NIB ANNUAL REPORT 2018

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 2018.

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
P - Exceptional events

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 P).
- 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. “S” in the beginning of the number means that the investigation is theme investigation.

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

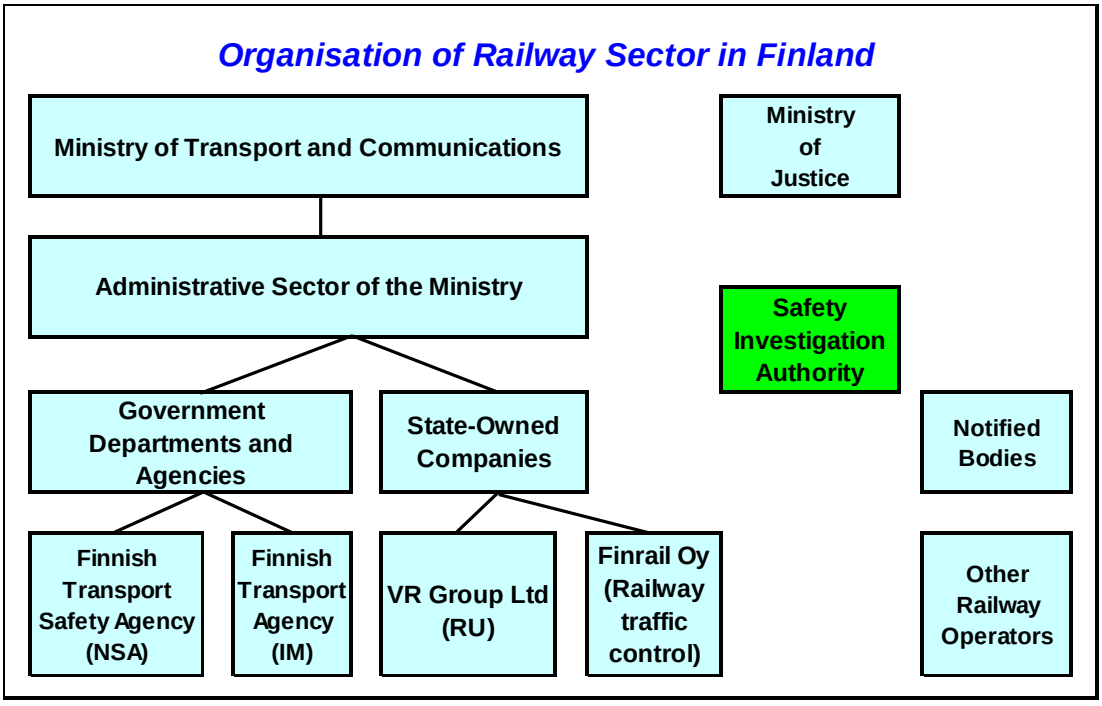
The Safety Investigation Act (525/2011) defines the task and the mandate of the Safety Investigation Authority. The Safety Investigation Act of Finland provides for the types of accidents and incidents investigated by the Safety Investigation Authority and how they are investigated.

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 (EU) 2016/798 of the European Parliament and of the Council on railway safety
  - **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** involving 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. Also, a joint investigation of several similar accidents or incidents may be conducted in accordance with the 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

The road accident investigation teams investigate all fatal road and off-road traffic accidents in Finland, including level crossing accidents. Preventing them is crucial from the human perspective in particular, but also from the economic perspective. In addition, the teams investigate on project basis accidents that have caused serious personal injury and property damage to clarify certain specific questions.

The main aim of the investigation is to promote road safety. Accident investigations do not comment on guilt or compensation issues.

Investigation is regulated by legislation on the investigation of road and off-road traffic accidents (Act on the investigation of road and cross-country traffic accidents, 24/2001, since 1.1.2017 Act on the investigation of road and off-road traffic accidents, 1512/2016).

The Finnish Crash Data Institute (OTI) coordinates the work of road accident investigation teams but does not intervene in the independent working of the teams. OTI also takes care of the training of the teams, the use of investigation results, and information services.

There are 20 investigation teams operating in different parts of Finland. They have a total of approximately 300 members. The teams are mainly positioned according to the current regional borders. The teams independently study the reasons for road accidents and make proposals to improve safety. The investigation team members are subject to public liability and a non-disclosure obligation.

The task of the road accident investigation teams is to determine the underlying reasons for an accident and to propose the necessary actions to improve traffic safety. The material collected is used in traffic safety work, the work of public authorities, international co-operation and communication. The teams do not investigate guilt or compensation issues related to accidents.

In addition to that what has been told above about the investigation of road and off-road accidents, we would like to mention, that SIAF can investigate any accident which has taken place in Finland, including road and off-road 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 in 2018, identifying key trends

Type of accidents investigated	Number of accidents	Number of victims		Damages in € (approximation)	Trends in relation to previous years
		Deaths	Seriously Injured		
Collisions	1	0	0	110 500	
Derailments	0				
Level crossing accidents	1	4	3	270 000	
Other	1	0	0	25 000	

3.2 Investigations completed and commenced in 2018

Investigations completed in 2018

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis	Completed (date)
28.6.2017	Runaway of a maintenance machine in Ylivieska, Finland, on 28 June 2017	I (2) (a)	14.2.2018
21.9.2017	Collision between shunting unit and wagons standing on the tracks at Kouvola on 21 September 2017	I (2) (a)	1.6.2018
26.10.2017	Level crossing accident which led to four deaths at Raasepori on 26 October 2017	I (1)	7.6.2018

Investigations commenced in 2018

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis
7.4.2018	Derailment of tank wagons at Mäntyharju 7 April 2018	I (2) (a)
12.12.2018	Level crossing accident at Kuusivaarantie level crossing in Kemijärvi on 12 December 2018	I (1)

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

I National rules imposed by implementing of the Directive on railway safety
- (1) in light of Article 20, §1
- (2) in light of Article 20, §2
  - (a) the seriousness of the accident or incident
  - (b) it forms part of a series of accidents or incidents relevant to the system as a whole
  - (c) its impact on railway safety on a Community level
  - (d) requests from infrastructure managers, the safety authority or the Member State
- (3) in light of Article 22
  - (§5) cross-border investigation or request to assistance
  - (§6) other reasons than those referred to in Article 20

II Other national rules/regulations (covering possible areas excluded in Article 2, §2 and §3)
- (2) (a) metros
- (2) (b) trams and other light rail systems
- (2) (c) networks that are functionally separate from the rest of the railway system
- (3) (a) privately owned railway infrastructure, including sidings, used by the owner or by an operator for the purpose of their respective freight activities or for the transport of persons for non-commercial purposes, and vehicles used exclusively on such infrastructure
- (3) (b) infrastructure and vehicles reserved for strictly local, historical or tourist use
- (3) (c) light rail infrastructure occasionally used by heavy rail vehicles under the operational conditions of the light rail system, where it is necessary for the purposes of connectivity of those vehicles only

(3) (d) vehicles primarily used on light rail infrastructure but equipped with some heavy rail components necessary to enable transit to be effected on a confined and limited section of heavy rail infrastructure for connectivity purposes only

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

3.3 Safety Studies completed and commenced in 2018

Safety Studies completed in 2018

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

Safety Studies commenced in 2018

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

3.4 Summaries of investigations completed in 2018

R2017-01

Runaway of a maintenance machine in Ylivieska, Finland, on 28 June 2017

At 7.07 in the morning of 28 June 2017, a self-powered track maintenance machine used for track tamping began moving of its own accord from the western double-track work site located to the south of Ylivieska. The machine trailed a turnout leading from the work site to a track section used by traffic and rolled north on a track used by traffic for a distance of one kilometre, coming to a halt on track 1 of the Ylivieska station. Only moments before, the track section had been used by a freight train heading south. Passenger trains were on their way to the Ylivieska station from both south and north. The trains were supposed to pass each other in Ylivieska.

In the evening of 27 June, the maintenance machine had been used for track tamping at the western double-track work site located to the south of the Ylivieska station. The crew of the machine stopped work after two o'clock in the night and moved the machine to the crossover between the eastern track used by traffic and the western double-track under construction, and left it standing there. The unusual location was chosen to make work easier. The driver, who acted as the crew chief, contacted the Kokkola–Ylivieska traffic control and reported that the machine had been left standing on the crossover and that it would not affect rail traffic.

The Ylivieska–Iisalmi traffic controller, under whose control the Ylivieska station also was, saw the centralised traffic control system showing the tracks become occupied to the south of the Ylivieska station. Because there was not supposed to be traffic in that area, the traffic controller called the engine driver of a passenger train waiting at the Ylivieska station and asked whether the driver could see any traffic on the track. The engine driver saw a lightless maintenance machine slowly rolling down the southern hill and coming to a halt on track 1 of the station. At the request of the traffic controller, the engine driver approached the machine and noticed that the parking brake of the machine was disengaged. The engine driver engaged the parking brake and ensured that the machine will stay in place by placing stop blocks in front of the wheels of the machine.

While rolling, the maintenance machine had occupied the track section to the south of the Ylivieska station, due to which the signal located further to the south had changed to the *stop* state. Due to this, the passenger train approaching from the south had to stop at the signal.

During the incident, the point machine was damaged. The damage totalled EUR 25,000. The incident caused three passenger trains to be delayed, with the IC train en route from Oulu to Helsinki delayed the most, 2.5 hours.

The maintenance machine started rolling after its pneumatic brakes released, because the parking brake had not been engaged. Furthermore, stop blocks intended to secure the machine in place had not been used. There was no clear distribution of critical duties for the machine, and critical

operations – such as engaging the parking break – were not verified when leaving the machine standing. In addition, the linkage of the machine's brake system was worn and poorly adjusted. These deficiencies had not been detected during the traffic worthiness inspection and safety inspection conducted on the machine one month earlier.

The location chosen for the machine to be left standing in was in conflict with the traffic safety plan of the work site in question. The crew of the machine did not have the knowledge required to intervene in the matter, because their induction had not included a review of the traffic safety plan. The general instructions in the field do not pay attention to locations where rolling stock may be left standing or how it should be secured in place.

The contractor who owns the machine did not have its own safety management system for trackwork. The Finnish Transport Agency's safety management system for trackwork had been specified to apply on the work site. The contractor's operations had not been audited by the Finnish Transport Agency, although deficiencies had previously been detected in the operations of said contractor, for example during investigation R2013-02 of the Safety Investigation Authority. The monitoring of trackwork safety issues on a practical level was found to be insufficient.

The traffic control did not have access to an up-to-date track diagram of the place of incident. For this reason, the traffic controller did not realise they should have intervened in the machine left standing on the crossover. The lack of documentation also slowed down clearing up the incident, because the centralised traffic control had no knowledge of the turnouts added to the track section used by traffic. The turnouts added to the track section used by traffic had not been connected to the centralised traffic control system; only their straight-running rails had been connected to be a part of the monitored track section.

In order to avoid similar incidents in the future, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency (Trafi) ensure the implementation of the following new recommendations:

1. *Already at the competitive tendering phase for the project, the Finnish Transport Agency should require each main contractor participating in track projects to have its own safety management system that takes the special characteristics of the companies and work sites into consideration and include monitoring of the realisation of these systems as part of its auditing process.*
2. *The Finnish Transport Agency should add instructions to the safety instructions of track maintenance (TURO) and the rail traffic and shunting work safety rules (Jt) on the locations where rolling stock may be left standing and the required procedures to secure it in place.*
3. *The Finnish Transport Agency should update Part 6, Safety devices, of the Railway Engineering Guidelines (RATO) so that the section of a turnout that sees traffic installed on a track section used by traffic must always be connected to the track circuit of the railway safety system as its own element and connected to the centralised traffic control monitoring immediately when technically possible.*
4. *The Finnish Transport Safety Agency should specify in more detail the checks required during a traffic worthiness inspection as well as the qualification and independence criteria for the party conducting the inspection.*

In addition, the Safety Investigation Authority reiterates the recommendation issued during investigation R2013-02:

The Finnish Transport Agency will increase the field monitoring of trackwork safety regulations by allocating appropriate resources for such work. [R2013-02/S346]

R2017-02

Collision between shunting unit and wagons standing on the tracks at Kouvola on 21 September 2017

A shunting unit consisting of diesel locomotives, four empty hopper wagons and two container wagons loaded with tank containers containing hydrogen peroxide, on a container car collided with timber wagons standing in the eastern up yard at Kouvola at 9.47 pm on 21 September 2017.

