



# **NIB ANNUAL REPORT 2009**

Accident Investigation Board

FINLAND





## PREFACE TO THE REPORT

This is the annual report of railway sector of the Accident Investigation Board of Finland for calendar year 2009. This is mainly the part of the Annual Report 2009 of AIBF, which relates to railway sector. There are some parts which have added that the report would measure up to standards of ERA. Also the data concerning implementation of recommendations has been updated.

### Terms used in this report:

Investigation categories	
A-investigation	Major accident
B-investigation	Accident or serious incident
C-investigation	Incident, damage or minor accident
D-investigation	Other incident
S-investigation	Safety study

### Investigation identifier:

Each investigation is designated by an identifier that consists of four parts, such as A1/1998R.

The first part refers to the investigation category (A, B, C, D or S).

The second part is a sequence number referring to the order of the accident within its accident category in the year in question.

The third part refers to the year of the accident.

The fourth part indicates the accident category (L, R, M or Y).

E.g. A1/1998R refers to the first major railway accident investigation in 1998.



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## **1 INTRODUCTION TO THE INVESTIGATION BODY**

### **1.1 Legal Basis**

The Accident Investigation Board of Finland was founded in 1996 within the Ministry of Justice. The tasks of the Accident Investigation Board are specified in the relevant act and decree which also include overall directions on the characteristics of the accidents to be investigated and the methods of investigation to be implemented.

The investigation of aviation accidents is based on the relevant European Council Directive (94/56/EY) and the Convention on International Civil Aviation (Treaty Series of the Statute Book 11/49). The European Parliament and Council regulation on the investigation of aviation accidents is currently being drafted. The investigation of rail accidents is based on the EU Railway Safety Directive (2004/49/EY). The investigation of maritime accidents complies with International Maritime Organization Casualty Investigation Code (MSC255(84)), which is part of the SOLAS Convention. European Parliament and Council Directive (2009/18/EC) also applies to the investigation of maritime accidents. This directive is currently in the process of adoption.

In Finland the investigation of rail accidents is based on the EU Railway Safety Directive. The New Rail Act came into force the 1 September 2006. The New Finnish Rail Agency started work the same day. The current accident investigation act is close to the Safety Directive. In January 2009 a working group was appointed to amend legislation applying to accident investigation. The working group submitted its report to the Ministry of Justice in February of 2010.

### **1.2 Role and Mission**

The tasks of the Accident Investigation Board are specified in the relevant act and decree which also include overall directions on the characteristics of the accidents to be investigated and the methods of investigation to be implemented.

By its investigation activities, the Accident Investigation Board intends to enhance overall safety and prevent accidents. As a result of an accident investigation, an investigation report is produced that contains safety recommendations for the competent authorities and other parties concerned. In fact the safety recommendations translate the investigators' views on the means of prevention of similar or corresponding accidents in the future. The Accident Investigation Board moreover monitors the implementation of the recommendations issued. The investigation work conducted by the Board exclusively focuses on an improvement of safety with no stances taken as for questions of culpability, responsibility or liability for damages.

It is the mission of the Investigation Board to investigate all serious accidents, serious incidents and aviation, rail, and marine accidents and incidents.



Accident investigation focuses on the course of events of the accident, its causes and consequences as well as on the relevant rescue measures. Particular attention is paid to whether the safety requirements have been adequately fulfilled in the planning, design, manufacture, construction and use of the equipment and structures involved in the accident. It is also investigated whether the supervision and inspection has been carried out in an appropriate manner. Any eventually detected shortcomings in safety rules and regulations may call for investigation, as well. In addition to the direct causes of an accident, the accident investigation intends to reveal any contributory factors and background circumstances that may be found in the organization, the directions, the code of practice or the work methods.

In the decision-making on the commencement of an accident investigation, the degree of seriousness of the incident is considered as well as its probability of recurrence. An incident or accident or hazardous situation, with only minor consequences may also require investigation in case it sets several persons at risk and an investigation is assessed as producing important information in view of the improvement of the general safety and the prevention of further accidents. Generally speaking, the Accident Investigation Board does not investigate an incident or accident caused intentionally or by an offence.

The Accident Investigation Board is also responsible for, e.g. the maintenance of a contingency to rapidly commence an investigation, the training of new accident investigators, the producing of general instructions on the carrying out of the investigation work and on the drawing up of the investigation reports, and the participation in international cooperation in the field.

Finally the Accident Investigation Board is responsible for the printing and distribution of the investigation reports and their publishing on its web pages, [www.onnettomuustutkinta.fi](http://www.onnettomuustutkinta.fi).

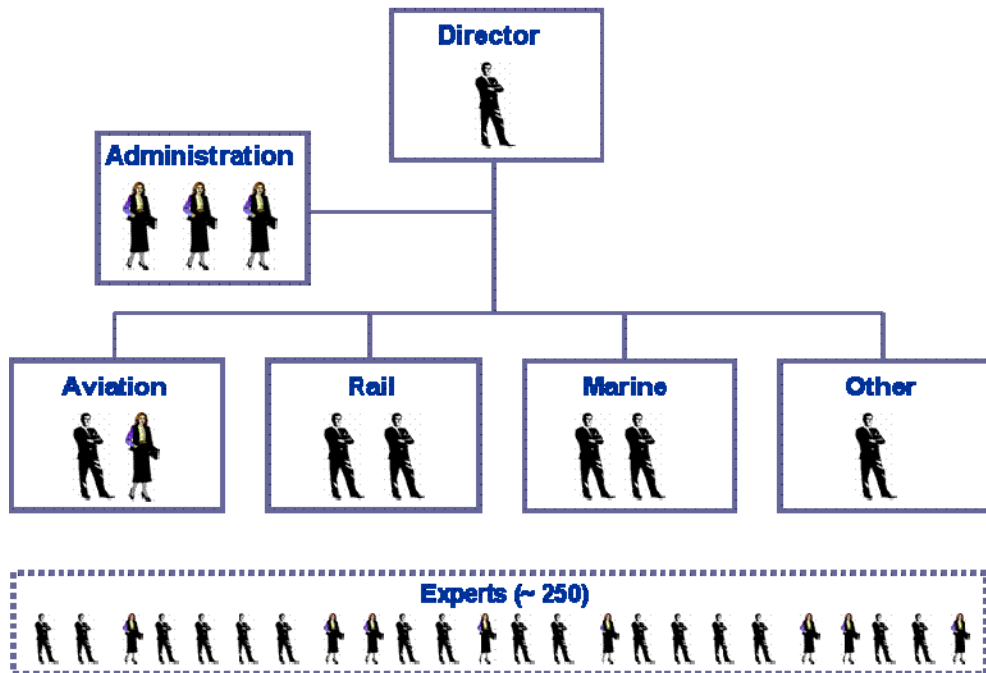
### 1.3 Organisation

#### Personnel:

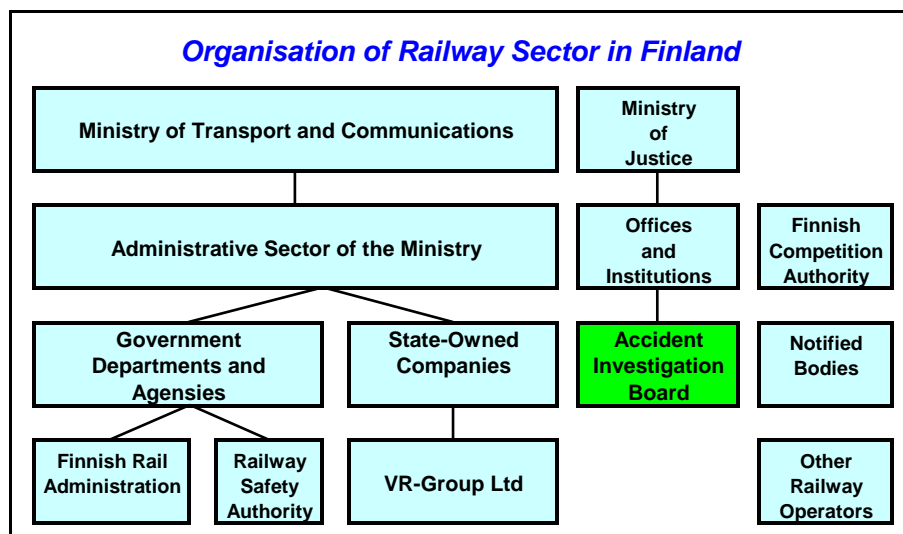
Director	Tuomo Karppinen
Administrative director	Pirjo Valkama-Joutsen
Assistant	Sini Järvi
Assistant	Leena Leskelä
Aviation accidents	
Chief Air Accident Investigator	Hannu Melaranta
Air Accident Investigator	Tii-Maria Siitonen
Rail accidents	
Chief Rail Accident Investigator	Esko Värttiö
Rail Accident Investigator	Reijo Mynttinen (On leave) Acting Erkki Hainari (→28.2.2010)

Marine accidents  
Chief Marine Accident Investigator                      Martti Heikkilä  
Marine Accident investigator                              Risto Repo

Other Accidents  
Chief Accident Investigator                                Kai Valonen



#### 1.4 Organisational flow





## **2 INVESTIGATION PROCESSES**

### **2.1 Cases to be investigated**

A rail accident investigation is conducted in following cases:

- Accident in train traffic
- Hazardous situation in train traffic
- Accident in shunting work in railways, if a person is deceased or seriously injured
- Accident in shunting work in railways, if it is related to transportation of dangerous goods
- Underground or tram accident, if several persons have been deceased or seriously injured or there is other special safety related reason for the investigation

In accordance with the Act on Accident Investigation (373/1985) the Accident Investigation Board of Finland investigates level crossing accidents in which a train has derailed or a passenger or a train crew member is deceased or injured seriously. In accordance with the EU Railway Safety Directive, the Accident Investigation Board has also investigated all fatal level crossing accidents involving road vehicles since the start of 2007. In accordance with the relevant legislation on the matter (24/2001), the traffic accident investigation teams of the Traffic Safety Committee of Insurance Companies (VALT) of the Finnish Motor Insurers' Centre investigate all fatal road and terrain accidents in Finland, which means also fatal level crossing accidents.

