NIB ANNUAL REPORT 2013

Safety Investigation Authority

FINLAND

PREFACE TO THE REPORT

This is the annual report of railway sector of the Safety Investigation Authority, Finland for calendar year 2013.

National investigation ID

From the beginning of year 2012 the identifying of accident investigation reports has been changed.

The new identifier

Accident/incident categories

L - Aviation accidents and incidents
R - Rail accidents and incidents
M - Marine accidents and incidents
Y - Other accidents and incidents
S - Safety study

Investigation identifier

Each investigation is designated by an identifier that consists of three parts, such as R2012-01.

- The first part refers the accident category (L, R, M, Y or S).
- The second part refers to the year of the accident.
- The third part is a sequence number referring to the order of the accident within its accident category in the year in question.

The old identifier

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.

CONTENTS

1 INTRODUCTION TO THE INVESTIGATION AUTHORITY

1.1 Legal Basis

The Safety Investigation Authority, Finland was founded in 1996 in connection with the Ministry of Justice. The tasks of the Safety Investigation Authority are specified in the relevant act (525/2011), which also include overall directions on the methods of investigation to be implemented. In Finland the Safety Investigation Authority is a multimodal investigation authority, which investigates aviation, maritime, rail and other accidents and incidents. The Safety Investigation Act also provides for the procedure to be followed in the event of exceptional and very serious events that, while not accident, had threatened or seriously damaged basic function in society.

The current Safety Investigation Act is in harmony with to the Railway Safety Directive.

1.2 Role and Mission

The purpose of the safety investigation is to promote general safety and to prevent any new accidents from occurring.

The safety investigation is conducted by the Safety Investigation Authority (SIAF). The safety investigation examines the course of events related to the accident or incident, their causes and consequences, and the search and rescue actions as well as the actions taken by the authorities. The investigation specifically examines whether safety had adequately been taken into consideration in the activity leading up to the accident and in the planning, manufacture, construction and use of the equipment and structures that caused the accident or incident or at which the accident or incident was directed. The investigation also examines whether the management, supervision and inspection activity had been appropriately arranged and managed. If necessary, the investigation also examines possible defects in the provisions and orders regarding safety and the authorities. The goal of the investigation is to discover factors and background causes contributing to the accident or incident in addition to its immediate cause, which may be found in e.g. the organisation, the instructions or the working methods.

When making the decision on whether to start the safety investigation, the seriousness of the incident and the probability that it will recur is taken into account. An incident or hazard with only minor consequences should be investigated if it caused a danger to several people and it is judged that the investigation will generate information that is significant in improving general safety and preventing accidents. The Safety Investigation Authority does not normally investigate incidents that have been caused deliberately or occur as a result of an offence.

The end result of the safety investigation is an investigation report. At the end of the report, there are safety recommendations addressed to the appropriate authorities and other agencies. The safety recommendations summarise the views of the investigators on how similar accidents and incidents can be avoided in the future. The Safety Investigation Authority monitors that the recommendations are implemented. The purpose of

the safety investigation is to promote general safety, prevent further accidents and incidents, and prevent losses caused by the accidents.

Safety investigations are not conducted to allocate legal liability. Other authorities and agencies are responsible for that task.

The task of the Safety Investigation Authority

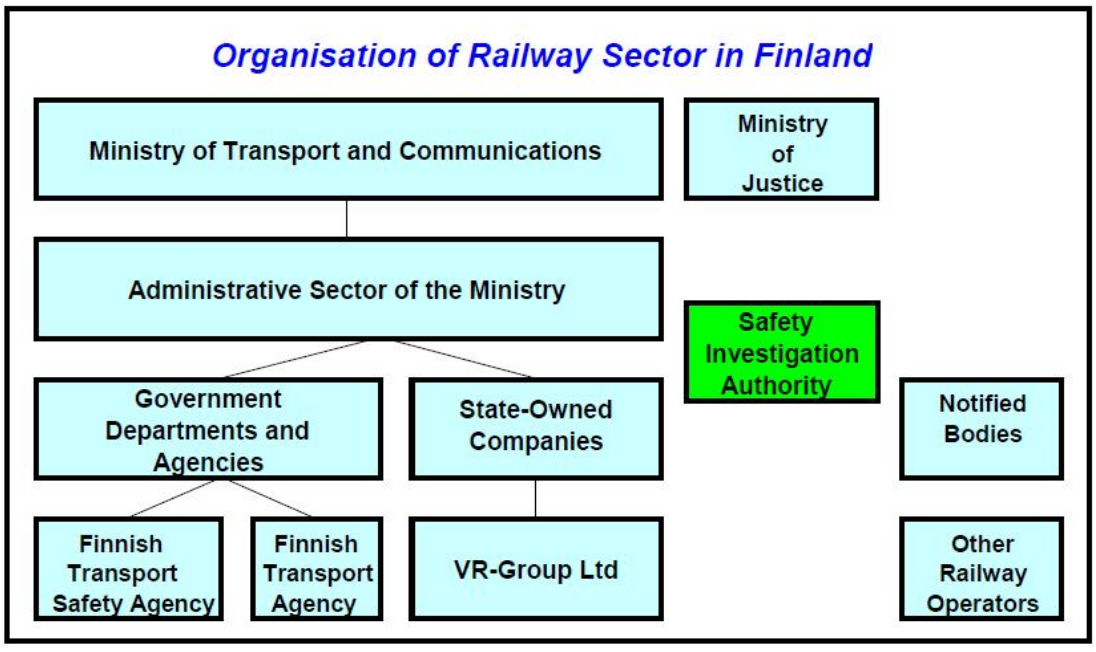
The Safety Investigation Act (525/2011) defines the task and the mandate of the Safety Investigation Authority. The Safety Investigation Act of Finland provides for the types of accidents and incidents investigated by the Safety Investigation Authority and how they are investigated.

The task of the Safety Investigation Authority is to investigate all major accidents and serious incidents regardless of their type, as well as aviation, rail traffic and maritime traffic accidents and incidents.

The Safety Investigation Authority

- Ensures the general organisation, planning, guidance, provision of information, and supervision of the safety investigation
- Trains persons suitable to be investigators
- Maintains the readiness to quickly initiate an investigation
- Attends to international cooperation connected with the safety investigation field
- Issues safety recommendations and monitors their implementation.

1.3 Organisational flow



2 INVESTIGATION PROCESSES

2.1 Cases to be investigated

Accidents and incidents to be investigated:

- **Rail traffic accident**, which due to deaths or injuries, the extent of damage incurred to the environment, property or assets, or nature of the accident can be regarded as particularly serious (**major accident**)
- **Serious railway accident** as specified in Article 3 of the Directive of the European Parliament and of the Council 2004/49/EC (Railway Safety Directive)
  - **train collision** (with another train, a shunting unit or an object or obstacle within the clearance gauge) or **derailment**, resulting in the death of at least one person or serious injuries to five or more persons, or extensive damage to the rolling stock, the infrastructure or the environment (in excess of EUR 2 million)
  - any other railway accident with similar consequences, which has an obvious impact on railway safety (safety regulation or safety management)
    - level crossing accident, resulting train derailment, or resulting in the death of at least one or serious injuries to five or more members of the train crew or passengers, or if the accident was result of failures within the railway system, or which due to deaths or injuries, the extent of damage incurred to the environment, property or assets, or nature of the accident can be regarded as particularly serious
    - accident to persons caused by rolling stock in motion at a station or railway yard (personnel, passengers), or in connection with a track maintenance operation (personnel)
    - fire in rolling stock when running between the departure station and the destination (including when stopped at the departure station, the interim and destination stops), and re-marshalling operations
    - other type of accident
- and **any similar accident in private or public rail traffic**
  - metro accident
  - tramway accident.
- A serious incident and another accident or incident may be investigated in accordance with the Safety Investigation Act.

2.2 Institutions involved in investigations

The Safety Investigation Authority, Finland can investigate all rail accidents. Those investigations are independent and reports are public. According to the Railway Act the Finnish Transport Safety Agency can investigate those occurrences SIAF does not investigate. Investigation reports are not public.

Level crossing accidents

Road accident investigation teams carry out the investigation of severe road and cross-country accidents in Finland, including level crossing accidents. Accidents resulting in serious injuries or only in material damages are also investigated. The objective is to produce information and safety suggestions to improve road safety through studying road and cross-country traffic accidents.

Investigation is regulated by legislation on the investigation of road and cross-country traffic accidents (Act on the investigation of road and cross-country traffic accidents, 24/2001). The investigation is steered and supervised by the Road Accident Investigation Delegation set up by the Ministry of Transport and Communications.

There are 20 investigation teams with a total of approximately 300 members. The members of investigation teams act to subject to liability and they have a duty of secrecy. The investigation teams do not take a stand on issues of liability or compensation.

In road accident investigation, the course of the accident, its risk factors, consequences and conditions are investigated in considerable detail. The investigation teams draws up an investigation report, which includes, for example, a description of the course of the accident, the results of the accident, and safety improvement proposals made by the investigation team.

The Finnish Motor Insurers' Centre takes care of the maintenance support of road accident investigation, the use of the investigation results and the information service. The data in the accident information register may be handed over without charge to be used in scientific and statistical research and in road safety work by the authorities. Unidentified or summed up data can also be used for other road safety work.

In addition to that what has been told above about the investigation of road and cross-country accidents, we would like to mention, that SIAF can investigate any accident which has taken place in Finland, including road and cross-country accidents. When SIAF has initiated an investigation, another authority or instance that has initiated its safety investigation shall transfer to SIAF the investigation materials that it has compiled. SIAF has investigated about 80 level crossing accidents and made four safety studies on level crossing accidents.

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	0	0	0	0	
Derailments	2	0	0	657 000	
Level crossing accidents	51*) (5 fatal)	6	6	125 000**)	
Other	1	0	0	0	

*) Belongs to the safety study on level crossing accidents.

**) Only railway side.

3.2 Investigations completed and commenced in 2013

Investigations completed in 2013

Date of occurence	Title of the investigation (Occurrence type, location)	Legal basis	Completed (date)
22.5.2012	Derailment of turnout transport wagons in the Riihimäki railway yard on 22 May 2012 and Kouvola railway yard on 28 June 2012	III	26.6.2013
19.10.2012	Incident in train traffic at Vammala station on 19 October 2012	III	29.8.2013

The Legal Basis for the decision to investigate accident/incident:

I National rules imposed by implementing of the Safety Directive
- (a) in light of Article 19, §1 of SD
- (b) in light of Article 19, §2 of SD
  - (1) the seriousness of the accident or incident
  - (2) it forms part of a series of accidents or incidents relevant to the system as a whole
  - (3) its impact on railway safety on a Community level
  - (4) requests from infrastructure managers, the safety authority or the Member State
- (c) in light of Article 21 of SD
  - (§5) cross-border investigation or request to assistance
  - (§6) other reasons than those referred to in Article 19

II Other national rules/regulations (covering possible areas excluded in Article 2, §2 of the SD)
- (a) metros, trams and other light rail systems
- (b) networks that are functionally separate from the rest of the railway system
- (c) privately owned railway infrastructure that exist solely for use by the infrastructure owner for its own freight operations.

III Other national rules/regulations not referred to the Safety Directive.

Investigations commenced in 2013

Date of occurence	Title of the investigation (Occurrence type, location)	Legal basis
6.4.2013	Derailment of 13 wagons of a freight train at Vammala station on 6 April 2013	I(b)(1)
7.11.2013	Collision of a freight train with an excavator in Pännäinen on 7 November 2013	I(b)(2)

The Legal Basis for the decision to investigate accident/incident:

I National rules imposed by implementing of the Safety Directive
- (a) in light of Article 19, §1 of SD
- (b) in light of Article 19, §2 of SD
  - (1) the seriousness of the accident or incident
  - (2) it forms part of a series of accidents or incidents relevant to the system as a whole
  - (3) its impact on railway safety on a Community level
  - (4) requests from infrastructure managers, the safety authority or the Member State
- (c) in light of Article 21 of SD
  - (§5) cross-border investigation or request to assistance
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III Other national rules/regulations not referred to the Safety Directive.

