Annual Railway Safety Report 2012 Finnish Transport Safety Agency Trafi

Network of National Safety Authorities

TraFi

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Finnish Transport Safety Agency Trafi
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Photograph: Rodeo

Contents

A. Scope of the report

This Annual Railway Safety Report presents the state of Finnish railway safety and the Finnish Transport Safety Agency's activities as the National Railway Safety Authority in 2012.

Section 41 of the Railway Act (304/2011) requires the Finnish Transport Safety Agency to publish an annual report on railway safety by 30 September each year. The Annual Railway Safety Report is published on the Finnish Transport Safety Agency website and delivered to the European Railway Agency (ERA) and the Ministry of Transport and Communications. The Annual Railway Safety Report follows the structure recommended by the ERA.

The information in the Annual Railway Safety Report is mainly based on the safety reports delivered to the Finnish Transport Safety Agency by railway stakeholders. Collection of data for this annual report was successful, and nearly all the required data was available in the stakeholders' safety reports.

B. Introductory section

B.1 Railway Structure Information

The Finnish Transport Agency manages the state-owned railway network in Finland. In addition to the Finnish Transport Agency, there are hundreds of private siding managers in Finland. Private sidings mainly function as the start and end points for the transport of goods. In 2012, there was one railway undertaking active in Finland, VR Group Ltd, which operates both passenger and freight traffic. What would be Finland's second railway undertaking began preparing small-scale operations during the year, mostly consisting of shunting tests at the Imatra operating station. Apart from VR Group Ltd, operators of railway transport in Finland in 2012 included track maintenance companies, heritage railway operators and infrastructure managers operating freight traffic on private sidings. Safety certificates were issued in 2012 to ten new railway undertakings in Finland. A map of the Finnish state-owned railway network is presented in Annex A.

B.2 Summary

Railway safety remained at a fairly good level in Finland in 2012. No passengers or railway personnel lost their lives or were seriously injured in accidents. There were 19 significant accidents, slightly less than the 2007–2011 average of 22. Railway safety has gradually been improving when viewed over the long term.

The most serious accidents in 2012 were the overturning of turnout transport wagons in Riihimäki on 22 May and in Kouvola on 28 June. These incidents resulted in derailment, significant damage to rolling stock and infrastructure and serious disruptions to traffic. A serious railway-traffic incident occurred in Vammala on 19 October when a freight train was directed on to a track where rail maintenance machinery was being stored. The freight train's driver managed to stop the train and avoid a collision. The most serious shunting accident of 2012 was the collision of some freight wagons with stationary wagons at the Ilmala rail yard on 14 January. Four people sustained minor injuries in the accident, which also caused considerable damage to rolling stock.

There were 51 level crossing accidents in 2012, of which 11 were significant. Six people were killed and another six seriously injured in these accidents. Although a higher figure than for the last three years, the number of level crossing accidents remained consistent with the ten-year

average. No explanation apart from random variation has been identified for the fluctuation in the number of accidents.

Relatively few significant collisions have occurred in recent years, the number varying between two and zero. No significant collisions occurred in 2012. Likewise, the numbers of fires and other accidents involving rolling stock remained low. Of the precursors to accidents in railway transport, the numbers of broken rails and acts of vandalism are on the rise, while the number of signals passed at danger was smaller than in previous years. The annual number of misunderstandings and incidents between rail maintenance work and train traffic remains alarming.

The most significant changes to Finnish railway legislation in 2012 consisted of an amendment to the act on transport safety tasks in the railway system (Laki rautatiejärjestelmän liikenneturvallisuustehtävistä 1664/2009) and the passing of three new regulations. These regulations concerned the annual safety reports of railway operators, the railway infrastructure register, and the psychological suitability of employees with duties related to railway transport safety and the psychological evaluation of such employees.

C. Organisation

C.1 Introduction to the organisation

On 1 January 2010, the Finnish Rail Agency, Finnish Civil Aviation Authority, Finnish Vehicle Administration and the safety functions of the Finnish Maritime Administration were merged to form the Finnish Transport Safety Agency. The Finnish Transport Safety Agency is directed by Director General Kari Wihlman. The main functions of the Finnish Transport Safety Agency are to develop the safety of the transport system, promote environmentally friendly transport and take care of the transport safety tasks that have been assigned to the Agency. The Finnish Transport Safety Agency's tasks in the railway sector include preparing for national and EU legislation, implementing technical interoperability specifications, technical approvals of rolling stock and the infrastructure, issuing safety certificates and authorisations, and acting as a regulatory body. The Finnish Transport Safety Agency also issues instructions on the health and competence inspections and training of railway personnel.

In its early days, the Finnish Transport Safety Agency was organised into divisions according to the form of transport, but preparations began in 2011 for a new organisation, introduced at the beginning of 2012. The old organisational structure was relinquished in favour of an agency organised by functions.

The new organisation is divided into Data Resources, Compliance, Regulation and Transport System divisions. The Data Resources division is responsible for managing the data stores of the transport system. The Compliance division's responsibilities include monitoring tasks and the granting of permits. The Regulation division attends to the agency's international relations and regulatory duties. The Transport System division's responsibilities include strategic direction of the Agency and monitoring the transport system's safety status via data analysis. The safety-status data and risk assessment are used as the basis for decision-making in risk-based targeting carried out by the Finnish Transport Safety Agency's functions. Drawing up the Annual Railway Safety Report is the duty of the Transport System division.

Although the organisation was now function-based, directors for each form of transport were nonetheless appointed. It is these directors' task to ensure that the Agency's international cooperation with stakeholders and customers functions in their particular area. The Director of Railways is Yrjö Mäkelä.

The organisational diagram of the Finnish Transport Safety Agency is presented in Annex B.1.

C.2 The Finnish Transport Safety Agency's relations with other national authorities

The Finnish Transport Safety Agency operates under the Ministry of Transport and Communications. The Agency cooperates closely with the Finnish Transport Agency and the Safety Investigation Authority. The Agency also cooperates with other authorities, such as the Finnish Competition Authority. A diagram of the Agency's partners is presented in Annex B.2.