The timber train had arrived in Kouvola on 19 September and was supposed to continue its journey to Kuusankoski on the same day. However, the final leg of the journey was cancelled. The intention was to move the wagons to their destination station on the afternoon of 21 September, but the train was cancelled, and the wagons were left to await a further transfer to track 843 of the railway yard on the night between 21 and 22 September.

Two shunting foremen were working in the shunting unit, taking turns to drive the locomotive by remote control. The shunting order being used gave instructions for the six wagons to be taken from Soramäki to the vacant track 843 at its eastern end. From Soramäki, route for the shunting unit was made to shunting signal 0823 in the direction of track 225.

The transfer to track 843 was accomplished as a pushing movement. The shunting foreman in the locomotive drove the locomotive by radio control and the shunting foreman on the wagon controlled the shunting movement via a radio telephone connection. After the signal had changed, the shunting foreman driving the locomotive used radio control to set a maximum speed request for the system of 35 km/h. As he saw the shunting unit turn towards the track with the standing timber wagon after the switch, the shunting foreman on the wagon shouted the signal *red* into the radio telephone. The shunting foreman driving the locomotive performed an emergency brake with the radio control. Despite the braking, the speed did not drop by much before the collision. The shunting foreman on the wagon jumped off the wagon before the collision. The shunting unit collided with the timber wagons at a speed of 26 km/h. In the collision, the central buffer coupling of a hopper wagon struck a tank container on a container wagon, upon which the hydrogen peroxide in the tank container poured out. The collision caused a short circuit, which cut the power from the overhead contact wire in the Kouvola entry railway yard.

An emergency call about the accident was recorded at 9.50.32 pm. The caller stated that the location was the entry railway yard and that the rescue department would know the place. No actual street address was given. The emergency duty officer created an assignment code for *an accident of medium severity involving dangerous goods* at the Kouvola railway station. Rescue Department units moved into the vicinity of the railway station. The on-call fire chief requested a precise address from the traffic controller, but the traffic controller was unaware of the accident at that point. The units moved towards the scene of the accident on the basis of the address details. The on-call fire chief requested the disruption of traffic and power in the railway yard and raised the assignment code to *high severity*. Units were added to the assignment and the on-call officer at the Kymenlaakso Rescue Department was alerted. A situation centre was established at the Kotka Fire Station.

Two sectors were formed at the accident site. The first sector was for chemical diving, leak management and fluid pumping. The second was for isolating the accident area, investigating the nearby area, monitoring the spread of the vapour cloud and cooperating with the police. The rescue department contacted a company which manufactures hydrogen peroxide, which provided suitable pumping gear. The hydrogen peroxide left in the tank was pumped into containers brought from the company.

The shunting foreman on wagon in the shunting unit during the accident was injured. The first hopper wagon viewed from the locomotive was the worst damaged in the accident. The last hopper wagon of the shunting unit, the second container wagon and the tank containers on the second container car were damaged. In addition to the wagons on the shunting unit, the first wagon of the timber wagons was damaged. Of the track equipment, one sleeper and an overhead contact wire were damaged. As a result of the accident, around 11,000 litres of 40.1% hydrogen peroxide solution poured into the ground. The accident caused EUR 110,500 in costs. To determine the environmental impact of the accident, a groundwater pipeline was commissioned by the South East Finland ELY Centre and installed on the northern side of the site of the accident. No deviations have so far been detected in the samples taken from the pipeline. The accident caused delays for the Allegro train from St. Petersburg to Helsinki and ten freight trains travelling in the Kouvola area.

The chain of events leading to the accident originated in the cancellation of the transfer of timber wagons on the afternoon of 21 September. The root cause of the accident was the failure to notify the change of destination track for the wagons in the shunting unit. Upon entering the railway yard, the crew of the shunting unit did not notice that the destination track was occupied. This was partly due to the difficulty in identifying the tracks in the dark railway yard. The shunting movement that ended in the collision was performed at too great a speed. When it was noticed that the destination track was occupied, nothing could be done to prevent the collision. The shunting foreman acting as an observer in the wagon did not have a radio control unit. With a radio control unit, he might have been able to perform emergency braking a little faster, but this would not have prevented the collision. If the shunting movement had been performed at the permissible speed of 20 km/h, this would have left more time for braking after the danger of collision had been detected. In such a case, both the collision speed and damage would have been reduced. In addition, braking would have been faster if the shunting foreman on the locomotive had performed emergency braking with the locomotive's *emergency stop* button rather than by radio control. The investigation revealed that, in the radio control system used in locomotives of this kind, there is a two-second delay in all commands. In addition, there is no separate *emergency stop* button on the radio control unit.

There was a major difference in the level of experience between the shunting foremen working on the shunting unit. They were working in the shunting unit as shunting foremen of the same level, but the shunting foreman with three months of experience would have needed the guidance of a more experienced colleague and advice on the correct and safe way to perform shunting work.

It was observed that rolling stock training for shunting foremen at the training institution was too focused on rolling stock for passenger transport. In addition, there is currently no way of engaging in supervised practice in using radio control and communication devices at the training institution. For this reason, the correct procedures may remain unclear. This can be seen, for example, in the use of incorrect communication tools in shunting work.

Work guidance forms a major part of the training of shunting foremen. This is mainly done as part of normal work in the railway yard. A single trainee can have several work guidance instructors; in this case, they had nine. Work guidance may be insufficient due to lack of time, and there is no guarantee that all of the issues are covered when there are several occupational instructors. It was observed that the verification of skills at the end of the training, i.e. the documentation of the skills demonstration, was restricted to pass/fail, which gives no indication of the employee's ability to work independently.

There are no written instructions on performing and reporting track changes. Furthermore, there is no verification that such procedures have been completed. Lack of an operational model and assignment of responsibility pose a serious safety risk in railway yards. Because a number of shunting operators work in the yards, they must have consistent practices.

Radio-controlled locomotives are involved in collisions and *near-miss* situations, some of which are not reported to superiors. This is due to the sanction procedure used by the investigated railway operator. The investigation revealed that there may be large differences between the practices described in the safety management system and those used in practice. Official supervision is insufficient to ascertain whether an enterprise is operating in the manner described in the safety management system.

The initiation of rescue operations was slowed by problems in locating the site of the accident. No addresses had been entered for the yard in the emergency centre system. The railway yard employees had not been instructed on the use of emergency service routes when making an emergency call. Even the Emergency Response Centre was unaware of the emergency service routes and had no instructions to ask the caller about them.

In order to avoid similar accidents in the future, the Safety Investigation Authority recommends that the Finnish Transport Safety Agency (Trafi) ensure the implementation of the following recommendations:

1. *When approving safety management systems and persons who are responsible for the verification of personnel skills, the Finnish Transport Safety Agency ensures that their skills verification methods are sufficient, and that skills verification is reported accordingly. Finnish Transport Safety Agency should provide instructions to training institutions in the railway sector on the creation of evaluation reports and monitor their use.*
2. *Training institutions in the railway sector include simulator training in the training programme for shunting foremen.*

3. *The Finnish Transport Agency draw up written instructions for track changes in railway yards and ensure that the operators in the yards act according to the instructions.*
4. *The Finnish Transport Safety Agency require that the radio control units used for shunting work have a separate non-delayed emergency stop button.*
5. *The Finnish Transport Safety Agency begin monitoring the practical implementation of safety management systems.*

The Safety Investigation Authority also recommends the following:

6. *The Emergency Response Centre add numbered emergency service routes for railway yards to its system, and emergency duty officers be instructed to locate the accident site primarily through such routes.*

Additionally, the Safety Investigation Authority will open a recommendation in the investigation report C10/2003R, which is intended for the Finnish Transport Agency and is currently in the “‘Not to be implemented” status:

Railway yard tracks should be equipped with number plates.

R2017-03

Level crossing accident which led to four deaths at Raasepori on 26 October 2017

A rail bus travelling from Karjaa to Hanko collided with a Defence Forces high mobility terrain vehicle in Skogby, Raasepori, at an unprotected level crossing at 8am on Thursday 26 October 2017. A pioneer unit from the Uusimaa Brigade was engaged in an attack exercise, moving vehicles from Skogby to Syndalen in Hanko. There were eight conscripts in the high mobility terrain vehicle: three in the cabin and five on the platform. In addition to the driver, 15 passengers were travelling on the rail bus.

The conscripts in the cabin of the high mobility terrain vehicle did not notice the approaching train and did not hear its warning sound. There was insufficient time to reduce the speed of the rail bus, despite emergency braking by the train driver. The collision was serious. The conscripts travelling on the high mobility terrain vehicle were thrown out of the vehicle. Three conscripts and one rail bus passenger were killed in the accident. Three conscripts were seriously injured and two were slightly injured. Some rail bus passengers suffered minor injuries. The Defence Forces high mobility terrain vehicle was completely wrecked in the accident and the nose section of the rail bus was damaged. The total costs caused by the accident were around €270,000.

Skogby's level crossing was particularly dangerous due to the angle of the track and road and the lack of warning devices. From the cabin in the high mobility terrain vehicle, it was difficult to see the train approaching at an angle from the rear. The section of line had a speed limit of 120km/h. A lower train speed would give train and vehicle drivers more time to react and take action as they approach a level crossing and would reduce the damage in possible collisions.

Level crossing improvements coordinated by the Finnish Transport Agency tend to have been made in order to increase the speed of railway lines. Because funds have been granted for the improvement of level crossings in conjunction with railway line projects, repairs have often not been targeted at the most dangerous level crossings. The Finnish Transport Safety Agency is aware of the problem but has not developed a better mechanism for improving the safety of level crossings.

Because the use of level crossings during the attack exercise had not been identified as a risk in the Uusimaa Brigade's risk assessment for the exercise and the level crossings to be crossed had not been named, the conscripts could not be warned about them. The risk assessment form used did not direct users towards the precise identification and naming of risks in the exercise taking place at the scene. Level crossing safety has not been a criterion affecting the choice of routes in the Uusimaa Brigade, or elsewhere in the Defence Forces.

Seatbelts were not in use in the high mobility terrain vehicle. The use of seatbelts would have reduced the severity of the injuries suffered by the conscripts and may even have saved lives. Seatbelts in the cargo space seating module are difficult to use when in combat gear. Seatbelts are often not used when travelling in a high mobility terrain vehicle.

Sufficient help was not initially available for all of the seriously injured people at the scene of the accident. There was a 4–5 minutes delay in the arrival of emergency care, due to the route driven. The emergency response centre did not guide the vehicles in their choice of route. At first, the emergency duty officer did not succeed in creating an accurate situational awareness of the accident. An operational area command (OAC) was not established close to the scene of the accident by the authorities. An OAC would have facilitated the coordination and communications of emergency care and rescue operations. Some of the next of kin and relatives of the victims of the accident found it difficult to obtain information on the status and location of the victims. There were problems in making official notifications of deaths. Many of the victims, their next of kin and relatives were assisted by crisis support efforts.

To avoid similar accidents and improve safety, the Accident Investigation Board recommends that:

1. *The Defence Forces develop the risk assessment of exercises in order to identify the actual risks and name those which are identified.*
2. *The Finnish Transport Agency and the Finnish Transport Safety Agency ensure that resources are allocated to improving the safety of, or removing, the most dangerous level crossings.*
3. *The Finnish Defence Forces develop seatbelts in the cargo space seating module so that they are easier to use and enhance their monitoring of the use of seat belts.*
4. *The Ministry of the Interior ensure that an operational area command (OAC) is set up by the public authorities in the case of long-term or exceptional multi-authority tasks.*

3.5 Comment and introduction or background to the investigations

Investigations commenced in 2018 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 2014–2018)

Rail investigations in 2014–2018

Accidents investigated		2014	2015	2016	2017	2018	TOT
Serious accidents (Art 20.1)	Train collision	0	0	0	0	0	**0**
	Train collision with an obstacle	0	0	1	0	1	**2**
	Train derailment	0	0	0	0	0	**0**
	Level crossing accident	0	0	1	1	1	**3**
	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	1	**1**
Other accidents (Art 20.2) + (Art 22.6)	Train collision	0	0	1	0	0	**1**
	Train collision with an obstacle	0	0	1	1	0	**2**
	Train derailment	0	0	2	0	0	**2**
	Level crossing accident	0	1	0	0	0	**1**
	Accident to person caused by RS in motion	0	0	1	0	0	**1**
	Fire in rolling stock	0	0	0	0	0	**0**
	Involving dangerous goods[1]	0	0	1	1	0	**2**
	Incidents	0	15[2]	0	1	0	**16**
TOTAL		**0**	**16**	**7**	**3**	**2**	**28**

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

In 2013 we started to publish reports of preliminary investigations in SIAF internet pages. In 2017 we developed a new layout of the report.