3.3 Safety Studies completed and commenced in 2013

Safety Studies completed in 2013

Date of commission	Title of the Study (Occurrence type, location)	Legal basis	Completed (date)
30.1.2012	Safety study on level crossing accidents 2012	I(b)(2)	22.8.2013

Safety Studies commenced in 2013

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

3.4 Summaries of investigations completed in 2013

R2012-02

Derailment of turnout transport wagons in the Riihimäki railway yard on 22 May 2012 and Kouvola railway yard on 28 June 2012

At 3:09 a.m. on Tuesday 22 May 2012, a turnout transport wagon, positioned as the 16th wagon of a freight train and carrying two turnout elements with concrete sleepers, was derailed at the southern end of the Riihimäki railway yard. When the derailing occurred, the train was running through the yard's turnouts at a speed of 26 kmph. The derailed wagon and its load finally fell onto the adjacent track. The accident inflicted damage to the track and track equipment and significantly hindered railway traffic until the following evening.

About a month later, at 1:20 p.m. on 28 June 2012, a similarly loaded turnout transport wagon was derailed in the Kouvola railway yard. This wagon was the last car in a 20-car train. It was derailed when travelling through the turnout and finally toppled onto the adjacent track. The speed of the train at the moment of derailment was 14 kmph. Some changes were required to the hump yard arrangements, due to the track and track equipment being damaged. The accident did not significantly hinder train traffic.

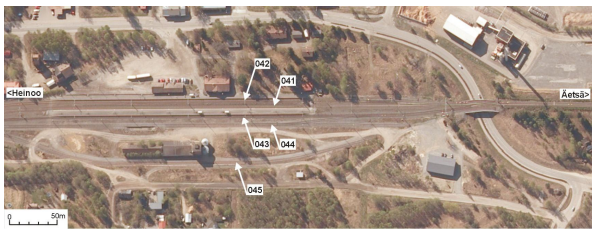
Imbalanced loading caused the sideways load balance distribution of the turnout transport wagon to be very uneven. The wheel-weight ratio was 1:1.96, meaning that wheels on one side were carrying almost double the load compared to wheels on the other side. This caused the frame of the wagon to lean heavily on the side bearer blocks placed on top of the bogies. Due to the remarkable imbalance, significant friction was generated between the frame and side bearer block. This friction made it difficult for the bogies to turn when travelling on curves and through turnouts.

The wagon's bogie pivot centres were also rather dry and somewhat rusty. This required the use of more force for turning the bogie.

In the Riihimäki accident, the head of the rail was cracked at the spot where the derailment occurred. In Kouvola, the turnout at the derailment spot was in poor condition, featuring wear exceeding the allowed measurement values. Moreover, the track featured dents of varying depth around the turnout. These flaws and wear contributed to the wheel flange rising on top of the rails. Similar turnout transports with imbalanced loads have been previously carried out without any problems. This fact supports the notion that wear and flaws in the track played a key role in the accidents.

In order to avoid similar accidents in the future, the Safety Investigation Authority, Finland recommends the following:

- The turnout transport wagon should be modified in such a manner that it can transport turnout elements, while ensuring that the wheel weight ratio complies with general loading instructions (1.25:1 at maximum).
- Drafting of the turnout transport wagon's loading instructions should be completed so as to ensure that these instructions are unambiguous and precise and that compliance with them guarantees that loading is performed in accordance with the wheel weight ratio and rolling stock gauge determined in the general loading instructions.
- The risk assessment element of the safety management system should also extend assessment to existing standardised activities.
- In the turnout condition monitoring system, turnouts that have been found to be in poor condition should be repaired or replaced to ensure that they fulfil the measurement values and other requirements set for turnouts.
- Unambiguous operational instructions regarding maintenance and traffic limitations should exist for cases in which the measurement values and acute limits determined for turnouts are exceeded.



R2012-03

Incident in train traffic at Vammala station on 19 October 2012

An extensive railway line superstructure project of long duration was under way between Lielahti and Kokemäki section of line. At times, a great deal of stock was present in the same area of this large work site, requiring careful consideration of the repository for stock between shifts. When choosing repository for these maintenance machines, the aim was to minimise journeys to work sites. After the workday of Friday 19 October 2012, machinery used for superstructure work was driven for storage onto track 043 of Vammala station. Use of track in traffic usage for the storage of machinery between shifts had been agreed earlier at a trackwork meeting. However, the traffic controller was to be informed separately each time trackwork machines were left on the track.

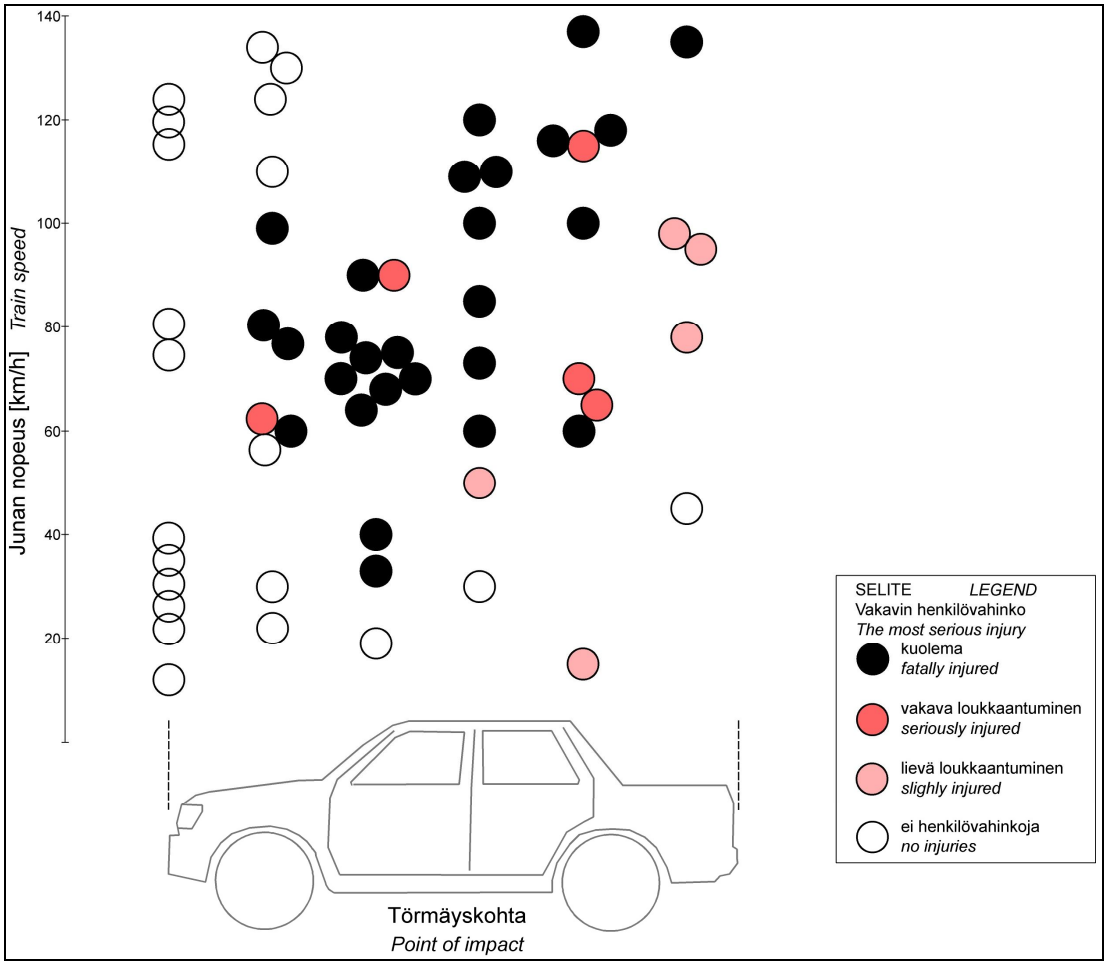
As trackwork ended on the afternoon of Friday 19 October 2012, the trackwork supervisor and traffic controller held a telephone conversation on axle counting sections still occupied after the trackwork. The trackwork supervisor reported that all occupied sections could be released. The traffic controller gave emergency release commands to reset axle counters of occupied turnout and track sections. Such a command was also given for track section 043 of Vammala station. At 4.38 pm, an incident developed at Vammala station when, according to its route, a freight train approaching the Vammala railway yard from Äetsä was supposed to switch to secondary track 043, to await oncoming traffic. Upon arriving at the Vammala station entry turnout, the engine driver noted the presence of the machinery on the safety track to the left and, soon after, that track 043 was also full of maintenance machines. At this point, the machinery was around 100 metres away. The engine driver braked and the train stopped around 50 metres from the machines on the track. After having to reverse back onto the line, the train was driven onto track 041 at Vammala. Due to this situation, the passing of oncoming traffic could not be organised as planned.

The direct cause of this incident was the release of the track sections occupied by the maintenance machines with emergency release commands. This enabled later to set a route towards the machines on track 043 of Vammala station. A factor in the incident was the trackwork supervisor's forgetting to notify the traffic controller of the machinery on the track – the traffic controller was therefore unaware of its presence. Protection command enabled by the railway safety device system were not used in order to protect the work site – such a system could have been used to maintain information on the track's occupied status or to prevent to set train routes. When clearing the occupied track sections, the traffic controller and trackwork supervisor did not go through the status of each track section individually. Both parties acted in a routine-based and very rapidly manner. These factors increased the chances of an error being made. The trackwork supervisor had a large number of tasks to remember and releasing the track for use by traffic was the final task of the working week. These factors too increased the chances that something would be forgotten.

In order to avoid similar incidents and possible accidents, the Safety Investigation Authority (SIA) recommends that the Finnish Transport Safety Agency (Trafi) ensure that the following recommendations are implemented:

- The Finnish Transport Agency should ensure that the command based track blocking is used effectively in centralised traffic control.
- The Finnish Transport Agency should identify the best practices for resetting axle counting after trackwork and should include these practices in the railway traffic control manual.
- The Finnish Transport Agency should ensure that traffic restriction notifications are also used when stock is stored on tracks in traffic usage.
- The Finnish Transport Safety Agency should ensure that concrete guidance is given on risk management procedures, that those engaged in various activities are familiarised with these instructions and that the implementation of risk management procedures is monitored.

R2012-S1 Safety study on level crossing accidents 2012



Seriousness of personal injury in level crossing accidents, categorised by point of impact and train speed. (Leading to deaths 2007–2012, others 2012.)

In 2012, a total of 51 level crossing accidents occurred. This is around 30 per cent higher than the average for the previous five years.

All of the accidents leading to serious personal injury occurred on the railways, where the average speed of railway vehicles is usually high (80–140 km/h). Six people died in the five fatal accidents. Six people were seriously injured.

Over a third of the accidents occurred during shunting work, where the speed of railway vehicles is usually low (35 km/h at maximum). The majority of shunting work related accidents occurred in harbour and industrial areas.

In one fifth of the accidents, a motor vehicle collided with the side of a railway vehicle. No personal injuries were sustained in these accidents. In most of the side collisions, the accident was caused by a vehicle sliding on a slippery road surface. The highest number of accidents occurred in December.

One third of the accidents that occurred at passive level crossings occurred at level crossings equipped with a STOP sign. In half of these cases, the driver of the vehicle failed to heed the STOP sign's obligation to stop. The valid guidelines do not unambiguously determine the use of STOP signs at level crossings.

For accidents that occurred at level crossings without warning devices and a STOP sign, 75 per cent of these accidents were caused by the vehicle driver's failure to properly observe or assess the scene, while 20 per cent were caused by too high a speed and the resulting slide on the tracks despite attempts to brake.

In 2012, a total of 114 permanent level crossings were removed from Finland's main railway lines. The majority of these removals and safety measures were related to increased speed limits on these railway line sections. No funds are separately budgeted for the removal and safeguarding of level crossings. By the end of 2012, there were a total of 3,581 level crossings in Finland, 78 per cent of which did not feature warning devices.