D. The development of railway safety

D.1 Initiatives to improve safety performances

Several safety measures were implemented in 2012 as a response to accidents and incidents. These measures are described in Table 1.

Table 1. Safety measures triggered by accidents

Accident/incident which triggered the measure			**Safety measure decided upon**
Date	**Location**	**Description of the event**	
2 January 2012	Viinijärvi	The person responsible for rail maintenance authorised a road-rail excavator to enter a section of track outside the scope of the rail maintenance operation.	(Rail Maintenance Company) A training event was held on defining and identifying rail maintenance areas and on communications with traffic control.
31 January 2012	Uusikylä	Incident related to turnout cleaning.	(IM) The use of leaf blowers and other noisy equipment in rail work secured by a lookout was forbidden.
22 May 2012 and 28 June 2012	Riihimäki and Kouvola	Freight train derailments	(RU) The loading instructions of turnout-element wagons were updated.
30 May 2012	Nurmes	Movement authority was erroneously given to a train (movement authority automation).	(IM) Development study of movement-authority automation launched.
10 June 2012	Kivesjärvi	A turnout was incorrectly switched and consequently forced open.	(IM) New instructions on the adoption of subsystems drawn up.
10 June 2012	Kivesjärvi	A turnout was incorrectly switched and consequently forced open.	(IM) Work begun on more accurate specification of the job descriptions of dispatchers and safety coordinators.
21 June 2012 and 27 June 2012	Punkaharju and Keuruu	Fires in Dm12-engine trains.	(RU) The fuel hoses of all Dm12-engine trains were replaced with a more durable type, and cleaning of the engine compartment was added to the maintenance programme.
20 September 2012	Punkaharju–Parikkala	A train collided with sleepers left on the track after the completion of rail maintenance work.	(RMC) Instructions on correct work procedures drawn up for maintenance personnel.

26 September 2012	Loviisa	Unauthorised rail maintenance work, incorrect traffic control contact details.	(IM) All traffic control contact details checked.
19 October 2012	Vammala	A freight train was directed on to an occupied track.	(IM) Review of axle-counting reset procedures begun.
29 October 2012	Muurame	Cracks detected in the wheels of an Sr1-locomotive.	(RU) All other wheels delivered in the same batch checked; no defects detected.
7 November 2012	Kolari	Unauthorised rail maintenance work.	(IM) The railway system's communications guidelines updated.
14 November 2012	Ilmala rail yard	Switching error in the crossing turnout, which was consequently forced open.	(IM) Note on the special characteristics of crossing turnouts added to turnout inspection and maintenance instructions.
14 November 2012	Ilmala rail yard	Switching error in the crossing turnout, which was consequently forced open.	(IM) Inspection check-list for crossing turnouts added to the new instructions on the adoption of subsystems.
15 November 2012	Tampere	Reliability defect in the safety device system.	(IM) The failure rate of relay packs and the resulting risks are being studied.
14 December 2012	Kuopio	Traffic control directed a train on to a rail maintenance site where a rail maintenance machine was working.	(RMC) The correct marking of rail maintenance sites in the rail maintenance work notification has been emphasised.
	Tampere–Hyvinkää	Excessive speed in museum traffic.	(Heritage) The operator has removed the person from traffic safety duties.

Safety measures implemented for other reasons are presented in Table 2.

Table 2. Safety measures with other triggers

Safety measure decided upon	**Reason for the measure**
(RU) The inspection of and response to safety incidents was enhanced by updating instructions and training supervisors.	Reduction in incidents and resulting costs.
(RU) Change to the structure of the main switch of Sm5-engine trains.	Over-pressure resulting from the sparkovers of the main switch broke the roof hatch and smoke entered the passenger area.

D.2 Detailed data trend analysis

The following figures are based on the safety indicator figures reported to the Finnish Transport Safety Agency annually by infrastructure managers (IM) and railway operators. The data contained in these sections is also based on the annual safety reports and incident reports of the operators, VR's train safety reports and the investigation reports of the Safety Investigation Authority.

In 2012, 19 significant railway accidents occurred in Finland (Figure 1). The total number of significant accidents was greater than in 2011 (14), yet lower than the average for 2007–2011 (22). The significant accidents consisted of three derailments, 11 level crossing accidents, three accident to persons caused by rolling stock in motion and two shunting accidents categorised as 'other accidents'. The major differences compared to recent years included the return of the number of level crossing accidents to the high levels of previous years and the reduced number of accident to persons caused by rolling stock.

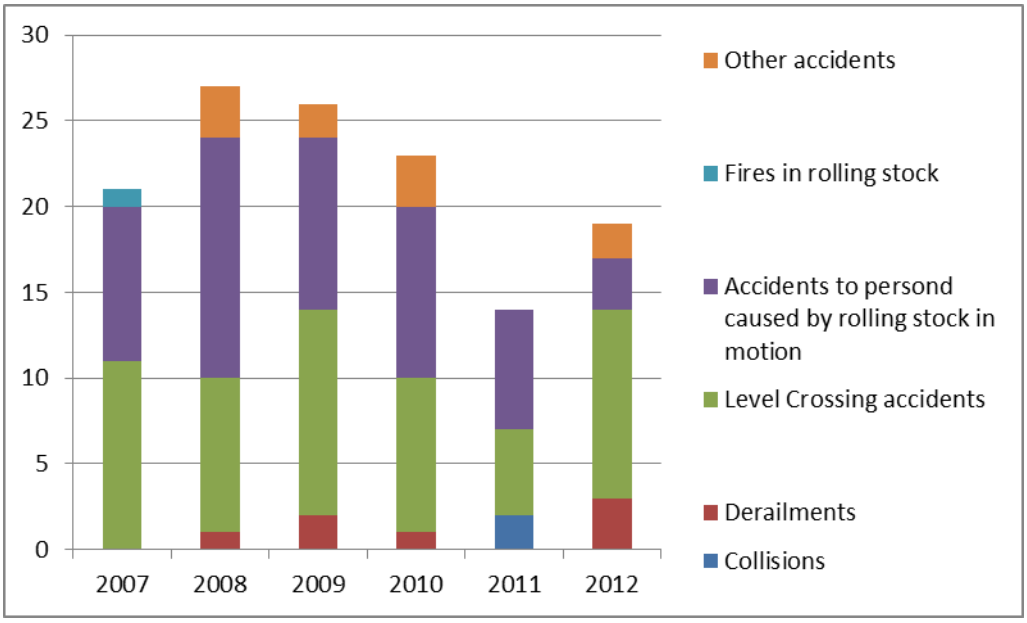


Figure 1. Number of significant accidents in Finland in 2007–2012 by accident type.