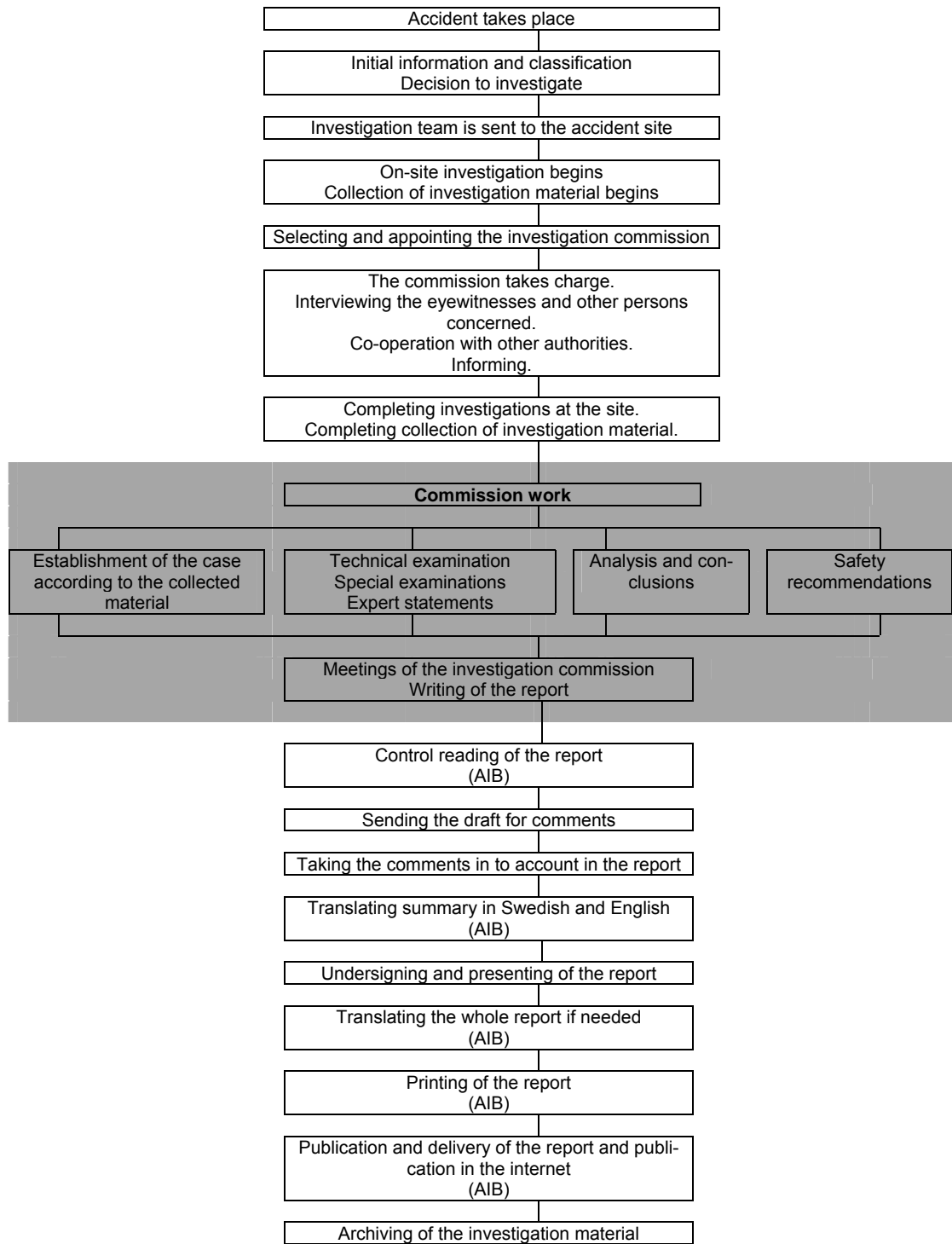
### **2.2 Institutions involved in investigations**

The Accident Investigation Board of Finland investigates all rail accidents. Those investigations are independent and they are public. According to the Railway Act the Finnish Railway Agency can investigate those AIBF does not investigate. Those investigation reports are not public.



## 2.3 Investigation process or approach of the IB

### Chart of the investigation process





### 3 INVESTIGATIONS

#### 3.1 Overview of investigations completed, identifying key trends

Type of accidents investigated	Number of accidents	Number of victims		Damages in € (approximation)	Trends in relation to previous years
		Deaths	Seriously Injured		
Collisions	1	0	0	214 000	
Derailments	1	0	0	2 000	
Level crossing accidents	5	6	0	115 000	
Other	2	0	2	60 000	

#### 3.2 Investigations completed and commenced in 2009

##### Investigations completed in 2009

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis	Completed (date)
25.2.2008	Fatal level crossing accident in Laukaa	i	26.1.2009
13.6.2008	Collision of trams on Mäkelänkatu in Helsinki	ii	4.11.2009
25.6.2008	Fatal accident at the Huikuri level crossing in Liperi, Viinijärvi	i	7.9.2009
7.7.2008	Fatal level crossing accident on the Vehkatie level crossing in Kiuruvesi	i	26.6.2009
26.8.2008	Fatal level crossing accident in Suonenjoki	i	26.6.2009
25.9.2008	Fatal level crossing accident in Iisalmi	i	15.6.2009
3.11.2007	Derailment of one wheelset of a locomotive during shunting work in Vainikkala	iii	13.1.2009
8.6.2008	Collision of a locomotive and a turnout tamping machine at the Jyväskylän railway yard	iii	6.8.2009

**Basis for investigation:** i = According to the Railway Safety Directive, ii = On national legal basis (covering possible areas excluded in Article 2 2§ of the Safety Directive), iii = Voluntary - other criteria (National rules/regulations not referred to the Safety Directive).

##### Investigations commenced in 2009

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis
11.2.2009	Fatal level crossing accident, in Pori at the unprotected Teurastamo level crossing	i
25.3.2009	Fatal level crossing accident in Nurmijärvi	i
25.4.2009	Fatal level crossing accident at Mustio in Raasepori	i
24.5.2009	Fatal level crossing accident in Eurajoki	i
16.6.2009	Derailment of a train in Toijala	i
14.7.2009	Fatal level crossing accident in Vihti	i
17.7.2009	Fatal level crossing accident in Loviisa	i
3.12.2009	Fatal level crossing accident in Seinäjoki	i

16.12.2009	Fatal level crossing accident in Laukaa	i
30.12.2008	Failure in automatic train protection in Korvensuo	iii
9.3.2009	Derailment of six wagons of a freight train at the Lahti railway yard	iii
17.9.2009	Derailment of five freight train wagons in Kilpua	iii
1.10.2009	Ending up on the wrong track of a passenger train in Korja	iii

**Basis for investigation:** i = According to the Safety Directive, ii = On national legal basis (covering possible areas excluded in Article 2, §2 of the Safety Directive), iii = Voluntary – other criteria (National rules/regulations not referred to the Safety Directive).

### 3.3 Safety Studies commissioned and completed in 2009

#### Safety Studies completed in 2009

Date of commission	Title of the Study (Occurrence type, location)	Legal basis	Completed (date)
23.5.2008	Safety study on traffic control deviations in Kouvola	iii	31.8.2009

**Basis for investigation:** i = According to the Safety Directive, ii = On national legal basis (covering possible areas excluded in Article 2, §2 of the Safety Directive), iii = Voluntary – other criteria (National rules/regulations not referred to the Safety Directive).

#### Safety Studies commenced in 2009

Date of commission	Title of the Study (Occurrence type, location)	Legal basis
-	-	-

**Basis for investigation:** i = According to the Safety Directive, ii = On national legal basis (covering possible areas excluded in Article 2, §2 of the Safety Directive), iii = Voluntary – other criteria (National rules/regulations not referred to the Safety Directive).

### 3.4 Summaries of investigations completed in 2009



**B1/2008R**

**Fatal level crossing accident in Laukaa on  
25 February 2008**

Picture: Police

On 25 February 2008 at 9.53 a.m., a fatal level crossing accident occurred on Laukaa's Kauramaa unprotected level crossing. A tractor returning along an agricultural road from ploughing work drove without stopping in front of a freight train en route from Jyväskylä to Suolahti. The only person in the tractor was the driver, who died from his injuries in hospital later that day. The damage to the tractor and rolling stock totalled around € 30,000.

The accident occurred because the driver of the tractor did not observe the approaching train and drove onto the level crossing without stopping. Furthermore, the crossing did not meet level crossing safety requirements on the part of the wait platform and with respect to sightline. Too short a wait platform, in particular, may have caused the driver to focus more than usual on controlling the tractor, to which extra equipment was hitched, as it approached and arrived at the crossing. The driver's visibility may also have been impaired due to the sun shining against him. The agricultural road was intended only for agricultural use and not for through-traffic.

In order to prevent similar accidents, the accident investigation commission recommends the removal of the Kauramaa level crossing. Two safer routes in the vicinity of the track offer access to the agricultural fields. In addition, the accident investigation commission pays attention to the notion of the Ministry of the Interior Rescue Department that mobile phones should be used in the localisation of accidents, or, alternatively, that the feasibility of supplying all trains with GPS positioning equipment should be reviewed, which would ensure fast and accurate relay of location information to the emergency response centre. As other observations, the investigation commission suggests that tractors used in road traffic should be equipped not only with safety cabins but also seat belts.



## B2/2008R

### Collision of trams on Mäkelänkatu in Helsinki on 13 June 2008

Picture: Police

On Friday, 13 June 2008, at 1:50pm, a line-1 tram collided with the rear of a line-7B tram on the Mäkelänrinne stop, on Mäkelänkatu, in Helsinki. Two passengers were severely injured. A tram driver and 22 passengers were slightly injured. Several others received lesser injuries such as bruises and neck and shoulder pain and headaches caused by whip flash. The rails were not damaged and the trams remained on the rails. The rear of the line-7B tram was substantially damaged. For example, the chassis of the rearmost car was bent out of shape. The front of the line-1 tram was somewhat damaged, but after minor repairs it was temporarily operative. The damage to the trams resulted in a total cost of EUR 60,000.

The cause of the accident was that the driver of the tram approaching from behind was not able to stop the tram in time. The driver apparently tried to stop the tram via incorrect braking methods in the belief that the brakes were not working properly. The background factors were the driver's inexperience, the possibility that the driver anticipated that the tram ahead would leave the stop earlier, and the driver's suspicion that the brakes were not working properly and therefore the use of the incorrect braking method.

In order to prevent the occurrence of similar accidents, the investigation commission recommends that tram drivers be taught to brake in the proper way. In order to specify just one correct way to brake in different kinds of situations, Helsinki City Transport should determine the most efficient way to brake for each type of situation. In addition, tram drivers should be provided with a personalised and progressive training programme in which performance is documented and thus skills are proved to be properly learned.

In order to ensure that floor hatches do not release during collision or other situations and thereby cause injury to passengers, the investigation commission recommends that methods be sought to ensure that tram floor hatches remain fastened in all conditions. In order to improve first-aid availability on trams, the commission recommends that trams be equipped with a first-aid kit.



**B3/2008R**

**Fatal accident at the Huikuri level crossing  
in Liperi, Viinijärvi on 25 June 2008**

On Wednesday, 25 June 2008, at 4:22.50 pm, a level crossing accident involving a scooter and a rail bus en route from Joensuu to Pieksämäki occurred at the Huikuri level crossing. The accident was fatal to the driver of the scooter. The personnel and passengers of the rail bus remained uninjured. The scooter was wrecked beyond repair. The rail bus incurred damage to its left front corner and the obstruction clearing device. The repair costs of the rail bus amounted to EUR 1,400.

The direct cause of the accident was that the driver of the scooter drove onto the level crossing without stopping. The driver of the scooter probably did not notice the rail bus at all or saw it too late. Contributing to this were the following factors:

- the level crossing was very close to a highway with substantial traffic
- the driver of the scooter was focusing on maintaining balance as the road surface changed from tarmac to gravel
- the level crossing was not equipped with an active warning installation
- the rail bus was approaching the crossing at 120 km/h
- rail buses are silent and quite neutral coloured, which makes them difficult to see.

In order to prevent similar accidents, the investigation commission recommends that the Huikuri unprotected level crossing be removed. Furthermore, in order to improve railway safety, the investigation commission reiterates recommendation S230 of investigation report B2/2007R: *The structure of the obstruction cleaning device of Dm12 rail bus should be such that it is either formed of one piece or possible additional parts are attached sufficiently well.*



Picture: Police

**B4/2008R**

**Fatal level crossing accident on the Vehkatie level crossing in Kiuruvesi on 7 July 2008**

At 22.41.40 on Monday 7 July 2008, a van and a train consisting of two locomotives en route from Ylivieska to Iisalmi collided on the Vehkatie unprotected level crossing in Kiuruvesi, resulting in the death of the van driver. The van was wrecked beyond repair and the locomotive's front and bogie structures were slightly damaged. The cost of the accident on the railway side was in excess of € 50,000.

The direct cause of the accident was that the van driver drove onto the level crossing without stopping. It is probable that the driver noticed the approaching train too late and was unable to avoid the collision. The evening sun was shining low on the horizon from the direction of the approaching train and this may have made observation difficult. It is possible that the driver's attention was focused on a newly arrived text message or that the driver was looking for the mobile phone. It is also possible that visibility in the direction of the train was blocked by the vehicle's chassis structures, because the vehicle approached the level crossing at an angle to the track.

