closed	C
		R3	Take the required steps to eliminate level crossing No. 65 on the Lozanne railway line at Paray-le-Monial and, pending this, restrict access to it strictly to residents only by all appropriate means. *Furthermore, without issuing formal recommendations, the BEA-TT:* *- called on railway companies to ensure that their drivers comply with "S" signs and, more generally, the regulations for the use of the audible warning;* *- drew the attention of the French Rail Network to the fact that the surroundings of certain unmanned level crossings at Croix de Saint-André make it difficult to hear the warning signals of trains, increasing the risks run by road users, and called on it to take account of this in the level crossing safety programme.*	SNCF Réseau Rhône Prefecture Breuil Municipality	The level crossing has been removed in autumn, 2018. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2013 - continued

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
06/2013	Collision between a rail motor vehicle and an insulator at Sevran (93) on 01/02/2012	R2	List the characteristics of front windscreens and windscreen heaters fitted on rolling stock and the regulations for the use of these windscreen heaters. For rolling stock equipped with front windscreens that do not comply with EN 15152 or NF F 15-818 or an equivalent national standard, examine the possibility and relevance of improving protection against the entry of projectiles into driving cabs during cold weather, for example by specifying the rules for the use of windscreen heaters or by planning to replace the glass with components with improved impact strength at low temperatures.	All EF	The items for implementing the actions expected by this recommendation were provided by all the 24 railway enterprises involved. Action closed	C
07/2013	Collision between a train and a works machine at Lachapelle-Auzac (46) on 04/07/2012	R3	Ensure that all communications related to operations carried out from signalmen's service telephones are recorded. *In addition, BEA-TT calls on SNCF to carry out a feedback process on the use of new LOR'AXE catenary maintenance engines and on the conditions for training their drivers.*	SNCF Réseau	The deployment of recorders is underway in workstations. The completion schedule was revised in 2019 with an expected end in 2025. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2014

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
01/2014	Inter-city train derailment at Bretigny-sur-Orge (91) on 12/07/2013 (progress report)	R3	Identify switch points and crossings or groups thereof with features that require enhanced maintenance or premature regeneration in comparison with the general prescriptions. Provide systems to ensure that these special features are taken into account in a reliable and auditable manner in the general organisation of maintenance works or that of the establishments.	SNCF Réseau	The process and organisation to define “fast moving devices” is in place. Feedback on the effectiveness of this process was given, resulting in actions to improve the level of managing this process. Action closed	C
04/2014	Collision between a regional express train and a mobile crane in Marseille (13) on 13/04/2013	R1	Make it impossible to cross the no. 1 Miramas railway line level crossing in Marseille by the Côte Bleue for heavy vehicles coming from rue Albert Cohen with characteristics that do not allow them to circulate easily downstream from the railway right-of-way. Indicate this ban at the crossroads of Chemin du Passet with rue Albert Cohen.	Bouches-du-Rhône prefecture City of Marseille	Signage announcing the block at the Chemin du Passet with Rue Albert Cohen has been implemented. The reply letter sent to BEA-TT announces a thought concerning the removal of this level crossing. A reminder was sent in February 2019 to obtain information on the implementation of this commitment. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2015

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
05/2015	Collision due to loss of control at Modane (73) on 24/01/2013	R1	Re-tighten and specify the maintenance regulation for finding and eliminating coupling devices on all wagons for which you are the entity in charge of maintenance that do not carry marks of compliance with the European standard or recognised national standards.	ERMEWA	The state of advancement of these actions shows that 42% of the fleet was handled by the end of 2019. Action in progress	O
		R2	For type C3A and C3W type distributors, make a suitable change in the specifications of the sleeves of “disconnecting” and “initial stage” devices or their assembly in order to ensure that the brake cylinder circuit is leakproof down to -25°C for a service life consistent with the maintenance schemes.	FAIVELEY-TRANSPORT	Studies were performed, resulting in an adopted technical solution. Action closed	C
				SNCF Mobilités Equipment division	SNCF Mobilités has taken note of the results of the study, which was launched by Faiveley Transport. Action closed	
		R3	When the modification specified in recommendation R2 has been perfected, apply it at the time of inspections of the relevant distributors in wagons for which you are the entity in charge of maintenance.	SNCF Mobilités Equipment division	Awaiting decisions taken in response to the results of the study launched by Faiveley Transport as part of recommendation R1. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2015 - continued

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
06/2015	Loss of control of a regional express train at Mérens-les-Vals (09) on 18/12/2013	R2	In the procedure manuals intended for personnel in charge of rail traffic management, specify the steps to be taken in the event of major skidding, particularly in the event of repeated skidding not limited to a precise location.	SNCF Réseau	The working group delivered its conclusions in October 2017. After experimenting with the proposed solution, the inter-trades safety committee did not accept the proposal. It decided to modify the response initially given to this recommendation. The actions implemented over the past year by SNCF Réseau relate to strengthening the rail cleaning process, whether by rewriting the MT3188 trades repository in order to consider previous projects during the period of October to December by setting up weekly national teleconferences between stakeholders. Action closed	C
		R4	Improve the braking performance of high-capacity self-propelled trains in cases of poor adhesion by: - quickly lowering the speed threshold below which electromagnetic rolling stock brake blocks must not be in contact with the rails to as low a level as possible that is compatible with the infrastructure and passenger comfort and with the constraints on this rolling stock; - prescribing and organising systematic checks on the operation and filling of sand hoppers every time the rolling stock visits the service station.	SNCF Mobilités	The deployment of changes provided in this recommendation is the subject of two change orders (CO) currently underway. The first is known as the “electrical CO”, and is linked to the response of the Serqueux drift. The second concerns the speed threshold used in operating electronic runners. Action in progress	O
06/2015	Collision between a TGV high-speed train and an articulated tank transporter at Saint-Rémy-de-Sillé (72) on 15/10/2013	R1	Prevent the access of low-clearance vehicles by all appropriate means to local road No. 3 or restore the profile along this route immediately to the north of level crossing No. 128 so that these vehicles can cross it without getting stuck.	SNCF Réseau Saint-Rémy-de-Sillé municipality	Advanced signage has been implemented as well as modifications to the traffic authorisations on the municipal road. Technical studies with the goal of improving the level crossing road crossing conditions have been performed, and these improvements are planned for 2020. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2015 - continued

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
09/2015	Inter-city train derailment at Bretigny-sur-Orge (91) on 12/07/2013 (Final report)	R5	Improve the management personnel allocation policy in bodies in charge of maintaining the rail infrastructure: - by avoiding concentrations of young managing personnel in operational units and keeping this objective in mind when determining the managing personnel to organise these units; - by ensuring the required complementarity of skills, competence and seniority of the teams at the head of the rail track sectors, including the line manager, the support technician and the operational technician. - by reducing their turnover, particularly in establishments located in the Île-de-France region.	SNCF Réseau	The deployment of the system should significantly reduce the risk of appointments of young managers whose profile would prove to be inadequate within the professional environment of the assigned posts. Action closed	C
		R6	In the safety audits of bodies in charge of rail infrastructure maintenance, always include inspection of the actual state of a sample of equipment on which monitoring or maintenance work has recently been carried out in order to assess the relevance of the maintenance regulations and the quality of their implementation. In this connection, pay particular attention to the implementation of supervisory and inspection tours for category B switch points and crossings.	SNCF Réseau	Verification of the actual condition of systems has been incorporated on a permanent basis as a part of internal safety audits performed by ASNO. Integration of this type of verification into the inspections performed by operating managers in maintenance establishments has been largely deployed. This remains to be perpetuated in some establishments. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2016

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
01/2016	Multiple fracture of rail passed at high speed by trains in Carbonne (31) on 26/11/2013	R1	In accordance with the programme established after the Carbonne rail fracture, depending on the track condition and local operating conditions, replace the half-turnings with the old type of machining on which a rail fracture would not be detectable by a track circuit. Furthermore, ensure the implementation of the enhanced procedures for monitoring all faults affecting these devices.	SNCF Réseau	The device replacement plan is being adhered to more than 50% of the fleet has been handled. The target for full completion of the project remains fixed at 31/12/2021. Progress reports are sent regularly to EPSF. Action closed	C
		R2	On line sections without a signal-related track circuit, the operating procedures must take into account the risk of rail fracture in the event of a malfunction of any track-based system.	SNCF Réseau	Analysis of the operational activity was performed, resulting in the observation that the identified risk is being taken into account. A risk/opportunity assessment concluded that this measure should not be reinforced. However, a change is planned in order to take greater account of the disruptions of ancillary installations. Action closed	C
		R3	Assess a change in the opposable reference system relating to train traffic providing, in case of doubt as to the nature of the shock felt on the train, a lighter procedure than the current procedure for reporting an abnormal shock, in particular for line sections without continuous coverage by track circuits connected to signalling.	SNCF Réseau EPSF	A working group was established by SNCF Réseau with the participation of EPSF in order to study the possibilities to change the relevant reference system. The working group's solution was not agreed due to the complexity that it would have entailed. "The response to this recommendation has been modified by SNCF Réseau in order to propose the use of the VIGI-EXPRESS device and to communicate this to the railway enterprises. Action in progress	O
01/2016	Catch-up collision between a regional express train and a TGV in Denguin (64) on 17/07/2014	R2	Beyond the scheduled maintenance and cleaning operations of the premises, recommend searching and reporting rodent breaches and damage to the wiring during any preventive or corrective intervention carried out in the signalling premises. Set up the traceability of signing and standardise the deadlines for corrective interventions.	SNCF Réseau	Regarding the planned procedural changes: - the update to MT00366 relating to maintenance intervals was published in March 2017; - the update of MT00494 in order to specify actions to be conducted in the event of the presence of rodent traces has been in force since June 2018. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2016 - continued

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
05/2016	Collision of a regional express train stopped at the platform by an infrastructure monitoring train at Saint-Germain-des-fossés (03) on 15/12/2014	R1	Ensure the recording and traceability of telephone exchanges between the train drivers and the traffic agents and traffic management department whose telephone numbers appear in the technical records of the national railway lines.	SNCF Réseau	The deployment of recorders is underway in workstations. The completion schedule was revised in 2019 with an expected end in 2025. Action in progress	O
08/2016	Accidental diversion of a suburban RER A train into siding in Saint-Germain-en-Laye (78) on 09/12/2014	R1	Reinforce the practical training and supervision of young SE supervisors on the aspects related to work on safety installations, with particular emphasis on the mandatory provisions specific to shunting work.	SNCF Réseau	In 2015, the signalling training specifications were amended to consider an REx sheet which was established after the incident. The other standards planned in particular to strengthen the "Test awareness" module for your managers were published in 2018. Action closed	C
		R2	Improve the readability of the SNCF standards relating to work on security installations by clearly highlighting the imperative security provisions and explaining the associated issues. Pursue the development of simple and educational business documents for operators for different types of work on security installations.	SNCF Réseau	The standards covered by this recommendation were modified in 2018. Action closed	C
		R4	Provide local procedures to ensure the adequacy of testing programmes developed as part of the small work on security installations.	SNCF Réseau	IN 3137, "Safety monitoring and surveillance in establishments or similar entities within the Industrial Production Department" was published in November 2019 for application on 1 January 2020. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2016 - continued