The Safety Investigation Authority gives one new recommendation for the improvement of safety in the future: *SIA recommends that the Finnish Transport Safety Agency enables the implementation of low-cost warning devices and ensures that the Finnish Transport Agency continues its research into the suitability of low-cost warning devices and begins implementing these devices.*

In addition, SIA reiterates two recommendations issued previously:

- S309: *A new strategy should be drawn up to improve level crossing safety, and a concrete plan with funding arrangements should be drafted based on this strategy.*
- S315: *Clear instructions should be drawn up regarding road traffic speed limits and use of the STOP sign at level crossings.*

3.5 Comment and introduction or background to the investigations

Investigations commenced in 2013 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)**
	-			

3.6 Accidents and incidents investigated during last five years (in 2009–2013)

Rail investigations in 2009–2013

Accidents investigated		**2009**	**2010**	**2011**	**2012**	**2013**	**TOT**
Serious accidents (Art 19.1)	Train collision	0	0	1	0	0	**1**
	Train collision with an obstacle	0	1	0	0	0	**1**
	Train derailment	1	0	0	0	0	**1**
	Level crossing accident	8	3	1	4	0	**16**
	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[1]	0	0	1	0	0	**1**
Other accidents (Art 19.2) + (Art 21.6)	Train collision	0	0	1	0	0	**1**
	Train collision with an obstacle	0	0	0	0	1	**1**
	Train derailment	0	3	1	3	1	**8**
	Level crossing accident	0	1	3	37	0	**41**
	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[1]	0	0	0	0	0	**0**
	Incidents	1	0	0	1	1	**3**
TOTAL		**12**	**8**	**7**	**45**	**2**	**74**

3.7 Preliminary investigations

The Safety Investigation Authority has made, in compliance with section 8 of the Safety Investigation Act (525/2011, preliminary investigations. The SIAF has decided on the basis of a preliminary investigation, that the special characteristics of the case do not require the starting of the full investigation, but the report on the preliminary investigation is sufficient from the point of view of the safety advantage to be obtained. In the report is described briefly the events which have led to the accident and the immediate and indirect causes, which have been found in the preliminary investigation. In the reports there

[1] Belongs also to another category and is not calculated another time to the total amount.

are not issued recommendations, but observations and suggestions for the measures to the actors. The reports published only in Finnish.

In 2013 we started to publish reports of preliminary investigations in SIAF internet pages. At the same time we developed content and layout of the report.

During the year SIAF made three preliminary investigation reports of which were published in the internet:

R2013-E1 Hitting of an excavator in track work to side of a passenger train in Malminkartano on 17 June 2013 (published 23.9.2013).

R2013-E2 Train traffic incident in Kouvola railway yard on 2 August 2013 (published 1.11.2013).

R2013-E3 Derailment of the first wagon´s first bogie of a departing freight train in Siilinjärvi on 17 September 2013 (published 6.2.2014)

3.8 Fatal level crossing accidents investigated by the road accident investigation teams

In 2013 occurred a total of 34 level crossing accidents, two of them were fatal. Two persons injured fatally in the accidents, one injured seriously and ten injured slightly. The road accident investigation teams steered and supervised by the Road Accident Investigation Delegation, investigated both of the two fatal level crossing accidents. Below short summaries of the fatal level crossing accidents:

Fatal level crossing accident in Rauma on 6 May 2013

On Monday, 6 May 2013, a level crossing accident involving a van and a freight train occurred on the Äyhö level crossing in Rauma. The level crossing was equipped with half-barriers. The accident was fatal to the van driver. The van was wrecked and burnt beyond repair. Also the electric locomotive of the train sustained significant damages because of the fire. Damages totalling € 500,000 was caused to the locomotive.

The direct cause (*the key event*[2]) of the accident was that the van driver advancing onto the level crossing drove through the barrier. It is likely that the van driver completely failed to notice the freight train approaching from the left (*immediate risk factor*[2]). This may have been due to the following *background risk factors*[2]:

- the angle of crossing
- the driver was focused on something other than making a safe crossing
- the sun shining in the driver's face blinded the driver.

In order to prevent similar accidents, the investigation team made the following improvement proposals:

- The blinding of the driver from the sun is with means of vehicle engineering to be prevented.

[2] Terms used by the road accident investigation teams.

- Repair of the road route straight towards the railway.
- The warning lights should be changed into LED-lamps.
- Removal of the level crossings.
- Developing of the telephone technology so that it would not be possible to use the telephone when driving.
- Developing of the systems which warn of the crashes.

Fatal level crossing accident in Ylistaro on 12 July 2013

On Friday, 12 July 2013, a level crossing accident involving a car and a diesel locomotive occurred on the Tuppela passive level crossing in Ylistaro. The accident was fatal to the car driver. The car was wrecked beyond repair. The locomotive sustained minor damage.

The direct cause (*the key event*) of the accident was that the car driver advancing onto the level crossing without stopping at the STOP sign. It is likely that the car driver completely failed to notice the locomotive approaching from the left (*immediate risk factor*).

In order to prevent similar accidents, the investigation team made the following improvement proposals:

- The level crossings should be built as overpasses on main railway lines.
- The speed limit of trains should be lowered to 80 km/h in those sections of line in which there are unguarded crossings.

4 RECOMMENDATIONS

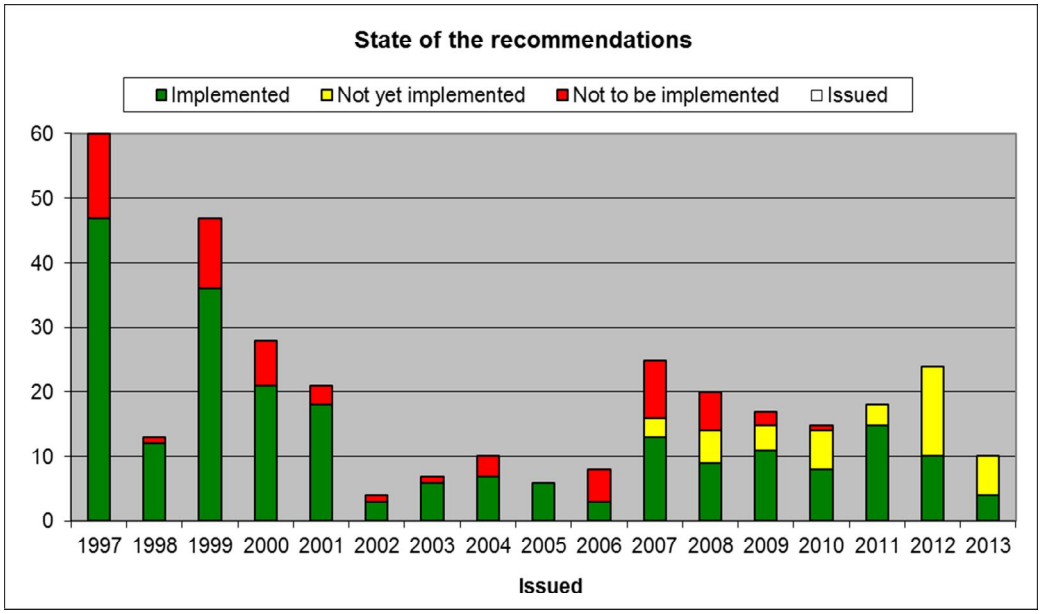
4.1 Short review and presentation of recommendations

Implementation of recommendations during 2007–2013

Recommendations issued		Recommendation implementation status					
		Implemented		In progress		Not to be implemented	
Year	[No.]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2007	25	13	52	3	12	9	36
2008	20	9	45	5	25	6	30
2009	17	11	65	4	24	2	12
2010	15	8	53	6	40	1	7
2011	18	15	83	3	17	0	0
2012	24	10	42	14	58	0	0
2013	10	4	40	6	60	0	0
TOTAL	**129**	**70**	**54**	**41**	**32**	**18**	**14**

Implementation status of Recommendations, see Annex 1

A total of 333 recommendations were issued from the beginning of 1997 until the end of 2013. According to information available at 10 March 2014, 229 (68.0 %) recommendations were implemented and 63 (18.7 %) were decided not to be implemented. The fulfilment of recommendations can take time, as indicated by the fact that, of the 204 recommendations issued from 1997–2006, 159 (77.9 %) had been implemented by the end of 2013 and 45 (22.1 %) were decided not to be implemented.



4.2 Recommendations 2013

S328 Changes to the turnout transport wagon

According to calculations, the turnout transport wagon could not be loaded with all of the turnout elements in a manner that would ensure a stable, even load, with the load remaining within the permitted rolling stock gauge and the weight wheel ratio staying under 1.25:1.

For this reason, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency ensure that VR Track Oy takes the required actions to implement the following recommendation:

The turnout transport wagon should be modified in such a manner that it can transport turnout elements, while ensuring that the wheel weight ratio complies with general loading instructions (1.25:1 at a maximum). [R2012-02/S328]

This could be implemented by changing the loading plane and/or installing counterweights in the wagon.

Calculations regarding different turnout elements must be performed on the modified wagon. Moreover, weighing tests as extensive as considered necessary must be performed using an appropriate scale, in order to ensure the weight wheel ratio. The modifications to the structure of the wagon require the approval of the supervising authority.

S329 Loading instructions for turnout transport wagons

VR Track Oy is currently in the process revising its instructions on the loading of turnout elements. These loading instructions should fulfil the railway traffic safety requirements.

In order to ensure that the instructions are implemented correctly, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency ensure that VR Track Oy takes the required actions to implement the following recommendation:

Drafting of the turnout transport wagon's loading instructions should be completed so as to ensure that these instructions are unambiguous and precise and that compliance with them guarantees that loading is performed in accordance with the wheel weight ratio and rolling stock gauge determined in the general loading instructions. [R2012-02/S329]

New transported turnout element types must undergo calculations and a weighing test using an appropriate scale, in order to ensure the wheel weight ratio.

Dedicated loading instructions should be drawn up for all turnout elements, clearly indicating which elements may be loaded onto the same wagon. Only one set of instructions regarding these matters, used by everyone, should exist.

Training on turnout loading should be provided for everyone who needs it, and the placement of different turnout elements in the wagon should be indicated by painting the outlines of each element in the loading plane, for instance.

S330 Safety management system risk assessment

Risk assessment had failed to recognise the overall effects of concrete-sleeper elements on transports. There has been some recognition of these issues, but not regarding the load imbalance, for instance. When concrete sleepers became building parts for turnout elements, the current safety management systems were not yet in use.

In some instances, the imbalance was recognised, but the notion of the seriousness of the matter, and information on it, were not distributed in a way which would bring unified changes to loading methods, instructions and training. Factors such as adjustable supporting poles and load-specific speed limits have been employed to alleviate this situation, but they were not mentioned in the loading instructions in general use.

Annual audits and the accountable parties mentioned in the manual would provide a good basis for the practical realisation of the planned practices mentioned in the comprehensive operating manual and the numerous detailed instructions the manual contains.

For this reason, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency ensure that VR Track Oy takes the required actions to implement the following recommendation:

The risk assessment element of the safety management system should also extend assessment to existing standardised activities. [R2012-02/S330]

It may also be useful to perform a risk assessment based on the limit values, such as length and imbalance of wagons.

S331 Turnout maintenance

The Finnish Transport Agency is responsible for monitoring the condition of turnouts. A system providing information on the condition of turnouts and potential replacements needs has been developed for this reason. However, this information is not being utilised in a manner that would result in the repair or replacement of all turnouts that have been found to be in poor condition.

For this reason, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency ensure that the Finnish Transport Agency takes the required action to implement the following recommendation:

In the turnout condition monitoring system, turnouts that have been found to be in poor condition should be repaired or replaced to ensure that they fulfil the measurement values and other requirements set for turnouts. [R2012-02/S331]

The Finnish Transport Agency's safety management system for railway operations already cites the description of practices for railway operations maintenance, which states: *If the required practices cannot be performed due to lacking resources, the maintenance provider must set speed and other limits necessary in order to ensure safety.* This also includes a ban on traffic operations, where necessary.

S332 Instructions for turnout maintenance

Monitoring of the condition of turnouts is largely based on the results of inspection measurements, performed at regular intervals. In addition to limit values, all turnout measurement values have acute limits, which allow for greater deviations. According to the railroad regulations and instructions (RATO), measurement values may not exceed acute limits. Unambiguous operational instructions should exist for cases in which normal maintenance limit values are exceeded, and these instructions should be strictly adhered to.

For this reason, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency ensure that the Finnish Transport Agency takes the required action to implement the following recommendation:

Unambiguous operational instructions regarding maintenance and traffic limitations should exist for cases in which the measurement values and acute limits determined for turnouts are exceeded. [R2012-02/S332]

If the practice of exceeding limit values and acute limits is considered generally acceptable, efforts should be made to clarify which turnout measurement values really are critical with regard to derailment, and whether traffic operations can be continued by performing certain measures.

S333 Low-cost warning devices

Equipping a level crossing with an automatic gate station is expensive, and removal of level crossings is not always possible at a reasonable cost. Alternative methods should be used to improve level-crossing safety. According to international experiences, it is possible to improve safety by means of warning devices that are less expensive than conventional safety devices.