During the year 2018 SIAF didn't publish any preliminary investigation reports of rail occurrences.

[1] Belongs also to another category and is not calculated another time to the total amount.
[2] Cases belongs to the theme investigation on wrong routings in train traffic in 2015.

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

In 2018 occurred a total of 27 level crossing accidents, four of them were fatal. Four persons injured fatally in the accidents, two injured seriously and one injured slightly. The road accident investigation teams investigated the fatal level crossing accidents happened to a vehicle[3]. Below short summaries of the accidents happened to vehicles.

1. Fatal level crossing accident in Heinävesi on 1 May 2018

On Tuesday, 1 May 2018, a level crossing accident involving a private car and a passenger train (railbus) occurred on the Nurkkalantie level crossing in Heinävesi. Speed of the train was 110 km/h and speed of the car was slow. The level crossing was passive. The accident was fatal to the car driver and the passenger of the car injured seriously. The car was wrecked beyond repair. The train sustained minor damages in front and side of the railbus.

The direct cause (*the key event*[4]) of the accident was that the car driver drove onto the level crossing without stopping.

The car driver failed to notice the train approaching from the left. (*immediate risk factors*[4]).

Background risk factors[4]:

- the level crossing was familiar to the car driver, which possibly reduced the attentiveness
- rain and the possible frosting of glasses weakened the visibility from the side windows of the car
- the crossing angle between the track and the private road forced the driver to watch backward to the left to see the train arriving.

In order to prevent similar accidents, the investigation team made the following improvement *proposals and safety recommendations*:

- the level crossing should be equipped with half-barrier installation
- fronts of locomotives should be equipped with systems which improve crash safety
- the crossing angle should be made correct way
- the speed of the trains should be lowered at unprotected level crossings.

2. Fatal level crossing accident in Turku on 7 May 2018

On Monday, 7 May 2018, a level crossing accident involving a private car and a passenger train occurred on the Vaalantie level crossing in Turku. Speed of the train was 140 km/h and speed of the car was about 40 km/h. The level crossing was active, automatic with user side protection. The accident was fatal to the car driver. The car was wrecked beyond repair. The train sustained minor damages in front of the locomotive. The level crossing barrier broke.

[3] SIAF has investigated the Kuusivaarantie level crossing accident. The road accident investigation team started to investigate also that case, but according to our legislation stopped the investigation and gave all information they got to SIAF.

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

The direct cause (*the key event*[5]) of the accident was that the car driver drove through barrier onto the level crossing.

The car driver failed to notice that the barrier was in lower position or drove purposely through the barrier. (*immediate risk factors*[4]).

Background risk factors[4]:

- the car driver may have concentrated on other than following the traffic and didn't that's why notice the barrier being in lower position
- the level crossing was familiar to the car driver
- it is possible that the mood of the car driver and haste caused the driver defiantly and thoughtlessly drive through the barrier; in that case the driver did not probably see the train
- the driver was in a hurry and the driver had not reserved enough time
- the level crossing is located on an extremely lively section of line at the junction of several residential areas; there are about 5 000 vehicles per day moving at the level crossing, buses also and plenty of light traffic
- there is a considerable speed difference between a train and other traffic; it is difficult to estimate the approaching speed of the train especially when it is coming toward.

In order to prevent similar accidents, the investigation team made the following improvement *proposals and safety recommendations*:

- entrance of a vehicle to the track should be prevented with whole barriers when a train is approaching
- wider safety area before level crossing and monitoring system joined to it and alarm system which will warn the engine driver when inside the safety area there are persons or vehicles
- replacement of the level crossing with a graded interchange
- emergency braking assistant of vehicles which slows down automatically when perceiving an obstacle
- visible camera surveillance as preventive measure of traffic offences
- improving sightlines by means of trimming trees and bushes
- informing and education of preparing for the possible time-consuming drags of the way to work and of scheduling of the journey to work
- informing and enlightening to be continued to the road users about the risks which are related to the level crossings and to the crossing of them
- fronts of trains should be equipped with systems which improve crash safety, for example air bellows.

3. Fatal level crossing accident in Tervola on 23 August 2018

On Thursday, 23 August 2018, a level crossing accident involving a private car and a passenger train occurred on the Hallaojantie level crossing in Tervola. Speed of the train was 126 km/h and speed of the car was slow. The level crossing was passive, equipped

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

with STOP signs. The accident was fatal to the car driver. The car was wrecked beyond repair. The train sustained minor damages in front and side of the locomotive.

The direct cause (*the key event*[6]) of the accident was that the car driver drove onto the level crossing when the train was approaching from the left.

The car driver did not follow a sufficient carefulness when approaching the level crossing. (*immediate risk factors*[4]).

Background risk factors[4]:

- the level crossing was too familiar to the car driver
- the driver's attention had been possibly fixed on the hay bales which had just recently appeared on the field
- the driver's high age may have affected to the ability to make observations and decisions in the traffic situation
- the driver had serious illnesses
- the level crossing was unprotected
- difference in weight and size of the vehicles.

In order to prevent similar accidents, the investigation team made the following improvement *proposals and safety recommendations*:

- adding of the protected level crossings (equipped with barriers)
- before crossing of an unprotected level crossing, one should always stop to secure safe crossing
- the unprotected level crossings should be equipped with STOP signs
- the follow-up of the old drivers' driving health has to be developed
- it would be good to have a dashcam on both the cars and the trains, for example to clarify the accident event
- the level crossing should be removed, and the road traffic directed to the nearest (4 kilometres to south) level crossing equipped with warning devices.

6 Terms used by the road accident investigation teams.

4 RECOMMENDATIONS

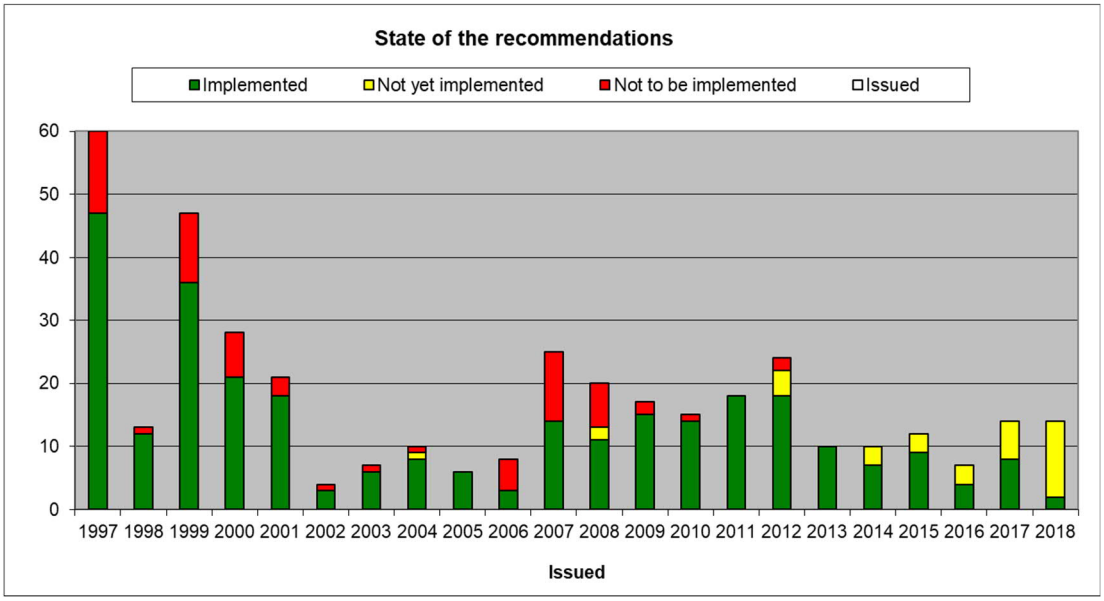
4.1 Short review and presentation of recommendations

Implementation of recommendations during 2007–2018

Recommendations issued		Recommendation implementation status					
		Implemented		In progress		Not to be implemented	
Year	[No.]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2007	25	14	56,0	0	0,0	11	44,0
2008	21	11	52,4	3	14,3	7	33,3
2009	17	15	88,2	0	0,0	2	11,8
2010	15	14	93,3	0	0,0	1	6,7
2011	18	18	100,0	0	0,0	0	0,0
2012	24	18	75,5	4	16,7	2	8,3
2013	10	10	100,0	0	0,0	0	0,0
2014	10	7	70,0	3	30,0	0	0,0
2015	12	8	66,7	4	33,3	0	0,0
2016	7	5	71,4	2	28,6	0	0,0
2017	14	7	50,0	7	50,0	0	0,0
2018	14	2	14,3	12	85,7	0	0
TOTAL	**187**	**129**	**69,0**	**35**	**18,7**	**23**	**12,3**

Implementation status of recommendations, see Annex 1.

A total of 391 recommendations were issued from the beginning of 1997 until the end of 2018. According to information available at 25 March 2019, 289 (73.9 %) recommendations were implemented and 66 (16.9 %) were decided not to be implemented. Since beginning of 2007 until the end of 2018 a total of 187 have been issued. 129 (69.0 %) have been implemented, 23 (12.3 %) have been decided not to be implemented and 35 (18.7 %) are under implementation.



4.2 Recommendations 2018

S1 Contractor-specific safety management systems in trackwork

The Finnish Transport Agency did not require the contractors participating in the track project to have their own safety management systems; instead, it required the application of the Finnish Transport Agency's safety management system. The adoption of the system on a work site with several contractors and subcontractors was deficient, as was the monitoring of the adoption process. For these reasons, the Safety Investigation Authority recommends that:

Already at the competitive tendering phase for the project, the Finnish Transport Agency should require each main contractor participating in track projects to have its own safe-ty management system that takes the special characteristics of the companies and work sites into consideration and include monitoring of the realisation of these systems as part of its auditing process. [2018-S1]

The main contractor’s safety management system must take the safety objectives set by the Finnish Transport Agency into consideration also with respect to subcontractors.

S2 Instructions on the locations where rolling stock may be left standing and ensuring that it remains in place

The instructions currently in use do not pay attention to the standing locations and the related procedures for rolling stock. In this respect, the missing instructions give the operators free hands in where and how to leave rolling stock standing, which may at worst lead to a serious accident. The instructions are particularly important in the case of maintenance machines, as their movements and locations are not known by the centralised traffic control. For these reasons, the Safety Investigation Authority recommends that:

The Finnish Transport Agency should add instructions to the safety instructions of track maintenance (TURO) and the rail traffic and shunting work safety rules (Jt) on the locations where rolling stock may be left standing and the required procedures to secure it in place. [2018-S2]

The procedures for ensuring that rolling stock remains in place must specify in which situations the use of stop blocks and in which situations the use of lockable blocks is required in addition to the parking brake.

S3 Connection of turnouts installed on a track section used by traffic to the monitoring of the centralised traffic control

In the worst case, the inability of the centralised traffic control to see turnouts installed in a track section used by traffic and their incomplete connection to the railway safety system could have caused a serious accident if the maintenance machine had stopped in the turnout section. Furthermore, the inability of the centralised traffic control to see the turnouts caused a significant slow-down to the post-incident track inspection operations. For these reasons, the Safety Investigation Authority recommends that:

The Finnish Transport Agency should update Part 6, Safety devices, of the Railway Engineering Guidelines (RATO) so that the section of a turnout that sees traffic installed on a track section used by traffic must always be connected to the track circuit of the railway safety system as its own element and connected to the centralised traffic control monitoring immediately when technically possible. [2018-S3]

A turnout on a track used by traffic should always be visible in the centralised traffic control system so that the traffic controller is able to locate the turnout. The visibility of the turnout to the centralised traffic control also improves trackwork safety, as the turnouts and their numbers are carefully specified in the trackwork notifications.