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
11/2016	Loss of control of a regional express train following a collision with cattle at Serqueux (76) on 20/10/2015	R1	Implementing the AGC Improvement Plan Effectively implement the modifications of the purge valves and their protection by the end of December 2017 and the modifications of the 72 V electrical circuit, by the end of September 2019 across the fleet concerned.	SNCF Mobilités	Changes to purge valves are completed. Progress of the change order concerning electrical insulation across the fleet exceeded the 50% threshold in 2018. Progress reports are sent regularly to EPSF. Action closed	C
		R2	Positioning of the obstacle-deflector and protection of sensitive underslung parts By involving the rail sector and having determined the most appropriate form for the European context: - explain how to calculate and operate the rolling stock construction template in order to optimise the positioning of the obstacle hoists with respect to risk overlap of an obstacle on the track; - formulate the necessary requirements for the identification of sensitive underslung parts, their protection and their height positioning in relation to the obstacle-deflector.	EPSF	Analysis under way with regard to the publication of new versions of these standards: - rolling stock gauge (EN 15273-2) - passive safety (EN 15227) Action in progress	O
11/2016	TGV high-speed train derailment at Gare de Lyon in Paris (75) on 28/01/2015	R1	Reinforce the practical training and supervision of young SE agents on aspects related to the maintenance of very particular old security installations.	SNCF Réseau	SNCF Réseau has launched several actions aimed at responding to this recommendation. In particular, it is performing risk analyses in order to detect old and special systems. The EPSF is awaiting evidence to settle these actions. Action in progress	O
		R2	Improve the quality of local standards relating to the maintenance of security facilities by continuing to develop simple and educational business documents for operators concerning very particular old installations.	SNCF Réseau	SNCF Réseau has launched several actions aimed at responding to this recommendation, in particular regarding particular attention paid to the existence and quality of reference systems and documents related to very specific old systems during safety inspections performed by experts or managers. Action closed	C

* C= Closed; O = Open

Recommendations issued in 2017

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
01/2017	Derailing of a TER on the entry point of the Sainte-Pazanne station (44) on 12/10/2015	R1	- Launch a useful study or investigation in order to improve awareness of the wheel clogging phenomenon. - Without delay, take this phenomenon and the possibility of deshunting on clean rail into consideration in the reflections on risks relating to deshunting, including on ITE track circuits, and examine the relevance of a scrubber equipment (or any other wheel cleaning equipment) for X 73500. - Take the results of these studies into account to modify, if necessary, the benchmarks for admission of equipment on RFN and at the European level, in connection with the European railway agency.	SNCF Réseau SNCF Mobilités EPSF	Studies have been performed to better understand the phenomenon of wheel clogging. They also provide details on electrical insulation characteristics. Different solutions to clean wheels on equipment not fitted with brake blocks have been tested with system constrains and varying levels of efficacy. Work is continuing with the rolling stock manufacturers and the SNCF Mobilités equipment department to recommend technical solutions which are adapted to each pollution source, with changes to be derived from them for equipment acceptance standards. SNCF Mobilités' equipment department is participating in the studies now underway. EPSF continually monitors progress of the work being done and approves, when necessary, the actions taken with a view to modifying SAM 004. Action in progress	O
		R3	Formalise the criteria and process for granting S6A No. 4 exemptions such as to limit them to cases where they correspond to a real need for the operation of the station concerned.	SNCF Réseau	SNCF Réseau has decided to use risk analyses to respond to this recommendation. This deployment throughout the RFN is scheduled to be completed before the end of 2020. Action in progress	O
		R4	Reflect on the functionality of modern substations in order to adapt them to the real needs of stations where they are located and thus limit their vulnerability in case of deshunting.	SNCF Réseau	Considering the shunting problems in the design of switching stations will be included in the specifications for preliminary studies of centralised network controls. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2017 – suite

Report date	Title of the investigation	No.	Wording of the recommendation	Entity	State of progress of action taken by EPSF at the end of 2019	Code*
11/2017	Breakage of numerous rails between the Beilland and Jonzac stations (17) on 13/12/2016	R1	Measure, on a sample of 30 wagons randomly selected from the series of 185 EX 90 wagons, the empty pressure delivered by the weight pressure reducers. If anomalies are noted for a significant number, research the causes along with the supplier of this equipment. BEA-TT therefore invites SNCF Mobilités to specify the tolerance to apply during the brake tests for the wagons equipped with the auto-levelling empty-loaded device. BEA-TT invites ERMEWA to analyze along with its manufacturer the causes of the rapid drift of the pressure of reducers (wagon left the factory in 2015).	ERMEWA	A project to measure empty pressures delivered by weighers was performed on a sample of 33 cars. No specific corrective action was identified for this equipment beyond the rules and recommendations set by the maintenance guide. Action closed	C
		R2	During the training and monitoring actions, take the necessary measures to ensure that all agents who may monitor moving trains (STEM) or manage traffic are aware of the risks inherent in the movement of wagons having out-of-tolerance flat spots. Make it clear to them that in the absence of action on their part, the flat spots may get worse and the wagons in question may cause at any time a breakage in the rails or run for rather long periods subjecting the track to abnormal impacts and stresses.	SNCF RESEAU	The AMV specifications (Movement Agent) and STEM training have been modified. Action closed	C
		R3	Establish and implement a policy for the deployment of convoy anomaly detectors on the major freight traffic flows. These detectors should aim to stop convoys with vehicles that have dangerous wheel defects but also identify and report to the railway company, to the entity in charge of maintenance (ECM) or to the concerned owner, vehicles having non-critical defects that may damage the infrastructure.	SNCF RESEAU	SNCF Réseau has undertaken studying the implementation principles for the national rail network of convoy anomaly detectors. A progress schedule incorporating the needed technical studies and risk analyses shows deadlines running to the end of 2022. Action in progress	O

* C= Closed; O = Open

Recommendations issued in 2019

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
02/2019	Derailment and load loss for a freight train carrying ethanol which occurred on March 13, 2017 in the Sibelin marshalling yard in the town of Solaize (69), March 13, 2017	R1	Revise the rules for monitoring service tracks carrying hazardous goods trains to include ultrasonic rail monitoring.	SNCF Réseau	SNCF Réseau has prescribed new rules to monitor rails using ultrasound on service tracks carrying hazardous goods. Action closed	C
		R2	Review and strengthen, if necessary, maintenance rules for the effectiveness of rail fasteners, including consideration of particular stresses in guiding traffic through small radius curves.	SNCF Réseau	SNCF Réseau has rewritten the rules for rail handling in curves of less than 350 metres as part of the “Maintenance of Service Ways”, MT0264. Analysis of the current modification by EPSF. Action in progress	O

* C = Closed; O = Open

Recommendations issued in 2019 – continuation

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
04/2019	A pedestrian hit by a train on a level crossing at Écommoy station (72), 22 February 2018	R1	Study the technical conditions under which light signals for level track crossings by the public can be equipped with devices to proof that they are operating. Define a modernisation plan making it possible, over a period to be specified, to equip them with these recording devices.	SNCF Réseau	SNCF Réseau shall study the technical conditions under which TVP illuminated signs can be equipped with recording equipment proving that they operate within two years. The term relating to this deployment program will be clarified after definition and design of the device. Action in progress	O
		R2	Implement the displacement of the Écommoy level passage in order to ensure, for pedestrian crossings during a station train stop, visibility on pictograms and, to a certain extent, on crossing trains. Identify similar situations throughout the network to show masked pictograms when a train stops, and incorporate this criterion when prioritising investments to improve crossings.	SNCF Réseau	SNCF Réseau has undertaken, in its response to BEA-TT, to move the TVP to the Tours side by the end of 2020. It also undertakes to identify by the end of the first half of 2020 similar situations of the making of pictograms when a train stops across the entire national rail network. Finally, SNCF Réseau is committed to integrating the improvement in masking situations for TVP illuminated pictograms, when possible, in its investment programme to improve crossings. Action in progress	O
		R3	Complete tests to improve warning signs at lane crossings by improving the markings on the ground in the hazardous zone by improving signage ergonomics and by adding a second mode of perception to the visual mode. Finally, develop a plan for deploying the improvements.	SNCF Réseau	SNCF Réseau is committed to experimenting and defining fixed warning signs for crossing tracks in stations (signs and ground markings) to improve its ergonomics by the end of 2020. Deployment of new fixed signage will be specified after they are defined. In addition to the second mode of perception other than visual is integrated in its response to recommendation 5. Action in progress	O

* C = Closed; O = Open

Recommendations issued in 2019 – continuation

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
04/2019	A pedestrian hit by a train on a level crossing at Écommoy station (72), 22 February 2018	R4	Study and deploy new awareness increasing solutions aimed at raising travellers' awareness of hazards who have to cross tracks, and encouraging them to adopt preventive behaviour to avoid these risks.	SNCF Réseau	SNCF Réseau is committed to developing a national safety campaign on station railway risks, including risks on TVPs, by searching for innovative preventative solutions (media and dissemination method) by the end of 2019. SNCF Réseau is also committed to make these materials available to various railway companies transporting passengers in order to involve them in implementing the campaign. Action in progress	O
				SNCF Mobilités	In addition to the actions already undertaken in the situations of stations equipped with TVP (signage in stations, announcements on-board and in stations, distributing flyers in stations, etc.), SNCF Mobilités will add to the content of presentations made in schools. The prevention message will be customised with local context so that younger people are made aware, from the identification of hazardous situations in the railway environment for each school. Action in progress	O
		R5	Learn from the risk study performed by SNCF Réseau on pedestrians at level track crossings, by experimenting with defences against the risk of collisions with a train in the station in the event of not paying attention to light signals, such as the presentation of a physical obstacle. Once validated, these solutions can be proposed in projects to secure the crossings.	SNCF Réseau	SNCF Réseau has started a research project to cover the group of factors at play and to develop a strategy to improve TVPs. SNCF Réseau is committed to testing the selected devices by the end of 2024 and integrating them, if applicable, into the safety policy for the prevention of station collision risks on TVPs. Action in progress	O

* C = Closed; O = Open

Recommendations issued in 2019 – continuation

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
05/2019	Collision between a TER and a school bus in Millas (66) on 14/12/2017	R1	Establish, in coordination with SNCF Réseau and the road safety delegation (DSR), a technical standard setting performance, and a procedure to assess the conformity of level crossing equipment. This is provided by road regulations relating to the qualification of road equipment, as well as rules to commission and install depending upon characteristics and environmental constraints.	General Director of Infrastructures, Transport and the Sea - DGITM	DGITM is committed to establishing a working group bringing together, in particular, SNCF Réseau and the road safety delegation (DSR) which will take stock of three types of equipment (flashing red lights, barriers and bells). The goal is in particular to identify existing standards and define the standards to be implemented, define the desired performance thresholds, etc. The work will then allow preparation of a decree which includes performance thresholds and certificates of conformity for these three groups of equipment in accordance with Art. R. 119-4 and R. 119-7 of the Highway Code. Action in progress	O
		R2	Study equipment which can broadcast a continuous audible warning signal from the time that barriers are lowered until raised again, for all using level crossings. As part of the developments in connected vehicles, study the feasibility of postponing a level crossing closure alert inside vehicles coupled to a GPS system and on-board mapping.	SNCF Réseau	SNCF Réseau has undertaken to start an equipment study to broadcast a continuous audible warning signal. This study could be presented during the meeting of the National Level Passage in the second half of 2020. With regard to the feasibility of reporting an alarm from an active level crossing in a connected vehicle, SNCF Réseau has undertaken to report regularly to the National Level Passage Authority on the progress of studies in which it is participating. Action in progress	O
		R3	Study the methods to widen existing intersections on both sides of level crossing 25 to facilitate roundabouts depending upon the type of heavy vehicle. Failing that, take policy measures to prohibit left turns towards the level crossing for these vehicle categories.	Departmental Council of Pyrénées-Orientales	The Department has performed turn studies for the crossroads located on either side of level crossing 25 for heavy vehicles turning left towards the level crossing. The directional island present on RD46 will be mortified to shift the RD46 outlet onto the RD612 towards the south, thus inducing a wider turn. This should allow heavy vehicles to position themselves perpendicular to the lowered half-barrier at the level crossing a few meters upstream from it. Action in progress	O