In order to prevent the occurrence of similar accidents, the investigation commission recommends the removal of the Vehkatie level crossing. Before its removal, the level crossing should be closed by Kiuruvesi town through temporary arrangements. Also, a track speed limit of 70 km/h should be set to run through the crossing until its removal. Furthermore, "No thoroughfare!" signs should be placed without delay on Vehkatie road and the Ratakatu-Kirkkoharjuntie crossing, and heavy vehicles should be prohibited from driving through the level crossing.

In order to ensure the accuracy of level crossing location information, the investigation commission recommends that emergency response centres update the level crossing location data of their ELS systems to match the tasoristeys.fi database, as set out in the relevant regulations.





**B5/2008R**

**Fatal level-crossing accident in Suonenjoki  
on 26 August 2008**

At 10.43 a.m. on Tuesday 26 August 2008, a railway work unit en route from Pieksämäki to Suonenjoki collided with a car at an unprotected level crossing in Suonenjoki.

The accident was fatal to the driver of the car. The car was damaged beyond repair and the railway work unit, which was a service railcar, incurred minor damage.

The direct cause of the accident was that the car driver drove onto the level crossing without stopping. In all probability, the driver completely failed to observe the railway work unit approaching from the left. The lack of a proper wait platform, a sharply rising road and limited visibility made it difficult to observe the surroundings and drive the car at the same time.

To prevent the occurrence of similar accidents, the investigation commission recommends that the sightlines of the level crossing be improved and the wait platforms reconditioned to meet regulations, and that the level crossing be equipped with a warning sign. If it becomes apparent that sightlines cannot be improved and that the wait platforms cannot be reconditioned, then the level crossing should be removed or equipped with a half-barrier.

In addition, the investigation commission recommends that the Finnish Rail Administration inform the parties in charge of road maintenance of their obligation to build and maintain road segments leading to level crossings as set out in the relevant regulations. The Finnish Rail Administration should also provide appropriate information on any track changes made and shortcomings discovered during inspection rounds. It is also suggested that the Finnish Rail Administration and the Ministry of Transport and Communications initiate a nationwide campaign about the obligations of road maintainers with regard to level crossings.

Furthermore, the investigation commission reiterates recommendation S211 of investigation report B1/2005R: *The instructions for the drawing up of an emergency notice should be developed to ensure that whenever urgent aid is needed from the rescue service, also the general emergency number is called from the incident scene, in addition to the notifying of the traffic control unit.*



The investigation commission also wishes to note that the level crossing safety study of 2007 and the related DVD on level crossing safety should still be actively used by driving schools and the other relevant parties. Drivers should also be provided with other forms of Information and education on level crossing safety, especially drivers who regularly cross level crossings. For example, the campaign “Be on guard at level crossings – especially the ones you know well” should be continued. Basic and advanced driving school instruction should pay greater attention to appropriate behaviour at level crossings.



**B6/2008R**

**Fatal level crossing accident in Iisalmi on  
25 September 2008**

On 25 September 2008 at 4.18 p.m., a level crossing accident leading to two fatalities occurred at the half barrier equipped level crossing of Suurisuo in Iisalmi. The accident occurred when a private car driving slowly westward along Parkatintie road collided with a passenger train en route from Kajaani to Helsinki. The two persons in the car died instantly. The car was wrecked beyond repair. The costs arising from the accident to railway rolling stock and equipment amounted to EUR 30,000.

The direct cause of the accident was that the car driver drove onto the level crossing without stopping. The driver applied the brakes only after the car had driven beneath the lowering barrier and was hit by it, with the result that the car stopped on the track. It is likely that the driver did not notice the level crossing warning signs or the lowering barriers. Potentially contributory factors possibly included the sun shining in the driver's face, a worn windshield, the driver's impaired eyesight, hearing and alertness.

In order to prevent similar accidents, the investigation commission recommends that the red blinking filament lamps of the barriers and warning signs of the Suurisuo level crossing be replaced by blinking or flashing LED lights. Identical replacements should be made at similar level crossings where it has been noted that the sun dazzles the driver when approaching the crossing.



**C7/2007R**

**Derailment of one wheelset of a locomotive during shunting work in Vainikkala on 3 November 2007**

On Saturday 3 November 2007 at 12.59 p.m., one wheelset of a locomotive was derailed at a railway yard turnout in Vainikkala when a shunting unit was pushing wagons onto the track. The turnout tongue was twisted and the Railex locking device was damaged.

The incident occurred because the shunting worker had pressed the local turnout button reversing twice while the locomotive was on the turnout. The first wheelset derailed during the first change in position. The shunting worker gave the second command before the first operation was complete, with the result that the switch blades started turning back and the locomotive's remaining wheelsets were directed correctly along the track.

In order to prevent the occurrence of similar incidents, the Accident Investigation Board of Finland recommends that local turnout reversing buttons be located close to the turnouts.



**C5/2008R**

**Collision of a locomotive and a turnout tamping machine at the Jyväskylä railway yard on 8 June 2008**

On 8 June 2008 at 5.48 a.m., a turnout tamping machine was involved in an accident at the Jyväskylä railway yard, leading to the slight injury of a track foreman in the driver's cab of the tamping machine. The accident involved the collision of a unit consisting of three Dv12 locomotives

with a tamping machine involved in work. The engine driver applied the emergency brakes, but the locomotives were unable to stop in time and the front corner of the foremost locomotive collided with the left corner of the tamping machine. The force of the collision caused the right rail to collapse underneath the tamping machine.

The collision damaged the tamping machine in places including the chassis, body, automated controls, bogie and wheelsets. The foremost locomotive incurred damage on the right side of the maintenance deck and hand rails. About 20 metres of track were damaged. The total damage to track and equipment amounted to € 214,000.

The direct cause of the accident was that the front of the tamping machine, which was at work on turnout V032, extended so close to turnout V024 that the locomotives were unable to safely pass the tamping machine. Since turnout V032 was reserved because it was being replaced, turnout V024 was also reserved. In order to control and reverse turnout V024, the traffic controller had to use the VHP<sup>1</sup> command. The traffic controller was unaware of the precise location of the tamping machine. Another factor contributing to the accident lay in the fact that the tamping machine's foreman and the traffic controller had not agreed on the precise limits of the work area.

In order to prevent the occurrence of similar accidents, the Accident Investigation Board of Finland recommends that track job notifications precisely detail the dimensions of work areas and that the traffic controller ensure that no other units are within the vicinity of the turnout before giving the relevant VHP command. In addition, the recommendation S180 of investigation report B1/2002R is reiterated: "*The initiation training programmes for train operators should be extended to include all stations and railway yards within the area of responsibility of the train operators in question.*"



**S1/2008R**

**Safety study on traffic control deviations in Kouvola**

On 21 August 2008, the Accident Investigation Board decided to start a safety study on traffic control safety deviations observed in Kouvola, Finland. The basis for the study was a VR Group Ltd letter sent to the Accident Investigation Board, dated 17 June 2008, in which VR Group expressed its concern about the possible route automation and safety system malfunctions observed in Kouvola Centralised Traffic Control.

<sup>1</sup> VHP = emergence release of point locking.



Initially, the investigation commission was tasked with investigating two safety deviations that had been observed before the initiation of the study. However a third incident occurred during the early stages of the study, and the decision was made to include it within the scope of the study.

The first deviation occurred on 25 April 2008 at Järvelä station on the Lahti–Riihimäki section of line. During shunting, a route automation memory function generated an unexpected train route setting leading to the turning of the turnouts in front of the shunting unit's intended route.

The second deviation occurred on 23 May 2008 on the Lahti–Riihimäki section of line, between the Hakosilta junction and Lahti station. A commuter train that had departed from Lahti station toward Riihimäki was issued with the number and train route of another commuter train that was awaiting its departure time at the station.

The third deviation was observed on 6 September 2008 on the Kerava–Lahti direct line on the southern side of the Hakosilta junction. Two trains were proceeding toward Lahti with only one block section between them. At the boundary between two interlocking areas on the southern side of the junction, the number of the train travelling first was replaced in the traffic control system with the number of the latter train.

The investigation revealed that the deviations involved software in all of the cases. The system manufacturers have also confirmed these observations. In connection with the investigation of these cases the investigation commission also reviewed the deviation management procedures for handling this kind of deviations and the role of different parties in the information system management. The conclusion was that the deviation management process was inadequate.

The investigation commission issued the following two recommendations:

- The organisations responsible for the ownership, use, and maintenance of traffic control and safety equipment systems should improve and clarify the procedures for deviation management.
- The experts using traffic control systems on a daily basis should participate in the specifications, inspections, and start-up activities of these systems and also take part in the system administration during the life-cycle of the system.

### 3.5 Comment and introduction or background to the investigations

#### Investigations commenced in 2009 and not followed

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis	Reason of non following or suspension of investigations	Who, why, when (decision)
	-			

**Basis for investigation:** i = According to the Safety Directive, ii = On national legal basis (covering possible areas excluded in Article 2, §2 of the Safety Directive), iii = Voluntary – other criteria (National rules/regulations not referred to the Safety Directive).

### 3.6 Accidents and incidents investigated during last five years (in 2005–2009)

#### Rail investigations in 2005–2009

Accidents investigated		2005	2006	2007	2008	2009	TOT
Serious accidents (Art 19, 1 + 2)	Train collision	0	0	0	0	0	0
	Train collision with an obstacle	0	0	0	1	0	1
	Train derailment	1	0	0	0	1	2
	Level-crossing accident	0	0	7	5	8	20
	Accident to person caused by RS in motion	0	0	1	0	0	1
	Fire in rolling stock	0	0	0	0	0	0
	Involving dangerous goods	0	0	0	0	0	0
Other accidents (Art 21.6)	Train collision	0	0	0	2	0	2
	Train collision with an obstacle	1	1	0	1	0	3
	Train derailment	7	2	5	3	2	19
	Level-crossing accident	1	1	0	0	0	2
	Accident to person caused by RS in motion	0	0	0	0	0	0
	Fire in rolling stock	0	0	0	0	0	0
	Involving dangerous goods <sup>2</sup>	1	1	1	3	0	6
	Incidents	0	0	1	1	2	4
<b>TOTAL</b>	<b>10</b>	<b>4</b>	<b>14</b>	<b>13</b>	<b>13</b>	<b>54</b>	

<sup>2</sup> Belongs also to an other category and is not calculated another time to the total amount.



## 4 RECOMMENDATIONS

### 4.1 Short review and presentation of recommendations

#### Implementation of recommendations during 2005–2009

Recommendations issued		Recommendation implementation status					
		Implemented		In progress		Not to be implemented	
Year	[No.]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2005	6	6	100	0	0	0	0
2006	8	2	25	2	25	4	50
2007	25	5	20	17	68	3	12
2008	20	4	20	14	70	2	10
2009	17	2	12	14	82	1	6
<b>TOTAL</b>	<b>76</b>	<b>19</b>	<b>25</b>	<b>47</b>	<b>62</b>	<b>10</b>	<b>13</b>

Implementation of Recommendations, see Annex 1

A total of 271 recommendations were issued from the beginning of 1997 until the end of 2009. According to information available at 19 February 2010, 164 (60.5 %) recommendations were implemented and 46 (17.0 %) were decided not to be implemented. The fulfilment of recommendations can take time, as indicated by the fact that, of the 201 recommendations issued from 1997–2005, 151 (75.1 %) had been implemented by the end of 2009 and 36 (17.9 %) were decided not to be implemented.

### 4.2 Recommendations 2009

#### S254 Location of local turnout control buttons

Turnouts for which local control is possible can be operated more safely if the local turnout control buttons are located close to the turnouts. Therefore, the Accident Investigation Board of Finland recommends the following:

*Local turnout control buttons should be located as close to turnouts as possible. [C7/07R/S254]<sup>3</sup>*

#### S255 Removal of the Kauramaa level crossing

Two alternative routes in the vicinity of the Kauramaa level crossing offer safer access to agricultural fields surrounding the track. The first is along Jyväskylätie and Pielislehdontie, with Jyväskylätie offering an underpass for crossing the Jyväskylä-

<sup>3</sup> Code in the parenthesis means: C7/07R = Investigation report number C7/2007R, S254 = Recommendation number 254.