SIA recommends that the Finnish Transport Safety Agency enables the implementation of low-cost warning devices and ensures that the Finnish Transport Agency continues its research into the suitability of low-cost warning devices and begins implementing these devices. [R2012-S1/S333]

Some experiments have been conducted in Finland. Similar experiments and studies have also been conducted in several other countries. The results obtained from this research should be used when selecting possible device alternatives. These devices should be suitable for Finnish conditions and also reliable, so as to preserve drivers' confidence in the functioning of warning devices. Level crossings without warning devices that have been identified as dangerous could be used as test level crossings.

S334 Use of command based track blocking

In this incident, maintenance machines had been stored on track being used for train traffic. The traffic controller was unaware of this. Storage of the machines had been agreed in an earlier trackwork meeting, at which a traffic control representative was present.

It is possible to use command based track blocking within signal boxes, which can restrict the route setting for trains. Command based track blocking can be activated and it function separately, even if the axle counting system is reset i.e. if a critical command is used to delete system information on the presence of stock on the section. Use of command based track blocking would also have been a good solution in an incident of the kind under discussion, in which a track in traffic usage was used long-term and repeatedly for other purposes.

The Finnish Transport Agency should ensure that the command based track blocking is used effectively in centralised traffic control. [R2012-03/S1]

Clear instructions on the use of command based prevention of driving, when stock is stored on tracks in traffic usage, should be included in the railway traffic control manual. In addition, traffic controllers should be trained accordingly.

S335 Procedures for resetting axle counting system

No set of clear instructions exists for resetting an axle counting system after trackwork.

The Finnish Transport Agency should identify the best practices for resetting axle counting after trackwork and should include these practices in the railway traffic control manual. [R2012-03/S2]

It should be forbidden to execute several, consecutive resets without going through each location with the trackwork supervisor. Separate line sections and tracks for each station should be gone through separately. This is particularly important in extensive trackwork projects, where permits cover several complete sections and stations.

S336 Use of traffic restriction notification

Information on long-term, exceptional situations affecting the work of the traffic controller should be made available at the workstations of traffic controllers. This would be particularly important in situations where traffic controllers' shifts are rotated around the various control stations in an area. An example is the present instance of maintenance machinery being stored on tracks used by train traffic.

A traffic restriction notification (TR notification) exists for such situations. Among other details, in the case of a TR notification, it’s existence should be marked in the related trackwork (TW) notification. Such a notification should be valid for as long as the factors restricting rail traffic last. While valid, TW and TR notifications must be kept in sight of the traffic controller.

The Finnish Transport Agency should ensure that traffic restriction notifications are also used when stock is stored on tracks in traffic usage. [R2012-03/S3]

This issue should also be included in the railway traffic control manual and the Track Maintenance Safety Instructions (Radanpidon turvallisuusohjeet (TURO)).

S337 Practical implementation of risk management practices

During the YTM (General Safety Procedure) for the trackwork project, risks to train safety were identified and the related risk management measures were logged, but in practice these were not implemented in full.

The Finnish Transport Safety Agency should ensure that concrete instructions are created for planned risk management procedures, that those executing the procedures are familiarised with them, and that the implementation of risk management procedures is monitored. [R2012-03/S4]

RECOMMENDATIONS

Date and time (Code):	30.3.2005, 4.07 (B1/2005R)		
Location:	Between Saakoski and Jämsänkoski		
Type of occurrence:	Derailment of car		
Train type and number:	Passenger train 802, locomotive Sr1 + 7 car		
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	3	
	Passengers:	≈50	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	Derailed wagon and its bogie damaged.		
Damages on track equipment:	About 1 200 meters of track were damaged.		
Other damages:	None		

***Summary*:** 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.

Final report issued:	15.1.2007

Recommendation Nr. S212	**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.**	
Date	***Status***	***Comments***
20.1.2009	In progress	Under process.
19.2.2010	In progress	Will be taken into consideration in ERC Administration's TOTI project.
16.6.2011	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure.
9.2.2012	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure. Next meeting last part of this year.
19.9.2013	In progress	Will be implemented in the end of year 2014.
10.3.2014	In progress	Will be implemented in the end of year 2014.

Date and time (Code):	17.1.2007, 10.52 (B1/2007R)		
Location:	Närpiö, Kallmossvägen / Karlå level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – van		
Train type and number:	Freight train 3273, two Dv12 diesel locomotives and 35 wagons		
Road vehicle:	Van Opel Astra, 2001 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	0	0
Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The locomotive suffered minor damage while the van was wrecked beyond repair.		
Damages on track equipment:	None.		

Other damages:	Deliverable post was lost and damaged.	
***Summary*:** 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.		
Final report issued:	23.11.2007	
Recommendation Nr. S225	Level crossings and other dangerous locations should also be taken into consideration when mail is sorted route-specifically.	
	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.	
Date	***Status***	***Comments***
20.1.2009	In progress	
16.6.2011	In progress	
9.2.2012	In progress	
19.9.2013	**IMPLEMENTED**	STOP-mark between papers.
Recommendation Nr. S227	Using the safety belt in an accident, even when driving at moderate speeds, may prevent injury or death.	
	Compulsory use of safety belts should be expanded to include delivery vehicle drivers and passengers, irrespective of the driving distance.	
Date	***Status***	***Comments***
20.1.2009	In progress	Finnish Transport and Logistics supports because of safety reasons.
16.6.2011	In progress	
9.2.2012	In progress	
19.9.2013		
10.3.2014		

Date and time (Code):	5.3.2007, 14.39 (B2/2007R)		
Location:	Nivala, Niskakankaantie / Pahaoja level crossing, unprotected		
Type of occurrence:	Level crossing accident, Passenger train – car		
Train type and number:	Local train H494, Dm12 rail bus		
Road vehicle:	Passenger car Renault Laguna Break 1.6, 2000 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	25	1
Fatally injured:	***Crew:***	0	1
	Passengers:	0	1
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Slight damages to the rail bus, the car was completely wrecked.		
Damages on track equipment:	None.		
Other damages:	None.		
***Summary*:** 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.			
Final report issued:	23.11.2007		
Recommendation Nr. S228	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.		
	The Pahaoja unguarded level crossing should be equipped with a half barrier equipment.		

Date	*Status*	*Comments*
20.1.2009	In progress	RHK is not going to install the level crossing with barriers.
16.6.2011	In progress	Nivala town is of the opinion that the level crossing should be equipped with half barriers.
9.2.2012	In progress	
19.9.2013		
10.3.2014		

Date and time (Code):	6.5.2007, 15.33 (B4/2007R)		
Location:	Kiuruvesi, Pohja level crossing, unprotected		
Type of occurrence:	Level crossing accident, passenger train - car		
Train type and number:	Regional train 746, two Dm12rail busses		
Road vehicle:	Car Nissan Almera 4D Sedan, 2005 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	≈60	1
Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	1
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The car was wrecked beyond repair. Equipment of the train's nose and substructure were damaged		
Damages on track equipment:	The wooden covering on the level crossing sustained minor damage.		
Other damages:	None		

***Summary*:** 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.

Final report issued:	29.1.2008

Recommendation Nr. S234	Since the Pohja level crossing is dangerous with regard to its conditions and very near a safe overpass, the investigation commission recommends:	
	The Pohja level crossing should be closed and a replacement overpass be created at the Hilapparannantie bridge.	
Date	***Status***	***Comments***
20.1.2009	In progress	
19.2.2010	In progress	
18.8.2011	In progress	
9.2.2012	In progress	
19.9.2013		
10.3.2014		

Date and time (Code):	9.3.2007, 16.13 (B3/2007R)		
Location:	Särkisalmi, Sinkonen level crossing, unprotected		
Type of occurrence:	Level crossing accident, passenger train -- car		
Train type and number:	Regional train 746, Dm12-railcar		
Road vehicle:	Car Mercedes Benz 190D, 1985 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	34	1
Fatally injured:	***Crew:***	0	1
	Passengers:	0	1
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0

Damages of rolling stock:	The railcar's blockage bumper and automatic coupling of the rail bus were damaged, while the passenger car was severely damaged.
Damages on track equipment:	None
Other damages:	None

***Summary*:** 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.

Final report issued:	12.12.2007

Recommendation Nr. S237	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:	
	The Sinkonen level crossing located in the Särkisalmi residential area should be removed.	
Date	***Status***	***Comments***
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.
16.6.2011	Not yet implemented	The Parikkala municipality and Finnish Transport Agency do not agree on the matter.
9.2.2012	Not yet implemented	
19.9.2013	In progress	In municipal decision making process.
10.3.2014		

Date and time (Code):	31.12.2005, 9.14 (C9/2005R)		
Location:	Tuupovaara railway yard		
Type of occurrence:	Derailment		
Train type and number:	Shuntig unit, Dv 12 diesel locomotive and 11 wagons		
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1+1	
	Passengers:	0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	1	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	The derailed wagon suffered minor damages.		
Damages on track equipment:	None		
Other damages:	None.		

***Summary*:**. 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.

Final report issued:	15.4.2008

Recommendation Nr. S240		
	Greater attention should be paid to shunting work safety during the ploughing of snow in rail yards.	
Date	***Status***	***Comments***
20.1.2009	In progress	
18.8.2011	In progress	
9.2.2012	In progress	

19.9.2013	In progress	Project of occupational safety in railway yards has been started.
10.3.2014	**IMPLEMENTED**	Railway yard cooperation.

Date and time (Code):	13.8.2007, 15.15 (B5/2007R)		
Location:	Nurmijärvi, Röykkä, Leppälammentie / Korpi level crossing, unprotected		
Type of occurrence:	Level crossing accident, Freight train – car		
Train type and number:	Freight train 3649, 2 Dv12 diesel locomotives and 41 wagons		
Road vehicle:	Car Ford Sierra 2.0, 1990 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	0	1
Fatally injured:	***Crew:***	0	0
	Passengers:	0	1
Seriously injured:	***Crew:***	0	1
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Damages to the equipment of locomotive nose, private car entirely wrecked.		
Damages on track equipment:	None.		
Other damages:	None		

***Summary*:**.. 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.

Final report issued: 23.6.2008

Recommendation Nr. S241	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:	
	The Korpi level crossing should be equipped with half-barriers.	
Date	***Status***	***Comments***
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.
18.8.2011	Not yet implemented	No funding yet.
9.2.2012	Not yet implemented	
19.9.2013	In progress	No funding.
10.3.2014	In progress	No funding yet.

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

Damages of rolling stock:	The car was wrecked beyond repair. The front of the locomotive sustained some damage.
Damages on track equipment:	None.
Other damages:	None.

***Summary*:** 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.

Final report issued:	9.9.2008

Recommendation Nr. S243	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.	
	Actions to improve level crossing safety along the Lahti–Heinola track should be carried out before the initiation of scheduled renovation investments.	
Date	***Status***	***Comments***
20.1.2009	In progress	
19.2.2010	In progress	In some level crossings there has been reduced speed limit on roads.
18.8.2011	In progress	Lahti town proposes to make a level crossing plan and to enclose it to the building program in the next few years.
9.2.2012	In progress	
19.9.2013	In progress	Lahti town has made a level crossing and has decided to equip the worst level crossing with barriers.
10.3.2014		

Date and time (Code):	4.8.2007, 6.24 (C6/2007R)		
Location:	Siilinjärvi, Kemira GrowHow Oyj industrial railway yard		
Type of occurrence:	Derailment		
Train type and number:	Shunting unit, 3 Dv12 diesel locomotives + 6 tank wagons		
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1 + 2	
	Passengers:	0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	Tank isolation and bogies of the overturned wagon damaged. Minor damages to two other wagons.		
Damages on track equipment:	Derailer and 5 meter track damaged.		
Other damages:	None.		

***Summary*:** 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.

Final report issued:	28.10.2008

Recommendation Nr. S247	Right operation of the derailer should always be secured so that misuse could not be possible. Forgetting a derailer on should be hindered.	
	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.	
Date	***Status***	***Comments***
20.1.2009	In progress	No instructions exist.
18.8.2011	In progress	
9.2.2012	In progress	
19.9.2013	In progress	There will not be a direction which includes old equipment.
10.3.2014	**NOT TO BE IMPLEMENTED**	There will not be a direction which includes old equipments.