* C = Closed; O = Open

Recommendations issued in 2019 – continuation

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
05/2019	Collision between a TER and a school bus in Millas (66) on 14/12/2017	R4	Update and complete the provisions of circulars related to level crossing safety and their implementing documents, so that safety diagnostics become more comprehensive, and quality risk analyses can make necessary preventive actions more relevant.	General Director of Infrastructures, Transport and the Sea - DGITM	A circular will be published to ask prefects to ensure implementation of the obligation to perform safety diagnostics by the stakeholders, and to ensure their follow-up. The circular should be published at the very beginning of 2020. Action in progress	O
		R5	Study the feasibility and install a front camera at the head of the train in order to record events dealing with the infrastructure which can be used in the event of an accident, and which can be limited to a few tens of minutes. Study the feasibility and install video camera equipment at least at certain level crossings which can record events during the passage of trains in order to improve safety.	SNCF Réseau	The proposal concerning equipment at level crossings is part of one of the measures in the ministerial action plan to improve level crossing safety, launched on May 3, 2019. The conclusions of the feasibility study were made at the end of 2019. These must now be shared and analysed before deciding what action is to be taken. Action in progress	O
				SNCF Mobilités	Thoughts on equipping front cameras on the head of the train were already underway as part of the response to the technical investigation into the derailment of a TGV train in Eckwersheim on 14 November 2015. Two devices from different suppliers have been tested since the end of 2018. The goal is to equip the first trains in 2021. Action in progress	

* C = Closed; O = Open

Recommendations issued in 2019 – continuation

Date of report	Investigation title	No.	Wording of the BEA-TT recommendation	Entity	Status of actions monitored by EPSF at the end of 2019	Code*
07/2019	Collision between a TER and an automobile at level crossing 8 at Bonneville-sur-Touques (14) 02/11/2017	R1	Implement, near level crossing no. 8, located at the Liberation Road in Bonneville-sur-Touques, a device which prevents access to the level crossing to those who are not entitled to access it.	Municipality of Bonneville-sur-Touques	As of 31/12/19, awaiting the response to the recommendation. Action in progress	O
		R2	Perform a study of the risks of the Saint-Andre level crossings located on lines travelling at 140 km/h, considering the seriousness of the consequences, on the rail vehicle of a collision, in addition to the ideas about when these level crossings are used. Present this study to a future National Level Crossing Authority in order to develop, if necessary, an action plan concerning the automation of “Saint-Andre” crossing level crossings.	SNCF Réseau	SNCF Réseau undertakes to present a study of the risks of level crossings at the “Saint-Andre” crossing located on lines travelling at 140 km/h during the National Level Crossing Authority meeting in June 2020. Action in progress	O
12/2019	Derailment of a TGV at the station of Marseilles - Saint-Charles (13) on 24/08/2018	R1	Study, for the simple connections with small radii used by bogie movements with a large wheelbase (TGV, NAT, etc.), reinforcement of the fastening system for the outer rail of the deviated track and, failing that or pending implementation, strengthen maintenance operations.	SNCF Réseau	Waiting for a response before the end of the first quarter of 2020. Action in progress	O

* C = Closed; O = Open

Appendix 2: STRMTG (Ski Lift and Guided Transport Technical Department) table showing monitoring the implementation of guided transport recommendations issued by BEA-TT

Recommendations issued in 2015

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Fall of a child under a tramway train that occurred on 28 April 2013 at “René Cassin” Station in Nantes (44)	R1	Adding to the operational resources and procedures for triggering and processing alarms so as to ensure, as soon as there is the suspicion of an accident, the rapid stoppage of the tramway vehicles involved. To this end, providing the stations on the Nantes tramway network with simple devices to enable any witness of an accident to issue warnings to the central control station without delay.	SEMITAN		display of an emergency number at all tram stations and development of a procedure at the PCC for handling calls	

Recommendations issued in 2016

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Mortal fall of a traveler in a tramway after emergency braking on 3 September 2012 in Montpellier (34)	R1	Request the tramway operators to ensure that the driver has sufficient time, and certainly more than two seconds, between the moment when an alarm indicates that they are unable to activate the safety device and the one where the corresponding emergency brake is activated.	STRMTG	05/07/16	This measure tends to reduce the occurrence of untimely standby FU unrelated to a driver's potential unease. The STRMTG will initiate a discussion with the operators and the Transport Organising Authorities to determine the conditions for implementing this recommendation. For future rolling stock, the technical guide "Tramway Watch Function - Safety Requirements" being developed by the STRMTG will take into account this recommendation. Technical guide "Tramway standby function" published on 10/02/2017	R
	R2	Check that the NF EN 13452 standard is specified in the safety files of the next tramway trains. In particular, ensure that the emergency braking design achieves different performance levels depending on whether it is triggered by the driver or by the standby device.	STRMTG	05/07/16	Designing an emergency brake with different performance levels depending on whether it is triggered by the driver or by the FU Standby is a measure that tends to reduce the severity of the events associated with the emergency brake activation related to standby. The STRMTG has already started this work with the rolling stock manufacturers and the latest generations of rolling stock already have different braking performance levels depending on whether it is triggered by the driver or by the FU standby. These elements will also be included in the aforementioned guide. Technical guide "Tramway standby function" published on 10/02/2017	R
	R3	Examine, in conjunction with operators and the STRMTG, to what extent instant deceleration and jerk of existing trains can be decreased under acceptable technical and economic conditions when emergency braking is triggered by the standby device or by technical security measures unrelated to a proven and imminent danger outside the train.	ALSTOM			
Derailment of a train on the Nice-Digne-les-Bains line, following the fall of a rock, on 8 February 2014 in Saint-Benoît	R1	Define a common monitoring device for the rocky slopes overlooking the railway or road rights-of-way, in areas at risk of falling rocks, in order to detect the warning signs of mass destabilisation and check the condition of the protective devices. Specify the criteria for triggering exceptional inspections and measures to take in case of the detection of an anomaly.	PACA Region, Interdepartmental Direction of Mediterranean Roads	2016	"The RRT PACA has already concluded with the General Council of Alpes-Maritimes an agreement that defines a common alert procedure for road and railway networks in the case of a fall of a block or a landslide. This agreement has been included in the safety regulations of the Chemins de Fer de Provence in the form of a local directive DL-INF no. 2. The RRT PACA is currently working with DIRMED to establish an identical procedure for the risk zones identified in the Alpes de HauteProvence department. Field monitoring and risk studies led to the construction of structures for protection against falling blocks. This work was funded under the contractual investment programmes (in particular CPER and PDMI)." STRMTG Opinion delivered on 28/10/15 on the pre-report; 23 June 2016: the STRMTG relaunched the study for the development of a forecasting tool for a more rational consideration in railway operations, variable data of natural hazards. CEREMA will deal with natural hazards, and the STRMTG working group and operators will propose associated operational measures. Ongoing contact with IRSTEA and SNCF. *Their study is ongoing at the start of 2018. The Cerema must finish the inventory phase of the two networks before the alarm threshold proposals according to the climatic hazards.*	EC

Recommendations issued in 2016 - continued

Unknown outcome: NC

Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
The collision of two metro trains on 18 June 2013 in Toulouse (31)	R1	Ask the operators of automatic VAL metros that have steep sections of track, located in the open air or tunnel entrance, to counter-streak their tracks by directing the arcs of the striations in the opposite direction of the slope, to improve the evacuation of water.	STRMTG	23/12/2016 30/01/2017	13-14/12/16 : Inter-VAL GT: exchanges with the profession on the content of the STRMTG recommendation 30/01/17: Publication of a recommendation from the STRMTG headquarters 15/06/17: deadline for the operators' responses 15/10/17: effective date when notices were issued to operators after analysis of their responses Points still monitored by the control offices in connection with the notices issued	EC
	R2	To ensure that VAL metro operators have an efficient procedure for monitoring the level of dirt on tracks and effective cleaning tools when criteria such as clogging of streaks are met.	STRMTG	23/12/2016 30/01/2017	*It should be noted that Recommendation R3 was the subject of a remark to all operators in the STRMTG notices issued: "However, I am asking you, while waiting for a tool to measure track adhesion on an ongoing basis [R4], to now show in the annual report a follow-up of the level of adhesion achieved with the help of means currently available, specifying the operational procedure employed,"* *This comment links recommendation R3 (STRMTG) to recommendation R4 (Siemens). The progress of recommendation R4 on the development of the tool is difficult today (Siemens is waiting for all networks to adhere to the approach (reasons a priori financial) and the STRMTG does not currently have action levers, it is feared that ultimately, the follow-up given to recommendations R3 and R4 will not be the expected ones.* *Overall, the topic of adhesion is regularly and consistently addressed by the Inter-VAL WG, which brings together the entire profession.*	EC
	R3	Have VAL metro operators check and, if necessary, restore traction on the tracks of their network.	STRMTG	23/12/2016 30/01/2017		EC
	R4	Develop, in conjunction with the operators of the VAL automatic metro systems and the STRMTG, an effective way of measuring the grip of the tracks. Develop the corresponding operational instructions for triggering corrective actions when these tracks no longer provide sufficient adhesion, including in adverse weather conditions.	Siemens	10/10/16		EC
		"Furthermore, without making a formal recommendation, the BEA-TT: *➢ invites the Siemens manufacturer and the building owners of the future VAL automatic metro lines or their future extensions to check the proper compliance with the requirements for the manufacturing of the tracks and to introduce a measure of their adhesion, making it possible to constitute a "point zero";* *➢ calls on light-rail manufacturers to equip the next models of tyre trains they will develop with anti-lock devices;* *➢ sees only advantages in pursuing and developing the current actions of research dealing with tyre adhesion of automatic VAL metro trains on their metal tracks, and invites other designers and automatic metro operators to join or conduct similar ones in connection with the STRMTG;* *➢ encourages the Michelin company to increase the adhesion of the next series of tyres intended for the VAL automatic metro trains that it may put on the market."*				EC