If the number of significant accidents is compared with kilometres travelled by rail, annual differences level out somewhat owing to the slight decline in annual train-kilometres in recent years (Figure 2). Several significant accidents occurred in 2008, but the number of train-kilometres (53.3 million) travelled in that year was also the highest during the period. From the base data presented in Figure 2 it can be concluded that one significant railway accident has occurred in Finland per 2.38 million train-kilometres in the period 2007–2012.

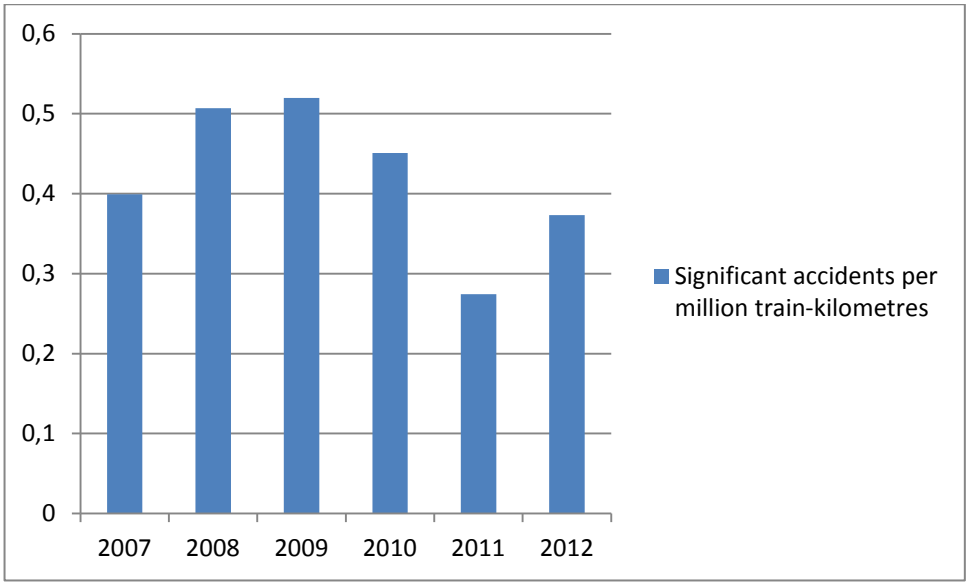


Figure 2. Number of significant accidents per million train-kilometres in 2007–2012.

Because of the high speeds and great masses involved, if the risks involved in railway traffic are realised as an accident the results can be extremely serious. In the worst-case scenario dozens of people may lose their lives. No significant railway accidents involving multiple fatalities have occurred in Finland in recent years. Several situations where realisation of a serious railway accident has only been narrowly avoided have nevertheless occurred each year. Significant accidents or incidents typically result from exceptional circumstances in which, for one reason or another, several safeguards have either failed or been deactivated.

Factors leading to significant accidents and incidents often include errors in technological systems, human factors and unclear procedures. For the improvement of safety, it is also vital to monitor and analyse minor railway incidents and their causes. It is crucial that operators report all railway-related safety incidents, both internally and to Trafi, analyse the collected data and implement the measures required as a result of these analyses.

Railway safety has improved in recent years, attaining a level where serious railway accidents occur only seldom. For passengers, travelling by rail can be considered particularly safe, since railway accidents very rarely involve personal injury. This improvement in railway traffic has been achieved through measures such as training, the development of safe operating methods and the adoption of safety-device systems. A few significant accidents and serious incidents nevertheless occur in railway traffic each year.

Significant railway accidents

Three derailments categorised as significant accidents occurred in 2012. The annual number of significant derailments in 2007–2012 varied between zero and two.

On 14 January 2012, a stop block left on under the train caused the derailment of the first two wagons of a freight train departing from Kouvola rail yard[1]. Although no personal injuries resulted, the accident was categorised as significant because of the considerable damage caused to railway infrastructure. One of the derailed wagons caused a chain reaction by hitting a signal post, which later collapsed on to an electric railway portal. Collapse of the portal then brought down electrical cables for seven tracks. The brake tester had forgotten to remove the stop block during brake testing. Poor visibility in snowfall and darkness contributed to the error.

A significant derailment occurred in Riihimäki on 22 May 2012, when a turnout transport wagon carrying two turnout elements with concrete sleepers was derailed and overturned[2]. The track and track equipment sustained damage in the accident, the elements carried by the wagon were irreparably destroyed and the wagon sustained minor damage. The accident also significantly hindered other traffic.

A very similar derailment to the one in Riihimäki occurred in Kouvola on 28 June 2012, when another turnout transport wagon was derailed and overturned. This accident caused significantly less material damage and disruption to traffic than the one in Riihimäki. The derailed wagons and their loads were similar in both accidents. There were also similarities in the causes of the two accidents. Neither accident resulted in personal injuries.

Although the accidents were a sum of several factors, the most significant contributor in both cases was the imbalanced load distribution of the wagons. The wagons' wheel-weight ratios

[1] Safety Investigation Authority, R2012-1. <http://www.turvallisuustutkinta.fi/Etusivu/Tutkintaselostukset/Raideliikenne/Raideliikenne2012/1324022256310>. Retrieved on 21 May 2013.