S4 Development of the commissioning permit procedure for individual machines of the type in use

At the time the incident occurred, the brake system of the maintenance machine was worn and poorly adjusted. This was the case despite a Finnish Transport Safety Agency (Trafi) traffic worthiness and safety inspection that had been conducted on the machine before it was taken into use. At the request of Trafi, extensive tests and measurements were performed on the machine, analysing the characteristics of the machine type, despite the fact that the machine type has been used in Finland for over 20 years. The purpose of these tests remains unclear, as the visibly poor condition of the individual machine was not detected. One factor could have been the missing of the machine's maintenance documentation. The role of the party that conducted these inspections was unclear in the investigated incident, as the company also participated in the refurbishment of the machine. For these reasons, the Safety Investigation Authority recommends that:

The Finnish Transport Safety Agency should specify in more detail the checks required during a traffic worthiness inspection as well as the qualification and independence criteria for the party conducting the inspection. [2018-S4]

In addition to the general safety regulations, the traffic worthiness inspection must be based on the requirements specified by the machine manufacturer; for this reason, the first step of the inspection should always be a check of the maintenance documentation. Based on this documentation, it can be checked whether the condition of the machine meets the requirements for safe use specified by its manufacturer. For example, the monitoring of the regular maintenance of safety-critical brake components is impossible without up-to-date documentation.

S5 On-site trackwork monitoring

Instructions issued by the Finnish Transport Agency define the parties' responsibilities and tasks related to the safety of railway operations, such as trackwork. The instructions emphasise monitoring that has been defined to be primarily carried out in the form of written forms and reports. Work site monitoring is rarely performed on-site with the exception of separate inspection visits. Indeed, the on-site monitoring of compliance with trackwork safety regulations should be increased. An increased risk of getting caught for breaches of regulations efficiently directs the behaviour of both organisations and individuals. Along with this measure, actions that comply with safety regulations should be made financially attractive. For these reasons, the Safety Investigation Authority reiterates the recommendation issued in investigation report R2013-02:

The Finnish Transport Agency will increase the field monitoring of trackwork safety regulations by allocating appropriate resources for such work. [R2013-02/S346]

S6 Development of work guidance monitoring

Work guidance forms a major part of the training of shunting foremen. Trainee competencies are not sufficiently ensured, because the monitoring of work guidance does not give a true picture of the competencies of trainees. Nor does this ensure that all issues have been learned.

The Safety Investigation Authority recommends that

When approving safety management systems and persons who are responsible for the verification of personnel skills, the Finnish Transport Safety Agency makes sure that their skills verification methods are sufficient, and skills verification is reported accordingly. [2018-S14]

The work guidance instructor must document the competencies of the trainee after each shift. Likewise, the trainee must evaluate the outcome of his or her training. The employer must arrange sufficient time for the instructor and trainee to perform evaluations directly after each shift.

S7 Development of teaching tools

Training at the educational institute does not include the possibility to practice the use of radio-controlled equipment. Guided training on a simulator would improve the preparedness of trainees for work.

The Safety Investigation Authority of Finland recommends that

> *Training institutions in the railway sector include simulator training in the training programme for shunting foremen. [2018-S15]*

The simulator should allow the use of different types of radio controllers. Practice with different types of communication equipment should be possible.

S8 Instruction on track changes in railway yards

Track changes are a daily activity in railway yards. If they are not done correctly and information is not passed onto the relevant parties, there is a high risk of accidents.

The Safety Investigation Authority recommends that

> *The Finnish Transport Agency draw up written instructions for track changes in railway yards and ensure that the operators in the yards act according to the instructions. [2018-S16]*

In addition to the correct working practices, the instructions should include the correct responsible persons and confirm that critical procedures have been performed.

S9 Emergency braking by radio control

The radio control system of the locomotives responds slowly to the driver's commands. There is no separate *emergency stop* button on the radio control unit. The delay in the radio control system slows the start of emergency braking in critical situations.

The Safety Investigation Authority recommends that

> *The Finnish Transport Safety Agency (Trafi) require that the radio control units used for shunting work have a separate, non-delayed emergency stop button. [2018-S17]*

As a direct measure, instructions should be given to initiate emergency braking by using the *emergency stop* button on the locomotive.

S10 Monitoring of the practical implementation of safety management systems

Near misses and minor collisions, which are not revealed, occur in the case of radio-controlled locomotives. Users do not dare to report such incidents, due to fear of sanctions. There is no way of learning from *near misses* and collisions involving radio-controlled locomotives, which hampers the development of the safety of radio-controlled work. In the railway sector, safety management systems remain at the level of target setting,

since their implementation is virtually unsupervised by public authorities and there is little self-supervision.

For these reasons, the Safety Investigation Authority recommends that:

The Finnish Transport Safety Agency begin monitoring the practical implementation of safety management systems. [2018-S18]

Supervision should mainly be performed by interviewing randomly selected employees engaged in practical work, and comparing the information received from them with the content of the company's safety management system.

S11 Use of emergency service routes during emergency calls

Emergency service routes are marked in the rescue plans for railway yards for the transport of dangerous goods), along which routes into the area are planned in case accidents occur. However, these routes are largely unknown to the Emergency Response Centre Administration, and this could hamper and delay access to the accident site. For these reasons, the Safety Investigation Authority recommends that:

The Emergency Response Centre add numbered emergency service routes for railway yards to its system, and emergency duty officers be instructed to locate the accident site primarily through such routes. [2018-S19]

In order to be able to use emergency service routes in the event of an accident, it should be ensured that they are marked individually in railway yards and workers in the railway yards know where they are.

S12 Track numbering in railway yards

Several railway yards have not been equipped with clearly visible track numbers at the ends of tracks. Identifying the destination track can be difficult and it may come as a surprise that the track is occupied.

For these reasons, the Safety Investigation Authority will open Recommendation C10/2003R, intended for the Finnish Transport Agency in the investigation report, with the status ”Not to be implemented”:

Railway yard tracks should be equipped with number plates. [C10/2003R/S194]

Track numbers can be installed in the electrical track portal crossing the railway yard, for example.

S13 Development of risk assessment

The Defence Forces have developed their risk assessment with regard to exercises, but this work is still in progress. The current risk assessment form does not encourage naming identified risks, but these are evaluated by predetermined risk type (e.g. land or sea traffic accidents). If the risks involved in exercises are not identified and named, it is difficult to control and warn troops on exercise.

The Safety Investigation Authority recommends that

The Defence Forces develop the risk assessment of exercises in order to identify the actual risks and name those which are identified. [2018-S20]

For example, local risks associated with transport should be identified.

S14 Improving the safety of the most dangerous level crossings

Repairs of level crossings have not always focused on the most dangerous level crossings.

The Safety Investigation Authority recommends that

The Finnish Transport Agency and the Finnish Transport Safety Agency ensure that resources are allocated to improving the safety of, or removing, the most dangerous level crossings. [2018-S21]

When level crossings are removed, passage between several level crossings close to each other should be planned via a single safe connection.

S15 Improved usability of seatbelts and monitoring usage

Seatbelts in the cargo space seating modules of the Defence Force's high mobility terrain vehicles are difficult to use for soldiers in combat gear. The use of seatbelts is not effectively monitored. There are guidelines on the use of seatbelts and the monitoring of such use.

The Safety Investigation Authority recommends that

The Finnish Defence Forces develop seatbelts in cargo space seating modules so that they are easier to use and enhance their monitoring of the use of seatbelts. [2018-22]

S16 The establishment of an operational area command by the authorities should be routine

An operational area command (OAC) is not necessarily established close to the scene of an accident by the authorities, even in the case of major accidents. The threshold for establishing such a command should be lower.

The Safety Investigation Authority recommends that

The Ministry of the Interior ensure that an operational area command (OAC) is set up by the public authorities in the case of long-term or exceptional multi-authority tasks. [2018-23]

An OAC is the only effective arrangement for managing a situation involving multiple authorities/actors.

RECOMMENDATIONS

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. 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		
25.2.2015	Under implementation	The renewal of the road traffic legislation is in progress.
3.3.2016	Under implementation	Waiting for the renewal of the road traffic legislation.
28.3.2017	Under implementation	Waiting for the renewal of the road traffic legislation.
11.3.2018	Under implementation	Legislative proposal will be presented to Finnish parliament. It does not include mandatory use of safety belt in delivery vehicles.
18.2.2019	**Not to be implemented**	The recommendation has not been implemented in 10 years. The active follow-up has been discontinued.

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		
25.2.2015	Under implementation	Financing for the improvement of level crossing safety is not granted.
3.3.2016	Under implementation	No progress.
28.3.2017	Under implementation	No progress.
11.4.2018	Under implementation	Level crossing is number 52 at the TOP 100 list of most dangerous level crossings in Finland. New track plan to be approved.
18.2.2019	**Not to be implemented**	The recommendation has not been implemented in 10 years. The active follow-up has been discontinued.

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 Dm12 rail 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		
25.2.2015	Under implementation	Financing for the improvement of level crossing safety is not granted.
3.3.2016	Under implementation	No progress.
28.3.2017	Under implementation	No progress.
11.4.2018	Under implementation	There are no corrective actions planned for Pohja level crossing.
25.3.2019	**IMPLEMENTED**	Pohja level crossing has been closed in December 2018.

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 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 decission making process.
10.3.2014		
25.2.2015		
3.3.2016	Under implementation	No progress.
28.3.2017	Under implementation	The opinion of the municipality is positive.
11.4.2018	Under implementation	Replacing road connections are studied, it is also possible that level crossing will be equipped with half barriers.
18.2.2019	**Not to be implemented**	The recommendation has not been implemented in 10 years. The active follow-up has been discontinued.

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.	
25.2.2015	Under implementation		
3.3.2016	Under implementation	No progress.	
28.3.2017	Under implementation	Municipality has presented the beginning of the realization to ELY Centre.	

11.4.2018	Under implementation	Track plan will most likely be approved at the beginning of year 2019 and will be carried out during summer 2019.
25.3.2019	Under implementation	Level crossings in Hanko-Hyvinkää line will be reviewed as a part of electrification of line. For Korpi level crossing options are to move level crossing to different location or equip the level crossing with half barriers.

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 plan and has decided to equip the worst level crossing with barriers.
10.3.2014		
25.2.2015	Under implementation	
3.3.2016	Under implementation	Possibly attention devices will be installed.
28.3.2017	Under implementation	Possibly attention devices will be installed.

11.4.2018	Under implementation	Level crossing warning devices that are based on new technology, will be installed during 2018.
25.3.2019	Under implementation	Procurement of warning devices for Lahti-Heinola line has been delayed. Process is on-going at commercial court. 12 most dangerous level crossings will be equipped with half barriers during 2019.

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. 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.
25.2.2015	Under implementation	Will be handled in the meeting of Finnish Transport Agency, Emergency Response Centre and VR Group Ltd.
3.3.2016	Under implementation	Finnish Transport Agency, Emergency Response Centre and VR Group Ltd are working with the issue.
28.3.2017	Under implementation	

11.4.2018	Partly implemented	Rolling stock has GPS based positioning system. Commissioning of the new ERICA system at emergency response centres has been delayed.
25.3.2019	**IMPLEMENTED**	Automatic location of emergency calls is in operation for calls made through 112Suomi-application and also through AML-emergency location function that is in all Android-phones and most iOS-phones. Finrail has taken into use YKÄ-application that displays locomotive drivers KUPLA-terminal location to traffic controllers. Railway operators have updated their instructions to include these new functions.

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. Accidents 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	
25.2.2015	Under implementation	
3.3.2016	Under implementation	Transport Agency has begun the operation definition of policy.
28.3.2017	Under implementation	Financing for the realisation of the strategy is missing.

11.4.2018	Partly implemented	New level crossing safety plan has been issued in 2018 and additional funding for it has been granted.
25.3.2019	**IMPLEMENTED**	Implemented differently: Ministry of transport has issued a plan to improve level crossing safety during years 2018-2021. Finnish transport agency is implementing the plan. Actions will be funded from additional budget.
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.
25.2.2015	Under implementation	Nearly ready.
3.3.2016	Under implementation	Ready in 2016.
28.3.2017	Under implementation	Database ready to tests.
11.4.2018	Under implementation	Will be operational at the beginning of year 2019.
25.3.2019	**REMOVED**	The recommendation 2016-S12 deals with the same matter.
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	
25.2.2015	Under implementation	
3.3.2016	Under implementation	Developed geographic information system.
11.4.2018	Partly implemented	School transport guide will be updated in 2018. Recommendation will be added as a part of designing new school transports.
25.3.2019	Under implementation	No answer to the inquiry.
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	
25.2.2015	Under implementation	Project for means to improve perceptivity is in progress.
3.3.2016	Under implementation	Project for means to improve perceptivity is in progress.
28.3.2017	Under implementation	
11.4.2018	Partly implemented	Finnish Transport Agency will define measures for improving visibility of level crossings. Focus is on developing and installing warning devices based on new cost-effective technology.