Recommendations issued in 2017

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation Title	Date Sent	Recommendation No.	Recommendation Item	Addressee(s)	Reply Date	Outcomes Specified and Progress Status (Literal and Encoded)	
						Literal	Encoding
Derailing and dislocation of a line T1 train on the Valenciennes tramway on 11 April 2014	01/05/17	R1	Reinforce operating safety at PCC by writing operational instructions clearly defining the organisation of traffic safety in both nominal and degraded modes (disturbances).	Transvilles			
		R2	Describe the organisation of the circulation of maintenance machines outside the framework of circulation run by the PCC, as well as the measures to be taken to return to the nominal situation.	Transvilles			
		Invitation	BEA-TT therefore invites the STRMTG to finalize this guide to bring designers, manufacturers and operators together to reinforce safety awareness in these operating areas. The work being fully underway, BEA-TT is not providing a recommendation. => Finalised guide (October 2017)	STRMTG	SO	SO	
Collision of a tramway train and a car on 21 December 2013 in Saint-Denis (93)	27/06/17	R1	Rapidly complete the programmes for processing fixed obstacles that may aggravate consequences of collisions between the tramway trains and roadway vehicles, and in the meantime, take simple and temporary preventive measures for the most critical.	AOM of the 11 tramway networks commissioned before 2003			
		R2	Review the internal feedback processes for accidents occurring on operating tramway lines, in order to improve the collection of information, analyses at different levels, as well as the definition and follow-up of corrective measures.	RATP			

Recommendations issued in 2017 – continued

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation Title	Date Sent	Recommendation No.	Recommendation Item	Addressee(s)	Reply Date	Outcomes Specified and Progress Status (Literal and Encoded)	
						Literal	Encoding
Collision of a tramway train and a car on 21st December 2013 in Saint-Denis (93)	27/06/17	R3	Ask the Transport Organising Authorities in charge of tramway lines and their operators to formalize their relationships with roadway managers and traffic police authorities, in order to effectively take into account the feedback from accidents and incidents.	STRMTG, UTP, GART	25/09/2017 11/01/2019 (information about the closing of actions undertaken by the STRMTG)	Decree No. 2017-440 of 30 March 2017, relating to the safety of guided public transport (STPG decree) provides for the formalisation of exchanges between AOT, roadway operators and managers within the framework of feedback from accidents and incidents by means of the provisions of the following three articles: Article 81 - "The Transport Organising Authority, the operator, the infrastructure manager, the lead manager and the roadway manager, shall ensure, each for what concerns them, for the entire duration of the operation, that the level of safety with regard to users, operating personnel and third parties, is maintained." Art. 89. – Any serious accident or incident affecting the operational safety of a guided public transport system shall be brought without delay to the knowledge of the Prefect, the Transport Organising Authority, the lead manager and the office of investigation of land transport accidents, by the operator or the infrastructure manager. This information shall specifically focus on the occurrence of this accident or incident and its gravity. Within two months from the occurrence or discovery of the serious accident or incident, the operator or lead manager will address a detailed report on this event to the Prefect and to the Transport Organising Authority. The report will analyze the causes and consequences observed from this event, potential risks and indicate the information that was collected as well as the measures taken in order to prevent its reoccurrence. All the entities mentioned in article 81 shall provide information, allowing for the analysis of the circumstances of the serious accident or incident. Article 92 - "The operator or lead manager shall establish an annual report on the safety of the operation of the system, which specifically includes a section regarding accidentology, a section concerning internal control, a section regarding the development of the system and a section relating to a single plan of action intended to maintain and improve the safety of the system. The entities mentioned in Article 81 will contribute to the drafting of these sections, each for what concerns them. The Transport Organising Authority shall provide this report to the competent authority, accompanied by its advice regarding the plan of action that its contains". STRMTG will indeed ensure the proper implementation of these provisions within the framework, particularly of the elaboration of its technical guides. For these purposes, STRMTG has, specifically undertaken an action to homogenize and enhance the annual reports following the proposal to delete the updated safety files. The work group associated with this action is ongoing, in collaboration with firstly the operators and secondly with the Transport Organising Authorities and the roadway managers in order to successfully update the STRMTG guide on the content of annual reports. Furthermore, STRMTG will launch a survey among the Transport Organising Authorities in order to make an assessment relative to the existence of a system (agreement or other) between AOT and roadway managers enabling them to provide State control services with supporting documents relating to the maintenance over time of the system's safety level, specifically taking into account the changes that may have been made. Concerning the transmission of information allowing for the analysis of the circumstances of a serious accident or incident as laid down in Article 89 mentioned above, the STPG decree of 30 March 2017 only confirms the practices already in place on the networks (for example the transmission of information in connection with the proper functioning of light signaling). Regarding traffic police authorities, as to their responsibilities, they do not directly intervene in the feedback process for accidents and incidents and, in fact, rely on their roadway managers, who are now essential actors in this process.	EC

Recommendations issued in 2017 – continued

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation Title	Date Sent	Recommendation No.	Recommendation Item	Addressee(s)	Reply Date	Outcomes Specified and Progress Status (Literal and Encoded)	
						Literal	Encoding
Collision of a tramway train and a car on 21st December 2013 in Saint-Denis (93)	27/06/17	R4	Implement, in the decree of application and technical guides, the new provisions laid out in decree No. 2017-440 of 30 March 2017 concerning the safety of guided public transport, ensuring that the following is rendered operational: ➢verification of the implementation of corrective actions; ➢the systematic involvement of roadway managers and traffic police authorities ➢coercive measures in case of delay, lack of involvement or failure of the actors in the process. Establish a statement of their efficiency when there is sufficient hindsight.	DGITM STRMTG	25/09/17	As for the verification of the implementation of corrective actions, the STRMTG through control offices will ensure continuous proximity control of the networks in operation according to the following provisions: operation monitoring meetings These meetings will provide for the maintenance of a permanent contact with the AOT operators, establishing a relationship of trust and provide information in good time of any evolution in the networks. The follow-up of the provisions of safety files and corrective actions following events are approached here, and tracked thanks to the monitoring tables. operation control audits These are effective tools that ensure the operators implement their safety and operational regulations and are organised to maintain the safety level of the systems they operate. instructions from the annual reports They are, first of all, useful to the operator, to AOT and the roadway managers to identify the areas of progress in the safety plan and, secondly, to the control service to ensure continuous improvement in safety. Henceforth, the involvement of roadway managers will allow STRMTG to intervene with an actor against whom until now, it had no means of taking regulatory action. “periodic” monitoring In addition to the previously noted items is the “periodic” monitoring carried out by control offices through operational events, which allows quick detection of security problems (accidents, pathology, etc.). All these modalities of control and monitoring of guided urban transport networks implemented by STRMTG are meant to verify the implementation of corrective actions following accidents or incidents and respond to the first point of your recommendation. On this subject, it is important to ensure that the active intervention of the State is not accompanied by a loss of the sense of responsibility of primary actors, those who are directly in charge of maintaining the level of safety. Concerning the second point of your recommendation, the comments are the same as those previously presented for recommendation R3. Regarding coercive measures in case of delay, lack of involvement or failure of actors in the process, Article 85 of the STPG decree states that the Prefect may request the operator, infrastructure manager, lead manager or the Transport Organising Authority to remedy any default or insufficiency in the transport system or its operation in terms of safety, each for what concerns them, and impose restrictive operational measures (provision already in force in STPG degree No. 2003-425). Furthermore, a new provision allows the Prefect to request that the operator, infrastructure manager, lead manager or Transport Organising Authority call upon a qualified body to carry out a diagnosis of the safety of the system when the annual report has not been submitted or its content is insufficient to assess the maintenance of overall safety. These provisions serve as a response to the third point of your recommendation. Finally, STRMTG regularly brings together industry professionals by means of work groups or information days and can thus perform an assessment in due course of the efficiency of the new provisions of the STPG decree.	EC

Recommendations issued in 2018

Recommendation made: R
Modified recommendation made: RM
Recommendation being implemented: EC
Recommendation not retained: NR
Follow-up unknown: NC
Continuation not followed by STRMTG: NS

Title of the investigation	Recommendation number	Wording of the recommendation	Receiver(s)	Date of response	Actions taken and progress (Literal and codified)	
					Literal	Codification
Technical investigation of the derailment of a train on the T2 line of the Lyon (69) tramway following a collision with a light vehicle on 23 August 2015.	R1	For the ranges which haven't yet been develop in application of the “Design of front ends of tramways” technical guide, did not validate reference material presenting unfavourable feedback, such as for the CITADIS X02 range. If the manufacturer cannot reasonably offer other reference material, request significant improvement in the derailment rate compared to the reference, or compensatory measures which significantly reduce the significance of a derailment.	STRMTG	18/10/18	STRMTG will implement the BEA TT recommendation relating to tramway ranges which have not yet been developed. However, the STRMTG considers that compensatory measures are interesting for existing tramway ranges, but are insufficient for the ranges being developed. Therefore, each manufacturer should be obligated to offer a tram less sensitive to derailment in the case that its feedback is unfavourable, such as with the X02 range. The criteria to specify significant improvement in derailment rates should be specified. STRMTG has no additional comments regarding recommendation R2 addressed to Alstom. As to recommendation R3 addressed to Keolis Lyon, SYTRAL, SEMITAG and SMTC Grenoble, STRMTG is completely favourable to imposing a speed limit to crossing intersections. This measure is now applied by almost al tram networks in France.	
	R2	Offer solutions to significantly improve derailments in the ranges subsequent to CITADIS X05 as compared to CITADIS X02. Failing this, propose compensatory actions that can reduce the significance of derailments. These actions can also be presented as a retrofit to current ranges.	ALSTOM		To see after the X05 range, a range not launched by Alstom.	
	R3	Impose a speed limit for trams at crossing intersections in view of danger and visibility, generally between 30 and 40 km/h. Have drivers specify the methods of approaching and crossing intersections to prevent collision risks in driving instructions and driver training.	Kéolis Lyon, SYTRAL, SEMITAG and SMTC		In consultation with SYTRAL, BSE, KEOLIS Lyon and DTMR	
	Invitation	BEA-TT invites STRMTG to lead a discussion with all the players (AOM or AOT, tram manufacturers) in order to significantly improve awareness of the importance of significantly improving derailment performance in future rolling stock.	STRMTG	SO	SO	

Recommendations issued in 2019

Recommendation made: R
Modified recommendation made: RM
Recommendation being implemented: EC
Recommendation not retained: NR
Follow-up unknown: NC
Continuation not followed by STRMTG: NS

Title of the investigation	Recommendation number	Wording of the recommendation	Receiver(s)	Date of response	Actions taken and progress (Literal and codified)	
					Literal	Codification
Technical investigation of the derailment of a metro train running on line 2, Paris metro, that occurred on 2/12/2016 at the Barbès-Rochechouart station in Paris (75)	R1	Submit to the French standardisation commission UC9XB "Electrical railroad applications - embedded electromechanical equipment", which monitors relevant European and international works, a request intended for the IEC/TC 9 committee "Railway electrical equipment and systems committee of the International Electrotechnical Commission with a goal of extending to application field of self-induced vibrations and the prescriptions of the IEC 61373 standard adopted in France as the NF EN 61373 standard.	BNF			
	R2	Study changes in regulations as in the use of air transport in particular at: ➢ an exchange of information between the owner, the manufacturer, the operator and the maintainer of passenger rail equipment, the infrastructure manager, of one of them identifies a risk to safety from the equipment; ➢ providing a solution by the manufacturer.	DGITM			
	R3	Improve organisation of checks and inspections of rolling stock components in order to ensure that they are complete.	RATP			

Appendix 3: STRMTG (Ski Lift and Guided Transport Technical Department) table showing monitoring of the implementation of ski lift recommendations issued by BEA-TT