Haapajärvi track. The second route is along Jyvaskyläntie and Eerolantie through the Eerola level crossing, which is equipped with a half-barrier.

*The Kauramaa level crossing should be removed. [B1/08R/S255]*

If the level crossing will not be removed, then the crossing should be restricted to light traffic only and measures should be taken to prevent heavy traffic from crossing it.

### **S256 Improving the visibility of barriers**

The visibility of red blinking warning signs should be improved at protected level crossings where bright sunlight from ahead inhibits the visibility of the level crossing warning signs. This has been tested along the Turku-Toijala track by replacing filament lamps with LED lamps, and the results indicate that drivers find the visibility of LED lights good. Therefore, the accident investigation commission recommends the following:

*At the Suurisuo level crossing and similar level crossings, where it has been noted that sunlight hinders visibility, the visibility of barriers and warning signs should be improved by replacing red blinking filament lamps with blinking or flashing LED lights. [B6/08R/S256]*

### **S257 Reconditioning of the level crossing to make it safe for road traffic**

The road rises too sharply before the level crossing and there is no proper wait platform. In addition, visibility is poor and does not meet the regulations in force. The crossing was also not equipped with the *unprotected railway level crossing* warning sign. A report in the level crossing database notes that the level crossing is dangerous. Although the Konttila level crossing is on a private road with little traffic, the track speed limit is 140 km/h and limited visibility makes even a diligent crossing dangerous.

*The sightlines of the level crossing should be improved and the wait platforms should be reconditioned to meet regulations and warning sign 171 should be installed. [B5/08R/S257]*

If it becomes apparent that sightlines cannot be improved and that the wait platforms cannot be reconditioned, then the level crossing should be removed or equipped with a half-barrier.

### **S258 Informing the parties in charge of road maintenance**

In their statement, the owners of the rights to the road indicated that they were not aware that they were responsible for the road's maintenance in the vicinity of the level crossing.



*The Finnish Rail Administration should inform parties in charge of road maintenance about their obligation to build and maintain road segments leading to level crossings as set out in the relevant regulations. The Finnish Rail Administration should also appropriately inform of any track changes to be made and any shortcomings discovered during inspection rounds. [B5/08R/S258]*

In particular, the Finnish Rail Administration should provide information on track embankment changes if these have an impact on wait platforms. If it is not possible to recondition wait platforms in such cases, the Finnish Rail Administration should negotiate with the parties in charge of road maintenance on the removal of the level crossing or other safety measures.

The Finnish Rail Administration and the Ministry of Transport and Communications could also communicate on nationwide level about the obligations of road maintainers with regard to level crossings.

#### **S259 Removal of the Vehkatie level crossing**

Because the level crossing is dangerous, the investigation commission recommends that:

*The Vehkatie level crossing be removed. [B4/08R/S259]*

Before the removal of the level crossing, Kiuruvesi town should close it through temporary arrangements.

Until the level crossing is removed, the 70 km/h speed limit already running for 400 metres at the other end of the railway yard should be continued for another 800 metres past the Vehkatie level crossing. "No thoroughfare!" signs should be placed without delay at the Ratakatu-Kirkkoharjuntie crossing and heavy vehicles prohibited from driving through the level crossing.

If it is desired that Vehkatie remains a significant entry route from Pielavedentie to the centre of Kiuruvesi, the investigation commission supports the solution proposed in a 1998 study, namely that Vehkatie be re-routed eastward as a continuation of Ratakatu, alongside the replacement of the level crossing with a railway bridge.

Because level crossings at the ends of railway yards are dangerous if unprotected, and because equipping them with a half-barrier installation is difficult, the removal of all level crossings at the ends of railway yards should be considered. In addition, track technical instructions should be updated to include the statement that the building of new level crossings in railway yards or their ends is prohibited.



### **S260 Regular updates of location data in the ELS information systems of emergency response centres**

The emergency response centre's ELS system did not produce any data when the search term "Vehkatie" was entered because the old name of the crossing had been saved in the system. When a search was made by track kilometre, the ELS system gave the name "Tiilitehdas" even though the crossing is named "Vehkatie" in the tasoristeys.fi database. In order to ensure that these names are uniform, the investigation commission recommends that:

*Emergency response centres regularly update the level crossing location data of their ELS systems to match the tasoristeys.fi database. [B4/08R/260]*

### **S261 Specifying the limits of the work area in rail work notifications**

The practice of vaguely prepared rail work notifications contributed to the accident. During the investigation, a review of recorded conversations indicated that the rail work notification only vaguely defined the limits of the work area in question for both the foreman of the tamping machine and the traffic controller. Therefore, the Accident Investigation Board recommends the following:

*Rail work notifications should precisely define the outermost limits of work areas. [C5/08R/S261]*

### **S262 Creating routes with the VHP command in areas reserved for railway work**

Just before the unit consisting locomotives and tamping machine collided, the traffic controller prepared a route for the locomotives through a turnout adjacent to the work area reserved for the tamping machine, using the VHP command. In order to ensure safety, the Accident Investigation Board recommends the following:

*Before executing the VHP command, the traffic controller should ensure that there are no other units at or within the vicinity of the turnout for which the command is given. [C5/08R/S262]*

The collision would have been avoided if the location of the tamping machine had been verified before the command was issued.

### **S263 Removal of the level crossing**

There are several level crossings in the vicinity of the Huikuri unprotected level crossing through which traffic can be directed.

*The Huikuri unprotected level crossing should be removed. [B3/08R/S263]*

The number of level crossings in the area could be reduced, and the remaining ones could be equipped with active warning installations.



#### **S264 Making it clear how brakes should be used**

The investigation revealed that tram drivers use different braking methods when the electric brakes seem to be inadequate. In order to ensure that drivers know how to brake correctly, especially in emergencies, the investigation commission makes the following recommendation:

*Tram drivers should be taught to brake in the proper way. [B2/08R/S264]*

Helsinki City Transport should determine the most efficient way to brake in different kinds of situations and should specify just one correct way to brake for each kind of situation.

#### **S265 Training programme development**

Tram driver training includes learning materials from several different teachers and is not organised well enough. The learning materials also overlap in part.

*Tram drivers should be provided with a personalised and logically progressing training programme. [B2/08R/S265]*

The training programme should be based on a detailed analysis of the job and its segmentation into constituent parts.

#### **S266 Monitoring of learning progress**

The driving skills of tram driver trainees are reviewed during an on-the-job learning period, but this is not documented in writing.

*The training programme for driving performance should be documented. [B2/08R/S266]*

Learning progress should be monitored by means of training diaries and checklists, for example (cf. procedures at professional driving schools).

#### **S267 Fastening of floor hatches**

The floor hatch that came off at the joints caused severe injury to one passenger. The floor hatches of articulated trams are not locked. In order to ensure that the hatches do not come off in collisions and similar accidents, the investigation commission makes the following recommendation:

*It should be ensured that tram floor hatches remain fastened in all conditions. [B2/08R/S267]*

### **S268 First-aid kits for trams**

Six tram passengers received wounds that would have required bandages to stop the bleeding. Tram drivers have first-aid skills, and some of the passengers had a health-care education, but neither tram was equipped with a first-aid kit.

*All trams should be equipped with a first-aid kit. [B2/08R/S268]*

### **S269 Deviation management**

In the deviation management system currently in use information about a deviation does not always reach all the relevant parties. It is possible that even documented deviations may not be handled. Also, some deviations has been undocumented. The informing of procedures related to the deviation management has been inadequate.

*The organisations responsible for the ownership, use, and maintenance of traffic control and safety equipment systems should improve and clarify the procedures by which deviations are identified and managed. [S1/08R/S269]*

### **S270 System management**

Several parties from the Finnish Rail Administration and VR Group participate in the traffic control system procurement and management. The organising of work packages and the assignment of project ownership and responsibilities over the life cycles of the systems are unclear. The centralisation of traffic control requires continuous introduction of new automation and information technologies. The deviations investigated have involved shortcomings in system user instructions as well as difficulties for the users to identify problematic situations on the display screens. The responsibility for ensuring that the systems function properly and that the corrective actions are monitored should be placed near the end users.

*The experts using traffic control systems on a daily basis should participate in the specifications, inspections, and start-up activities of these systems and also take part in the system administration during the life-cycle of the system. [S1/08R/S270]*



## RECOMMENDATIONS

<b>Date and time (Code):</b>	30.3.2005, 4.07 (B1/2005R)		
<b>Location:</b>	Between Saakoski and Jämsänkoski		
<b>Type of occurrence:</b>	Derailment of car		
<b>Train type and number:</b>	Passenger train 802, locomotive Sr1 + 7 car		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	3	
	<b>Passengers:</b>	≈50	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	Derailed wagon and its bogie damaged.		
<b>Damages on track equipment:</b>	About 1 200 meters of track were damaged.		
<b>Other damages:</b>	None		
<b>Summary:</b> At Jämsä on the Jyväskylä - Tampere section of line between the Saakoski and Jämsänkoski stations, on Wednesday March 30, 2005 early in the morning an incident occurred where a bogie of a car of the 802 passenger train derailed at a rail breakage. The train was carrying about 50 passengers. Neither the passengers nor the train crew were injured in the incident. The total cost of the accident was 127 600 euros.			
<b>Final report issued:</b>	15.1.2007		
<b>Recommendation Nr. S211</b>	<b>The instructions for the drawing up of an emergency notice should be developed to ensure that whenever urgent aid is needed from the rescue service, also the general emergency number is called from the incident scene, in addition to the notifying of the traffic control unit.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009 <sup>4</sup>	In progress	The ERC Administration supports, VR Ltd is oppose.	
26.6.2009		Reiteration in report B5/2008R	
19.2.2010	In progress	The ERC Administration supports, VR Ltd will consider to change directions when the new GSM-R system is in use.	
<b>Recommendation Nr. S212</b>	<b>The compliance of the localization data used by the railway with the data system of the Emergency Response Centre Agencies shall be ensured, e.g. by installing the track-kilometre data in the data system of the Emergency Response Centre Agencies.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	Under process.	
19.2.2010	In progress	Will be taken into consideration in ERC Administration's TOTI project.	

<b>Date and time (Code):</b>	S1/2005R
<b>Location:</b>	-
<b>Type of occurrence:</b>	Safety Study on Level Crossing Accidents
<b>Summary:</b> At the request of VR-Group Ltd, in December 2005 the Accident Investigation Board of Finland commenced a safety study on road/railway level crossing accidents and appointed a commission therefor. The safety study included seven recent level crossing accidents, the first one of which had been subject to investigation before the commencement of the safety study referred to. Moreover the commission investigated other level crossing accidents having occurred in 2003, 2004 and 2005, on the basis of data collected by VR-Group Ltd. The investigation also included fatal level crossing accidents in 1991–2004 as based on investigation documents produced by the Traffic Safety Commission of Insurance Companies (VALT), statistics from 1991–2004 on level crossing accidents and rail-	

<sup>4</sup> Date of the annual meeting concerning status of the recommendations.