25.3.2019	Partly implemented	Finnish transport agency has studied available solutions and started procurement of warning devices. Planned delivery was during years 2020-2021, but process has been delayed and is now in commercial court.

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.
25.2.2015	Under implementation	Will be handled in the meeting of Finnish Transport Agency, Emergency Response Centre and VR Group Ltd.
3.3.2016	Under implementation	
11.4.2018	Partly implemented	Rolling stock has GPS based positioning system. Commissioning of the new ERICA system at emergency response centres has been delayed.
25.3.2019	**IMPLEMENTED**	Automatic location of emergency calls is in operation for calls made through 112Suomi-application and also through AML-emergency location function that is in all Android-phones and most iOS-phones. Finrail has taken into use YKÄ-application that displays locomotive drivers KUPLA-terminal location to traffic controllers. Railway operators have updated their instructions to include these new functions.

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.
25.2.2015	Under implementation	3400 wagons are installed with reflectors; work is not yet ready.
3.3.2016	Under implementation	In realisation: in the new wagons and ¼ of the old wagons already have.
28.3.2017	Under implementation	
11.4.2018	Partly implemented	75% of freight wagons owned by VR Group have been fitted with end reflectors.
25.3.2019	Partly implemented	VR is installing reflectors to freight wagons. 75% of freight wagons owned by VR Group have been fitted with end reflectors.

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. 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.
25.2.2015	Under implementation	Instruction and training; nearly ready.

3.3.2016	Under implementation	Instructions renewed.
28.3.2017	Under implementation	
11.4.2018	Under implementation	Responsibility for railway yard instructions should in future be assigned to infrastructure manager therefore that there will be several operators at railyards.
25.3.2019	Under implementation	Development of rail yard instructions has been started in Finnish transport agency and in railway stakeholders common instruction work group.

Date and time (Code):	6.4.2013, 3.22 (R2013-01)		
Location:	Vammala railway yard		
Type of occurrence:	Derailment		
Train type and number:	Freight train 3703, Sr1 electric locomotive and 43 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:	13 wagons damaged.		
Damages on track equipment:	Two tracks were damaged at a distance of 177 metres, including two turnouts. In addition, the sleepers of one track were damaged at a distance of 249 metres.		
Other damages:	A small amount of crude tall oil leaked onto the ground.		
Disturbances of traffic:	The accident caused a traffic interruption that lasted approximately 11 hours. The station was returned to normal use one month after the accident. 11 trains in passenger traffic and 11 trains in freight traffic had to be cancelled.		

Summary**:** Freight train 3703 en route from Tampere to Rauma derailed at the Vammala station in Sastamala. The train was proceeding as planned, until at the Vammala turnout V003, the rear bogie of wagon 15 or the front bogie of wagon 16 was directed between the switch blades and the stock rails of the turnout. As a consequence, the rear end of the train began to derail. Two Russian tank wagons tipped over and the train broke into two parts. Nine Finnish freight wagons derailed. The intermediate wagon between the Russian tank wagons and the Finnish freight wagons derailed to the left, causing minor damage to the track to the left of the train's direction of travel. The 16 wagons at the end of the train remained on the rails. The front end of the train, the locomotive and 15 wagons continued moving for another 314 metres after the brake pipe was broken. The rear bogie of the last wagon at the front end of the train ran off the rails and broke some sleepers. According to the locomotive's data recorder, the train's speed at the moment of derailment was 67 km/h.

The derailment was caused by the switch turning underneath the train. The train caused the open switch blade to move, resulting in the opening of the switch lock, which allowed the switch to turn. When an open switch blade is subjected to vibration or sufficiently powerful impacts, a switch lock that allows trailing may become unlocked. As a result, the closed switch blade opened, and the wagon wheels fell between the switch blade and the stock rail.

Final report issued:	20.2.2014

Recommendation Nr. S338	The log data available in the railway safety system had not been examined and analysed.	
	The Finnish Transport Agency should establish a system and methodology for the analysis of the error logs of safety systems to ensure that repeated flaws endangering safety are detected.	
Date	***Status***	***Comments***
25.2.2015	Under implementation	Fault situations will be recorded in the POHA system.

3.3.2016	Under implementation	The instruction is being prepared.
28.3.2017	Under implementation	
11.4.2018	Under implementation	Track and safety equipment repair, and measurement data will be integrated to a single system in RAID-E project.
25.3.2019	Partly implemented	The development project of the condition control of the track network and of maintenance systems (RAID-E) improves the matter but because of different generations of equipment, all the equipment cannot be connected to the system.

Date and time (Code):	7.11.2013, 17.17 (R2013-02)		
Location:	Pännäinen, Seinäjoki Ylivieska section of line		
Type of occurrence:	Train collision, Collision with an obstacle, a maintenance machine.		
Train type and number:	Freight train 5489, 2 Dv12 diesel locomotives and 6 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:***	0	-
	Passengers:	0	-
Slightly injured:	***Crew:***	0 + 1	-
	Passengers:	0	-
Damages of rolling stock:	The collision caused a hole into the fuel tank of the first engine, and the left steps of both engines were damaged. The excavator was damaged beyond repair.		
Damages on track equipment:	None.		
Other damages:	600 liters fuel leaked onto the track.		
Disturbances of traffic:	Traffic at the accident site was interrupted for 3.5 hours. Delays from hour to four hours for eight passenger trains and effects on several other trains because of waiting. One freight train was cancelled from between Kokkola–Tampere.		

Summary**:** Freight train 5489 collided with an excavator carrying out trackwork on the track section between Pännäinen and Kolppi, on which superstructure and electrification works were being conducted. Located near Pännäinen Station, the trackwork supervisor had requested the traffic controller for permission for an excavator to carry out trackwork. The permission was given for the work to begin on the Pännäinen−Kolppi section "behind a freight train". The trackwork supervisor informed the excavator driver of the permission. At the time, the excavator was located 3.4 kilometres from Pännäinen Station towards Kolppi.

Having driven the excavator partially onto the track, the driver noticed the lights of an approaching train and immediately attempted to get off the track. Only moments earlier, the engine driver had realised that signal P523 had been switched to display Stop and had begun emergency braking from the speed of 50 km/h. However, the locomotive's left buffer hit the left rear corner of the excavator's top carriage and the locomotive's lower part hit the rear left corner of the excavator's undercarriage.

Final report issued:	11.11.2015

Recommendation Nr. S343	In addition to their normal workload, trackwork supervisors may be responsible for requesting trackwork permissions for several teams. This disrupts their focus on their own tasks and endangers trackwork safety. Allocation of sufficient time and opportunities for trackwork supervisors to focus on the traffic safety functions should be ensured in each trackwork project.
	The Finnish Transport Agency will ensure that trackwork supervisors focus on their traffic safety function and develop better tools for trackwork supervisors for ensuring safety.

Date	***Status***	***Comments***
25.2.2015	Under implementation	In the safety instructions is entered the maximum number of the teams for track work supervisor; in the future GPS locating.
3.3.2016	Under implementation	Project started.

28.3.2017	Under implementation	
11.4.2018	Partly implemented	New RUMA-application has been taken in to use 12.6.2018. It allows rail work notifications and locations to be applied through map-based user interface that is also visible to traffic controllers.
25.3.2019	**IMPLEMENTED**	RUMA-application for track work has been in use since June 2018.
Recommendation Nr. S345	Currently, trackworks begin without sufficient preparation and clarification of the parties' responsibilities. Initial safety meetings are held in an attempt to ensure that the safety aspects are put right in order for the contractors to begin work. However, much more time should be devoted to such preparation, planning and clarification of responsibilities. Good planning also involves ensuring that communication between the parties is working.	
	The Finnish Transport Agency will ensure that contracts include a separate and sufficient timeframe for planning trackwork and clarifying responsibilities before trackwork is begun.	
Date	***Status***	***Comments***
25.2.2015	Under implementation	In March workshop of track possession planning.
3.3.2016	Under implementation	Tested in Seinäjoki–Oulu project.
28.3.2017	Under implementation	
11.4.2018	Under implementation	The will is to proceed towards this.
25.3.2019	Partly implemented	Track work meetings are widely in use in the whole of Finland. The handling of track work is systemised in the regional quality and track work meetings concerning traffic. The procedures will be unified during 2019.
Recommendation Nr. S346	Instructions issued by the Finnish Transport Agency define the parties' responsibilities and tasks related to the safety of railway operations. The instructions emphasise monitoring where written forms and reports are used. With the exception of commissioning inspections, site monitoring is rarely carried out on the field. The monitoring of compliance with trackwork safety regulations should be increased. The large number of unauthorised trackworks was a cause for particular concern. These occurrences can be reduced only by increasing field monitoring. An increased risk of getting caught for breaches of regulations efficiently directs the behaviour of both organisations and individuals. Along with this measure, actions that comply with safety regulations should be made financially attractive.	
	The Finnish Transport Agency will increase the field monitoring of trackwork safety regulations by allocating appropriate resources for such work.	
Date	***Status***	***Comments***
25.2.2015	Under implementation	Accepted in the management team; work underway.
3.3.2016	Under implementation	Safety coordinator training underway.
28.3.2017	Under implementation	Piloted. Transport Agency tries to develop monitoring.
11.4.2018	Under implementation	Guide book for supervisors is being prepared. Rail maintenance supervision instruction is ready. Minimum requirements for supervision will be defined during 2018.
25.3.2019	Under implementation	Finnish transport agency has improved instructions and procurement process. Supervision criteria will be defined in all future contracts.

Date and time (Code):	18.3.2015, 14.58 (R2015-03)
Location:	Hyvinkää, Helsinki Riihimäki section of line (line number 112), km 61+293
Type of occurrence:	Incident, risk of derailment

Train type and number:	Commuter train 9692, 2 x Sm4 electric train units		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	-
	Passengers:	100	-
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:	None.		

***Summary*:** The regional train (the R train) had departed the Riihimäki station at 2.52 p.m. About two kilometers before the Hyvinkää station, at 2.58 p.m., the train ran through a switch at a speed of 156 km/h. The maximum allowed speed over the switch was 80 km/h. The engine's ATP device had not been switched on. The incident did not cause significant personal injuries. One passenger travelling in the rear unit reported having fallen off the seat due to a strong lurch. Loose fluorescent tubes on the overhead rack fell on the floor and broke.

Final report issued:	7.8.2015

Recommendation Nr. 2015-S15	If the ATP engine device is not switched on or it malfunctions, a cabin equipment should give the engine driver a clear warning. The Safety Investigation Authority, Finland recommends that the Finnish Transport Safety Agency (Trafi) ensure the implementation of the following recommendation:	
	Cabin equipment should give the engine driver a clear warning if the train's ATP engine device is not operating.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	The realisation decision made; completed 2017.
28.3.2017	Under implementation	For VR it will be carried out during the year 2017. Fenniarail has already it.
11.4.2018	Partly implemented	Implemented differently: Some rolling stock has warning lamps on driver's desk, some limit maximum speed if ATC is not on and in some, warning is generated in train software. Will not be applied to obsolescent rolling stock.
25.3.2019	**IMPLEMENTED**	Implemented differently: In Fenniarail's Dr18 locomotives speed is automatically limited if ATC is not operative. In Helsinki City Transport's Sm5 trains there is an alarm to driver is ATC is not operative and speed is also limited. VR Group's new Sr3 locomotives have also an alarm to driver and speed is limited. VR has installed separated warning lights to alert driver if ATC is not operative to older rolling stock except Dv12 locomotives.

Recommendation Nr. 2015-S16	Since the accident risk of an operating train increases if its ATP engine device is not switched on, the maximum speed of the train should be mechanically restricted in order to reduce the consequences of a possible accident. The Safety Investigation Authority, Finland recommends that the Finnish Transport Safety Agency (Trafi) ensure the implementation of the following recommendation:	
	If a train's ATP engine device is not switched on, the train's speed should be restricted to a maximum of 80 km/h.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	Will be only in the new Sr3 locomotives.
28.3.2017	Under implementation	VR's rolling stock only in the new Sr3 locomotives. Fenniarail already has.
11.4.2018	Under implementation	Implemented into some series of rolling stock.
25.3.2019	Under implementation	In Fenniarail's Dr18 locomotives speed is automatically limited if ATC is not operative.