Recommendations issued in 2013

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on passengers' fall from a cable car cabin at Pleney which occurred on 31 December 2011 in Morzine (74)	R1	Sustainably strengthen management of the operational safety of the Pleney cable car and, more generally, all mechanical lift systems serving the areas of Pleney and Nyon by: ➢ developing training and skills monitoring for the staff involved, operations manager, sector managers, drivers and look-outs; ➢ formalising safety procedures in operating instructions to be applied, both in normal operating mode and in degraded modes, including in the event of an incident or accident; ➢ organising effective internal controls, including an independent level of operational use of the relevant systems; ➢ ensure complete traceability of incidents and accidents as well as the actions taken to remedy them.	SA at Pleney		See response from Pleney's SA from 18 July 2013, published on BEA-TT's internet site. Pleney's SA integrated BEA-TT's recommendations into an action plan (15 actions) developed following a safety audit performed by an external consultant in April 2012. See also BHS audit following the accident. Note that since the accident, the obligation to establish an SMS has been introduced into the tourist code (R. 342-12). Pleney's SA therefore implemented an SMS at the end of 2017, and has opted to monitor its SMS by an approved inspection body which audits the system every two years. It was audited on March 15, 2019 by OISGS DSF. The audit report indicates that the operation is generally good, reflecting two non-conformities. The operator responded to the notes and proposed an action plan. This recommendation can therefore be considered fulfilled from our point of view.	R

Recommendations issued in 2013 - continued

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical inquiry report on passengers falling from a Pleney cable-way car on 31 December 2011 in Morzine (74)		*Furthermore, in the sequence of recommendations made in the inspection report that the Environment and Sustainable Development General Council (CGEDD) made on the safety of mountain lifts and of track-guided transport, BEA-TT:* *- Invited the Directorate General for Infrastructures, Transport and the Sea (DGITM) to launch a study into additions to be made to regulatory requirements, in terms, on the one hand, of the approval of ski lifts by operators, by heads of operations and by staff that perform major safety tasks, and on the other hand, of setting up, partly independent internal checks for larger facilities on their operations;*	DGITM		The Tourism Code was amended by the decree of 19 January 2016 to introduce the obligation for all operators of ski lifts and mountain conveyors to implement a safety management system (SMS), i.e. a device that aims to organise all the means, rules, procedures and methods implemented at the level of each operator with a view to ensuring the safety of their activity. With regard to the SMS validation and monitoring procedure, the operator must choose one of the following two possibilities, permitted by the regulations: - Case 1: submit its SMS to a validation and control procedure with the services of the State; in this case, the regulation provides for a training period of 2 months; - Case 2: submit its SMS to a periodic inspection by an accredited or approved inspection body within 6 months from the date on which it begins operating; this period is extended to 2 years for existing operators. Thus, since 1 April 2016, all new operators1 must notify the State services of the existence of their SMS before they can start their activity. In addition, if the operator uses Case 1, the SMS must have been validated by these services in order to carry out its activity. In terms of the operators in place, the deadline for the application of the above-mentioned provisions was extended to 1 October 2017, except for those operating only ski lifts or conveyors, for which the deadline of 1 October 2019 was established. A ruling dated 12/04/2016 specifies the content expected for each SMS, in particular the consideration of 8 mandatory issues. These issues include skills management. If an enabling device is not required by the decree or the STRMTG RM-SGS1 guide which complements it, the device clearly articulates the identification of the security tasks, the definition and the implementation, and the follow-up of the qualifications corresponding to the complexity of these tasks, then the organisation of operations to ensure the availability on the ground of qualified personnel. For the moment, these provisions will be upheld and will be the subject of an evaluation for second time to see if they need to be reinforced. The organisation of a permanent internal control system is another subject that must be dealt with in the context of SMS, even if its definition is left to the discretion of the operators. The independence of this internal check from the staff in charge of the operation was not required.	R
		- Encourage the ski lift and guided transport technical department (STRMTG) to develop a programme for inspecting operators of mountain lifts, based on a formalised methodology and references.	STRMTG		Initial experiments on the use of the audit technique to complete the RM control tool panel were carried out from 2005-2006. After the merger of code inspectors with STRMTG at the end of 2011, joint criteria for planning operator inspections have been defined and inspection frameworks have been rediscussed. Nowadays inspections are performed by all offices of STRMTG and internal communications meetings have been organised to enable experience to be shared and for the tool to be further refined. This practice is supported by the introduction of safety management systems.	R

Recommendations issued in 2013 - continued

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on the fall of five cars from the “Aup-de-Véran” cable car that occurred on 13 October 2011 on the skiable area in Flaine (74)	R1	Organise in conjunction with manufacturers and operators, the study and experiments with technical and organisational structures to be developed in order to detect any blockage of a cabin or ski lift seat when passing a pylon. Develop regulations, standards and guides based on the conclusions of these analyses.	DGITM STRMTG		STRMTG held a meeting with professional partners to ask them to consider the issue in June 2014. During 2015, STRMTG had to define the specifications to state the expected performance and the scenarios that must be taken into account by these arrangements. However, for planned workload reasons, the STRMTG could not move as fast as desired on the file and these specifications were not established. However, bilateral contacts have been made with some RM manufacturers to discuss the subject. It shows rather contrasting positions; adherence and proactivity on the one hand, doubts surrounding the interest and the technical feasibility (with simple means) on the other. The initial discussions with the profession seem to place the majority opinion on the side of this second position. In any case, during 2018 we plan to finalise the aforementioned specifications and to distribute them to the professional partners in order to learn their official position on the subject. This makes it possible to check the positions before directing the strategy to move forward on the subject	EC
		In addition, BEA-TT has invited approved principals and STRMTG to ensure, through tests performed prior to commissioning, that the values for *maximum longitudinal tilting of the cars or chairs of new or amended facilities* *in all circumstances remain less than those taken into account during their design.*				

Recommendations issued in 2014

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on the derailment of a Grande Motte cable car cabin that occurred on the 3rd December 2011 in Tignes (73)	2011-017-R1	By way of feedback, ensure that the design, maintenance and supervision terms for the scrapers fitted to the cable-way cars prevent the derailment risk that could be caused by those parts coming loose.	STRMTG	15.09.14	The STRMTG issued a recommendation dated 11/07/2014 aimed at: 1) List the ice scraper mountings on existing twin-cable cableway cars in France, 2) Assess the reliability of the mountings 3) Change any mountings deemed inadequate 4) Fix the terms for monitoring homogeneous mountings across France. The date for filing information for the survey has been set at Friday 12/09/2014. The summary of this survey was formalized through the STRMTG recommendation of 18/12/2014 establishing the following elements: The evaluation led to the conclusion that the scraper assemblies of the bi-cable cableways cars are generally satisfactory, although small improvements could still be occasionally carried out, and that it is, however, necessary to establish minimum rules for controlling these elements, given the wide variety of monitoring methods found on the field. The STRMTG has therefore decided to recommend the following rules to be implemented on the two-way cable cars whose trucks are fitted with ice scrapers: Recommendation no1: At the level of the bolted fastening systems of the scrapers, it is requested, if necessary, the implementation of solutions avoiding a loosening of the screws such as threadlock, Nylstop nut, Nord Lock washer, ... Recommendation no2: In order to facilitate the visual inspection of the scrapers, it is advisable, where possible, to position their fixing nuts on the visible side. Recommendation no3: The RM1 guide provides in particular "§A.3.2 - weekly checks" a visual check on the carriage to check the status. Verification of the correct position and assembly of the scrapers must be included in this weekly check. Recommendation no4: Setting up a check of the fixings and the position of the scrapers after each installation deicing operation. These provisions were implemented on the cable cars upon receipt of the recommendation (ie from the 2014/2015 season). They have been included in the RM1 guide in its Rev.3 edition of 18/05/2016.tion	R
	2011-017-R2	Ensuring, especially during exercises, that all timing for work set out in the Grande Motte cable car rescue plan can be complied with even in the most difficult weather conditions in which the use of the facility is permitted.	Société des Téléphériques de la Grande Motte [Grande Motte Cable Car Company]			NS

Recommendations issued in 2014 - continued

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on the derailment of a Grande Motte cable car cabin that occurred on the 3rd December 2011 in Tignes (73)	2011-017-R3	Check that the goals set in the ski lift rescue plan, especially as regards evacuation times, can be complied with even in the most difficult weather conditions in which the use of the facility is permitted. In this context, invite operators to perform exercises regularly, for each of the modes of evacuation provided, in such weather conditions and execute them on the most sensitive facilities in particular.	STRMTG	15.09.14	Feedback on past situations shows that difficult evacuations are very largely encountered in equipment at risk. A facility can be described as being at risk when it presents difficult access, extensive overflight, a watercourse, very rough or very sloping overflights (thus with difficult access on the ground), etc. The existence of specific procedures such as a zip line for evacuation or the use of car access equipment using non-standard cables are also to be considered for this definition. Furthermore, over a thousand cable-ways exist in French territory (chair lifts, cable cars, twin-cable cable cars, etc.). Reassessing their evacuation plans would demand work that the professionals involved (operators, Prefectural training departments and supervisory services) do not have the resources to provide. Taking these observations into account, it thus seems necessary to focus primarily on the sensitive facilities. After consulting the Domaines Skiables de France during July 2014, and also in liaison with the ski lift manufacturers' association, STRMTG has decided to start a procedure for identifying the facilities at risk (based on the criteria set out above) and for the assessment of the evacuation plans for those facilities at risk, incorporating the following topics: - The reliability of the evacuation method - The time it takes to mobilise teams - Evacuation times Based on that assessment, it will be possible to work to improve the plans deemed inadequate, by working with the operators involved in planning exercises in tricky conditions to corroborate the relevance of the changes deemed necessary. The target schedule was initially as follows: I Reassessment 1) Formalizing the procedure by a STRMTG recommendation by the end of the month of September 2014. Everyone will be reminded in that recommendation that the operation of a facility is subject to the operator's ability to implement the User Evacuation Plan under the conditions specified (as the BEA-TT report restates). 2) Revision of the User Evacuation Plans involved by the end of 2015. II Good practice guide Furthermore, in order to improve operators' collective capacity to properly handle the evacuation of all the equipment transported, STRMTG has decided to start drafting a guide to the application of part B of STRMTG guide RM1 on cable car evacuation at the beginning of 2015. That application guide, drafted with professional participation, and that of operators in particular, will be intended to specify good practice with regard to the design, execution and maintenance of evacuation plans. In particular it will enable a practical context to be specified for handling evacuation exercises, which stresses the need to perform exercises regularly on the various kinds of facilities installed at each location, especially on facilities at risk, including in difficult conditions. These various plans have not yet been implemented for reasons of the planning workload and prioritisation of recommendations. They remain within STRMTG targets and will be addressed, at best in 2021.	EC