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way and road traffic accidents, international statistics on level crossing accidents and railway and road traffic accidents, as well as investigation reports on individual accidents in certain countries and documentation pertaining to projects on the development of level crossing safety in some countries.		
<b>Final report issued:</b>		20.06.2007
<b>Recommendation Nr. S215</b>	As the road vehicle driver's perception error is often the cause of his failing to stop at a level crossing, the perceptibility of both the train and the level crossing should be improved. For example, in the accidents investigated by the commission, the road vehicle driver either failed to perceive the train or only perceived it too late.	
	<b>The perceptibility of a train and a level crossing should be improved.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	Different kind of alternatives is tested.
19.2.2010	In progress	Bumps and vibration ribs on road are on tests.
<b>Recommendation Nr. S216</b>	A great number of level crossings feature high speed limits, even 80 km/h. This impacts the road vehicle driver's impression of a safe level crossing and hence his/her driving behaviour at the level crossing.	
	<b>At a level crossing the maximum speed allowed on the road should be 50 km/h or lower as depending on the locality and the characteristics of the level crossing.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	In progress	Will be taken up when making new directions.
<b>Recommendation Nr. S217</b>	At a number of level crossings, the condition of the wait platform fails to meet the relevant RAMO <sup>5</sup> specifications. This often results in an unwillingness to stop at the level crossing.	
	<b>Such wait platforms of level crossings that feature a poor condition should be upgraded to meet the relevant RAMO specifications.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	In progress	No mutual understanding that who is in charge.
<b>Recommendation Nr. S218</b>	The regulations in Part 9, RAMO are not applied to old level crossings. Consequently it is not quite clear what regulations apply to the maintenance of level crossings.	
	<b>Maintenance instructions should be drawn up for level crossings.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	In progress	
<b>Recommendation Nr. S219</b>	At the moment it is not possible to restrict traffic on level crossings or prohibit the use of level crossing, e.g. for heavy-duty road vehicles, even in case of an extremely dangerous level crossing. For example, on the rail network there are level crossings with sightlines that are insufficient for a safe crossing of the level crossing by a combined transport vehicle. Nevertheless the use of the crossing cannot be prohibited.	
	<b>The railway keeper and the safety authority should be allowed to restrict road vehicle traffic on level crossings.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	The Rail Act makes it possible.
19.2.2010	In progress	The Rail Act makes it possible when making track plan and the use is changed.
<b>Recommendation Nr. S220</b>	In many countries, the warning whistle given by a train is a key safety element. In some countries this is even mandatory and in some countries, it is customary to whistle at all level crossings. On the other hand, whistling generates noise nuisance. Furthermore no Finnish research data exists as for the audibility and conspicuousness of whistles.	
	<b>A study should be conducted on the use of whistles at level crossings.</b>	

<sup>5</sup> RAMO = The Track Technological Rules and Regulations.

<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	No plan to go over. No evidences of the need.
19.2.2010	In progress	No evidences of the need.
<b>Recommendation Nr. S221</b>	If the advance route plan has been drawn up poorly or on an erroneous basis, leads this to unnecessary and dangerous crossings, especially for heavy vehicles. <b>In their route plans, transport operators should consider possible crossings of railways. Railway crossings should be minimized and more safe crossings prioritized.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	In progress	
<b>Recommendation Nr. S222</b>	As the amount of building land continuously diminishes especially in big population centres, new areas are planned with only poor transport connections. A road may cross a railway in a place where the crossing was originally designed and built for only one house or one farming road. The planning of transport connections should be carefully carried out so as to ensure safe access to the area. <b>In land use planning, special attention should be paid to safe railway crossing, and the building of new level crossings should be avoided.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	In progress	The Ministry of Environment has made a publication where the issue is enclosed.

<b>Date and time (Code):</b>	21.6.2005, 16.04 (C2/2005R)		
<b>Location:</b>	Helsinki railway station		
<b>Type of occurrence:</b>	Collision with an obstacle		
<b>Train type and number:</b>	Passenger train 171		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1+1	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	The end- and substructures of the collided coach.		
<b>Damages on track equipment:</b>	Trackbuffer		
<b>Other damages:</b>	None		
<b>Summary:</b>	In Helsinki on 20 April 2005 at 16.04, while being shunted to its departure track, passenger train 171 collided with a rail barrier, broke it and, having mounted it, continued for a further six metres towards the end platform.		
<b>Final report issued:</b>	26.9.2007		
<b>Recommendation Nr. S223</b>	In order to identify the cause of the audibility disturbances, and to determine whether the technical requirements for escort radios are sufficient and whether some new technical solutions are required to guarantee audibility, the Accident Investigation Board recommends the following: <b>The operation of escort radios at Helsinki Central Railway Station must be inspected in order to identify any black spots in radio audibility and any external interference.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	Use of GSMR-radio will cancel the audibility disturbances. 2010 in use.	
19.2.2010	In progress	Nothing new.	

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<b>Date and time (Code):</b>	17.1.2007, 10.52 (B1/2007R)		
<b>Location:</b>	Närpiö, Kallmossvägen / Karlå level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, freight train – van		
<b>Train type and number:</b>	Freight train 3273, two Dv12 diesel locomotives and 35 wagons		
<b>Road vehicle:</b>	Van Opel Astra, 2001 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The locomotive suffered minor damage while the van was wrecked beyond repair.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	Deliverable post was lost and damaged.		
<b>Summary:</b>	On Wednesday 17 January 2007 at 10.50 a.m. an accident occurred in Närpiö in which a train carrying lumber on its way from Seinäjoki to Kaskinen collided with a van at an unprotected level crossing.		
<b>Final report issued:</b>	23.11.2007		
<b>Recommendation Nr. S224</b>	When driving on a familiar route, a driver performing a delivery task may pay such strong attention to matters other than driving that his/her attentiveness, and following the traffic and his or her surroundings is disrupted. At such moments, special danger zones include unguarded level crossings.		
	<b>Itella and other businesses performing deliveries can improve safety by avoiding unguarded level crossings when planning their delivery routes.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
<b>Recommendation Nr. S225</b>	Level crossings and other dangerous locations should also be taken into consideration when mail is sorted route-specifically.		
	<b>A warning sign notifying of a dangerous location on the route, placed between sorted mail stacks being delivered, might act as a prompt to the mail carrier when he/she arrives at the dangerous location on the route.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
<b>Recommendation Nr. S226</b>	As the use of navigators is becoming more common, they can be complimented with various programs which will warn of dangerous locations en route.		
	<b>A navigator/GPS device in the vehicle, should be installed warning of dangerous locations such as level crossings.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
19.2.2010	In progress	Level crossing databank for navigators can be found from the internet.	
<b>Recommendation Nr. S227</b>	Using the safety belt in an accident, even when driving at moderate speeds, may prevent injury or death.		
	<b>Compulsory use of safety belts should be expanded to include delivery vehicle drivers and passengers, irrespective of the driving distance.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	SKAL supports because of safety reasons.	

<b>Date and time (Code):</b>	5.3.2007, 14.39 (B2/2007R)		
<b>Location:</b>	Nivala, Niskakankaantie / Pahaoja level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, Passenger train – car		



<b>Train type and number:</b>	Local train H494, Dm12 rail bus		
<b>Road vehicle:</b>	Passenger car Renault Laguna Break 1.6, 2000 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	2	1
	<b>Passengers:</b>	25	1
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	1
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	Slight damages to the rail bus, the car was completely wrecked.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	On Monday 5 March 2007 at 2.39 p.m., a level crossing accident took place involving a passenger car and a rail bus travelling from Ylivieska to Iisalmi. Both the driver and the passenger of the car perished, while the train personnel and passengers were unharmed. The accident wrecked the car beyond repair, while the train suffered only minor damage. The total material costs due to the accident were approximately EUR 70,000.		
<b>Final report issued:</b>	23.11.2007		
<b>Recommendation Nr. S228</b>	The Pahaoja unguarded level crossing is situated on a busy private road in Niskakangas which, in addition to the locals, is used by regular taxi traffic and heavy traffic due to farming and industry in the area. For train safety alone, it would be extremely important that the level crossing be equipped with a warning station with automatic gates. This measure would also increase the likelihood that a driver notices an approaching train, thanks to lowered or lowering gates. <b>The Pahaoja unguarded level crossing should be equipped with a half barrier equipment.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	RHK is not going to install the level crossing with barriers.	
<b>Recommendation Nr. S230</b>	The lower part of the fender, attached with screws, was torn loose in the collision. Had it been caught underneath the wheels it might have derailed the train. <b>The structure of the obstruction cleaning device of Dm12 rail bus should be such that it is either formed of one piece or possible additional parts are attached sufficiently well.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	The construction has been designed.	
19.2.2010	<b>IMPLEMENTED</b>	Fastened by welding.	

<b>Date and time (Code):</b>	2.2.2007, 9.01 (C1/2007R)		
<b>Location:</b>	Pelto switch area at the Joensuu railway yard		
<b>Type of occurrence:</b>	Accident during shunting work		
<b>Train type and number:</b>	Shunting unit, Dr14 diesel locomotive and 7 wagons		
<b>Road vehicle:</b>		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1+3	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	1	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	None		
<b>Damages on track equipment:</b>	None		
<b>Other damages:</b>	The shunting unit foreman's radio telephone got unuseable broken.		

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<b>Summary:</b> An accident claiming the life of a shunting unit foreman occurred at the Joensuu railway yard on Friday 2 February 2007 at 9.01 a.m. The foreman, employed by VR Cargo Joensuu, perished instantly after being run over by one of the wheels of a freight car.		
<b>Final report issued:</b>		7.12.2007
<b>Recommendation Nr. S233</b>	In the instructions for safe rail yard work, it is stated that the footwear used must be suitable for shunting work and special attention must be paid to the footwear being supportive of the ankles and that the material used in the soles must be of the kind that reduces the risk of slipping. According to test results, the footwear model used at the time of the accident was of average level regarding grip. The grip category of the footwear in the conditions at the time of the accident was "uncertain" and "slippery" in terms of the heel's side slip.	
	<b>The grip of footwear used in rail yard work should be better than average under all weather and working conditions.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	Tests have been done and tests are going on.

<b>Date and time (Code):</b>	6.5.2007, 15.33 (B4/2007R)		
<b>Location:</b>	Kiuruvesi, Pohja level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, passenger train - car		
<b>Train type and number:</b>	Regional train 746, two Dm12 rail buses		
<b>Road vehicle:</b>	Car Nissan Almera 4D Sedan, 2005 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	2	1
	<b>Passengers:</b>	≈60	1
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	1
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The car was wrecked beyond repair. Equipment of the train's nose and substructure were damaged		
<b>Damages on track equipment:</b>	The wooden covering on the level crossing sustained minor damage.		
<b>Other damages:</b>	None		
<b>Summary:</b> A fatal level crossing accident took place in Kiuruvesi, at the unprotected level crossing of Pohja. This accident occurred when a car travelling along the Pohja private road drove without stopping under a rail bus running from Ylivieska to Iisalmi. There were two passengers in the car; the driver perished and the front seat passenger was seriously injured.			
<b>Final report issued:</b>		29.1.2008	
<b>Recommendation Nr. S234</b>	Since the Pohja level crossing is dangerous with regard to its conditions and very near a safe overpass, the investigation commission recommends:		
	<b>The Pohja level crossing should be closed and a replacement overpass be created at the Hilapparannantie bridge.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
19.2.2010	In progress		
<b>Recommendation Nr. S235</b>	The Pohja level crossing is located very close to a safe overpass, and the cost of its removal would be reasonably low. The safe overpass located nearby is not utilised in the current situation.		
	The Finnish Rail Administration should systematically locate and remove level crossings in cases where the removal and construction of a replacement route could be performed at a minor cost. Due to this, the investigation commission recommends:		

	<b>The Finnish Rail Administration should systematically locate crossings that have a bridge nearby or whose traffic can otherwise be directed through a safer route, removing them even though their volume and risk level might be low.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
<b>Recommendation Nr. S236</b>	The start of the accident rescue operation was hindered by the fact that the emergency alarm call made by a traffic controller was patched through to the North Ostrobothnia and Kainuu Emergency Response Centre, which was not the Emergency Response Centre responsible for the accident site. Since railway traffic control areas are typically part of more than one Emergency Response Centre's area, the opportunities traffic controllers have for making emergency alarm calls should be enhanced. Due to this, the investigation commission recommends: <b>Traffic controllers should have the capacity to place an emergency alarm call to the Emergency Response Centre in the ERC area in which the accident site is located.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	On process.
19.2.2010	In progress	Remote controllers have direct numbers to different ERCs.