		In Helsinki City Transport's Sm5 trains speed is also limited if ATC is not operative. In VR Group's new Sr3 locomotives speed is limited if ATC is not operative. VR has not decided to make modifications to other rolling stock.
Recommendation Nr. 2015-S19	The current safety management system and engine driver training have a scarcity of content related to the mastery of human factors. These include, for instance, maintaining situational awareness during the performance of one's work, recovery from shocking situations, and learning from deviations. The Safety Investigation Authority, Finland recommends that the Finnish Transport Safety Agency (Trafi) ensure the implementation of the following recommendation:	
	The Finnish Transport Safety Agency (Trafi) should demand that the subject matter of human factors will be emphasised more in both the safety management systems of railway operators and training in the field.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	Trafi arranges the cooperation forum.
28.3.2017	Under implementation	In progress.
11.4.2018	Under implementation	Regulation for contents of safety management system will be renewed as part of implementation of EU 4th railway package.
25.3.2019	**IMPLEMENTED**	New EU-regulations for including human factors into safety management systyems have been in use since 16.6.2018. In Finland HF-network for railways promotes subject. Traficom has also issued a HOF-quide.

Date and time (Code):	6.2.2015, 9.14 (R2015-01)		
Location:	Kokemäki, Isotalo level crossing (km 285+145), Kokemäki Pori section of line (line number 344)		
Type of occurrence:	Level crossing accident, passenger train–tractor		
Train type and number:	Passenger train 461, Sr1electric locomotive and 3 coaches		
Road vehicle:	Articulated Hauler (Dumper), Volvo A25D, 2002 model		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	1
	Passengers:	25	0
Fatally injured:	***Crew:***	0	0
	Passengers:	0	0
Seriously injured:	***Crew:***	1	1
	Passengers:	0	0
Slightly injured:	***Crew:***	0	0
	Passengers:	0	0
Damages of rolling stock:	Locomotive front was damaged, the dumper was broken from its articulation.		
Damages on track equipment:	None.		
Other damages:	None.		
Disturbances of traffic:	Traffic at the accident site was interrupted for 7 hours. The train to Pori was replaced with bus. Three passenger trains from between Tampere–Pori were replaced with busses.		

Summary**:** On Friday, 6 February 2015, a passenger train and an articulated hauler collided in Kokemäki. The collision occurred at the unprotected level crossing of a private road and the Kokemäki–Pori railway. The accident happened while workmen were preparing to move a track excavator over the track. The driver of the articulated hauler was driving over the tracks to transport materials required for moving the excavator, when the passenger train came from his left and collided with the trailer of the articulated hauler. Both the hauler driver and engine driver were seriously injured. The articulated hauler is a 21-tonne earthmoving machine. The impact split the hauler in two, the tractor being thrown to the left side of the tracks and the trailer to the right side. The front end of the locomotive was badly damaged. The collision caused no damage to the track. The costs of repairs to the train engine and articulated hauler amounted to about EUR 700,000.

Final report issued:	19.8.2015

Recommendation Nr. 2015-S23	The railway maintenance provider issued appropriate instructions to the work supervisors of the earthworks company for how to move the excavator over the tracks. For this purpose, the maintenance provider adapted the trackwork safety instructions, as there are no separate instructions available for non-trackwork-related use of level crossings in exceptional circumstances that pose a risk of collision. The Safety Investigation Authority, Finland recommends that the Finnish Transport Safety Agency should ensure the adoption of the following recommendation:	
	The Finnish Transport Agency must draft readily available guidelines for time-intensive, non-trackwork-related use of level crossings or other similar work that poses a risk of a collision.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	Need for new instructions will be taken into account when preparing the next action plan.
28.3.2017	Under implementation	It has been dealt with different actors. Actors must learn to estimate.
11.4.2018	Partly implemented	Guide book for special road transports in level crossings will be published in 2018.
25.3.2019	Partly implemented	Instructions for special road transports in level crossings have been published 1.1.2019. Instructions for other time-consuming rail crossing will be finished during 2019.
Recommendation Nr. 2015-S24	According to Section 88 of the Road Traffic Act, the use of seatbelts in work machines and tractors is not mandatory. In this accident, the articulated hauler driver would probably have suffered less severe injuries if he had worn a seatbelt. Seatbelts should be used in tractors and work machines at least when driving in general traffic. The Safety Investigation Authority issues the following recommendation to the Ministry of Transport and Communications:	
	The Road Traffic Act must stipulate that those operating tractors and work machines must wear seatbelts when driving in traffic.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	The tractors which have seat belt will come within the sphere of the use duty. One cannot require to the old tractors in which have no belts.
28.3.2017	Under implementation	This is in the amendment of the road traffic act which is on the statement.
11.4.2018	Under implementation	Mandatory use of safety belt in tractors is included in legislative proposal.
25.3.2019	**IMPLEMENTED**	Implemented differently: In new road legislation (in force 1.6.2020) use of safety belt is will be mandatory in tractors and motorised work machines. However, the seat belt does not need to be used when from the use of the seat belt there is a drawback in the work which is done with the vehicle.

Date and time (Code):	12.3.2015, 13.19 (R2015-02)		
Location:	Oulunkylä, Helsinki–Riihimäki section of line (line number 112), km 8.		
Type of occurrence:	Incident, risk of collision		
Train type and number:	Commuter train 9676, 2 x Sm4 electric train units – Commuter train 9840, 2 x Sm4 electric train units.		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2 – 2	-
	Passengers:	50 – 50	-
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:	H-train fell behind its schedule for about 24 minutes and Z-train fell behind its schedule about 15 minutes.

Summary**:** On Thursday, 12 March 2015 at 1.19 pm, an incident occurred at Pukinmäki Station after two Sm4 commuter trains ended up within the same block section. The incident occurred after the H train stopped as a result of a malfunction in safety device on the neutral section following signal E581. The engine driver let the train "roll" backwards in order to exit the neutral section, causing it to enter the block section of the Z train following it on the same track. The H train ran late 24 minutes and the Z train 15 minutes. Other rail traffic was not disturbed. The incident did not cause any damage.

Final report issued:	22.10.2015

Recommendation Nr. 2015-S30	In this case the fault of the safety device had not been repaired even though it had been signed repaired. In order that in the future the maintenance would know how to correct the right faults:	
	The maintainer of the rolling stock must ensure and instruct the repairs of safety device mal-functions in the rolling stock better than at present.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	VR will settle.
28.3.2017	Under implementation	VR will settle.
11.4.2018	Partly implemented	Has been applied partly in VR Group's intelligent maintenance concept.
25.3.2019	Under implementation	VR has implemented for its part as a part of the developing of the maintenance systems of the rolling stock (intelligent maintenance).

Recommendation Nr. 2015-S31	The technical support needed in the problem situations of Sm commuter trains to the engine drivers has not been arranged equally well as with goods trains and long-distance traffic. The engine drivers even do not necessarily know where to ask for the technical support and getting the support is not guaranteed all the times of day. To solve the problem:	
	The technical support for the Sm commuter trains is moved to the VR Operations Centre.	
Date	***Status***	***Comments***
3.3.2016	Under implementation	Negotiations for an agreement unfinished.
28.3.2017	Under implementation	VR will move the technical support to transport control of local traffic.
11.4.2018	Partly implemented	Commuter train driver's technical support has been moved to operations control at Helsinki depot.
25.3.2019	**IMPLEMENTED**	Implemented differently: VR Commuter Traffic, that includes also HSL Commuter Traffic, has separate technical services for train drivers. This service will be kept separate from VR operation centre, because services can this way be more specialised.

Date and time (Code):	2015 (R2015-S1)		
Location:	Finland		
Type of occurrence:	Wrong routings		
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:		
Disturbances of traffic:		
***Summary*:** The Safety Investigation Authority investigated factors causing wrong routings in train traffic, by examining a number of selected cases and going through all of the wrong routes formed in 2015, based on data made available by the Finnish Transport Agency, Finrail and VR.		
Final report issued:	8.7.2016	
Recommendation Nr. 2016-S11	Around 80% of the wrong routings were created manually. The use of train number automation would have been possible in over half of these cases. The manual creation of routes is prone to error.	
	The Finnish Transport Agency should, in collaboration with Finrail Oy, ensure that, as a general rule, routes are created by the automated system.	
Date	***Status***	***Comments***
28.3.2017	Under implementation	Transport Agency and Finrail try to implement the recommendation.
11.4.2018	Under implementation	By improving situational traffic planning, use of automation can be increased in forming train routes.
25.3.2019	**IMPLEMENTED**	Traffic controllers are trained and instructed to use primarily automatic functions when forming and securing routes. It is however necessary to make sure that they can also do the tasks manually in case of system failures etc.3EHV62vuotta
Recommendation Nr. 2016-S12	Not all wrong routings are reported, or their data is not collected, although this would be possible through IT means. No clear and uniform system exists for reporting on wrong routings that covers all parties: the rail traffic operators, the owner of the railway network and the safety authority. It is not possible to gain an overview of the issue.	
	The Finnish Transport Safety Agency (Trafi) is obliged to create a uniform system for the reporting and classifying of deviations; one covering all actors.	
Date	***Status***	***Comments***
28.3.2017	Under implementation	Trafi is making the system and soon it is possible to test.
11.4.2018	Under implementation	Will probably be operational at the beginning of year 2019.
25.3.2019	Partly implemented	Traficom is working on a common incident reporting system. VR Group's and Finnis transports agency's incidents reports will be transferred directly to the system. Smaller actors' incident reports to the database by e-mail or with help of the network form.
Recommendation Nr. 2016-S13	The rapid deregulation of national regulations and references to EU regulations has lately created a situation, where detailed and practical regulations no longer exist. National instructions have been finished too late considering the adoption of the regulations, resulting in several postponements of their adoption. The time traffic controllers have to familiarise themselves with the instructions has been short. Regulations and instructions already rescinded have also been left in use.	
	The Finnish Transport Agency (Trafi) must ensure that the instructions directly affecting the work of traffic controllers are kept up to date and that they are not put into use without sufficient orientation of personnel.	
Date	***Status***	***Comments***
28.3.2017	Under implementation	Transport Agency strives towards this.
11.4.2018	Under implementation	Finnish Transport Agency has developed and taken into use a new system for controlling changes in instructions.
25.3.2019	**IMPLEMENTED**	Finnish transport agency and Finrail have agreed procedures and meeting structures to ensure sufficient communication and coordination of system changes and commissioning of new systems.
Recommendation Nr. 2016-S14	Continuous changes and the deployment of incomplete systems increase the workload of the traffic controllers.	
	The Finnish Transport Agency must ensure that new systems or modifications to existing systems are not introduced incomplete, or without sufficient orientation of the staff.	
Date	***Status***	***Comments***
28.3.2017	Issued	

11.4.2018	Under implementation	In RUMA-application that will be commenced in summer 2018 criteria for commissioning is clearly defined.
25.3.2019	**IMPLEMENTED**	Finnish transport agency has established procedures for change management.
Recommendation Nr. 2016-S15	Traffic controllers feel that they have insufficient say in the creation of new traffic control systems and the development of old ones. Defects that are the responsibility of the Finnish Transport Agency (such as defects in technical equipment) are corrected quickly, but deficiencies and development needs are not necessarily reacted to at all.	
	When procuring traffic control systems, the Finnish Transport Agency must take steps to ensure that any development needs emerging in a system can be implemented smoothly during the system's lifespan.	
Date	***Status***	***Comments***
28.3.2017	Under implementation	Transport Agency examines if it is working in Riihimäki–Tampere amendment work.
11.4.2018	Partly implemented	Finish Transport Agency and Finrail have started regular meetings where among other topics the most critical development needs are discussed.
25.3.2019	Partly implemented	Responsibility of system development is divided between Finnish transport agency and Traffic Management Finland Group (TMFG). Transport agency has agreed procedures for processing initiatives from traffic controllers. Initiative processing will be improved during 2019.