[2] Safety Investigation Authority, R2012-2 <http://www.turvallisuustutkinta.fi/Etusivu/Tutkintaselostukset/Raideliikenne/Raideliikenne2012/1330603743384>. Retrieved on 29 July 2013.

were 1:1.96, while the limit value is 1:1.25. The wheels on one side of the wagon were therefore carrying a load nearly double that carried by those on the other side. Other contributing factors included the wagons' dry and somewhat rusty bogey centres, and wear and flaws in the tracks.

The root cause of these incidents can be traced to running-characteristic tests conducted in the early 1990s in connection with the wagons' adoption, during which the wagons were loaded with turnout elements with wooden sleepers. The elements on the wagons in the accidents had concrete sleepers. Turnout elements with concrete sleepers are much heavier than those with wooden sleepers, and cause a considerable lateral shift in the wagon's centre of gravity. The effect of the concrete sleepers on the centre of gravity had not been sufficiently identified in the risk assessment, and consequently not taken into account in loading instructions. After these accidents, the VR Group updated the loading instructions for turnout elements in order to avoid similar incidents in the future.

In addition to these significant derailments, two empty freight wagons derailed in Harjavalta on 11 June 2012. Although the train also consisted of wagons transporting hazardous materials, the accident's consequences were minor.

As evidenced by the cases described above, human error and deficiencies in risk management contribute to accidents alongside technological problems. The reasons for human error are frequently complex, and no single contributing factor can be identified. Carelessness caused by hurry or routine, or unclear procedure nevertheless frequently contribute to accidents. Deficiencies in risk management often involve situations where a change and the risks incurred have not been identified in time.

Other accidents and incidents

Practically all tracks used for railway traffic in Finland are equipped with the Automatic Train Protection system (ATP). Of the state-owned railway network in 2012, 82% was covered by the Automatic Train Protection (ATP) system, and 98% of all train traffic operated on tracks equipped with ATP devices. There were no significant collisions in 2012 between trains, or between trains and objects on the track.

The number of significant collision accidents has also been low in previous years, apart from 2011, when two train collisions occurred. Five trains collided with obstacles on the track in 2012. The objects included a dead stop rail and sleepers that had fallen on the track from a rail maintenance machine. There were ten collisions between trains and objects on the track in 2010, and 11 in 2011.

There have been no significant fires involving rolling stock in Finland in recent years. On the other hand, there were ten minor fires involving rolling stock in railway traffic in 2012, and 16 in both 2011 and 2010. Fires involving rolling stock typically start in the locomotive's engine compartment, and can be prevented by regular maintenance. Two fires caused by an oil leak in the engine compartment of Dm12 rail cars occurred in 2012. This prompted the VR Group to replace the fuel hoses of Dm12 rail cars with a more durable type, and to include engine compartment cleaning in the rail car maintenance programme.

As in previous years, no broken axles were detected in rolling stock in 2012. A single case of broken wheels was detected in rolling stock, when cracks were detected in the wheel of an electric locomotive. There was a marked increase in cases of hot box, i.e. overheating of a train's wheel bearing, in 2012 compared to previous years (Table 1). In the worst case, a hot box can lead to derailment of the wagon. The majority of hot-box cases were caused by the incorrect use of brakes, or by other technical problems, such as brakes dragging due to freezing.

The VR Group seeks to reduce the incidence of hot-box cases by enhancing the travel-worthiness inspections of trains.

Table 1. Overheating of train wheel bearings in 2010–2012.

Year	Hot boxes
2010	104
2011	102
2012	147

In recent years, the number of signals passed at danger has varied between 20 and 35. In 2012 there were 20 cases. Typical cases involve a driver miscalculating the braking distance and the train passing a few metres beyond the signal, or trains leaving the station by mistake before movement authority has been given. The number of train separations, passenger train doors open when on the move and deficiencies in the locking of doors increased slightly compared to the two previous years. The most serious incident involving the locking of doors occurred in Pasila on 26 December 2012, when a child fell between the train and platform because the train doors were unlocked too early.

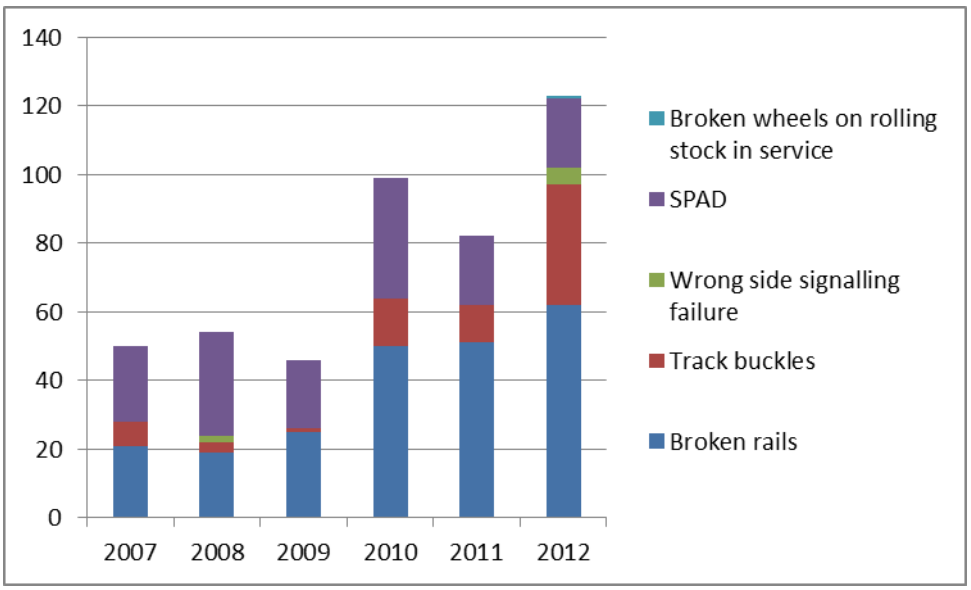


Figure 3. Development in the number of incidents, 2007–2012.