<b>Date and time (Code):</b>	9.3.2007, 16.13 (B3/2007R)		
<b>Location:</b>	Särkisalmi, Sinkonen level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, passenger train -- car		
<b>Train type and number:</b>	Regional train 746, Dm12-railcar		
<b>Road vehicle:</b>	Car Mercedes Benz 190D, 1985 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	2	1
	<b>Passengers:</b>	34	1
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	1
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The railcar's blockage bumper and automatic coupling of the rail bus were damaged, while the passenger car was severely damaged.		
<b>Damages on track equipment:</b>	None		
<b>Other damages:</b>	None		
<b>Summary:</b>	A level crossing accident involving a passenger car and a rail bus travelling from Savonlinna to Parikkala took place in Särkisalmi on 9 March 2007 at 4.13 p.m. The driver and passenger of the passenger car were killed but the train personnel and passengers escaped uninjured. The passenger car was completely wrecked and the train sustained minor damage.		
<b>Final report issued:</b>	12.12.2007		
<b>Recommendation Nr. S237</b>	Drivers cross a railway through the Särkisalmi level crossing, equipped with half-barriers, as they drive along Melkonniementie to the Särkisalmi residential area. This route is 200 metres longer than the route taken by the vehicle driver through the Sinkonen level crossing. In order to prevent this dangerous shortcut from being used, the Accident Investigation Board recommends: <b>The Sinkonen level crossing located in the Särkisalmi residential area should be removed.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	The speed limit area of the track has been lengthened.	
16.2.2010	In progress	Parikkala municipal executive board renews comment that the Sinkonen level crossing should be equipped with warning installations.	

## Liite 1/8 (20)

<b>Date and time (Code):</b>	21.3.2007, 10.33 (C2/2007R)		
<b>Location:</b>	Ylivieska railway station		
<b>Type of occurrence:</b>	Derailment		
<b>Train type and number:</b>	Freight train 5406, electric locomotive Sr1 + 23 wagons		
<b>Road vehicle:</b>	-		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	The coupling equipment of two wagons and the bogie of the derailed wagon were damaged.		
<b>Damages on track equipment:</b>	The electric-motor switch drives of two turnouts were damaged.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	On Wednesday, 21 March 2007, at 10:33 am, one wagon of the freight train en route from Oulu to Ylivieska was derailed at the northern turnout of the Ylivieska station, as the train was switching from main track to side track.		
<b>Final report issued:</b>	3.3.2008		
<b>Recommendation Nr. S238</b>	Because inspections had not reacted to the wheel flat or the broken leaf, the Accident Investigation Board of Finland recommends:		
	<b>Greater care should be exercised during statutory freight train inspections, and any flaws observed should be acted upon more quickly than is currently the case.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		

<b>Date and time (Code):</b>	31.12.2005, 9.14 (C9/2005R)		
<b>Location:</b>	Tuupovaara railway yard		
<b>Type of occurrence:</b>	Derailment		
<b>Train type and number:</b>	Shunting unit, Dv 12 diesel locomotive and 11 wagons		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1+1	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	1	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	The derailed wagon suffered minor damages.		
<b>Damages on track equipment:</b>	None		
<b>Other damages:</b>	None.		
<b>Summary:</b>	On Saturday 31 December 2005 at 9.14 a.m., a shunting accident occurred in the Tuupovaara railway yard, in which a group of empty wagons for carrying wood products, being pushed by an engine, collided with a derailer, causing the derailment of the first wagon in the direction of travel. The shunting foreman, who was standing on the wagon's left end step, was seriously injured after falling between the tracks and being hit by the left end step of the next wagon as he extricated himself from the moving wagons. The step dragged him for several metres before he was able to break free.		
<b>Final report issued:</b>	15.4.2008		
<b>Recommendation Nr. S239</b>	Because the derailleurs are widely used in railway yards, it should also be ensured that they can be operated as safely as possible.		

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	It should not be possible to remove the key from a derailer's safety lock without also removing the derailer from the rail.	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	No instructions exist.
<b>Recommendation Nr. S240</b>	Greater attention should be paid to shunting work safety during the ploughing of snow in rail yards.	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	

<b>Date and time (Code):</b>	13.8.2007, 15.15 (B5/2007R)		
<b>Location:</b>	Nurmijärvi, Röykkä, Leppälammentie / Korpi level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, Freight train – car		
<b>Train type and number:</b>	Freight train 3649, 2 Dv12 diesel locomotives and 41 wagons		
<b>Road vehicle:</b>	Car Ford Sierra 2.0, 1990 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	1
	<b>Passengers:</b>	0	1
<b>Fatally injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	1
<b>Seriously injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	Damages to the equipment of locomotive nose, private car entirely wrecked.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None		
<b>Summary:..</b>	On Monday 13 August 2007 at 3.15 p.m., a level crossing accident occurred in Röykkä, Nurmijärvi, in which a passenger car collided with a freight train en route from Kirkniemi to Riihimäki, resulting in the death of the car's passenger and serious injuries to the car driver.		
<b>Final report issued:</b>	23.6.2008		
<b>Recommendation Nr. S241</b>	Because the area's growing population is continuously increasing the volume of traffic at the Korpi level crossing, and because fast growing bushes around the crossing do not enable the maintenance of visibility in line with Ministry of Transport and Communications and Finnish Railway Administration requirements, the investigation commission recommends the following: <b>The Korpi level crossing should be equipped with half-barriers.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	Will be equipped with half barriers, when the financing is ok.	
19.2.2010	In progress	In action and economic plan 2010–2013.	

<b>Date and time (Code):</b>	21.11.2007 (B7/2007R)		
<b>Location:</b>	Lahti, Heikinpellontie level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, freight train – car		
<b>Train type and number:</b>	Freight train 2873, Dv12 diesel locomotive		
<b>Road vehicle:</b>	Car Volkswagen Golf 1.6, 1999 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	2	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0

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	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The car was wrecked beyond repair. The front of the locomotive sustained some damage.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None.		
<b>Summary:</b> On 21 October 2007 at 12.55 p.m., a fatal level crossing accident occurred on an unprotected level crossing along Heikinpellontie road in Lahti. The accident occurred when a car on Heikinpellontie road drove without stopping in front of a locomotive en route from Lahti to Heinola. The driver, who was the sole person in the car, died instantly. The accident occurred because the driver of the car did not see the train. The level crossing in question meets regulations concerning visibility and crossing angles, but does not meet those concerning wait platforms. It is possible that the driver was not sufficiently vigilant due to familiarity with the crossing and the impression that train traffic was infrequent there.			
<b>Final report issued:</b>	9.9.2008		
<b>Recommendation Nr. S243</b>	Track renovation investments have been scheduled for the Lahti–Heinola track within the next few years. The intended focus is on track technology renewal, but it is clear that the investments will also cover raising level crossing safety to the level set in technical track requirements (RATO). Considering the danger posed by the level crossings along the track at the moment, it is recommended that actions to improve level crossing safety are initiated in advance before the investments proper. Such actions include the following: possible replacement of level crossings with alternative road routing, sightline improvements, wait platform improvements and crossing angle adjustments.		
	<b>Actions to improve level crossing safety along the Lahti–Heinola track should be carried out before the initiation of scheduled renovation investments.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
19.2.2010	In progress	In some level crossings there has been reduced speed limit on roads.	
<b>Recommendation Nr. S244</b>	The speed limit along the Lahti–Heinola track is currently 60 km/h for the most part. However, sightline on many level crossings is limited to such an extent that an accident is possible even if nobody makes a mistake or there is no technical fault in the vehicles. The track profile does not allow for a reduction in speed limits to the appropriate levels, but it is nevertheless possible to reduce speeds to some degree.		
	<b>The speed limit along the Lahti–Heinola track should be reduced in the proximity of level crossings with poor sightline to the extent that this is reasonably possible.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
19.2.2010	In progress	Is not yet reduced.	

<b>Date and time (Code):</b>	4.8.2007, 6.24 (C6/2007R)		
<b>Location:</b>	Siilinjärvi, Kemira GrowHow Oyj industrial railway yard		
<b>Type of occurrence:</b>	Derailment		
<b>Train type and number:</b>	Shunting unit, 3 Dv12 diesel locomotives + 6 tank wagons		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1 + 2	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	

	<b>Passengers:</b>	0
<b>Damages of rolling stock:</b>	Tank isolation and bogies of the overturned wagon damaged. Minor damages to two other wagons.	
<b>Damages on track equipment:</b>	Derailer and 5 meter track damaged.	
<b>Other damages:</b>	None.	
<b>Summary:</b> At Kemira GrowHow Oyj railway yard an accident occurred on Saturday 4.8.2007 at 6.24 am, where a tank wagon loaded with nitric acid collided with a derailer, causing the wagon to derail and tip over. The following wagon also derailed. It stayed upright. The total cost of the accident was less than 50 000 euros. The reason for the accident was that the derailer was not removed before shunting of the wagons and that the derailer that had been left on was not noticed in time. The shunting foreman gave order to shunt without securing the route first.		
<b>Final report issued:</b>	28.10.2008	
<b>Recommendation Nr. S247</b>	Right operation of the derailer should always be secured so that misuse could not be possible. Forgetting a derailer on should be hindered. <b>A derailer should always have interdependence to the turnout which leads to the track in question. Especially railway yards where dangerous substances are handled should always be built according to regulations.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	No instructions exist.

<b>Date and time (Code):</b>	15.7.2007, 18.11 (C5/2007R)		
<b>Location:</b>	Talviainen station		
<b>Type of occurrence:</b>	Derailment		
<b>Train type and number:</b>	Freight train 3913, 2 Dv12 diesel locomotives and 35 wagons		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	Some brake clutches of the locomotive had to be replaced and wheels required lathing.		
<b>Damages on track equipment:</b>	Track retainers broke off and the wheels of the derailed locomotive left marks on the sleepers.		
<b>Other damages:</b>	The axle counter sensor and cable were replaced.		
<b>Summary:</b> On Sunday 15 July 2007 at 6.11 p.m., one of the two locomotives of a freight train was derailed after passing a curved turnout in Talviainen station. The derailed locomotive incurred some damage. The derailment occurred because the track was bent out of shape and therefore hindered passage.			
<b>Final report issued:</b>	18.11.2008		
<b>Recommendation Nr. S249</b>	The rail inconsistency that was uncovered during the investigation would have been noticed earlier if track geometry measurements had been completed before the rail was taken into use, for example during final rail securing work. Final rail securing work is a good time for this, since today's securing machines enable track geometry measurements. Measurements could be a quality requirement. This would ensure that any geometries that do not meet regulations would become apparent before track commissioning. <b>Demanding surface construction projects should include rail geometry measurements before the track is taken into use. The measurements could be compared with set limit values.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	All of the constructors do not yet have devices.	