Recommendations issued in 2014 - continued

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on the fall of a skier from the "Fontaines-de Cotch" chair lift that occurred on 22 December 2012 on the skiable area at Gourette in Eaux-Bonnes (64)	2012-017-R1	Increase the safety of boarding of users onto the "Fontaines-de Cotch" chair lift by any appropriate technical or organisational means that will either physically limit the risks of a fall or significantly extend the area that can be effectively supervised.	EPSA			NC
	2012-017-R2	Ask all chair lift operators to ensure that their boarding area layout, their working conditions, the amount and nature of their use, the methods for supervision and their equipment form a cohesive unit that guarantees safe boarding of users and optimal supervision when they take their places in their seats. Coordinate the resulting upgrade campaign and support the efforts of builders and operators in the development, implementation and evaluation of additional fall prevention and monitoring assistive technology.	STRMTG	12/09/14 (response to draft report)	We initially planned to implement this recommendation through an approach aimed at defining a methodological framework enabling operators to analyze their chairlifts with respect to their exposure to the risk of passengers falling off and to define developments, organization and equipment in a coherent manner vis-à-vis the main identified risk factors. A schedule could then be established to allow operators to make the necessary changes. During a meeting in September 2015, DSF indicated to STRMTG that they had started working on an equivalent approach, with the elaboration of an internal guide on the difficulty of operating fixed-grip chairlifts. DSF thus regretted seeing an initiative taken by the operators at best supported by STRMTG, at worst abandoned for the benefit of a different framework. STRMTG, pointed out at the time that on the one hand they had already announced the action (cableways commission) and on the other, that the DSF guide was for the moment only an experimental framework, limited it to TSF and left it to the initiative of the operators. After discussions, it was then agreed that DSF would restart its project and expand it to all chairlifts, coming closer to the spirit of the desired approach, and would present it to STRMTG as the basis of a discussion to define a solution passing through a voluntary approach of the operators. This presentation finally took place in December 2017 and was followed by exchanges and experimentation on the field in early January 2018 in order to verify the relevance of the provisions of this guide. After the DSF RM commission validated its content and the associated scoring grid to identify the devices requiring improvement of their facilities, DSF finally renounced disseminating the guide in a prescriptive form, stating that this was not the role of an operator association. STRMTG is therefore expected to disseminate this guide in 2018 by means of recommendation formalizing the application process of this DSF guide. STRMTG was behind schedule in drafting the corresponding recommendation. This was not finally released until 20/01/2020. This calls for diagnostics to be performed by operators during the winter of 2019/2020, the definition of action plans as a function of these diagnostics by the end of 2020, then the implementation of these plans over three to five years, depending upon the number of chairlifts managed by each operator. Given the short winter season due to COVID-19, the DSF has requested a one-year schedule shift, a request which in principle was accepted by STRMTG. STRMTG should formalise this new schedule in 2020 in an additional recommendation.	R
	2012-017-R3	In the technical guides relating to the design and operation of cable-ways, specify, adjust and ensure the overall consistency of the requirements for safe boarding on chairlifts so that their application ensures optimum prevention of user falls in the development, equipment and operating conditions of the installations concerned.	STRMTG	12/09/14 (response to draft report)	The decree of 7 August 2009 and the RM1 and RM2 guides were amended (for the resp. version guides rev3 and rev2 on 18/05/2016) in a manner that integrates the changes in rules for developing loading and unloading areas in accordance with this recommendation R3, in order to clarify and improve the coherence of provisions relating to the loading of chairlifts, by articulating the rules on the development of areas (RM2) and those relating to their monitoring (RM1). Article 15 of the decree of 07/08/2009 was amended in a manner that better reflects the safety objectives relating to the development of departure terminals in particular: facilitating loading operations, allowing the supervision of these operations, and if necessary, the implementation of corrective actions and preventing damage to passengers. A general paragraph was added as an introduction to § A4-15 of the RM2 guide, making the connection between the development, equipping and organization of the supervision of chairlifts loading and unloading areas. A paragraph from the experience of operators was introduced (A4-15.2 RM2) to improve the design of chairlifts waiting lines, loading areas and zones. A definition of the loading zone, which appeared in the schematic diagram but was not included in the text, was provided. The distance between the ground and the chairs was slightly modified to facilitate the loading of children (§A5.5.6.1.7 RM2): distance of between 39 and 51 c (rather than the 41- 51 cm previously provided for). The RM1 guide specifies in §A1.3. the missions of the loading supervisors, especially by indicating that their supervision is carried out in the loading zone at the end of which they must be able to react if they detect improper loading. The schematic diagram of the loading areas included in the preamble of the RM1 guide and was modified to show the materialization of an end of the loading zone, intended for the operating personnel, to indicate the end of the zone beyond which their supervision is normally no longer required. The BEA-TT recommendation is considered to be implemented by STRMTG.	R
	2012-017-R4	For each of the chairlifts that serves the Gourette skiing area, define the automatic actions that the staff in charge of supervising operations must adopt when they detect a user in difficulty after boarding, and train staff in their implementation. Extend that initiative to the Pierre-Saint-Martin area.	EPSA			NS

Recommendations issued in 2014 - continued

Completed recommendation: R
Amended recommendation: RM
Recommendation in progress: EC
Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Technical investigation report on the fall of a car from the Bosses cable car that occurred on 2 February 2013 on the skiable area at Gourette in Eaux-Bonnes (64)	2013-002-R1	Take action with the European Standards Committee so that standard NF EN 13223 relating to the security requirements applicable to cable facilities transporting persons specify the requirements it formulates as regards the dimensions of the balance beams fitted to the pylons in such facilities and in this field provide for account to be taken of all the lateral stresses that these parts may be subjected to during operation. With this in mind, add to the provisions of the technical guidelines entitled Ski lifts - RM2 - General design and amendments to cable-ways" in order to ensure that these lateral stresses are taken suitably into account during the design of new cable car or chair lift facilities or during the repair of existing facilities.	STRMTG	17.07.14	The analyses performed after the accident under STRMTG coordination (and in particular restrictive measures on balance-beams fitted by the POMA manufacturer) have in fact revealed the existence of horizontal dynamic stresses on the balance beams that the current balance beam design rules do not cover. Since 2015, the STRMTG has launched a study aimed both at carrying out stress measurements on the structures of a sample of pendulums and aircraft representative of the French fleet and secondly in analyzing the results of these measurements for possible define a method for evaluating the fatigue sensitivity of the French park balance wheels. At the end of 2017, five measurement campaigns were carried out on different equipment balances and builders. A 6th measurement campaign is planned for May 2018 and the final analysis should be completed by the end of 2018. Depending on the results of this study, STRMTG will act within the European Standards Committee (CEN) in order to make a proposed amendment to standard NF EN 13223 intended to introduce practical rules to justify fatigue under dynamic horizontal loading on balance beams of single cable cable ways. In practice, this kind of proposal may only take place during the next revision of the standard NF EN 13223. Pending this, a change to STRMTG guide RM2 to incorporate additional design arrangements for balance beams is difficult to envisage insofar as it would constitute a breach of the European rules for the free circulation of EC marked components.	EC
	2013-002-R2	Ensure that the operators of these cable cars and chair lift facilities establish and implement precise and verifiable visual supervision procedures for the state of balance beam bogies fitted to their pylons, which will enable any developing cracks to be detected.	STRMTG	17.07.14	Detailed specific visual checking procedures may be required when the level of risk involved in a situation demands special monitoring whilst awaiting the set-up of a permanent safety measure. Accordingly, if actions to make changes to balance beams identified as being at risk of fatigue generated by horizontal stresses (see outcomes of recommendations R1 and R3) were to be spread over a period requiring interim operation using balance beams in their pre-existing state, precise visual checking procedures could be necessary and, if appropriate, STRMTG will ensure that such procedures are duly documented and implemented.	EC
	2013-002-R3	Provide new chair lift and cable car facilities with safety devices that enable their operation to be stopped automatically in the case of total or partial breakage of a bogie on their balance beams and define the arrangements to be put in place to reach that goal on facilities currently in operation in accordance with their technical features and their operating conditions.	STRMTG	17.07.14	Fitting a breakage detector to part of the balance beam is intended to deal with the consequences of a structural failure of the balance beam but will not allow the appearance of such a failure to be prevented in the absence of action on its primary cause. Based on rules defining the justification of fatigue under dynamic horizontal loads on balance beams (see outcomes of recommendation R1) , it will be possible to carry out a survey of the sensitivity of the various kinds of balance beams present across all single cable cable ways in service to this fatigue phenomenon and thus to identify the designs that present weaknesses and need reviewing. STRMTG thus envisages setting up that initiative by defining an action programme that enables the kinds of balance beams identified as being at risk from the "horizontal" fatigue phenomenon to be dealt with. This programme may combine replacing balance beam structures with improved design structures, non-destructive testing, or even fitting them with balance beam part breakage detection for cases where replacement is not possible. That survey including recent generations of balance beams will thus enable checking good design of such balance beams with regard to the phenomenon of fatigue connected with horizontal stresses and suitable steps to be taken if this is not the case, pending the relevant update to standard NF EN 13223. This strategy will enable action on the phenomenon identified as the initial cause of the accident at Gourette and thus significantly reduce the probability of such a breakage occurring again. Furthermore that was the strategy that was selected for defining actions to be undertaken on balance beams whose type had been implicated after that accident. In this way the main action involved replacing the bogies of two of the 420 POMA balance beams with bogies whose resistance to fatigue was improved following strain measurements on various bogies.	EC

Recommendations issued in 2015

Rejected recommendation: NR
Unknown outcome: NC
Outcome not monitored by STRMTG: NS

Investigation title	Recommendation no.	Recommendation item	Recipient(s)	Reply date	Outcomes specified and progress status (Literal and Encoded)	
					Literal	Encoding
Train derailment on “Le Panoramique des Dômes” rack and pinion railway that occurred on the 28 October 2012 in Orcines (63)	R1	Prepare a full study on the risks involved in the accidental tailgating of various track apparatus on the “Panoramique des Dômes” rack and pinion railway, and set up suitable measures to limit its impact, if justified.	TC Dôme		Following the derailment, the REX was noted by the operator and it decided to install Active and Automatic Supervision (SAA) monitoring at the crossing area. This system forces the driver to limit speed in the crossing area and to check the position of the points before crossing them with the lug end.	R
	R2	Amend legislation to extend the application of regulations on track-guided transport to rack and pinion trains located in mountainous areas instead of that which applies to ski lifts. At least, if such a change of regulations were not to take place, strengthen the terms for approving the main contractors involved, by applying article R. 342-4 of the Tourism Code to rack and pinion trains so that they guarantee in-depth knowledge and experience on their part on the technologies and modes of operation of this kind of railway.	DGITM		A draft decree *that is being considered* provides for creating a specific class devoted to rack and pinion railways within the approvals system for mountain lifts, which will enable the specific features of such equipment to be better acknowledged. *A "design and operation of rack and pinion trains" guide was published on 21/12/2016, and it provides elements on the design of rack and pinion trains and essential requirements for their use.*	EC