Figure 3 presents the development in the number of incidents included in the common safety indicators for railway traffic in 2007–2012. The number of reported incidents has clearly increased in recent years. This does not necessarily point to a decrease in railway safety, however. The question may also be one of more active reporting and the clarification of indicator definitions, which in recent years has led to new types of cases being included in the indicators.

Observations regarding infrastructure

Five wrong-side signalling failures were recorded in 2012. These are situations where the signalling system gives a false clear to a train due to a technical fault. In an incident in Nurmes on 30 May 2012, the remote-control system's component system for giving movement authority to trains by SMS gave movement authority to the wrong train. However, the driver noticed that

the turnout was in the wrong position and managed to stop the train before reaching the turnout. A wrong-side signalling failure led to an incident in Tampere on 15 November 2012, as the pre-signal issued a “wait drive” signal to a train when the correct signal would have been “wait stop”. The failure was caused by a faulty relay pack. In addition to wrong-side signalling failures, faults in safety devices caused other incidents, some of which involved the 'emergency resetting' of axle-counting systems, although functional flaws were also detected.

There were 62 broken rails in 2012, more than in the previous year for the third year running. Cold weather induces tensile stress in rails, which facilitates breaking. The cold winters of 2010 and 2011 consequently explain the high numbers of broken rails during those years. The winter of 2012 was not particularly cold, however, and the reason for the high number of broken rails is not known.

In 2012, 35 track buckles due to heat were recorded. Hot summer weather causes track to buckle due to heat expansion. The large number of track buckles is surprising, since the summer of 2012 was cooler than the two previous summers.

The high numbers of broken rails and track buckles are probably explained by more active reporting and the collection of more comprehensive statistics. Figures from different years are not mutually comparable, since the Finnish Transport Agency, the party responsible for reporting on broken rails and track buckles, receives different information from different sources for these categories, and not all cases are reported to the Agency. The statistics on track buckles do not consider frost damage, which typically causes distortion in track geometry and frequently also additional speed limits. In one instance in 2012, speed limits caused by frost damage were operating on as much as 60 kilometres of track.

Based on statistics compiled by the Finnish Transport Agency, the reports concerning vandalism have increased by approximately 40 per cent. In 2012, 302 cases of vandalism were recorded, compared to 215 in 2011. Typical cases involved piling rocks, pieces of wood or other items on tracks, and breaking safety devices. The damage caused by vandalism is typically minor, but always entails a serious accident risk.

Level crossing safety

In 2012, there were 51 level crossing accidents, which caused six fatalities, six cases of serious injury and six cases of minor injury. Of all level crossing accidents, 11 (roughly one fifth) were significant.

Figure 4 presents the numbers of level crossing accidents and fatalities in 2000–2012. A linear trend indicator has been added to the figure. A decreasing trend is evident in the number of accidents over the previous 13 years, but there is no clear trend to the number of fatalities.

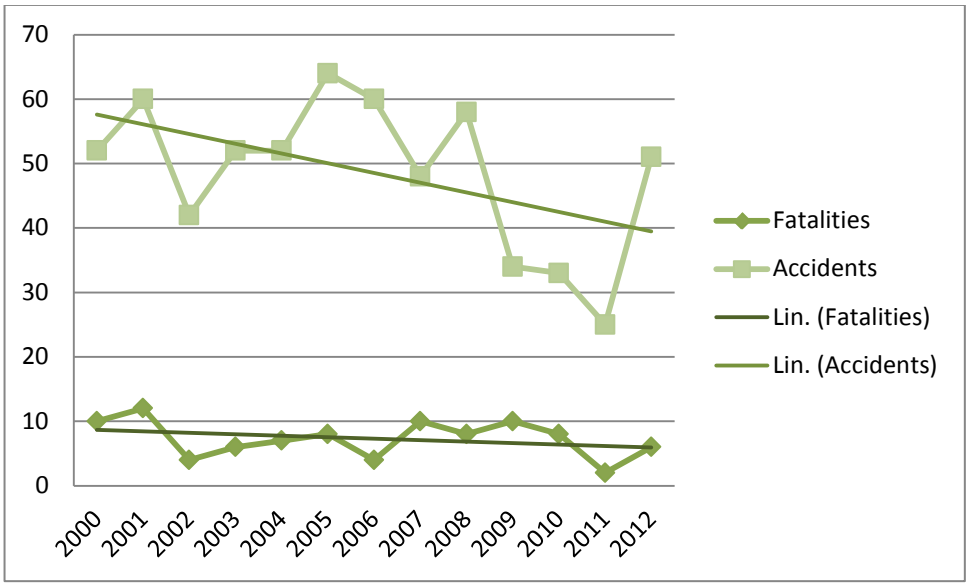


Figure 4. Numbers of level crossing accidents and fatalities in 2000–2012.

Over the past 13 years (2000–2012), 1,579 level crossings have been removed from the railway network. Figure 5 presents the numbers of level crossing accidents and fatalities per one hundred level crossings, as well as linear trends in these numbers. No clear trend can be seen in either number. Though the number of level crossings has decreased, judging from the numbers of accidents and fatalities their safety has not improved.