Liite 1/12 (20)

<b>Date and time (Code):</b>	6.10.2008 (B6/2007R)		
<b>Location:</b>	Kempele, Sohjanantie / Perälä level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, Pendolino train – car		
<b>Train type and number:</b>	Pendolino S52, Sm3 electric motor train, 6 cars		
<b>Road vehicle:</b>	Car Volkswagen Polo, 1998 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	3	1
	<b>Passengers:</b>	38	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	Damages to the locomotive nose and the equipment of nose, the car entirely wrecked.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	On Saturday 6 October 2007 at 11.36 a.m., a car and a Pendolino train en route from Oulu to Helsinki collided on the Perälä level crossing in Kempele, resulting in the death of the car driver. The train staff and passengers were not injured. The direct cause of the accident was that the car driver drove onto the level crossing without stopping. It is likely that the driver failed to make any observation of the train approaching from the left.		
<b>Final report issued:</b>	29.12.2008		
<b>Recommendation Nr. S251</b>	Because the speed limit at the level crossing is 140 km/h and because the track is in heavy use, the Accident Investigation Board recommends the following:		
	<b>The Perälä unprotected level crossing should be removed or replaced by an interchange.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress	The municipality will remove the level crossing during changing the town plan.	
<b>Recommendation Nr. S252</b>	Because a car can become wedged under the front structure of the train when the structure breaks, the Accident Investigation Board recommends the following:		
	<b>The front structure of the Sm3 electric train should be redesigned to prevent cars from being wedged under the structure.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
20.1.2009	In progress		
19.2.2010	In progress		

<b>Date and time (Code):</b>	30.4.2008, 7.04 (C3/2008R)		
<b>Location:</b>	Joensuu, Syväsatama Port		
<b>Type of occurrence:</b>	Collision with an obstacle		
<b>Train type and number:</b>	Shunting unit, Dr14 locomotive and 12 wagons		
<b>Road vehicle:</b>	Forklift truck		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	3	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	1	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0



<b>Damages of rolling stock:</b>	One wagon incurred minor damages, the forklift truck was badly damaged.	
<b>Damages on track equipment:</b>	None.	
<b>Other damages:</b>	None.	
<b>Summary:</b>	On Wednesday 30 April 2008 at 7.04 a.m., a shunting unit collided with a heavy forklift truck on Joensuu's Syväsatama port track 183. The shunting foreman was seriously injured. One of the freight wagons incurred minor damage and the forklift truck was badly damaged. The accident occurred because the forklift driver did not observe the approaching shunting unit before turning or when turning to cross the track.	
<b>Final report issued:</b>	30.12.2008	
<b>Recommendation Nr. S253</b>	The port track bends strongly to the left after passing the port gate towards the port area. Halfway into the curve, there are storage containers next to the track on the inside curve. They impede visibility when approaching the port. <b>The storage containers next to the track should be placed further away from the track so that they do not impair visibility.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
20.1.2009	In progress	
19.2.2010	<b>IMPLEMENTED</b>	Also cleared.

<b>Date and time (Code):</b>	3.11.2007, 12.59 (C7/2007R)		
<b>Location:</b>	Vainikkala yard		
<b>Type of occurrence:</b>	Derailment		
<b>Train type and number:</b>	Shunting unit, Dr14 diesel locomotive and 15 wagons		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	3	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	None.		
<b>Damages on track equipment:</b>	The turnout tongue was twisted and the Railex locking device was damaged. Also, a concrete sleeper was cracked and rail fastening springs had to be replaced.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	On Saturday 3 November 2007 at 12.59 p.m., one wheelset of a locomotive was derailed at a railway yard turnout in Vainikkala when a shunting unit was pushing wagons onto the track. The turnout tongue was twisted and the Railex locking device was damaged. The incident occurred because the shunting worker had pressed the local turnout button reversing twice while the locomotive was on the turnout. The first wheelset derailed during the first change in position. The shunting worker gave the second command before the first operation was complete, with the result that the switch blades started turning back and the locomotive's remaining wheelsets were directed correctly along the track.		
<b>Final report issued:</b>	13.1.2009		
<b>Recommendation Nr. S254</b>	Turnouts for which local control is possible can be operated more safely if the local turnout control buttons are located close to the turnouts. <b>Local turnout control buttons should be located as close to turnouts as possible.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
19.2.2010	<b>NOT TO BE IMPLEMENTED</b>		

<b>Date and time (Code):</b>	25.2.2008, 9.53 (B1/2008R)		
<b>Location:</b>	Laukaa, Notkotie / Kauramaa level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, freight train – tractor		

Liite 1/14 (20)

<b>Train type and number:</b>	Freight train 3359, Dv12 diesel locomotive and 27 wagons		
<b>Road vehicle:</b>	Tractor Case IH 4240, 1997 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The front of the locomotive sustained some damage, the tractor was totally wrecked.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None		
<b>Summary:</b> On 25 February 2008 at 9.53 a.m., a fatal level crossing accident occurred on Laukaa's Kauramaa unprotected level crossing. A tractor returning along an agricultural road from ploughing work drove without stopping in front of a freight train en route from Jyväskylä to Suolahti. The only person in the tractor was the driver, who died from his injuries in hospital later that day. The accident occurred because the driver of the tractor did not observe the approaching train and drove onto the level crossing without stopping. Furthermore, the crossing did not meet level crossing safety requirements on the part of the wait platform and with respect to sightline. Too short a wait platform, in particular, may have caused the driver to focus more than usual on controlling the tractor, to which extra equipment was hitched, as it approached and arrived at the crossing. The driver's visibility may also have been impaired due to the sun shining against him. The agricultural road was intended only for agricultural use and not for through-traffic.			
<b>Final report issued:</b>	26.1.2009		
<b>Recommendation Nr. S255</b>	Two alternative routes in the vicinity of the Kauramaa level crossing offer safer access to agricultural fields surrounding the track.		
	<b>The Kauramaa level crossing should be removed.</b>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
19.2.2010	In progress	Laukaa community seconds the recommendation.	

<b>Date and time (Code):</b>	25.9.2008, 16.18 (B6/2008R)		
<b>Location:</b>	Iisalmi, Suurisuo level crossing, protected, equipped with half barriers		
<b>Type of occurrence:</b>	Level crossing accident, passenger train – car		
<b>Train type and number:</b>	Passenger train IC78, Sr1 electric locomotive and 7 coaches		
<b>Road vehicle:</b>	Car Toyota Camry 4D sedan, 1998 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	4	1
	<b>Passengers:</b>	≈180	1
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	1
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The front and left side of the locomotive were damaged in the collision. The car was wrecked beyond repair.		
<b>Damages on track equipment:</b>	A column supporting the track's electric cables and its foundations incurred damage.		
<b>Other damages:</b>	None.		

**Summary:** On 25 September 2008 at 4.18p.m., a level crossing accident leading to two fatalities occurred at the half barrier equipped level crossing of Suurisuo in Iisalmi. The accident occurred when a private car driving slowly westward along Parkatintie road collided with a passenger train en route from Kajaani to Helsinki. The two persons in the car died instantly. The car was wrecked beyond repair.

The direct cause of the accident was that the car driver drove onto the level crossing without stopping. The driver applied the brakes only after the car had driven beneath the lowering barrier and was hit by it, with the result that the car stopped on the track. It is likely that the driver did not notice the level crossing warning signs or the lowering barriers. Potentially contributory factors possibly included the sun shining in the driver's face, a worn windshield, the driver's impaired eyesight, hearing and alertness.

**Final report issued:** 15.6.2009

<b>Recommendation Nr. S256</b>	The visibility of red blinking warning signs should be improved at protected level crossings where bright sunlight from ahead inhibits the visibility of the level crossing warning signs. This has been tested along the Turku-Toijala track by replacing filament lamps with LED lamps, and the results indicate that drivers find the visibility of LED lights good.
	<b>At the Suurisuo level crossing and similar level crossings, where it has been noted that sunlight hinders visibility, the visibility of barriers and warning signs should be improved by replacing red blinking filament lamps with blinking or flashing LED lights.</b>

Date	Status	Comments
19.2.2010	In progress	

<b>Date and time (Code):</b>	26.8.2008, 10.43 (B5/2008R)		
<b>Location:</b>	Suonenjoki, Haapakoski, Konttila level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, railway work unit – car		
<b>Train type and number:</b>	Railway work unit 7582, Service rail car Tka8 and 3 wagons		
<b>Road vehicle:</b>	Car Ford Sierra 4D 2.0, 1986 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1 + 2	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	Slight damages to the service railcar, the car entirely wrecked.		
<b>Damages on track equipment:</b>	None.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	At 10.43 a.m. on Tuesday 26 August 2008, a railway work unit en route from Pieksämäki to Suonenjoki collided with a car at an unprotected level crossing in Suonenjoki. The accident was fatal to the driver of the car. The car was damaged beyond repair and the railway work unit, which was a service railcar, incurred minor damage. The direct cause of the accident was that the car driver drove onto the level crossing without stopping. In all probability, the driver completely failed to observe the railway work unit approaching from the left. The lack of a proper wait platform, a sharply rising road and limited visibility made it difficult to observe the surroundings and drive the car at the same time.		
<b>Final report issued:</b>	26.6.2009		
<b>Recommendation Nr. S257</b>	The road rises too sharply before the level crossing and there is no proper wait platform. In addition, visibility is poor and does not meet the regulations in force. The crossing was also not equipped with the <i>unprotected railway level crossing</i> warning sign. A report in the level crossing database notes that the level crossing is dangerous. Although the Konttila level crossing is on a private road with little traffic, the track speed limit is 140 km/h and limited visibility makes even a diligent crossing dangerous.		

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	The sightlines of the level crossing should be improved and the wait platforms should be reconditioned to meet regulations and warning sign 171 should be installed.	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	
<b>Recommendation Nr. S258</b>	In their statement, the owners of the rights to the road indicated that they were not aware that they were responsible for the road's maintenance in the vicinity of the level crossing. The Finnish Rail Administration should inform parties in charge of road maintenance about their obligation to build and maintain road segments leading to level crossings as set out in the relevant regulations. The Finnish Rail Administration should also appropriately inform of any track changes to be made and any shortcomings discovered during inspection rounds.	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	

<b>Date and time (Code):</b>	7.7.2008, 22.41 (B4/2008R)		
<b>Location:</b>	Kiuruvesi, Kirkkoharjuntie / Vehkatie level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, freight train – van		
<b>Train type and number:</b>	Freight train 5040, two Dv12 diesel locomotives		
<b>Road vehicle:</b>	Van Toyota Hiace, 2000 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1	1
	<b>Passengers:</b>	0	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The front of the locomotive was slightly damaged and the van was wrecked beyond repair.		
<b>Damages on track equipment:</b>	The level crossing's platform structure was damaged.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	At 22.41.40 on Monday 7 July 2008, a van and a train consisting of two locomotives en route from Ylivieska to Iisalmi collided on the Vehkatie unprotected level crossing in Kiuruvesi, resulting in the death of the van driver. The van was wrecked beyond repair and the locomotive's front and bogie structures were slightly damaged. The direct cause of the accident was that the van driver drove onto the level crossing without stopping. It is probable that the driver noticed the approaching train too late and was unable to avoid the collision. The evening sun was shining low on the horizon from the direction of the approaching train and this may have made observation difficult. It is possible that the driver's attention was focused on a newly arrived text message or that the driver was looking for the mobile phone. It is also possible that visibility in the direction of the train was blocked by the vehicle's chassis structures, because the vehicle approached the level crossing at an angle to the track.		
<b>Final report issued:</b>	26.6.2009		
<b>Recommendation Nr. S259</b>	Because the level crossing is dangerous. The Vehkatie level crossing should be removed.		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
19.2.2010	IMPLEMENTED	The level crossing is closed from vehicle traffic and equipped with gates for pedestrians.	
<b>Recommendation Nr. S260</b>	The emergency response centre's ELS system did not produce any data when the search term "Vehkatie" was entered because the old name of the crossing had been saved in the system. When a search was made by track kilometre, the ELS system gave the name "Tiilitehdas" even though the crossing is named "Vehkatie" in the tasoristeys.fi database. In order to ensure that these names are uniform.		