Date and time (Code):	6.10.2008 (B6/2007R)		
Location:	Kempele, Sohjanantie / Perälä level crossing, unprotected		
Type of occurrence:	Level crossing accident, Pendolino train – car		
Train type and number:	Pendolino S52, Sm3 electric motor train, 6 cars		
Road vehicle:	Car Volkswagen Polo, 1998 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	3	1
	Passengers:	38	0
Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Damages to the locomotive nose and the equipment of nose, the car entirely wrecked.		
Damages on track equipment:	None.		
Other damages:	None.		

***Summary*:** 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.

Final report issued:	29.12.2008

Recommendation Nr. S251	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:	
	The Perälä unprotected level crossing should be removed or replaced by an interchange.	
Date	***Status***	***Comments***
20.1.2009	In progress	The municipality will remove the level crossing during chancing the town plan.
18.8.2011	Not yet implemented	Will be removed in context of Seinäjoki-Oulu track project.
9.2.2012	Not yet implemented	
19.9.2013	In progress	Will be removed latest in year 2015.
10.3.2014	In progress	Will be removed latest in year 2015.

Date and time (Code):	25.2.2008, 9.53 (B1/2008R)		
Location:	Laukaa, Notkotie / Kauramaa level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – tractor		
Train type and number:	Freight train 3359, Dv12 diesel locomotive and 27 wagons		
Road vehicle:	Tractor Case IH 4240, 1997 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	0	0
Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The front of the locomotive sustained some damage, the tractor was totally wrecked.		
Damages on track equipment:	None.		
Other damages:	None		

***Summary*:** 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.

Final report issued:	26.1.2009

Recommendation Nr. S255	Two alternative routes in the vicinity of the Kauramaa level crossing offer safer access to agricultural fields surrounding the track.	
	The Kauramaa level crossing should be removed.	
Date	***Status***	***Comments***
19.2.2010	In progress	Laukaa community seconds the recommendation.
18.8.2011	Not yet implemented	The municipality of Laukaa and Finnish Transport Agency have not yet started discussions.
9.2.2012	Not yet implemented	
19.9.2013		
10.3.2014		

Date and time (Code):	25.9.2008, 16.18 (B6/2008R)		
Location:	Iisalmi, Suurisuo level crossing, protected, equipped with half barriers		
Type of occurrence:	Level crossing accident, passenger train – car		
Train type and number:	Passenger train IC78, Sr1 electric locomotive and 7 coaches		
Road vehicle:	Car Toyota Camry 4D sedan, 1998 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	4	1
	Passengers:	≈180	1
Fatally injured:	***Crew:***	0	1
	Passengers:	0	1
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The front and left side of the locomotive were damaged in the collision. The car was wrecked beyond repair.		

Damages on track equipment:	A column supporting the track's electric cables and its foundations incurred damage.
Other damages:	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

Recommendation Nr. S256	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.	
	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.	
Date	***Status***	***Comments***
19.2.2010	In progress	
18.8.2011	Not yet implemented	The town of Iisalmi supports the recommendation.
9.2.2012	Not yet implemented	
19.9.2013	In progress	The Finnish Transport Agency is not sure if led-light is better than ordinary lights.
10.3.2014		

Date and time (Code):	25.6.2008, 16.23 (B3/2008R)		
Location:	Liperi, Viinijärvi, Huikuri agricultural road / Huikuri level crossing, unprotected		
Type of occurrence:	Level crossing accident, passenger train – scooter		
Train type and number:	Regional train 784, Dm12 rail bus		
Road vehicle:	Scooter: Baotian BT49QT-7-TCAP7/49, 2006 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	≈20	0
Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The rail bus was slightly damaged; the scooter was wrecked beyond repair.		
Damages on track equipment:	The ploughing sign was bent		
Other damages:	None.		

***Summary*:** 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.

Final report issued:	7.9.2009

Recommendation Nr. S263	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.	
Date	***Status***	***Comments***
19.2.2010	In progress	
18.8.2011	In progress	
9.2.2012	In progress	
19.9.2013	In progress	No changes.
10.3.2014		

Date and time (Code):	Safety Study S1/2008R
Location:	Kouvola remote control
Type of occurrence:	Incident, traffic control safety deviations

Summary:. 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.

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 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.

Final report issued:	31.8.2009

Recommendation Nr. S269	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.	
Date	***Status***	***Comments***
19.2.2010	In progress	
16.6.2011	In progress	VR supports the recommendation.
9.2.2012	In progress	
19.9.2013	In progress	Will be implemented in 2014.
10.3.2014	In progress	Will be implemented in 2014.

Date and time (Code):	20.10.2008, 16.46 (C6/2008R)
Location:	Kerava, Helsinki Riihimäki section of line
Type of occurrence:	Incident

Train type and number:	Commuter train 9700, Sm4 electrical train		
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	
	Passengers:	?	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	None.		
Damages on track equipment:	One turnout was damaged.		
Other damages:	None.		

***Summary*:** On Monday, 20 October 2008, at 4:46pm, an incident occurred in the Kerava railway yard when an H-marked local train en route from Riihimäki to Helsinki passed an entry signal that was in the stop position and forced open the turnout.
The reason for passing the entry signal in the stop position and forcing open the turnout was that the H train's driver did not observe the stop signal, drove past the signal, and forced open the turnout after it.

Final report issued:	11.4.2010		
Recommendation Nr. S272	The bridge structures and the catenary suspension limit the visibility of the stop signal from the locomotive cab.		
	Signal E681 should be moved to a more visible location.		
Date	***Status***	***Comments***	
18.8.2011	In progress		
9.2.2012	In progress		
19.9.2013	In progress	Nothing has been done yet.	
Recommendation Nr. S274	The train driver's advance notification information (ET) did not provide sufficient details about the construction area. The information, for example, did not point out that the signal box was functioning as normal and also did not remind the driver that the visible signals should be followed.		
	Advance notification (ET) provided to the engine driver should provide more specific information about ATC construction area conditions.		
Date	***Status***	***Comments***	
16.6.2011	In progress	ET reported in the main message that the ATP is off.	
9.2.2012	In progress		
19.9.2013	In progress	In 2015 tablet computers to drivers; will make the situation better.	
10.3.2014			
Recommendation Nr. S275	The information provided by the locomotive's running control as the train approached the ATC construction area was incomplete.		
	The running control monitors of locomotives and the information provided via these monitors should be developed in such a way that they provide better information during non-standard situations.		
Date	***Status***	***Comments***	
18.8.2011	In progress		
9.2.2012	In progress		
19.9.2013	In progress	In 2015 tablet computers to drivers; will make the situation better.	
10.3.2014	In progress	In 2015 tablet computers to drivers.	

Date and time (Code):	11.2.2009, 15.12 (B1/2009R)		
Location:	Pori, Kyläsaari / Teurastamo level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – car		
Train type and number:	Freight train 3864, diesel locomotive Dv12		
Road vehicle:	Private car Volvo S40, 1997 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	1	2

Fatally injured:	***Crew:***	0	0
	Passengers:	0	2
Seriously injured:	***Crew:***	0	1
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Minor damages to the locomotive. Car was entirely wrecked.		
Damages on track equipment:	None.		
Other damages:	None.		

***Summary*:** A level crossing accident took place at the unprotected level crossing of Teurastamo on the Mäntyluoto–Pori track and Pikakyläntie road on Wednesday, 11 February 2009, at 3.12 p.m. The engine driver emergency braked 29 metres before the collision, when the car had disappeared from his sight. The locomotive hit the middle of the car's right side, not being able to reduce speed before the collision. The car clung to the front of the locomotive and travelled in front of it for 223 metres, until the locomotive stopped. Two passengers in the car suffered fatal head injuries in the accident, and the driver was seriously injured. The locomotive suffered minor damage, while the car was wrecked beyond repair.

The accident was caused by the car driver noticing the train too late and not having time to stop or otherwise prevent the accident.

Final report issued: 10.3.2010

Recommendation Nr. S276	The Pikakyläntie road is mainly used as a shortcut, and there are two guarded level crossings in the vicinity of the level crossing. Traffic on Pikakyläntie could be safely directed to these roads and over the Pori–Mäntyluoto track. In addition, since equipping a level crossing with a warning installation with half-barriers is expensive, the Investigation Commission recommends:	
	The unprotected level crossing of Teurastamo on the Pikakyläntie road should be removed.	
Date	***Status***	***Comments***
18.8.2011	In progress	Private road transaction is in progress.
9.2.2012	In progress	
19.9.2013	In progress	Will be removed, scedule not yet decided.
3.10.2013	**IMPLEMENTED**	Level crossing removed.

Recommendation Nr. S277	Time was wasted in locating problems between the engine driver and the traffic controller and between the traffic controller and the Emergency Response Centre. Because of these difficulties, the traffic controller had problems clarifying to the ERC operator the location of the level crossing. For the entire duration of the rescue operation, the level crossing was referred to with incorrect names. At their worst, such location problems can lead to treatment procedures being delayed, with fatal consequences.	
	A variety of operators should develop systems and implement equipment to facilitate location of an accident site.	
Date	***Status***	***Comments***
18.8.2011	In progress	Markings on track to demote the location will be improved.
9.2.2012	In progress	
19.9.2013	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure of best practises. Next meeting last part of this year.
10.3.2014	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure of best practises.

Date and time (Code):	25.4.2009, 13.08 (B3/2009R)		
Location:	Raasepori, Mustio /Ingvallsby level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – car		
Train type and number:	Freight train 3534, Dv12 diesel locomotive and 7 wagons		
Road vehicle:	Car Toyota 4D Corolla Sedan, 2004 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	0	0

Fatally injured:	***Crew:***	0	1
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The locomotive suffered minor damage and the car was entirely wrecked.		
Damages on track equipment:	None.		
Other damages:	None.		

***Summary*:** At 1:08 p.m. on Saturday 25 April 2009, a level crossing accident occurred in Mustio in Raasepori involving a car and a freight train en route from Kirkniemi to Karjaa. The accident proved fatal to the car driver, while the engine driver escaped uninjured. While the car was wrecked beyond repair, the train sustained only minor damage.

The direct cause of the accident lay in the car's driving onto the level crossing while the freight train was approaching simultaneously from the right. It has not been ascertained why the car driver drove onto the level crossing.

Final report issued:	15.10.2010

Recommendation Nr. S282	The Ingvallsby unprotected level crossing offers a shortcut to Nikuntie, but an alternative route to this destination also exists via road 186. The investigation commission therefore recommends the following:	
	The Ingvallsby unprotected level crossing should be removed.	
Date	***Status***	***Comments***
18.8.2011	In progress	
9.2.2012	In progress	
19.9.2013		
10.3.2014		

Date and time (Code):	14.7.2009, 11.17 (B6/2009R)		
Location:	Vihti, Kotkaniemi / Kotkaniemi 1 level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – car		
Train type and number:	Freight train 3647, two Dv12 diesel locomotives		
Road vehicle:	Car Renault Megane 1.6, 2000 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	0	1
Fatally injured:	***Crew:***	0	0
	Passengers:	0	1
Seriously injured:	***Crew:***	0	1
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The front of the locomotive suffered minor damage and the car was entirely wrecked.		
Damages on track equipment:	Wooden cover of the next level crossing was damaged.		
Other damages:	None.		

***Summary*:** At 11:17 a.m. on Tuesday 14 July 2009, a fatal level crossing accident occurred on the Kotkaniementie unprotected level crossing in Ojakkala in Vihti. The accident occurred when a car travelling along Kotkaniementie road drove without stopping in front of a freight train en route to Riihimäki. A nine-year-old girl in the car was fatally injured. The car was wrecked beyond repair. Damage totalling €6,000 was caused to yhe rolling stock and to the track.

The cause of the accident lay in the car driver's completely failing to observe the approaching freight train.