Date and time (Code):	3.2.2016, 8.09 (R2016-01)		
Location:	Uimaharju, (line number 701), km 673+930		
Type of occurrence:	Accident to persons involving rolling stock in motion – Track worker hit by a train.		
Train type and number:	Regional train 760, Dm12 rail bus		
Road vehicle:	-		
		In the train	***Other***
Persons on board:	***Crew:***	1	
	Passengers:	24	
Fatally injured:	***Crew:***	0	
	Passengers:	0	
Seriously injured:	***Crew:***	0	1
	Passengers:	0	
Slightly injured:	***Crew:***	0	
	Passengers:	0	
Damages of rolling stock:	None.		
Damages on track equipment:	None.		
Other damages:	Portable earth radar was damaged.		
Disturbances of traffic:	Traffic at the accident site was interrupted for 20 minutes.		
***Summary*:** The accident happened when one of the cable markers did not notice the approaching train and moved too close to the rails. The cable marker's attention was focused on the cable detector. In addition, the current weather conditions and the train being quiet made the train more difficult to notice. Due to the suddenness of the situation, the engine driver had no chance to avoid the collision.			
Final report issued:	4.10.2016		

Recommendation Nr. 2016-S27	The Finnish Transport Agency's cable marking request form does not directly address the need for protective measures during the work. The instructions on cable marking do not discuss work safety sufficiently. At the moment, there is a great variety among cable marking requests, cable marking request forms are not used, and the responsibilities for using the forms are unclear.	
	The Finnish Transport Agency shall renew the instructions on cable marking and adapt the cable marking request form so that the purchaser must comment on the protective measures to be used in the work.	
Date	***Status***	***Comments***
28.3.2017	Under implementation	Not yet ready.

11.4.2018	Under implementation	Instructions will be updated during 2018.
25.3.2019	Under implementation	Finnish transport agency is updating cable detection form's commercial issues. Instructions for cable detection will be updated at the same time. New instructions clearly state that all cable detection work on railways is official track work and all trac work instructions must be followed.

Date and time (Code):	23.3.2016 (R2016-02)		
Location:	Finland		
Type of occurrence:	Train collision		
Train type and number:	Freight train 11375 – Sr1 electric locomotive		
Road vehicle:	-		
Persons on board:	***Crew:***	***Crew:***	***Crew:***
	Passengers:	***Passengers:***	***Passengers:***
Fatally injured:	***Crew:***	***Crew:***	***Crew:***
	Passengers:	***Passengers:***	***Passengers:***
Seriously injured:	***Crew:***	***Crew:***	***Crew:***
	Passengers:	***Passengers:***	***Passengers:***
Slightly injured:	***Crew:***	***Crew:***	***Crew:***
	Passengers:	***Passengers:***	***Passengers:***
Damages of rolling stock:	Damages to the locomotive.		
Damages on track equipment:	Damage to approximately 250 meters of track and track equipment.		
Other damages:	None.		
Disturbances of traffic:	There was interruption of three days in rail traffic in one lane of two lane track. Totally closed for five hours.		

***Summary*:** A locomotive on its way from Kokkola to Ylivieska collided with a steel slit coil on the track at the speed of 120 km/h near the Matkaneva Station. The locomotive jumped over the slit coil, which was lying on its flat side, and became derailed. After being derailed, the locomotive travelled 185 metres and came to rest tilted over the right rail so that the rail was close to the middle of the locomotive.

Final report issued:	20.2.2017

Recommendation Nr. 2017-S3	The breaking of the radial straps holding the slit coil pack together was preceded by the radial straps becoming loose and displaced during the handling and transport after they were bound at the factory. The loose radial straps allowed the slit coil pack to tilt during transport. In order to ensure that the radial straps are sufficiently tight and that they stay in place, the Safety Investigation Authority recommends that: **SSAB specifies the binding of slit coil packs and verifies it by calculations, taking the stresses due to handling at the factory into account in addition to the lateral accelerations on the coil pack during railway transport.**	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Preliminary calculations have been made, calculations are being checked.
25.3.2019	Partly implemented	Calculations for defining sufficient strapping of steel rolls are ready, but maximum acceleration forces used in calculations need to be checked.

Date and time (Code):	8.7.2016 (R2016-03)		
Location:	Finland		
Type of occurrence:	Train collision		
Train type and number:	Shunting unit, Dr14 diesel locomotive and 20 tank wagons		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	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:	Two wagons were damaged.		
Damages on track equipment:	Buffer stop damaged.		
Other damages:	Few.		
Disturbances of traffic:	None.		

***Summary*:** A radio-controlled shunting unit collided with a rail barrier and two tank wagons loaded with SPB gasoline were derailed at the port of Mussalo in Kotka on the night of Friday 8 July 2016. As the first wagon was derailed, the end of the second wagon mounted the under-frame of the first wagon. Because the height difference was so great, the override protection on the central buffer coupling was unable to prevent the couplings from detaching from each other.

Final report issued: 10.3.2017

Recommendation Nr. 2017-S7	The lengths of railway yard tracks vary depending on the data source and system. During shunting work, this can lead to errors of interpretation which can cause an incident or accident. The consequences of an accident can be significant in railway yards were dangerous goods are being transported. To improve the safety of railway yards, the Safety Investigation Authority recommends that:	
	Infrastructure managers are responsible for ensuring that the usable track length in railway yards are consistent regardless of the system.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Some infrastructure managers have implemented. Information is missing from some infrastructure managers.
25.3.2019	**IMPLEMENTED**	Most Infrastructure managers have ensured that lengths of tracks are similar in different systems.
Recommendation Nr. 2017-S8	A rescue plan forms the basis of safety in ports and other areas where several companies are operating. The promotion of overall safety in such an area requires consistent actions from all operators. The ensure consistent actions, the Safety Investigation Authority recommends that:	
	Railway undertakings should comply with local emergency plans in ports and other areas where other companies are also operating.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	To be discussed in infrastructure managers co-operation group.
25.3.2019	Partly implemented	Local operators and infrastructure managers have reviewed rescue plans. Updating of rescue plans for dangerous goods railway yards is ongoing.
Recommendation Nr. 2017-S9	In railway yards, old buffer stops are of little relevance in stopping wagons. In addition, the transport of dangerous goods in wagons built according to varying standards sets a wide range of requirements for buffer stops. In risk analyses, overshootings have been identified as a potential cause of accidents. Because there has been no change in shunting supervision practices, structural accident prevention should be made more effective, particularly in railway yards where dangerous goods are being handled. To improve the safety of railway yards in which dangerous goods are being transported, the Safety Investigation Authority recommends that:	
	Infrastructure managers should modernise buffer stops on tracks where shunting work is done related to the transport of dangerous goods.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Some infrastructure managers have studied the situation and made action plan for replacement. Information is missing from some infrastructure managers.
25.3.2019	Partly implemented	Finnish transport agency has checked all end buffers on its network and made a schedule for renewal of obsolete buffers. Information from some of the smaller infrastructure managers is missing.

Date and time (Code):	27.7.2016 (R2016-04)
Location:	Finland
Type of occurrence:	Train collision
Train type and number:	Metro trains
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:			
Damages on track equipment:			
Other damages:			
Disturbances of traffic:			

***Summary*:** Two metro trains collided at Itäkeskus metro station in. The sides of the departing test drive train and the teaching train standing at the turnout area of the station collided and the test drive train was derailed.

Final report issued: 8.5.2017

Recommendation Nr. 2017-S22	The accident investigation revealed that the safety device design included a fault that has been carried across two generations of devices.	
	Helsinki City Transport and the safety device supplier should investigate and analyse the requirements relating to the operational safety of the metro railway system thoroughly in order to avoid potential faults being carried across to the next system in the course of the current safety device revision.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Helsinki City Transport (HKL) has started to use notified bodies to improve safety devices design and installation. Safety devices will be unified.
25.3.2019	Partly implemented	Definitions have been analysed and clarified during recent safety devices update project. Work continues due to deficiencies found in old documentation.
Recommendation Nr. 2017-S23	Helsinki City Transport was not required to have a safety management system until the summer of 2016, following the entry into force of the new Urban Rail Transport Act. This is why the system was undeveloped. For example, there were shortcomings in the processing of safety deviations, and the risk of metro trains colliding had not been identified.	
	The Finnish Transport Safety Agency should ensure that Helsinki City Transport's safety management system is developed so that it meets the requirements set by the European Railway Agency (ERA) for safety management systems.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Finnish Transport Safety Agency and Helsinki City Transport (HKL) have together improved safety management system of Helsinki City Transport.
25.3.2019	**IMPLEMENTED**	According to new Rail transport legislation Traficom monitors also Helsinki City Transport's safety management system. Requirements in legislation are similar to criteria used by European railway agency (ERA).
Recommendation Nr. 2017-S24	Controlling night-time traffic is challenging. Unscheduled night-time test and teaching traffic had not been planned sufficiently well or coordinated. It was difficult to form a comprehensive picture of the traffic situation. Night-time traffic requires traffic controllers to make quick decisions based on events.	
	Helsinki City Transport should schedule night-time metro trains and other units and draw up a driving programme for them.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	There is still room for development in maintenance planning and track reservations.
25.3.2019	Partly implemented	Helsinki City Transport is improving synchronising of track work and night time traffic on metro lines. Also of the teaching drivings are drawn up more detailed plans. There is however still room for improvement in these processes.

Date and time (Code):	13.8.2916 (R2016-06)		
Location:	Finland		
Type of occurrence:	Train collision		
Train type and number:	Freight train 5316, 2 x Sr1 electric locomotives and 24 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:***	1	-
	Passengers:	0	-
Damages of rolling stock:	Locomotive and three wagons damaged badly. Seven wagons damaged less severely.		
Damages on track equipment:	Track damaged about 100 meters and the portal suspension of electric railway damaged.		
Other damages:	None.		
Disturbances of traffic:	Railway yard traffic disrupted due to a power outage.		

***Summary*:** An empty timber train on its way from Kemi to Kontiomäki was about to arrive at the Oulu freight yard, where it was intended to stop for two hours and change drivers. The freight train arrived on track 118 and collided with the empty wagons standing on the tracks at a speed of 33 km/h.

Final report issued: 23.5.2017

Recommendation Nr. 2017-S28	A safety risk is involved in the work done by switchmen to protect routes in railway yards without modern technical systems to protect the passage of trains. Route protection by the switchman is not verified in any way, which also constitutes a risk. The faulty procedure used by the switchman made it possible to protect the route of a train on an occupied track. Traffic implemented as shunting operations should be more controlled, in which case the engine driver would also have an obligation to keep a lookout. If, say, for financial reasons it is not possible to equip all railway yards with technical monitoring by centralised traffic control, the Safety Investigation Authority recommends that	
	The Finnish Transport Agency should restrict trains running on tracks that are not under technical centralised traffic control.	
Date	***Status***	***Comments***
11.4.2018	Under implementation	A test is in process where a part of trains route is run according to shunting operation rules. A report will be made from this test and decisions will be based on it.
25.3.2019	Partly implemented	Due to recommendation, procedures have been changed for example at Oulu railway yard, partly with different procedures.
Recommendation Nr. 2017-S29	The instructions on traffic control are not consistent in all parts, and some of the actors do not know which instructions should be applied to which function or which instructions should be followed. Some of the instructions refer to other instructions that have already been repealed. To ensure that the instructions on traffic control are up to date and clear for all actors, the Safety Investigation Authority recommends that	
	The Finnish Transport Agency should harmonise and clarify the instructions on centralised traffic control.	
Date	***Status***	***Comments***
11.4.2018	Partly implemented	Railway yard traffic control instructions and train traffic control instructions have been combined to a single document.
25.3.2019	**IMPLEMENTED**	Separate instructions have been replaced by Traffic controller's manual.

Date and time (Code):	28.6.2017 (R2017-01)
Location:	Ylivieska, Seinäjoki Ylivieska section of line, (line number 412), km 629+164.

Type of occurrence:	Incident – A track tamping machine began moving by itself – Hazard of collision.		
Train type and number:	A track tamping machine.		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	0	-
	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:	Point machine was damaged.		
Other damages:	None.		
Disturbances of traffic:	The traffic was at a standstill for two hours.		

***Summary*:** A self-powered track maintenance machine used for track tamping began moving of its own accord from the western double-track work site located to the south of Ylivieska. The machine trailed a turnout leading from the work site to a track section used by traffic and rolled north on a track used by traffic for a distance of one kilometre, coming to a halt on track 1 of the Ylivieska station. Only moments before, the track section had been used by a freight train heading south. Passenger trains were on their way to the Ylivieska station from both south and north.