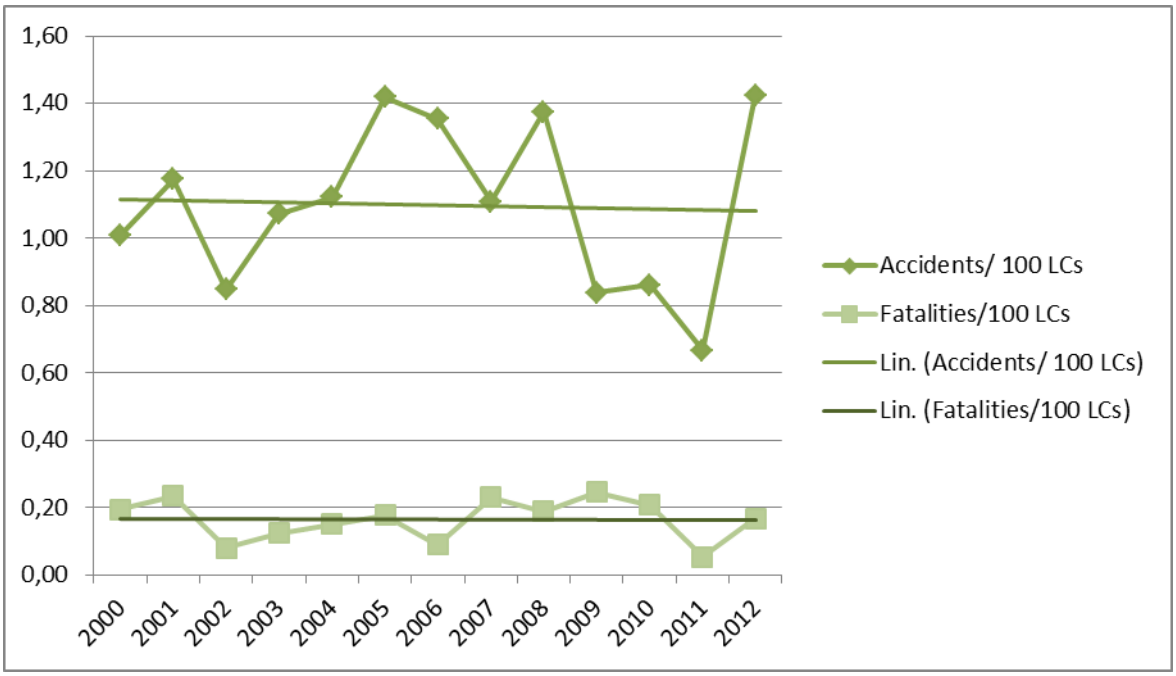


Figure 5. Numbers of level crossing accidents and fatalities per one hundred level crossings, 2000–2012.

Trafi and the Finnish Transport Agency have commissioned an accident model for the evaluation of the safety of railway level crossings from VTT Technical Research Centre of Finland[3]. The accident forecasts calculated using the model support the hypothesis that level crossing removal has not been successfully targeted at the level crossings where most accidents have occurred and are projected to happen. According to the number of accidents forecast by the

[3] Peltola et al., VTT, Safety evaluations of level crossings, Research reports of the Finnish Transport Agency 38/2012.

model, 43% of accidents will occur at the most dangerous ten per cent of level crossings. However, only 4% of such level crossings have been closed recently. Level crossings are usually removed in connection with rail improvement work.

On the basis of the model created by VTT, the following features are characteristic of high-risk level crossings:

- such level crossings are evenly distributed throughout Finland
- the number of cars using the level crossing varies between 100–11,000 per day (i.e. eight cars per minute, around the clock, in the worst cases)
- between 2–27 trains, frequently freight trains, pass the level crossing each day
- the crossings are almost evenly distributed between roads and highways (there are many level crossings on private roads, but traffic on such crossings is usually light, and the number of accidents low as a consequence)
- they are mostly on asphalt-topped roads
- approximately half such level crossings do not cross the track at a right angle (a right angle would be ideal)
- roughly a half do not comply with visibility guidelines (these guidelines are mandatory for track renovations, but do not apply to all level crossings because of a lack of resources).

Fatalities and serious injuries in railway accidents

Six people were killed in railway accidents in 2012. The annual number of fatalities caused by railway accidents has decreased in recent years (Figure 7). There is some uncertainty regarding the number of people killed in railway accidents, since drawing the line between accidents and suicides can be challenging, particularly in cases of pedestrians being hit by trains.

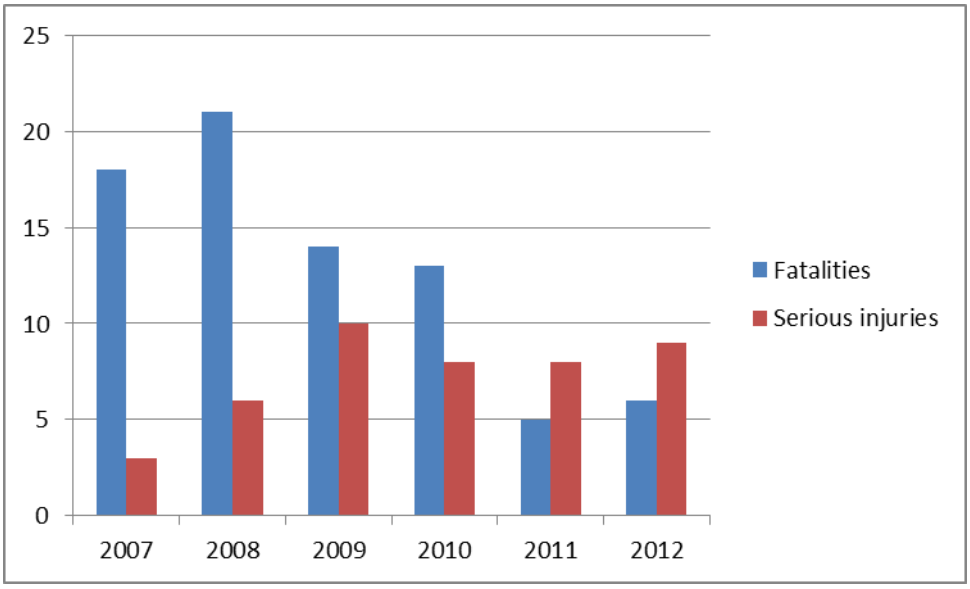


Figure 7. Number of people killed or seriously injured in railway accidents in 2007–2012.

All six railway fatalities in 2012 were level crossing users. This category also contains the majority of fatalities in previous years, with accidents to persons caused by rolling stock in motion making up the second major category (Figure 8). No passengers and less than one railway employee per year have been killed in accidents in recent years. Train travel is therefore an extremely safe mode of transport for passengers.