Final report issued:	15.10.2010

Recommendation Nr. S283	The level crossing is very busy with various kinds of traffic, especially during the summer. Each year, nearly 4,000 people visit the premises of Yara Suomi on the other side of the crossing (Kotkaniemi road maintenance committee statement 5 November 2009). There is no alternative route to these premises. In addition, the Kotkaniemi private road maintenance committee covers four properties and summer residences with a total of 22 shareholders. Considering the busy domestic

	and international traffic on the Kotkaniemi road, the investigation commission recommends the following:	
	The Kotkaniemi 1 level crossing should also be equipped with warning installation with half-barriers.	
Date	***Status***	***Comments***
16.6.2011	In progress	Transport Agency and Vihti municipality are drafting a joint project Nissola interchange arrangement preliminary master plan, the purpose is the removal of Kotkaniemi level crossing.
9.2.2012	In progress	
19.9.2013	In progress in a different way	The level crossing will be equipped with half barriers.
3.2.2014	**IMPLEMENTED**	Equipped with half barriers

Date and time (Code):	16.12.2009, 13.26 (B9/2009R)		
Location:	Laukaa, Lemettilänmäentie / Lemettilä level crossing, unprotected		
Type of occurrence:	Level crossing accident, freight train – van		
Train type and number:	Freight train 3365, Dv12 diesel locomotive and 23 wagons		
Road vehicle:	Van Volkswagen Transporter, model 1998		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	0	1
Fatally injured:	***Crew:***	0	1
	Passengers:	0	1
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	The front of the locomotive sustained some damage, the van was totally wrecked.		
Damages on track equipment:	None.		
Other damages:	None.		

Summary**:** On Wednesday 16 December 2009 at 13:26 p.m., a fatal level crossing accident occurred on the Lemettilä unprotected level crossing in Laukaa municipality. The accident occurred when a van with a couple inside drove in front of a freight train en route from Jyväskylä to Äänekoski. The van's driver and passenger died immediately from the injuries received. The damage caused by the accident to rolling stock amounted to € 1,300.

The cause of the accident was that the van driver drove onto the level crossing without apparently observing the train approaching from the right. A contributing factor was the fact that, when approached, the crossing looks safe, rendered observation more difficult. Special care should have been exercised, however, considering that the road slopes downwards before the level crossing, that there is a road crossing close to the level crossing and that the sun was shining directly towards the approaching van.

Final report issued:	13.12.2010

Recommendation Nr. S285	With the supply of relevant signs and within limitations set by the road maintainer, traffic passing through the Lemettilä unprotected level crossing could be redirected to cross the bridge on road 637 north of the crossing. In addition, given that equipping the crossing with a half-barrier installation is expensive and would not ensure that further accidents are prevented, the investigation commission recommends:	
	The Lemettilä unprotected level crossing should be removed.	
Date	***Status***	***Comments***
16.6.2011	In progress	
9.2.2012	In progress	
19.9.2013	In progress	Will possible be removed next year.
10.3.2014	In progress	

Date and time (Code):	16.6.2009, 20.51 (B5/2009R)
Location:	Toijala railway yard
Type of occurrence:	Derailment
Train type and number:	Freight train 3513, Sr1 electric locomotive and 30 wagons

Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	0
	Passengers:	0	0
Fatally injured:	***Crew:***	0	0
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Ten wagons damaged.		
Damages on track equipment:	450 metres of track, two turnouts, safety devices and the portal suspension of electric railway were damaged.		
Other damages:	A safety device and communications cable was damaged.		

***Summary*:** Ten wagons of a freight train on its way from Turku to Tampere were derailed in Toijala on 16 June 2009 at 8:51pm. Five of the wagons tipped over. The derailed wagons were the 17th–26th wagons of the total 30 wagons in the train. The speed of the train at the moment of derailment was 70km/h. Safety equipment, parts of the track, and electric railway equipment were damaged in the accident. Safety device and communications connections were disrupted in Toijala and in the nearest operating points.

Traffic was totally interrupted for 5 hours 20 minutes. When operations were resumed, diesel locomotives were used initially to pass the accident spot, using one track only. The first train passed the accident spot at 2:10am. The first electric train passed Toijala on 18 June 2009 at 3:40pm, that is, some 43 hours after the accident. Close to normal operations were resumed on the main track on 18 June 2009 after 8pm, 48 hours after the accident. Traffic between Turku and Tampere resumed on 19 June 2009 after 6pm, but trains were unable to stop at Toijala. Trains between Turku and Tampere were again able to stop at Toijala on 28 June 2009. Normal operations were resumed 15 days after the accident.

According to VR, 134 passenger trains and more than 100 freight trains had to be cancelled as a result of the accident at Toijala. In terms of direct costs, the damage to rolling stock, track and equipment amounted to more than € 2 million.

No direct environmental damage was caused by the accident. Due to insufficient clearing and cleaning operations, an odour problem and a pest problem later developed in the railway yard. The wagons involved in the accident contained grain and fishmeal, among other things. The cleaning was completed on 21 July 2009, 35 days after the accident.

The derailment of the freight train was caused by a switch turning underneath the train. In the ensuing investigation, it was shown that it was possible to force open the switch lock by exposing the switch blade to mechanic oscillation at the frequency same as caused by the axles of the freight train in question. It also became apparent in the investigation that the Railex locking device had been adjusted eccentrically, and that the switch contactors at the locking device allowed the closed switch blade to move in excess of the reference value. The Investigation Commission considers it likely that as a combined result of track geometry, switch adjustments, the oscillatory properties of the switch, and the rolling stock passing through the turnout, the switch lock became unlocked as the train passed over it.

Final report issued:	4.5.2011

Recommendation Nr. S293	During the investigation it transpired that the documentation of switch maintenance was insufficient. The Investigation Commission therefore makes the following recommendation to the Finnish Transport Agency:	
	The installation, inspections and maintenance of switches and their components should be seamlessly documented.	
Date	***Status***	***Comments***
9.2.2012	In progress	
19.9.2013	In progress	Project of managing condition of switches started, ready 2014.
10.3.2014	In progress	Project of managing condition of switches started, ready 2014.

Date and time (Code):	4.1.2010, 8.28 (B1/2010R)
Location:	Helsinki Central Railway Station, track 13
Type of occurrence:	Collision with an obstacle (with a rail barrier and thereafter the wall of a building)
Train type and number:	Shunting unit: Passenger train IC71 during shunting to the departure track, Sr2 electric locomotive and 8 passenger cars

Annex 1/16 (27)

Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1+1+2+1	0
	Passengers:	0	0
Fatally injured:	***Crew:***	0	0
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	1	0
	Passengers:	0	0
Damages of rolling stock:	One car damaged badly and other four sustained some damage.		
Damages on track equipment:	A rail barrier, parts of the track and some electric track equipment damaged.		
Other damages:	The building at the end of the track suffered damage.		

***Summary*:** At 8:28am on Monday, 4 January 2010, four passenger cars that had become separated from a train collided with a rail barrier at the end of the track at the Helsinki Central Railway Station at a speed of approximately 35 km/h. The front end of the double-decker coach that was the first in the train was pushed onto the damaged rail barrier and then the concrete buffer stop at the end of the track, eventually hitting the wall of the office building at the end of the track. The car broke the wall and came to a stop partially inside the building. Pushed by a locomotive, the train was being shunted to its departure track at the Helsinki station from the Ilmala depot, 4.5 kilometres away. The security officers at the station managed to evacuate the people from the platform before the collision.

Of the three people in the cars during the collision, one was slightly injured. The total costs of the damage amounted to € 825 000.

The accident was caused by the coupling loop coming loose from the hook during the pushing movement. This caused the train to break into two, and the automatic air brakes engaged once the brake conduit had come off. The conductor released the brakes of the cars to get the train moving. He did not realise that the train had broken into two. The coupling loop come loose because, as the car buffers compressed, the coupling loop, which had frozen solid, rose off the hook. The situation was aggravated by the fact that the screw coupling had not been tightened properly. Seeing the coupling loop was difficult because of poor lighting and the ice and snow in the space between the cars. The train in question had last been de-iced nine days previously, and there was a lot of snow on the bogies and between the cars. Additionally, the water coming from the outlet pipe of the sink in the WC of the car behind the restaurant coach had increased the formation of ice in this space.

Final report issued:	5.5.2011

Recommendation Nr. S297	Currently there are no instructions concerning use of the handbrake in a situation where cars have to be released by 'milking' them to get the train moving. To ensure that cars remain stationary at all times, the Investigation Commission recommends to the Finnish Transport Safety Agency that it ensure that the VR Group take the necessary steps to implement the following recommendation:	
	To ensure that the cars remain stationary while the brakes are released by 'milking', instructions on the use of the handbrake should be drawn up.	
Date	***Status***	***Comments***
9.2.2012	In progress	
19.9.2013	In progress	Instructions in the making.
10.3.2014	In progress	Soon ready.
Recommendation Nr. S298	The train waitresses had not been instructed in how to stop the cars in an emergency. To ensure that all train personnel knows how to act in exceptional situation, the Investigation Commission recommends to the Finnish Transport Safety Agency that it ensure that the VR Group and Avecra Oy take the necessary steps to implement the following recommendation:	
	Training in the use of device, which are important for safety reason, should be organised for restaurant car personnel also.	
Date	***Status***	***Comments***
9.2.2012		
19.9.2013		
10.3.2014	In progress	Not yet done.

Date and time (Code):	30.12.2008 (C1/2009R)
Location:	Korvensuo–Haarajoki, Kerava Hakosilta section of line

Type of occurrence:	Incident, wrong signal information of the ATP		
Train type and number:			
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	0	0
	Passengers:	0	0
Fatally injured:	***Crew:***	0	0
	Passengers:	0	0
Seriously injured:	***Crew:***	0	0
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	None.		
Damages on track equipment:	None.		
Other damages:	None.		

***Summary*:** According to a deviation notification a safety problem was encountered in Korvensuo on 30 December 2008. Engine drivers notified that they were receiving restrictive information. A distant signal was indicating stop even though a balise at the previous signal had given to the automatic train protection equipment (ATP) the preliminary information that driving at the fastest speed was permitted (proceed Fsl), and, as the train caught sight of the subsequent main signal, it showed the proceed aspect.

The reasons for the faulty ATP operation was that an outdated card version had been placed in the IM -module (signal box computer) controlling data transfer between Haarajoki and Korvensuo signal boxes. The wrong flash card had been installed because the software version had not been verified before installing the card. The installers said that this was because verification equipment was not operational due to the transfer of the office to another location. The card had also not been marked sufficiently clearly.

The situation was temporarily fixed once the deviation had become apparent by setting an 80 km/h speed limit in the area. The Thales "Emergency Team" met on 5 January 2009 to analyse the situation. Once the reason for the irregularity was observed, a new flash card was installed in the Haarajoki signal box module on 5 January 2009 at 23.00. The operations were tested and on 7 January 2009 the 80 km/h speed limit was lifted from the area.

Final report issued:	11.5.2011

Recommendation Nr. S301	In order to prevent the use of wrong card versions, the Accident Investigation Board has made the following recommendation:	
	The Finnish Transport Agency should ensure that component versions are marked clearly and that personnel are made aware of different versions during maintenance actions.	
Date	***Status***	***Comments***
9.2.2012	In progress	
19.9.2013	In progress	
10.3.2014	**IMPLEMENTED**	

Date and time (Code):	2.2.2011, 11.55 (C1/2011R)		
Location:	Nurmes, Joensuu Kontiomäki section of line		
Type of occurrence:	Collision of freight trains		
Train type and number:	Freight train 4720, Dv12 diesel locomotive – Freight train4713, Dv12 diesel locomotive and 8 wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	3	
	Passengers:	130	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	2	
	Passengers:	0	
Damages of rolling stock:	The diesel engine chassis were bent and the buffers, centre buffers with shunting couplers, and engine covers were damaged.		

Damages on track equipment:	None.
Other damages:	None.

***Summary*:** A collision between a freight trains occurred in the direction of Lieksa, two kilometres from the Nurmes yard, on Wednesday 2 February 2011 at 11.55. Both the engine driver and traffic controller in the locomotive were injured, while both locomotives sustained major damage.
The immediate cause of the accident was the cancellation of interlockings necessary to signal box safety, thus allowing the trains to use the same track. The insulation fault, frequency of critical commands, inadequate train location information and inadequate communication all contributed to the accident. Apparently, the traffic controller believed that train 4713 was already at the Nurmes yard. Despite having spoken to the engine driver, the controller did not realise that this train was standing at the entry signal.