Recommendations issued in 2017

Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Date sent	Recommendation No.	Recommendation item	Addressee(s)	Reply Date	Outcomes specified and progress status (literal and encoded)	
					Literal	Encoding
07/07/17	R1	Specify concrete measures to be taken in case of the activation of the strong wind alarm and state, without ambiguity, the measures to be taken when the wind speed reaches the maximum provided for in the equipment design, in this case 20 m/s. Include the measures to be taken in case of the unavailability of one or several anemometers. Provide traceability and registration rules to ensure the proper application of these measures.	SEVABEL	02/10/17	Cf. SEVABEL mail of 02/10/2017: General operation procedure updated to specify the instructions in case of an unfavourable development of wind and the unavailability of a wind speed measurement.	**R**
	R2	Specify the regulatory requirements regarding devices that measure wind speed and alarm, especially with regard to the following: ➢ the determination of the number and position of anemometers which should be based on prior consideration of the aerological peculiarities of the site and on the visibility of the line from the control room; ➢ the recording of anemometric measurements; ➢ the ergonomics of display and alarms with regard to the tasks of the operator; ➢ the materialization of maximum wind speed during operation by a specific alarm or an automatic shut-down device.	STRMTG	02/10/17	Organise a meeting with professionals on 19/09/2017 which provided a group strategy definition. Then implement a working group which met five times in 2018 and 2019. They primarily worked on the following points: - provide details in French regulations on the installation and use of anemometer measurements for new devices, - identify any measures to be taken to the existing fleet. The following conclusions were derived from this work: On determining the number and positioning of anemometers: A requirement referring to draft paragraph A5-5.1.1 of the RM2 guide with a specific note referring to analysis of site anemometric conditions in a new installation and providing the numbers, positions and types of anemometers to be installed. This specific analysis was made using: - data sources: feedback from the operator, wind data from a weather station or anemometers, etc.; - different equipment areas depending upon their wind exposure, directions of prevailing winds, the existence of venturi effects, particular areas masking or aggravating wind effects (forest, particular geography, etc.); - determining the areas which were visible from the facilities' permanent workstations (end stations)(; - exposure to frost in different areas. Logging wind data and corresponding operating conditions: It was determined that this must be provided over a minimum period of one week. This is considered sufficient to allow use of the data either in the event of an incident (accident, for example) or within the context of the operator's internal monitoring. The same article as the one cited above formalises this requirement. Draft paragraph A5-5.1.1 of the RM2 guide provides the following rules regarding alarm and stop functions related to wind measurement: 1) One must use an anemometer to define wind thresholds, possibly variable depending upon wind direction, in accordance to each equipment's design, and in particular available templates. 2) The first wind threshold is an alarm trigger, creating an audible alarm at the control station and staff driving workstation as well as an automatic slow-down of the system for devices operating at a speed of more than 3 metres/second. 3) The second threshold is a so-called "dimension" threshold beyond which normal system operation is no longer possible, therefore causing safe shut-down of the system. This shut-down is followed by the operator's analysis of the situation, defining in particular the conditions under which one can re-start the system in order to recover passengers. The RM2 guide has not yet been amended to incorporate draft article A5-5.1.1, a tidying up of the guide is planned in 2020 for release in 2021 at the latest. In the meantime, rules have been circulated in a letter from STRMTG to the professionals, and have applied to new equipment since 2018. These will partially apply to the existing fleet in service. STRMTG will provide recommendations to ensure global compliance (wind management, gauge management, see R4) of the most sensitive equipment in the fleet - TSD with bubbles, single-cable TPH operated with significant wind pressure. STRMTG considers that the recommendation is implemented.	**R**

Recommendations issued in 2017– - continued

Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation title	Date sent	Recommendation No.	Recommendation item	Addressee(s)	Reply Date	Outcomes specified and progress status (literal and encoded)	
						Literal	Encoding
The fall of a chair of the "Les Granges" chairlift at the Ménuires ski area at Saint-Martin de Belleville in Savoie	07/02/14	R3	Set up in collaboration with the manufacturer Leitner, a training course on the operation, adjustment and verification of the actuating devices for chairlift bubbles. Make participation in this course a mandatory condition for assigning any agent to work on the maintenance of these devices. Organise a hierarchical control to periodically ensure that the maintenance procedures prepared by the manufacturer and the special instructions determined by the operator are correctly applied.	SEVABEL	02/10/17	SEVABEL's mail of 02/10/2017 announced the implementation of a training programme before the 2017/2018 season. During the control conducted on 05/04/2018, the operator informed STRMTG/BS of the postponement of this training programme to spring. The operator must provide STRMTG/BS with the corresponding training certificate. SEVABEL also announced the implementation of a control to ensure the proper application of maintenance procedures by sector heads at the start and end of vehicle maintenance. Finally, LEITNER established the ST 881 028 30 4 ind B notice regarding the operation and maintenance of SA4H-SA6H-CD6H bubbles operating devices	**EC**
		R4	To develop the RM2 technical guide and contribute to the evolution of the NF EN 12929-1 European standard, in order to better prevent risks related to the oscillation of chairs under the effect of the wind, specifically: ➢ for the calculation of clearance template, provide for the prior determination, through calculations or tests, of the maximum amplitude of longitudinal oscillations taking into consideration the characteristics of the chair and the permissible wind speed during operation; ➢ for the calculation of clearance template, take into account the superposition of the longitudinal and transversal oscillations; ➢ in specific cases where clearance template calculated with new rules cannot be completely determined, plan on using devices that have a limited risk of collision.	STRMTG	02/10/17	Organise a meeting with professionals on 19/09/2017 which provided a group strategy definition. Then implement a working group which met five times in 2018 and 2019. They primarily worked on the following points, which are complementary to those cited for the R2 recommendation: - develop new rules for considering the meters linked to longitudinal oscillations for new devices; - study different cases with combinations of longitudinal and transverse oscillations, their impact, then assess the advisability of modifying the rules; The following decisions were derived from this work: - acceptable operating wind pressure ≤ 250 Pas Standard oscillation of 0.34 rad (current rule = European rule) - acceptable operating wind pressure > 250 Pas Standard oscillation calculated or measured by tests + a margin of 0.1 rad (with a minimum of 0.34 rad) For chairlifts with seats equipped with bubbles, regardless of the wind speed expected in operation, it's case (b) which must be used, considering the relative speed of the cable's movement. These new rules were partially applied to bubble chairlifts built in 2017 and 2018. They were fully applied to these devices from 2019. For other devices, this has been partially applied to devices built from 2019 forward, and will be fully applied for projects authorised for construction from 2020 forward. At the same time, the STRMTG launched a compliance campaign targeting the in-service fleet: - bubble chairlifts (recommendation: 18/07/2019): * Check that the oscillations calculated under maximum operating winds, considering the relative wind of the cable displacement, not to exceed the available template (airlock margin) * Development of a wind analysis note (Implement an intermediate wind threshold triggering an alarm - other devices (recommendation being prepared) Depending upon the admissible operating wind, and depending upon the type of vehicle, application of some of these provisions: calculate compliance with the free template the maximum operating wind, preparation of a wind analysis note, implementing an intermediate threshold with or without slow-down, etc. Regarding the superposition of longitudinal and transverse oscillations, professionals' calculations and verifications, coordinated with STRMTG, led to a recommendation that the margin of 0.1 rad should be required in the future for longitudinal oscillations, providing a notable improvement in the templates. This improvement, based on 2D verification of longitudinal oscillations as well as transverse ones, which are simple to calculate, enable not reaching an accumulation of the two which is not governed at the European level. This would also generate complex 3D verifications which must be implemented for each project. Finally, these provisions will be brought to the European Standardisation Committee by the STRMTG for inclusion in the EN12929-1 standard during its next revision.	**EC**

Recommendations issued in 2017– - continued

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation title	Date sent	Recommendation No.	Recommendation item	Addressee(s)	Reply Date	Outcomes specified and progress status (literal and encoded)	
						Literal	Encoding
The fall of a chair of the "Les Granges" chairlift at the Ménuires ski area at Saint-Martin de Belleville in Savoie	07/02/14	R5	Amend the technical document attached to the "EC" declaration of conformity of chair SA6H in order to specify the maximum amplitudes of oscillations corresponding to its area of use.	LEITNER	?	The chair model originally fitted to the TSD of the Granges is an old model, known as "vehicle SA6H", whose EC conformity was established by STRMTG-ON, formalized by the EC examination certificate No. 10, referring to the technical documentation DD 00078. It is this latter documentation that is covered by recommendation R5. This chair model no longer corresponds to the construction standard for new devices and is now only used in the SAV or for modification operations of existing devices. Taking advantage of a flow increase by adding seats on the TSD of the Granges, carried out at the end of 2017, LEITNER reworked its technical documentation in collaboration with STRMTG-ON in 2017. For the moment, considering the need to modify the indications on the template (taking into consideration the BEA-TT recommendation) and since they are mainly interfaced with the adjustment of line walkways, the manufacturer chose to create a new vehicle subsystem, dedicated to the TSD of Granges. This subsystem received the EC certificate of conformity No. 578, referring to the technical documentation D10216262. Though the design of this new subsystem is very similar to that of the former, the technical documentation was mainly amended to specify the oscillations reached with different wind values. Certain data used to calculate the templates, in particular the coefficient of form Cx, are from the seat operation file integrated in the subsystem. This chair and its EC documentation were evaluated by another notified organisation besides STRMTG-ON. The template calculations and plans for the Granges TSD established by LEITNER and taken into consideration by STRMTG-ON support the wind pressure data (300 Oa, that is a pressure compatible with a limit of 20 m/s of wind, increased by the relative speed of movement at 5 m/s) and the templates cited in paragraph §3.3.2.4 interfaces with the infrastructure. Concerning the original Certificate No. 10, whose supporting technical documentation was not updated, it should be noted that the entry into force of the European Regulation 2016/424 by replacing Directive 2000/9/EC renders it null and void as from 21/04/2018, in the same manner as all the subsystem certificates of conformity issued previously. At this date, Certificate No. 10 is therefore no longer valid.	R

Recommendations issued in 2017– - continued

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation Title	Date Sent	Recommendation Nº	Recommendation Item	Addressee(s)	Reply Date	Outcomes Specified and Progress Status (Literal and Encoded)	
						Literal	Encoding
the derailing of the Telemetro which occurred on 12 January 2017 in La Plagne (73)	09/11/17	R1	Conclude the current operations to reconsider the design of the cable supports and the Telemetro vehicle cars and bring them into conformity with the current regulations.	SAP	12/02/18	The SAP mandated the manufacturer BMP to modify the Telemetro starting in May 2018. The principle retained was to remove the brakes on the vehicle cars, with the provision of new cars and hangers, allowing for the replacement of the line and terminal clamps by clamps that surround the carrying cables in more complete manner. The cables will also be replaced at this time. The machinery will also be modified, but to a lesser extent, in order to respect the integrity justification criteria for the cable loop monotractor. On the one hand, this wrapping is favourable to the stability of the cable carriers and on the other, the car/clamp connection will be improved, the new design allowing for the improvement of the available clearance template. The modification was the subject of a Work Execution Authorization file, approved by the Savoie Prefect in 2018. The modified device should be in service starting in the fall of 2018, thus, for the next season of operation. The device was indeed modified in 2018 according to the above provisions.	**R**
		R2	Carry out a risk analysis for all the chairlifts concerned by the STRMTG circular letter No. 86-229, evaluating for each of them the risk factor and the efficiency of stops and measures adopted by the operators, to guard against the consequences of the icing of supports. Launch processing actions for critical situations.	STRMTG	31/01/18	Organisation of a meeting with industry professionals on 22/01/2018 to define the processing strategy. In order to respond to this recommendation, STRMTG launched a survey by means of recommendation on 12/03/2018 among the operators of bi-cable cableways with a least one line tower, specifically including 3S devices (that is a larger park than that intended by circular 86-229). This survey aims to identify the characteristics of the bi-cable installations with regard to their conditions of carrying cable support on the line towers, for the design of supports as well as for operation practices and conditions, notably in the presence of snow. There is also a request to note the feedback with all the events/incidents involving the carrying cable supports. The feedback of operators is expected by 04/06/2018; it will allow for more precise familiarity, for each device, on the one hand with specificities in terms of supports design and on the other, with feedback and associated operation instructions. These two themes will be jointly analyzed in order to evaluate if they cover all the risk situations with regard to the icing of supports, as well as the associated potential consequences. The exploitation of this survey by STRMTG, in collaboration with DSF and IARM, will provide an overview of the compatibility of design elements and associated operational rules, especially in the presence of snow. It will eventually determine whether there are connections between all of the design and operational elements that are favourable or disadvantageous to the presence of ice on the clamps and the potential derailment of a cable-car connection. Depending on this evaluation, case-by-case adaptations of support conditions for carrying cables of certain bi-cable cableways or their operation conditions can thus be discussed with the operators.	**EC**
		R3	Establish specific instructions for the Telemetro indicating the detailed verifications to carry out before safety shunting and the compensatory measures to be taken afterward. Integrate the corresponding learning into the training courses.	SAP	12/02/18	SAP has established operating procedures firstly concerning the specific monitoring of the device (MO145) and snow monitoring and removal (MO93) conditions of Telemetro supports in case of snowy weather and secondly concerning the cross-linking conditions (MO97) of the device's monitoring functions. A training course for the operating personnel was therefore organized on 17/12/2018 to prepare them to use the device's control-command electrical architecture.	R