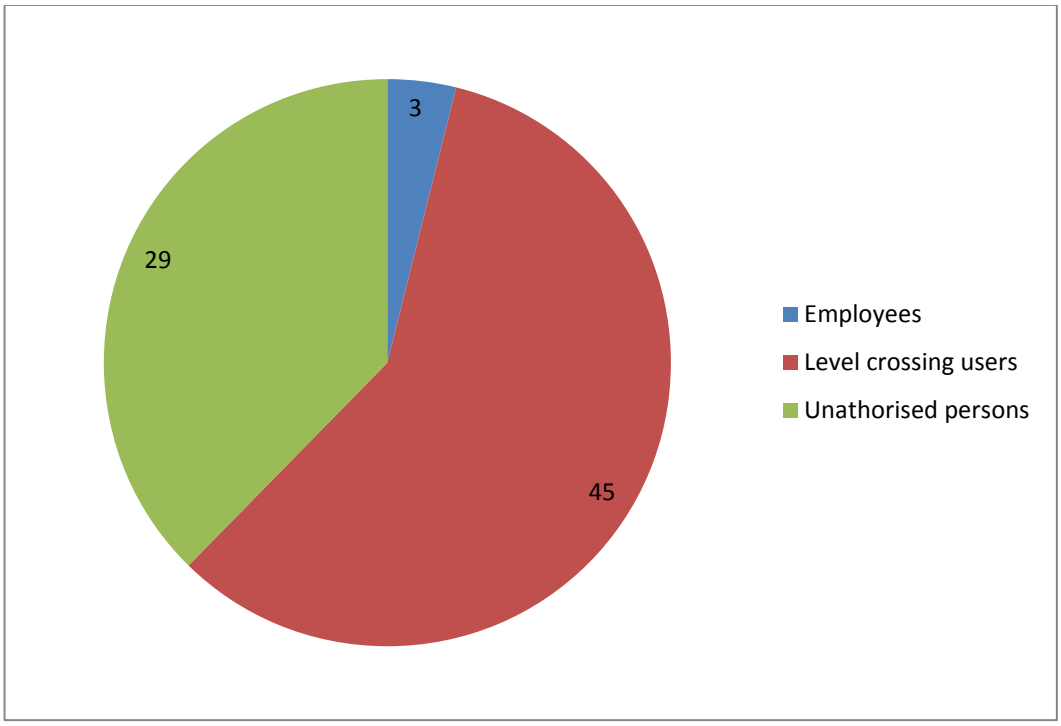


Figure 8. Railway accident fatalities by category, 2007–2012.

Nine people were seriously injured in railway accidents in 2012. The definition of serious injury is tied to the duration of hospitalisation (a minimum of one day in hospital). Information on the duration of hospitalisation is usually not available, however. Data on the severity of injuries is normally based on eyewitness accounts from the scene of the accident and on information provided by the rescue services. In recent years, the number of serious injuries has remained roughly stable, varying between three and ten annual cases (Figure 7). Six level crossing users and three trespassers were seriously injured in railway accidents in 2012. The majority of all serious injuries in 2007–2012 were likewise sustained by trespassers (20) and level crossing users (18). A total of three passengers and three railway personnel were seriously injured during this period. There is also some uncertainty involved in the statistics on serious injuries sustained in railway accidents.

Trespassing on railways involves great risk

The majority of railway accidents to trespassers occur when such persons are hit by a train while crossing a track without authorisation. The prevention of unauthorised track crossing was studied in the recent doctoral thesis of Anne Silla[4]. The results indicate that there are several locations in the Finnish railway network at which unauthorised crossings repeatedly take place. The number of persons killed while crossing a track without authorisation has not decreased at the same rate as other fatalities caused by railway accidents. The number of people killed during unauthorised crossings has even increased slightly since the end of the 1980s.

The majority of unauthorised track crossers are adult and males. People killed or injured while crossing tracks without authorisation are frequently under the influence of alcohol. It is a significant conclusion of the study that unauthorised crossings can be prevented almost completely by fencing and landscaping. Prohibitory signs, on the other hand, are considerably less effective. The measures for preventing unauthorised track crossings should nevertheless always be selected according to the characteristics of the crossing location. Authorities, railway operators

[4] Silla, Anne: Improving safety on Finnish railways by prevention of trespassing. VTT Science 27. 49 pp. + appendices 43 pp., Espoo 2012.

and municipalities should all bear their responsibility for the prevention of unauthorised track crossings.

More people are killed in railway-related suicides than in accidents. The number of suicides that occurred on Finnish railways in 2012 is not yet known. In recent years, the number of suicides has varied between 47 and 59[5]. There is considerable uncertainty related to suicide statistics, and this should be kept in mind with regard to the figures. There have been no significant changes in the number of railway-related suicides in recent years. In addition to the loss of life, drivers and other witnesses sustain traumas from witnessing such suicides or accidents, and train traffic is disrupted by them.

Suicides on railways and highways are a wide-ranging problem, requiring a solution that crosses administrative boundaries. The Ministry of Transport and Communications are currently conducting a cross-sectoral pilot project whose target group is young drivers in road traffic. If such projects can be implemented on a wider scale, positive effects will probably be felt in several administrative branches.

Costs incurred from significant accidents

In 2012, the social costs of significant railway accidents amounted to EUR 16,968,715. The major part of this financial impact, EUR 14,004,198, consisted of the costs of personal injuries. The costs increased by approximately 40% from 2011. This change is explained by the increase in personal injuries and the significant material damages caused by accidents in 2012. In 2012, significant accidents caused an economic impact of EUR 2,752,867 on rolling stock and infrastructure.

D.3 Results of safety recommendations

The Safety Investigation Authority began three investigations on the basis of events in 2012. These investigations concerned:

- The derailment of two freight train wagons in Kouvola railway yard on 14 January 2012
- The derailment of turnout transport wagons in the Riihimäki railway yard on 22 May 2012 and Kouvola railway yard on 28 June 2012
- An incident in train traffic at Vammala station on 19 October 2012.