	<b>Emergency response centres regularly update the level crossing location data of their ELS systems to match the tasoristeys.fi database.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	

<b>Date and time (Code):</b>	8.6.2008, 5.48 (C5/2008R)		
<b>Location:</b>	Jyväskylä railway yard		
<b>Type of occurrence:</b>	Collision of the locomotive and the tamping machine at the railway yard		
<b>Train type and number:</b>	3 x Dv12 locomotive – turnout tamping machine Ttk2-857		
<b>Road vehicle:</b>			
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1 - 4	
	<b>Passengers:</b>	0	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Slightly injured:</b>	<b>Crew:</b>	0 – 1	
	<b>Passengers:</b>	0	
<b>Damages of rolling stock:</b>	The tamping machine was damaged in the chassis, body, bogies, wheelsets and automated controls. The foremost locomotive's maintenance deck and hand rails were damaged on the right side.		
<b>Damages on track equipment:</b>	About 20 metres of track was damaged.		
<b>Other damages:</b>	None.		
<b>Summary:</b>	<p>On 8 June 2008 at 5.48 a.m., a turnout tamping machine was involved in an accident at the Jyväskylä railway yard, leading to the slight injury of a track foreman in the driver's cab of the tamping machine. The accident involved the collision of a unit consisting of three Dv12 locomotives with a tamping machine involved in work. The engine driver applied the emergency brakes, but the locomotives were unable to stop in time and the front corner of the foremost locomotive collided with the left corner of the tamping machine. The force of the collision caused the right rail to collapse underneath the tamping machine. The collision damaged the tamping machine in places including the chassis, body, automated controls, bogie and wheelsets. The foremost locomotive incurred damage on the right side of the maintenance deck and hand rails. About 20 metres of track were damaged.</p> <p>The direct cause of the accident was that the front of the tamping machine, which was at work on turnout V032, extended so close to turnout V024 that the locomotives were unable to safely pass the tamping machine. Since turnout V032 was reserved because it was being replaced, turnout V024 was also reserved. In order to control and reverse turnout V024, the traffic controller had to use the VHP<sup>6</sup> command. The traffic controller was unaware of the precise location of the tamping machine. Another factor contributing to the accident lay in the fact that the tamping machine's foreman and the traffic controller had not agreed on the precise limits of the work area.</p>		
<b>Final report issued:</b>	6.8.2009		
<b>Recommendation Nr. S261</b>	<p>The practice of vaguely prepared rail work notifications contributed to the accident. During the investigation, a review of recorded conversations indicated that the rail work notification only vaguely defined the limits of the work area in question for both the foreman of the tamping machine and the traffic controller.</p> <p><b>Rail work notifications should precisely define the outermost limits of work areas.</b></p>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
19.2.2010	In progress		
<b>Recommendation Nr. S262</b>	<p>Just before the unit consisting locomotives and tamping machine collided, the traffic controller prepared a route for the locomotives through a turnout adjacent to the work area reserved for the tamping machine, using the VHP command.</p> <p><b>Before executing the VHP command, the traffic controller should ensure that there are no other units at or within the vicinity of the turnout for which the command is given.</b></p>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	

<sup>6</sup> VHP = emergence release of point locking.

Liite 1/18 (20)

19.2.2010	In progress	

<b>Date and time (Code):</b>	25.6.2008, 16.23 (B3/2008R)		
<b>Location:</b>	Liperi, Viinijärvi, Huikuri agricultural road / Huikuri level crossing, unprotected		
<b>Type of occurrence:</b>	Level crossing accident, passenger train – scooter		
<b>Train type and number:</b>	Regional train 784, Dm12 rail bus		
<b>Road vehicle:</b>	Scooter: Baotian BT49QT-7-TCAP7/49, 2006 model		
		<b>In the train</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	2	1
	<b>Passengers:</b>	≈20	0
<b>Fatally injured:</b>	<b>Crew:</b>	0	1
	<b>Passengers:</b>	0	0
<b>Seriously injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Slightly injured:</b>	<b>Crew:</b>	0	0
	<b>Passengers:</b>	0	0
<b>Damages of rolling stock:</b>	The rail bus was slightly damaged; the scooter was wrecked beyond repair.		
<b>Damages on track equipment:</b>	The ploughing sign was bent		
<b>Other damages:</b>	None.		
<b>Summary:</b>	<p>On Wednesday, 25 June 2008, at 4:22.50 pm, a level crossing accident involving a scooter and a rail bus en route from Joensuu to Pieksämäki occurred at the Huikuri level crossing. The accident was fatal to the driver of the scooter. The personnel and passengers of the rail bus remained uninjured. The scooter was wrecked beyond repair. The rail bus incurred damage to its left front corner and the obstruction clearing device. The repair costs of the rail bus amounted to EUR 1,400.</p> <p>The direct cause of the accident was that the driver of the scooter drove onto the level crossing without stopping. The driver of the scooter probably did not notice the rail bus at all or saw it too late. Contributing to this were the following factors:</p> <ul style="list-style-type: none"> <li>- the level crossing was very close to a highway with substantial traffic</li> <li>- the driver of the scooter was focusing on maintaining balance as the road surface changed from tarmac to gravel</li> <li>- the level crossing was not equipped with an active warning installation</li> <li>- the rail bus was approaching the crossing at 120 km/h</li> <li>- rail buses are silent and quite neutral coloured, which makes them difficult to see.</li> </ul>		
<b>Final report issued:</b>	7.9.2009		
<b>Recommendation Nr. S263</b>	<p>There are several level crossings in the vicinity of the Huikuri unprotected level crossing through which traffic can be directed.</p> <p><b>The Huikuri unprotected level crossing should be removed.</b></p>		
<b>Date</b>	<b>Status</b>	<b>Comments</b>	
19.2.2010	In progress		

<b>Date and time (Code):</b>	13.6.2008, 13.50 (B2/2008R)		
<b>Location:</b>	Helsinki, Mäkelänkatu 45, Mäkelänrinne stop, no. 0269		
<b>Type of occurrence:</b>	Collision, rear collision		
<b>Rolling stock type and number:</b>	Articulated tram type I, no. 70, line 1, shift 3 – articulated tram type I, no. 42, line 7B, shift 71		
<b>Road vehicle:</b>		<b>In the tram</b>	<b>In the road vehicle</b>
<b>Persons on board:</b>	<b>Crew:</b>	1 + 1	
	<b>Passengers:</b>	18 + 31	
<b>Fatally injured:</b>	<b>Crew:</b>	0	
	<b>Passengers:</b>	0	
<b>Seriously injured:</b>	<b>Crew:</b>	0 + 0	
	<b>Passengers:</b>	2 + 0	
<b>Slightly injured:</b>	<b>Crew:</b>	0 + 1	
	<b>Passengers:</b>	11 + 11	

<b>Damages of rolling stock:</b>	The front of the tram colliding with the other was somewhat damaged, and the rear of the other tram was seriously damaged.	
<b>Damages on track equipment:</b>	None.	
<b>Other damages:</b>	None.	
<b>Summary:</b> On Friday, 13 June 2008, at 1:50pm, a line-1 tram collided with the rear of a line-7B tram on the Mäkelänrinne stop, on Mäkelänkatu, in Helsinki. Two passengers were severely injured. A tram driver and 22 passengers were slightly injured. Several others received lesser injuries such as bruises and neck and shoulder pain and headaches caused by whip flash. The rails were not damaged and the trams remained on the rails. The rear of the line-7B tram was substantially damaged. For example, the chassis of the rearmost car was bent out of shape. The front of the line-1 tram was somewhat damaged, but after minor repairs it was temporarily operative. The cause of the accident was that the driver of the tram approaching from behind was not able to stop the tram in time. The driver apparently tried to stop the tram via incorrect braking methods in the belief that the brakes were not working properly. The background factors were the driver's inexperience, the possibility that the driver anticipated that the tram ahead would leave the stop earlier, and the driver's suspicion that the brakes were not working properly and therefore the use of the incorrect braking method.		
<b>Final report issued:</b>	4.11.2009	
<b>Recommendation Nr. S264</b>	The investigation revealed that tram drivers use different braking methods when the electric brakes seem to be inadequate. In order to ensure that drivers know how to brake correctly, especially in emergencies. <b>Tram drivers should be taught to brake in the proper way.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	IMPLEMENTED	Testing brakes during driving is stressed in driver training. Emergency braking training has been increased and training is documented.
<b>Recommendation Nr. S265</b>	Tram driver training includes learning materials from several different teachers and is not organised well enough. The learning materials also overlap in part. <b>Tram drivers should be provided with a personalised and logically progressing training programme.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	Will be ready in 2010.
<b>Recommendation Nr. S266</b>	The driving skills of tram driver trainees are reviewed during an on-the-job learning period, but this is not documented in writing. <b>The training programme for driving performance should be documented.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	Will be ready in 2010.
<b>Recommendation Nr. S267</b>	The floor hatch that came off at the joints caused severe injury to one passenger. The floor hatches of articulated trams are not locked. In order to ensure that the hatches do not come off in collisions and similar accidents. <b>It should be ensured that tram floor hatches remain fastened in all conditions.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	Fastening of hatches in articulation part has been solved, designing of the fastening of other hatches is not yet ready.
<b>Recommendation Nr. S268</b>	Six tram passengers received wounds that would have required bandages to stop the bleeding. Tram drivers have first-aid skills, and some of the passengers had a health-care education, but neither tram was equipped with a first-aid kit. <b>All trams should be equipped with a first-aid kit.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	Will be ready in 2010.

<b>Date and time (Code):</b>	Safety Study S1/2008R
<b>Location:</b>	Kouvola remote control

**Liite 1/20 (20)**

<b>Type of occurrence:</b>		Incident, traffic control safety deviations
<p><b>Summary:</b> On 21 August 2008, the Accident Investigation Board decided to start a safety study on traffic control safety deviations observed in Kouvola, Finland. The basis for the study was a VR Group Ltd letter sent to the Accident Investigation Board, dated 17 June 2008, in which VR Group expressed its concern about the possible route automation and safety system malfunctions observed in Kouvola Centralised Traffic Control.</p> <p>Initially, the investigation commission was tasked with investigating two safety deviations that had been observed before the initiation of the study. However a third incident occurred during the early stages of the study, and the decision was made to include it within the scope of the study.</p> <p>The first deviation occurred on 25 April 2008 at Järvelä station on the Lahti–Riihimäki section of line. During shunting, a route automation memory function generated an unexpected train route setting leading to the turning of the turnouts in front of the shunting unit's intended route.</p> <p>The second deviation occurred on 23 May 2008 on the Lahti–Riihimäki section of line, between the Hakosilta junction and Lahti station. A commuter train that had departed from Lahti station toward Riihimäki was issued with the number and train route of another commuter train that was awaiting its departure time at the station.</p> <p>The third deviation was observed on 6 September 2008 on the Kerava–Lahti directr line on the southern side of the Hakosilta junction. Two trains were proceeding toward Lahti with only one block section between them. At the boundary between two interlocking areas on the southern side of the junction, the number of the train travelling first was replaced in the traffic control system with the number of the latter train.</p> <p>The investigation revealed that the deviations involved software in all of the cases. The system manufacturers have also confirmed these observations. In connection with the investigation of these cases the investigation commission also reviewed the deviation management procedures for handling this kind of deviations and the role of different parties in the information system management. The conclusion was that the deviation management process was inadequate.</p>		
<b>Final report issued:</b>		
<b>Recommendation Nr. S269</b>	In the deviation management system currently in use information about a deviation does not always reach all the relevant parties. It is possible that even documented deviations may not be handled. Also, some deviations has been undocumented. The informing of procedures related to the deviation management has been inadequate.	
	<b>The organisations responsible for the ownership, use, and maintenance of traffic control and safety equipment systems should improve and clarify the procedures by which deviations are identified and managed.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	
<b>Recommendation Nr. S270</b>	Several parties from the Finnish Rail Administration and VR Group participate in the traffic control system procurement and management. The organising of work packages and the assignment of project ownership and responsibilities over the life cycles of the systems are unclear. The centralisation of traffic control requires continuous introduction of new automation and information technologies. The deviations investigated have involved shortcomings in system user instructions as well as difficulties for the users to identify problematic situations on the display screens. The responsibility for ensuring that the systems function properly and that the corrective actions are monitored should be placed near the end users.	
	<b>The experts using traffic control systems on a daily basis should participate in the specifications, inspections, and start-up activities of these systems and also take part in the system administration during the life-cycle of the system.</b>	
<b>Date</b>	<b>Status</b>	<b>Comments</b>
19.2.2010	In progress	