Recommendations issued in 2018

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation title	Recommendation nu	Wording of the recommendation	Receiver(s)	Date of response	Actions taken and progress (Literal and codified)	
					Literal	Codification
Technical investigation of immobilisation and late evacuation of the "Panoramique Mont Blanc" cable car that occurred on 8 September 2016 in Chamonix	R1	Formalise the lessons learned and tests on the dynamic behaviour of Panoramic Mont-Blanc in an "instruction" type document for the use of future operators, describing: ➢ the settings selected for the system that must be paid attention to which are supported with regard to modifications or their derivatives; ➢ the group of risky dynamic effects with a description of the load configurations that produce them; ➢ periodic dynamic tests to be performed in order to ensure behavioural stability over time by deciding the criteria which can be measured during tests which validate behaviour, and lack of drifts.	CMB	07/12/18		**NS**
	R2	Complete the rules in the RM1 and RM2 technical guides for dynamic tests for systems which are sensitive to the effects of cable oscillations, with a double obligation to assess the most penalising dynamic load cases, and to conduct tests using these load cases.	STRMTG	30/11/18	The main aspects of the response to the recommendation were defined during a meeting with the professionals on 13/11/2018, and were given in the STRMTG's response to the BEA-TT dated 30/11/2018. The concrete measures must be defined in the context of the GT tidying up of the RM1 and RM2 guides, which are to be launched in 2020.	**EC**
	R3	Study the feasibility of improving derailment safety for cabins by reinforcing the physical equipment to retain the cabins.	CMB	07/12/18	This equipment was included in the prefectural order to resume operations after the event. It was signed on 6 June 2017. Since then, the CMB has conducted a study on this subject. It reached the following conclusion with its assistant DCSA; *Following the analysis, the detection rod is maintained in piano wire. Its length will be adapted to a value which provides safe detection of derailing on diabolos. It is necessary to maintain a copper cable to connect the rod to the clamp.* *The search for new types of materials for the rod, using common components, has not led to a proper solution either.* *Therefore, detecting vehicle derailments based on the use of piano wire is not, in principle, in question. It offers the benefits of good feedback. The spring effect has been improved by installation of a copper cable for electrical earthing between the detection rod and the clamp.* These improvements were implemented before the system was returned to service in June 2019 (operations had been interrupted since January 2018 due to the failure of a carrier during the storm "Eleanor").	R

Recommendations issued in 2018– - continued

Completed Recommendation:	**R**
Amended Recommendation:	**RM**
Recommendation in Progress:	**EC**
Rejected Recommendation:	**NR**
Unknown Outcome:	**NC**
Outcome Not Monitored by STRMTG:	**NS**

Technical investigation of immobilisation and late evacuation of the "Panoramique Mont Blanc" cable car that occurred on 8 September 2016 in Chamonix	R4	Create a list of the minimum number of risks to be considered in the studies of cable car safety with integrated recovery, and provide it to engineering offices and operators. Require in these safety studies that these provisions are taken into account	STRMTG	30/11/18	The main aspects of the response to the recommendation were defined during a meeting with the professionals on 13/11/2018, and were given in the STRMTG's response to the BEA-TT dated 30/11/2018. For the "minimum list of scenarios" section, a proposal is being developed by STRMTG on the basis of integrated recovery files already validated plus the feedback from the experiences with cable car immobilisations. This proposal will be developed by the summer of 2020. Regarding final actions, the DGITM has been approached, and recently contacted the Ministry of the Interior (DGSCGC). A first meeting took place between our departments. We are reflecting on which legal framework will be used for final plans. A working group will be launched in a second phase, possibly in 2020, to define the concrete actions in these final plans. Note that no equipment with integrated recovery has been implemented since the publication of the BEA-TT report.	**EC**
	R5	Implement a plan to sustainably strengthen the Panoramic Mont-Blanc's safety management by: ➢ ensuring that safety documentation is complete, and correct information about the staff and external contacts who must implement it; ➢ provide traceability and monitoring of operating faults, as well as implementation of actions to remedy them, ➢ ensure complete traceability of incidents and accidents in order to summarise feedback of experience; ➢ ensure a control plan for service provider interventions during operating periods.	CMB	07/12/18		**NS**

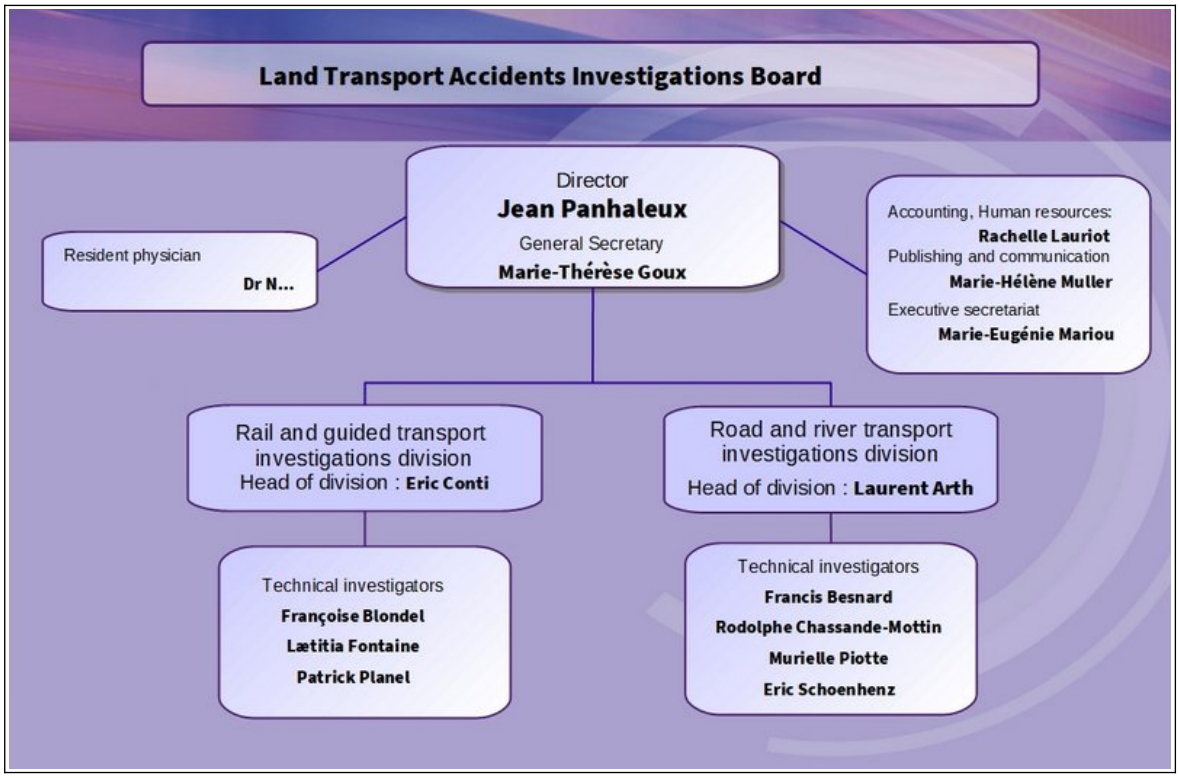
Recommendations issued in 2019

Completed Recommendation: R
Amended Recommendation: RM
Recommendation in Progress: EC
Rejected Recommendation: NR
Unknown Outcome: NC
Outcome Not Monitored by STRMTG: NS

Investigation title	Recommendation number	Wording of the recommendation	Receiver(s)	Date of response	Actions taken and progress (Literal and codified)	
					Literal	Codification
Technical investigation of the fall of a cabin from the Costebelle gondola Occurred on 25 March 2018 at Pra Loup (04)	R1	Continue progress in safety management, including improvements in the following areas: ➢ trace changes in values measured and maintenance actions performed on the devices; ➢ create an exhaustive report of the gaps between practices and maintenance as prescribed by the manufacturer, followed by an analysis of the risks generated by these gaps; ➢ update procedures describing essential and safety points for each system; ➢ strengthen training, in particular continuous training and monitoring knowledge, including behaviours to adopt if there are alarms; ➢ complete information sharing between operations and maintenance as well as experience feedback on data in the operating logs.	RPLU04	10/09/19		**NS**
	R2	For new or regenerated PLCs, introduce the obligation to record data and easy retrieval into the regulations over a minimum period of one year in order to provide feedback and analysis of the equipment's operation following an incident	STRMTG	09/09/19	The main aspects of the response to the recommendation were defined during a meeting with the professionals on 06/09/2019, and were given in the STRMTG's response to the BEA-TT dated 09/09/2019. The concrete actions are defined, and must be included in the new RM1 and RM2 guides in the context of their tidying up, which should be started in 2020.	**EC**
	R3	In compliance with Art. 34 of the Decree of 7 August 2009 as amended, conduct an annual exercise on one of its facilities, from simulation of a breakdown to complete evacuation of volunteer passengers. This should provide testing the implementation of actions, materials and procedures, and ensure proper coordination between the various stakeholders	RPLU04	10/09/19		**NS**

Appendix 4

BEA-TT organisational chart as on 1/01/2020



Institutional texts

European Directives No 2004/49/EC of 29 April 2004 and No 2016/798 of 11 May 2016

French Transport Code: articles L. 1621-1 to L. 1622-2 and Articles R. 1621-1 to R. 1621-26

French Tourism Code: article L. 342-8 making the following applicable to ski lifts: Articles L. 1621-1 to L. 1622-2 of the Transport Code.

Appendix 5: Glossary

- **DGEC**: Directorate general for energy and climate
- **DGITM**: Directorate general for infrastructure, transport and the sea
- **DSR**: Road safety and traffic delegation
- **EPSF**: National rail safety authority
- **RFF**: French rail network, the body managing the national rail network until 31 December 2014
- **RFN**: national rail network
- **SNCF**: French national railways company, a rail operator and, until 31 December 2014, delegated body in charge of managing the national rail network
- **SNCF Mobilités**: rail company in the SNCF group
- **SNCF Réseau**: body in charge of managing the national rail network
- **STRMTG**: Ski lift and guided transport technical department
- **TER**: Regional express train
- **TGV**: High-speed train

Bureau d'Enquêtes sur les Accidents de Transport Terrestre

Grande Arche - Paroi Sud
92055 La Défense cedex
Téléphone : 01 40 81 21 83
Télécopie : 01 40 81 21 50
bea-tt@developpement-durable.gouv.fr
www.bea-tt.developpement-durable.gouv.fr