Final report issued:	30.1.2012

Recommendation Nr. S304	Traffic control error situations can have a significant impact on railway traffic safety. Critical commands allow the traffic controller to create a situation in which the technical safety equipment system is unable to ensure traffic safety. The investigation found that, due to communication errors, there had been a major increase in the need for axle counting emergency commands in the month preceding the accident.	
	Traffic control personnel should undergo regular training and drills on identifying hazards related to error situations and on applying predefined, safe procedures.	
Date	***Status***	***Comments***
19.9.2013	In progress	Will be taken into account in repetition training program.
10.3.2014	**IMPLEMENTED**	Using operation cards in training; advance scenarios.
Recommendation Nr. S305	A key factor in this accident was incomplete communication on the train's location.	
	Safety management should have a particular focus on punctuality and consistency of communication and on accurate location of trains.	
Date	***Status***	***Comments***
19.9.2013	In progress	Ifrastructure managers instructions 2014 can possibly solve the poblem.
10.3.2014	**IMPLEMENTED**	Renewed communication instruction has taken into consideration in the education.
Recommendation Nr. S306	In the MiSO TCS system, the axle counting system emergency release function for line sections with low traffic volumes has been set to release the section without special conditions. In some parts of the railway network, the axle counting emergency release function must detect at least one axle leaving the section. Emergency release of the axle counting system is possible only after this has occurred. The purpose of this is to ensure that the last event was a unit leaving the section.	
	It should be a prerequisite for the emergency release of all axle counting sections, that the last axles counted at an axle counting point must be axles exiting the section.	
Date	***Status***	***Comments***
19.9.2013	In progress	In Traffic control handbook. New specification will be made in 2013.
10.3.2014	In progress	Risk management study concerning resetting in progress.

Date and time (Code):	24.2.2011, 4.55 (C2/2011R)		
Location:	Pedersöre, Kolppi statin, Seinäjoki–Ylivieska section of line		
Type of occurrence:	Derailment, wheelset of the locomotive		
Train type and number:	Freight train 5478, Dv12 diesel locomotive and 29 wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	
	Passengers:	0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	

	Passengers:	0	
Damages of rolling stock:	Damagages to the locomotive.		
Damages on track equipment:	A turnout was damaged and the rail was broken at three points. Elastic rail fas-teners were loosened and 163 concrete sleepers were damaged.		
Other damages:	None.		

***Summary*:** The front bogie wheelset on the second locomotive of a freight train travelling from Kokkola to Pietarsaari derailed. The locomotive, one turnout, and 163 sleepers were damaged, with total repair and clearance costs amounting to 132,000 euros. The accident prevented all traffic on the section of line for nine hours.

The bogie wheelset was derailed by an SA3 automatic coupler on the track. This coupler had been dragged there by another freight train, as a result of incorrect procedures in reaction to the train's decoupling into two parts. The engine driver had believed that the uncoupling lever chain would break when the train set off and that the automatic coupler would remain in place. Trusting the engine driver's assessment, the traffic controller gave the train permission to drive. The automatic coupler separated from the car after the detachment of the bolted key holding the coupler in place, due to a missing screw and the remaining hex screw being too short and without a hex nut. With the poorly secured key installation going unnoticed, wagon maintenance was not performed in line with the related instructions.

Final report issued:	8.2.2012

Recommendation Nr. S307	In the case of SA3 automatic coupler draft clips without screw holders, the hex screws supporting the bolted key can slide out of place when the nut is missing. In the version with the screw holder, the head of the hex screw enters the holder, preventing the screw from sliding and falling off when the nut is detached. Only a fraction of all SA3 automatic coupler draft clips have no screw holder.	
	SA3 automatic coupler draft clips without screw holders should be replaced by ones with such holders.	
Date	***Status***	***Comments***
19.9.2013	In progress	Not yet done
10.3.2014	In progress	

Date and time (Code):	1991–2010		
Location:	Finland		
Type of occurrence:	Level crossing accidents		
Train type and number:			
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***		
	Passengers:		
Fatally injured:	***Crew:***		
	Passengers:		
Seriously injured:	***Crew:***		
	Passengers:		
Slightly injured:	***Crew:***		
	Passengers:		
Damages of rolling stock:			
Damages on track equipment:			
Other damages:			

***Summary*:** While the number of level crossing accidents in Finland reduced significantly between 1991 and 1998, since then the number has remained constant and, at times, has even increased slightly. The number of accidents has fallen in the last two years. However, this has not influenced the number of deaths. Since 1993, there has been an average of 10 fatalities per year in level crossing accidents. Compared to other European countries, level crossing safety in Finland is below average.

Some 78 per cent of all fatal accidents occurred on level crossings without warning devices. Ac-cidents on level crossings of this type were generally caused by the vehicle driver misjudging the situation, not by the driver taking unnecessary risks. The road speed limit was typically 80 km/h and the railway speed limit 120 km/h. Most level crossings without warning devices are located on private roads and most fatal accidents occurred on level crossings on such roads. Nearly all level crossings without warning devices fail to meet the related railway regulations. Maintainers of private roads do not have sufficient information on their level crossing maintenance obligations.

Based on statistical analysis, a dangerous level crossing is one without warning devices, with a low road speed limit, and with a high amount of average daily traffic. Such level crossings are typically located in residential areas.		
Final report issued:	13.2.2012	
Recommendation Nr. S309	Practice has shown that the rate of removal and securing level crossings is governed by allocations granted by the Parliament. The level crossing strategy should be accorded greater importance by moving it under the Ministry of Transport and Communications, which might ease acquisition of the required resources.	
	A new strategy should be drawn up to improve level crossing safety, and a concrete plan with funding arrangements should be drafted based on this strategy.	
Date	***Status***	***Comments***
19.9.2013		
10.3.2014	In progress	
Recommendation Nr. S311	No single up-to-date level crossing database exists, but there are several databases with partially incomplete information.	
	Databases on level crossing and their conditions should be merged into one and the database should be kept up to date.	
Date	***Status***	***Comments***
19.9.2013	In progress	Not yet done. There will be just one database.
10.3.2014	In progress	Not yet done. Trafi will collect data from other infrastructure managers.
Recommendation Nr. S312	Railway actors have no common database for accidents and dangerous situations. According to VTT's research, accident information is saved in the information systems of the railway company, the Finnish Transport Agency, and the Finnish Transport Safety Agency. Merging these accident databases is recommended.	
	A single and common accident and deviation database for all those operating the railway system in Finland should be created.	
Date	***Status***	***Comments***
19.9.2013	In progress	Trafi will in future hold a common database.
10.3.2014	In progress	Trafi will in future hold a common database. Will be ready in 2014.
Recommendation Nr. S313	In some cases, insufficient consideration is taken of level crossing safety in traffic safety plans devised by the Centres for Economic Development, Transport and the Environment (ELY Centres) and the municipalities. Stronger account should be taken of level crossing safety in the traffic safety planning instructions.	
	Level crossing safety should also be included in the provincial and municipal traffic safety plans.	
Date	***Status***	***Comments***
19.9.2013	In progress	Finnish Transport Agency can order Centres for Economic Development, Transport and the Environment to contact municipalities.
10.3.2014		
Recommendation Nr. S314	The Koululiitu software, which evaluates the dangers of school routes, does not include level crossings, because the road database information used by the software does not contain level crossing information.	
	When planning school transportation, the municipalities should improve safety by avoiding level crossings without warning devices along the routes.	
Date	***Status***	***Comments***
19.9.2013	In progress	
10.3.2014	In progress	
Recommendation Nr. S315	The previously issued recommendation *S216 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.* should be reformulated.	
	Clear instructions should be drawn up regarding road traffic speed limits and use of the STOP sign at level crossings.	
Date	***Status***	***Comments***
19.9.2013	In progress	Partially implemented; STO-mark is missing from the directions.

10.3.2014	In progress	A new guide to the road administrators is in preparation.
Recommendation Nr. S316	Most fatal level crossing accidents occurred at level crossings without warning devices. Level crossing perceptivity was also noted in VTT's research. To make level crossings perceptible sufficiently early for road users and to ensure correct level crossing use:	
	Ways of improving the perceptivity of level crossings and their conditions of use and technical properties should be specified.	
Date	***Status***	***Comments***
19.9.2013	In progress	Researches made and also on going.
10.3.2014	In progress	
Recommendation Nr. S318	The previously issued recommendation *S215 The perceptibility of a train and a level crossing should be improved.* was too extensive and should be divided into recommendations concerning the mobile equipment and the level crossing.	
	The visibility of fronts of locomotives and train units should be improved.	
Date	***Status***	***Comments***
19.9.2013	In progress	Started. Material will be reflective.
10.3.2014	**IMPLEMENTED**	With reflective material.
Recommendation Nr. S319	The previously issued recommendation *S224 Itella and other businesses performing deliveries can improve safety by avoiding unguarded level crossings when planning their delivery routes.* was too extensively targeted and the follow-up of its implementation was impossible. To target the recommendation accurately and to facilitate monitoring of its implementation:	
	When planning delivery routes, Itella should improve safety by avoiding level crossings without warning devices.	
Date	***Status***	***Comments***
19.9.2013	In progress	Itella tries to avoid level crossings where it is possible and economically vice.
10.3.2014	**IMPLEMENTED**	Itella tries to avoid level crossings where it is possible and economically vice.
Recommendation Nr. S320	It seems that nobody is responsible for the Rescue Services' risk evaluation instructions used by the Emergency Response Centres. These instructions have not been changed since their publication. Each rescue department of the Rescue Services area is responsible for these instructions, but the related change needs have not been coordinated nationally.	
	Emergency Response Centre risk assessment instructions should be continuously up-dated and a national operator responsible for the instructions should be assigned.	
Date	***Status***	***Comments***
19.9.2013		
10.3.2014	In progress	

Date and time (Code):	21.2.2011, 4.05 (B1/2011R)		
Location:	Nokia, between Siuro and Suoniemi stations		
Type of occurrence:	Collision of trains, rear end collision		
Train type and number:	Freight train 3811, Sr1 electric locomotive and 21 wagons – Freight train 3801, 2 Dv12 diesel locomotive and 24 wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1 – 1	
	Passengers:	0	
Fatally injured:	***Crew:***	1 – 0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	*Sr1 electric locomotive and two timber wagons were badly damaged.*		
Damages on track equipment:	Some sleepers were damaged.		
Other damages:	None.		

***Summary*:** A freight train, which had arrived to assist another freight train travelling to Mäntyluoto, Pori, collided with the end of the other train in Nokia, between Siuro and Suoniemi, at 4.05 am on 21 February 2011. The engine driver of the assisting train fatally injured in the accident. One wagon and the locomotive, which collided the end of the other train, were badly damaged and had to be scrapped. Additionally, one wagon was badly damaged, but was still repairable. The tracks were undamaged. Traffic at the accident site was interrupted for 14 hours.
According to the running recorder data, the driver of the train which collided had begun emergency braking, at a speed of 46 km/h, five seconds before the impact. The train speed was 43 km/h upon impact. The maximum permitted speed of the train which collided was 50 km/h.
The accident was caused by the erroneous location information of the train to be assisted.

Final report issued:	20.2.2012

Recommendation Nr. S321	Determining the location of trains is a challenging task. In addition to the improved instructions currently in use:	
	A satellite location system should be implemented as quickly as possible to assist in location.	
Date	***Status***	***Comments***
19.9.2013	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure of best practises. Next meeting last part of this year.
10.3.2014	In progress	Emergency Response Centre, VR Group Ltd and Finnish Transport Agency in co-operation are drafting the procedure of best practises.
Recommendation Nr. S323	The visibility of wagons should be improved. In the reconstruction drive, it was found that a wagon without a reflector on the end can only be seen from a short distance in darkness.	
	Reflectors should be installed on the ends of wagons.	
Date	***Status***	***Comments***
19.9.2013	In progress	Belongs also to the needs of shunting areas.
10.3.2014	In progress	VR Ltd regards the realisation as challenging.
Recommendation Nr. S324	The calculations show that a distance of 130 metres would have been sufficient to stop the train from a speed of 23 km/h, with normal braking and 32 km/h with emergency braking, when both the reaction time and brake delay are taken into account.	
	The speed of the assisting unit should be limited to 35 km/h, when it is driving to assist a train on the line.	
Date	***Status***	***Comments***
19.9.2013	In progress	Trafi has not made new orders. VR limited by using shunting rules when assisting.
10.3.2014	In progress	Will concern all actors after the regulations have changed.

Date and time (Code):	14.1.2012, 0.15 (R2012-01)		
Location:	Kouvola freight traffic railway yard		
Type of occurrence:	Derailment		
Train type and number:	Freight train 2032, Sr1 electric locomotive and 35 wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	
	Passengers:	0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	Two derailed wagons sustained minor damage.		
Damages on track equipment:	40 metres of rail were damaged. Turnout 730, the electric railway portal and the electric cables for seven tracks were damaged.		
Other damages:	A signal post fell down.		