Final report issued: 14.2.2018

Recommendation Nr. 2018-S1	The Finnish Transport Agency did not require the contractors participating in the track project to have their own safety management systems; instead, it required the application of the Finnish Transport Agency's safety management system. The adoption of the system on a work site with several contractors and subcontractors was deficient, as was the monitoring of the adoption process.	
	Already at the competitive tendering phase for the project, the Finnish Transport Agency should require each main contractor participating in track projects to have its own safety management system that takes the special characteristics of the companies and work sites into consideration and include monitoring of the realisation of these systems as part of its auditing process.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Finnish transport agency will include subcontractor safety management system requirements to its own safety management system. Changes will be introduced during 2019.
Recommendation Nr. 2018-S2	The instructions currently in use do not pay attention to the standing locations and the related procedures for rolling stock. In this respect, the missing instructions give the operators free hands in where and how to leave rolling stock standing, which may at worst lead to a serious accident. The instructions are particularly important in the case of maintenance machines, as their movements and locations are not known by the centralised traffic control.	
	The Finnish Transport Agency should add instructions to the safety instructions of track maintenance (TURO) and the rail traffic and shunting work safety rules (Jt) on the locations where rolling stock may be left standing and the required procedures to secure it in place.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	Instructions for temporary storage and standing places of rolling stock and how to secure rolling stock in place will be updated during 2019.
Recommendation Nr. 2018-S3	In the worst case, the inability of the centralised traffic control to see turnouts installed in a track section used by traffic and their incomplete connection to the railway safety system could have caused a serious accident if the maintenance machine had stopped in the turnout section. Furthermore, the inability of the centralised traffic control to see the turnouts caused a significant slow-down to the post-incident track inspection operations.	
	The Finnish Transport Agency should update Part 6, Safety devices, of the Railway Engineering Guidelines (RATO) so that the section of a turnout that	

	sees traffic installed on a track section used by traffic must always be connected to the track circuit of the railway safety system as its own element and connected to the centralised traffic control monitoring immediately when technically possible.	
Date	***Status***	***Comments***
25.3.2019	**IMPLEMENTED**	Finnish transport agency's operating policy is that turnouts are connected to safety system as soon as it is technically possible. Decisions have to be made case by case when planning work phases and designing safety devices. Connection of turnouts to safety devices will also be included in safety plans for projects.
Recommendation Nr. 2018-S4	At the time the incident occurred, the brake system of the maintenance machine was worn and poorly adjusted. This was the case despite a Finnish Transport Safety Agency (Trafi) traffic worthiness and safety inspection that had been conducted on the machine before it was taken into use. At the request of Trafi, extensive tests and measurements were performed on the machine, analysing the characteristics of the machine type, despite the fact that the machine type has been used in Finland for over 20 years. The purpose of these tests remains unclear, as the visibly poor condition of the individual machine was not detected. One factor could have been the missing of the machine's maintenance documentation. The role of the party that conducted these inspections was unclear in the investigated incident, as the company also participated in the refurbishment of the machine.	
	The Finnish Transport Safety Agency should specify in more detail the checks required during a traffic worthiness inspection as well as the qualification and independence criteria for the party conducting the inspection.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	Finnish Transport Safety Agency will describe rolling stock track worthiness requirements more precisely in its internal work instructions.

Date and time (Code):	21.9.2017 (R2017-02)		
Location:	Kouvola marshalling yard, track number 843, (line number 412), km 193+568.		
Type of occurrence:	Collision – A shunting locomotive with 6 wagons collided into 48 wagons loaded with timber.		
Train type and number:	Shunting unit 6403, a Dr14 diesel-hydraulic locomotive and 6 wagons.		
Road vehicle:	-		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	2	-
	Passengers:	0	-
Fatally injured:	***Crew:***	0	-
	Passengers:	0	-
Seriously injured:	***Crew:***	0	-
	Passengers:	0	-
Slightly injured:	***Crew:***	1	-
	Passengers:	0	-
Damages of rolling stock:	1 hopper wagon was seriously damaged, 2 container wagons were slightly damaged. A 20-foot tank container that was loaded on container wagon was seriously damaged.		
Damages on track equipment:	None.		
Other damages:	11 000 litres of hydrogen peroxide-water mixture leaked to ground, 10 000 litres were salvaged but had to be sent to chemical waste plant for disposal.		
Disturbances of traffic:	The traffic on track east of Kouvola was stopped for 15 minutes. Kouvola rail yard was partly out of use for 24 hours.		
Summary**:** A shunting unit consisting of diesel locomotives, four empty hopper wagons and two container wagons loaded with tank containers containing hydrogen peroxide, on a container car collided with timber wagons standing in the eastern up yard at Kouvola.			
Final report issued:	1.6.2018		

Recommendation Nr. 2018-S14	Work guidance forms a major part of the training of shunting foremen. Trainee competencies are not sufficiently ensured, because the monitoring of work guidance does not give a true picture of the competencies of trainees. Nor does this ensure that all issues have been learned.	
	When approving safety management systems and persons who are responsible for the verification of personnel skills, the Finnish Transport Safety Agency makes sure that their skills verification methods are sufficient, and skills verification is reported accordingly.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	According to Finnish Transport Safety Agency, they use EU-level criteria when auditing safety management systems. Procedures have not been changed due to recommendation. Investigation showed, that procedures are not sufficient to ensure competencies of trainees.
Recommendation Nr. 2018-S15	Training at the educational institute does not include the possibility to practice the use of radio-controlled equipment. Guided training on a simulator would improve the preparedness of trainees for work.	
	Training institutions in the railway sector include simulator training in the training programme for shunting foremen.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	KRAO is researching on acquiring a simulator for radio-controlled locomotive operator training. Decision will be made during 2019.
Recommendation Nr. 2018-S16	Track changes are a daily activity in railway yards. If they are not done correctly and information is not passed onto the relevant parties, there is a high risk of accidents.	
	The Finnish Transport Agency draw up written instructions for track changes in railway yards and ensure that the operators in the yards act according to the instructions.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Finrail will test during 2019 new IT tool to indicate track occupancy situation on railway yards. It should solve the issue.
Recommendation Nr. 2018-S17	The radio control system of the locomotives responds slowly to the driver's commands. There is no separate *emergency stop* button on the radio control unit. The delay in the radio control system slows the start of emergency braking in critical situations.	
	The Finnish Transport Safety Agency (Trafi) require that the radio control units used for shunting work have a separate, non-delayed emergency stop button.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	According to Trafi adding an emergency-stop button to existing rolling stock would be time consuming and expensive. Because of these reasons Trafi cannot require this kind of feature. SIAF has information, that there are radio-control systems in use in Finland that fulfil the recommendation. So, the solutions should be still clarified.
Recommendation Nr. 2018-S18	Near misses and minor collisions, which are not revealed, occur in the case of radio-controlled locomotives. Users do not dare to report such incidents, due to fear of sanctions. There is no way of learning from *near misses* and collisions involving radio-controlled locomotives, which hampers the development of the safety of radio-controlled work. In the railway sector, safety management systems remain at the level of target setting, since their implementation is virtually unsupervised by public authorities and there is little self-supervision.	
	The Finnish Transport Safety Agency begin monitoring the practical implementation of safety management systems.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	Finnish Transport and Communications Agency Traficom monitors the contents of safety management systems. SIAF's impression is that there is needed more monitoring of practical realization.
Recommendation Nr. 2018-S19	Emergency service routes are marked in the rescue plans for railway yards for the transport of dangerous goods), along which routes into the area are planned in case	

	accidents occur. However, these routes are largely unknown to the Emergency Response Centre Administration, and this could hamper and delay access to the accident site.	
	The Emergency Response Centre add numbered emergency service routes for railway yards to its system, and emergency duty officers be instructed to locate the accident site primarily through such routes.	
Date	***Status***	***Comments***
25.3.2019	Under implementation	According to Emergency response centres, emergency service routes cannot be added to its new ERICA system. Ministry of Interior has proposed that emergency service routes could be handled like normal streets, so they would be visible in all road maps. Finnish transport agency has checked all rail yard emergency service routes as a part of safety study for dangerous gods rail yards.
Recommendation Nr. C10/2003R/S194	Several railway yards have not been equipped with clearly visible track numbers at the ends of tracks. Identifying the destination track can be difficult and it may come as a surprise that the track is occupied. For these reasons, the Safety Investigation Authority will open Recommendation C10/2003R, intended for the Finnish Transport Agency in the investigation report, with the status "Not to be implemented":	
	Railway yard tracks should be equipped with number plates.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Finnish transport agency is studying best possibilities to display track information to railway operators in all operating conditions. Priority is in rail yards for dangerous goods.

Date and time (Code):	26.10.2017 (R2017-03)		
Location:	Raasepori, Skogby level crossing, line number 142, Karjaa–Hanko section of line (km 183+714)		
Type of occurrence:	Level crossing accident		
Train type and number:	Passenger train 382, Dm12 rail bus		
Road vehicle:	Military off-the-road truck Sisu A2045		
		In the train	***In the road vehicle***
Persons on board:	***Crew:***	1	1
	Passengers:	15	7
Fatally injured:	***Crew:***	0	0
	Passengers:	1	3
Seriously injured:	***Crew:***	0	1
	Passengers:	0	2
Slightly injured:	***Crew:***	0	0
	Passengers:	0	2
Damages of rolling stock:	Front end damage to Dm12 rail bus. Military off-the-road truck was wrecked totally.		
Damages on track equipment:	None.		
Other damages:	None.		
Disturbances of traffic:	Track between Tammisaari and Hanko out of service 6.5 hours.		
Summary**:** A rail bus travelling from Karjaa to Hanko collided with a Defence Forces high mobility terrain vehicle in Skogby, Raasepori, at an unprotected level crossing. A pioneer unit from the Uusimaa Brigade was engaged in an attack exercise, moving vehicles from Skogby to Syndalen in Hanko.			
Final report issued:	7.6.2018		

Recommendation Nr. 2018-S20	The Defence Forces have developed their risk assessment with regard to exercises, but this work is still in progress. The current risk assessment form does not encourage naming identified risks, but these are evaluated by predetermined risk type (e.g. land or sea traffic accidents). If the risks involved in exercises are not identified and named, it is difficult to control and warn troops on exercise.	
	The Defence Forces develop the risk assessment of exercises in order to identify the actual risks and name those which are identified.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Risk management is and has been under development in Finnish defence forces. Aim is to make risk management a fixed part

		of all activities. Development program has been planned to be completed by the end of year 2020.
Recommendation Nr. 2018-S21	Repairs of level crossings have not always focused on the most dangerous level crossings.	
	The Finnish Transport Agency and the Finnish Transport Safety Agency ensure that resources are allocated to improving the safety of, or removing, the most dangerous level crossings.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Finnish transport agency is implementing the so called 65-program, in which safety of several level crossings will be improved. In addition to this, the agency has introduced a new action package to improve level crossing safety. Actions will be realised 2018–2022.
Recommendation Nr. 2018-S22	Seatbelts in the cargo space seating modules of the Defence Force's high mobility terrain vehicles are difficult to use for soldiers in combat gear. The use of seatbelts is not effectively monitored. There are guidelines on the use of seatbelts and the monitoring of such use.	
	The Finnish Defence Forces develop seatbelts in cargo space seating modules so that they are easier to use and enhance their monitoring of the use of seatbelts.	
Date	***Status***	***Comments***
25.3.2019	Partly implemented	Finnish defence forces is studying and planning possible technical changes to seatbelts. Decisions on changes will be made after studies are finalised. Training and monitoring of seat belt usage has been improved.
Recommendation Nr. 2018-S23	An operational area command (OAC) is not necessarily established close to the scene of an accident by the authorities, even in the case of major accidents. The threshold for establishing such a command should be lower.	
	The Ministry of the Interior ensure that an operational area command (OAC) is set up by the public authorities in the case of long-term or exceptional multi-authority tasks.	
Date	***Status***	***Comments***
25.3.2019	**IMPLEMENTED**	Ministry of Interior has issued rule 1363/2018 on 1.1.2019. It contains orders to make plans for organising rescue services. A part of these are command structures for demanding situations, for example setting up operational area command (OAC).