***Summary*:** An accident occurred in the Kouvola freight traffic yard at 00.15 hrs on 14th January 2012

when two wagons of a departing freight train were derailed immediately after their departure. One of the derailed wagons struck a signal post, which collapsed onto an electric railway portal ten minutes later. The electrical cables for seven tracks were brought down by the portal's collapse. No personal injuries resulted. The accident was caused by a stop block left under the train. Difficult weather conditions and darkness made it difficult to see the stop block. Additionally, the brake tester responsible for removing the stop block decided to perform an extra shunt on the train in place of standard procedures, because the train had moved too far alongside the shunting signal.		
Final report issued:	24.9.2012	
Recommendation Nr. S326	A stop block constitutes a safety-critical factor and its visibility should be good. During the investigation, it was discovered that some stop blocks are in poor condition with respect to their visibility. The shape of the stop block does not improve its visibility from the direction of the track. Improved reflectivity could improve the visibility of stop blocks in dark conditions.	
	Stop blocks should be painted well to ensure their visibility, and the block's visibility improved by other means.	
Date	***Status***	***Comments***
19.9.2013	In progress	New stop blocks will be purchased.
10.3.2014	**IMPLEMENTED**	Stop blocks are in better painting and they are stored in poles.
Recommendation Nr. S327	It was found in the investigation that the railway yard work instructions do not take account of all situations arising during normal work. Instructions for safety-critical operations should be presented as a checklist, in order to make work as standardised and uniform as possible, instead of working from memory. A checklist would help to avoid a situation where issues are forgotten.	
	The railway yard work instructions should be developed in order to take account of all situations arising from normal work. Safety-critical instructions should be presented as a checklist.	
Date	***Status***	***Comments***
19.9.2013	In progress	In a different way.
10.3.2104	In progress	Guidelines will be gone through in this year.

Date and time (Code):	22.5.2012, 3.09 / 28.6.2012, 13.20 (R2012-02)		
Location:	Riihimäki station railway yard / Kouvola railway yard		
Type of occurrence:	Derailment		
Train type and number:	Freight train 3605, Sr2 electric locomotive and 33 wagons / Freight train 2482, Sr1 electric locomotive and 20 wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1 / 1	
	Passengers:	0 / 0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	One turnout transport wagon and the following wagon carrying turnout equipment were damaged in the accident. / One turnout transport wagon was damaged in the accident.		
Damages on track equipment:	Three turnouts were damaged. 120 concrete sleepers had to be replaced. / 136 meters of rail was damaged and 62 sleepers had to be replaced. Two turnouts were damaged, with parts having to be replaced.		
Other damages:	The turnout elements carried by the wagon that fell over were damaged beyond repair. / The turnout elements carried by the wagon that fell over were damaged beyond repair.		
Disturbances of traffic:	The accident significantly hindered traffic for one day. The tracks were returned to full normal use after nine days. / *No significant hinder to traffic.*		
***Summary*:** At 3:09 a.m. on Tuesday 22 May 2012, a turnout transport wagon, positioned as the 16th			

wagon of a freight train and carrying two turnout elements with concrete sleepers, was derailed at the southern end of the Riihimäki railway yard.
About a month later, at 1:20 p.m. on 28 June 2012, a similarly loaded turnout transport wagon was derailed in the Kouvola railway yard. This wagon was the last car in a 20-car train. It was derailed when travelling through the turnout and finally toppled onto the adjacent track.
Imbalanced loading caused the sideways load balance distribution of the turnout transport wagon to be very uneven. In the Riihimäki accident, the head of the rail was cracked at the spot where the derailment occurred. In Kouvola, the turnout at the derailment spot was in poor condition, featuring wear exceeding the allowed measurement values. Moreover, the track featured dents of varying depth around the turnout.

Final report issued:	26.6.2013	
Recommendation Nr. S328	According to calculations, the turnout transport wagon could not be loaded with all of the turnout elements in a manner that would ensure a stable, even load, with the load remaining within the permitted rolling stock gauge and the weight wheel ratio staying under 1.25:1.	
	The turnout transport wagon should be modified in such a manner that it can transport turnout elements, while ensuring that the wheel weight ratio complies with general loading instructions (1.25:1 at a maximum).	
Date	***Status***	***Comments***
10.3.2014	**IMPLEMENTED**	Wagons and instructions have been changed.
Recommendation Nr. S329	VR Track Oy is currently in the process revising its instructions on the loading of turnout elements. These loading instructions should fulfil the railway traffic safety requirements.	
	Drafting of the turnout transport wagon's loading instructions should be completed so as to ensure that these instructions are unambiguous and precise and that compliance with them guarantees that loading is performed in accordance with the wheel weight ratio and rolling stock gauge determined in the general loading instructions.	
Date	***Status***	***Comments***
10.3.2014	**IMPLEMENTED**	Wagons and instructions have been changed.
Recommendation Nr. S330	Risk assessment had failed to recognise the overall effects of concrete-sleeper elements on transports. There has been some recognition of these issues, but not regarding the load imbalance, for instance. When concrete sleepers became building parts for turnout elements, the current safety management systems were not yet in use. In some instances, the imbalance was recognised, but the notion of the seriousness of the matter, and information on it, were not distributed in a way which would bring unified changes to loading methods, instructions and training. Factors such as adjustable supporting poles and load-specific speed limits have been employed to alleviate this situation, but they were not mentioned in the loading instructions in general use. Annual audits and the accountable parties mentioned in the manual would provide a good basis for the practical realisation of the planned practices mentioned in the comprehensive operating manual and the numerous detailed instructions the manual contains.	
	The risk assessment element of the safety management system should also extend assessment to existing standardised activities.	
Date	***Status***	***Comments***
10.3.2014	**IMPLEMENTED**	Wagons and instructions have been changed.
Recommendation Nr. S331	The Finnish Transport Agency is responsible for monitoring the condition of turnouts. A system providing information on the condition of turnouts and potential replacements needs has been developed for this reason. However, this information is not being utilised in a manner that would result in the repair or replacement of all turnouts that have been found to be in poor condition.	
	In the turnout condition monitoring system, turnouts that have been found to be in poor condition should be repaired or replaced to ensure that they fulfil the measurement values and other requirements set for turnouts.	
Date	***Status***	***Comments***
10.3.2014	In progress	Maintenance project ready 2015.
Recommendation Nr. S332	Monitoring of the condition of turnouts is largely based on the results of inspection measurements, performed at regular intervals. In addition to limit values, all turn-	

	out measurement values have acute limits, which allow for greater deviations. According to the railroad regulations and instructions (RATO), measurement values may not exceed acute limits. Unambiguous operational instructions should exist for cases in which normal maintenance limit values are exceeded, and these instructions should be strictly adhered to.	
	Unambiguous operational instructions regarding maintenance and traffic limitations should exist for cases in which the measurement values and acute limits determined for turnouts are exceeded.	
Date	***Status***	***Comments***
10.3.2014	In progress	Maintenance project ready 2015.

Date and time (Code):	Year 2012 (R2012-S1)		
Location:	Finland, level crossings		
Type of occurrence:	Level crossing accidents		
Train type and number:			
Road vehicle:			
		In the train	***In the road vehicle***
Persons on board:	***Crew:***		
	Passengers:		
Fatally injured:	***Crew:***	0	Tot 4
	Passengers:	0	Tot 1
Seriously injured:	***Crew:***	0	Tot 6
	Passengers:	0	0
Slightly injured:	***Crew:***	Tot 1	Tot 5
	Passengers:	0	0
Damages of rolling stock:			
Damages on track equipment:			
Other damages:			

Summary**:** In 2012, a total of 51 level crossing accidents occurred. This is around 30 per cent higher than the average for the previous five years. All of the accidents leading to serious personal injury occurred on the railways, where the average speed of railway vehicles is usually high (80–140 km/h). Six people died in the five fatal accidents. Six people were seriously injured. Over a third of the accidents occurred during shunting work, where the speed of railway vehicles is usually low (35 km/h at maximum). The majority of shunting work related accidents occurred in harbour and industrial areas.
For accidents that occurred at level crossings without warning devices and a STOP sign, 75 per cent of these accidents were caused by the vehicle driver's failure to properly observe or assess the scene, while 20 per cent were caused by too high a speed and the resulting slide on the tracks despite attempts to brake.

Final report issued:	22.8.2013

Recommendation Nr. S333	Equipping a level crossing with an automatic gate station is expensive, and removal of level crossings is not always possible at a reasonable cost. Alternative methods should be used to improve level-crossing safety. According to international experiences, it is possible to improve safety by means of warning devices that are less expensive than conventional safety devices.	
	SIA recommends that the Finnish Transport Safety Agency enables the implementation of low-cost warning devices and ensures that the Finnish Transport Agency continues its research into the suitability of low-cost warning devices and begins implementing these devices.	
Date	***Status***	***Comments***
10.3.2014	In progress	20 low-cost warning devices to experiment in 2014.

Date and time (Code):	19.10.2012, 16.38 (R2012-03)
Location:	Vammala station
Type of occurrence:	Incident
Train type and number:	Freight train 3742, Sr1 electric locomotive and 38 wagons.
Road vehicle:	-

		In the train	*In the road vehicle*
Persons on board:	***Crew:***	1	
	Passengers:	0	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	None.		
Damages on track equipment:	None.		
Other damages:	None		
Disturbances of traffic:	*A* passenger train suffered a minor delay.		

Summary**:** At 4.38 pm, an incident developed at Vammala station when, according to its route, a freight train approaching the Vammala railway yard from Äetsä was supposed to switch to secondary track 043, to await oncoming traffic. Upon arriving at the Vammala station entry turnout, the engine driver noted the presence of the machinery on the safety track to the left and, soon after, that track 043 was also full of maintenance machines. At this point, the machinery was around 100 metres away. The engine driver braked and the train stopped around 50 metres from the machines on the track.
The direct cause of this incident was the release of the track sections occupied by the maintenance machines with emergency release commands. A factor in the incident was the trackwork supervisor's forgetting to notify the traffic controller of the machinery on the track – the traffic controller was therefore unaware of its presence. Protection command enabled by the railway safety device system were not used in order to protect the work site – such a system could have been used to maintain information on the track's occupied status or to prevent to set train routes.

Final report issued:	29.8.2013

Recommendation Nr. S334	In this incident, maintenance machines had been stored on track being used for train traffic. The traffic controller was unaware of this. Storage of the machines had been agreed in an earlier trackwork meeting, at which a traffic control representative was present. It is possible to use command based track blocking within signal boxes, which can restrict the route setting for trains. Command based track blocking can be activated and it function separately, even if the axle counting system is reset i.e. if a critical command is used to delete system information on the presence of stock on the section. Use of command based track blocking would also have been a good solution in an incident of the kind under discussion, in which a track in traffic usage was used long-term and repeatedly for other purposes.	
	The Finnish Transport Agency should ensure that the command based track blocking is used effectively in centralised traffic control.	
Date	***Status***	***Comments***
10.3.2014	**IMPLEMENTED**	Is focused to the manual which is at the finish stage => to training.
Recommendation Nr. S335	No set of clear instructions exists for resetting an axle counting system after trackwork.	
	The Finnish Transport Agency should identify the best practices for resetting axle counting after trackwork and should include these practices in the railway traffic control manual.	
Date	***Status***	***Comments***
10.3.2014	In progress	Risk assessment under way.
Recommendation Nr. S336	A traffic restriction notification (TR notification) exists for such situations. Among other details, in the case of a TR notification, its existence should be marked in the related trackwork (TW) notification. Such a notification should be valid for as long as the factors restricting rail traffic last. While valid, TW and TR notifications must be kept in sight of the traffic controller.	
	The Finnish Transport Agency should ensure that traffic restriction notifications are also used when stock is stored on tracks in traffic usage.	
Date	***Status***	***Comments***
10.3.2014	In progress	Is taken into account in the Safety instructions of the track maintaining.

Recommendation Nr. S337	During the YTM (General Safety Procedure) for the trackwork project, risks to train safety were identified and the related risk management measures were logged, but in practice these were not implemented in full.	
	The Finnish Transport Safety Agency should ensure that concrete instructions are created for planned risk management procedures, that those executing the procedures are familiarised with them, and that the implementation of risk management procedures is monitored.	
Date	***Status***	***Comments***
10.3.2014	In progress	Audits.