The Safety Investigation Authority also carried out a thematic study on the 2012 railway accidents.

Trafi has an internal process for the handling of safety recommendations issued on the basis of safety investigations. The process coordinator forwards the investigation report drafts to the appropriate persons within Trafi and compiles drafts of their statements. Once the safety investigation is finished, the coordinator will communicate the results. The safety recommendations issued as a result of completed investigations are discussed at Trafi's internal bi-monthly railway safety reviews. The reactions to safety recommendations are decided at these reviews. These may include forwarding the recommendations to the applicable parties.

The Safety Investigation Authority and Trafi also hold an annual meeting for monitoring the implementation of recommendations. At the meeting, railway stakeholders and other interested parties, such as the rescue authorities, share their reactions to the recommendations issued, and explain which recommendations have been implemented and which are not intended for im-

[5] Silla, Anne: Rautatieliikenteen allejäännit, tilastointi ja analyysit. (Train-pedestrian collisions, statistics and analysis.) Trafi publications 9/2011. Helsinki 2011 (in Finnish).

plementation. The implementation of safety recommendations frequently takes time, and as a result the implementation of many recommendations issued in previous years is still incomplete. In the long term, however, approximately half of all recommendations are implemented. Typical reasons for non-implementation include the expiration or general nature of a recommendation. From time to time, the Safety Investigation Authority itself withdraws a recommendation.

In 2013, this meeting will be held in late autumn, so the state of safety recommendations issued on the basis of investigations completed in 2012 is not yet known.

E. Important changes in safety legislation and regulations

In 2012, the act on transport safety tasks in the railway system (Laki rautatiejärjestelmän turvallisuustehtävistä 1664/2009) was amended (860/2012). A proposal for amending the Railway Act with regard to matters such as the infrastructure register and ECM certification was also being prepared.

The Finnish Transport Safety Agency issued six regulations, of which the following three were new:

- Finnish Transport Safety Agency Regulation on the Safety Reports of Railway Undertakings and Infrastructure Managers (TRAFI/15772/03.04.02.00/2011)

- Finnish Transport Safety Agency Regulation on the Railway Infrastructure Register (TRAFI/2127/03.04.02.00/2012)

- Finnish Transport Safety Agency Regulation on the Psychological Suitability of Employees with Duties Related to Railway Transport Safety, and the Psychological Evaluation of Such Employees TRAFI/8037/03.04.02.02/2012?

Two of the regulations issued in 2012 updated and replaced prior regulations. The system of regulations was also clarified by revoking the outdated regulation and instructions on the acceptance of rolling stock (LIMO 7).

The renewal project for regulations governing the railway system was also continued in 2012. The purpose of the project is to move from detailed to general regulation, and to obligate operators to regulate their own operations within prescribed limits. The readability and manageability of the regulations will also be improved in connection with the project.

F. The development of safety certification and authorisation

F.1 National legislation – availability

1.1 Availability of national safety rules (NSR) or other relevant national legislation to RUs and IMs

The national legislation and regulations concerning the infrastructure manager and railway undertaking are available on the www.finlex.fi website, maintained by the Ministry of Justice. The Finnish Transport Safety Agency's website also has links to the regulations and applicable legislation.

F.2 Numerical data on Safety Certificates and Authorisations

See Annex E.

F.3 Procedural aspects relating to the handling of Safety Certificate and Safety Authorisation applications

3.1 Safety Certificate, Part A

3.1.1 Reasons for updating or amending Part A of Safety Certificates

No updates or amendments were made to Safety Certificates in 2012.

3.1.2 Main reasons for cases when the issuing time for Part A Certificates exceeded the 4 months foreseen in Article 12(1) of the RSD /1/

The average processing time for Part A of Safety Certificates was 2.5 months from the date all required information had been delivered to Trafi.

3.1.3 Overview of the requests from other NSAs to verify/access information relating the Part A Safety Certificate of a RU that has been certified in your country but applies for a Part B certificate in the other MS

There were no cases of this kind in 2012.

3.1.4 Summary of issues with the mutual acceptance of the Community-wide valid Part A Safety Certificate

Mutual acceptance was not applied in Finland in 2012.

3.1.5 NSA charging fee for issuing a Part A Safety Certificate

In 2011, the Finnish Transport Safety Agency collected fees in accordance with the Decree of the Ministry of Transport and Communications on fees charged for services provided by the Finnish Transport Safety Agency (Liikenne- ja viestintäministeriön asetus Liikenteen turvallisuusviraston maksullisista suoritteista 1185/2010). The Decree entered into force on 1 January 2011.

On the basis of the above-mentioned Decree, the fee charged for issuing a Safety Certificate depends on the extent and nature of the applicant's operations. Railway undertakings operating on several parts of the rail network are charged an hourly rate of EUR 140, while undertakings operating on a single part of the network are charged a fixed price of EUR 3,000. Museum traffic operators are also charged a fixed price, in this case EUR 1,000. The issuing of only Part A of a Safety Certificate for a railway undertaking operating on a single track costs EUR 1,500 and for museum traffic operators EUR 500.

3.1.6 Summary of the issues with using the harmonised formats for Part A Safety Certificates, specifically in relation to the categories for type and extent of service

The Finnish Transport Safety Agency received no notifications of problems caused by the harmonised format, nor did it experience any difficulties in using the harmonised format for Safety Certificates.

3.1.7 Summary of the common issues/difficulties for the NSA in application procedures for Part A Safety Certificate

There is a great deal of variation in the quality of Safety Certificate applications, particularly with regard to the safety management system description. Describing the safety management system in the detail required by the application process frequently presents a significant challenge, particularly to smaller operators. Several rounds of additional clarification are often required in the application process, due to poorly prepared applications.

In some cases, the applicant has been surprised by the rather long period of time required to process Safety Certificate applications. This problem has arisen in situations where a rail maintenance operator has purchased equipment and needs to transport it quickly by rail.

3.1.8 Summary of the issues mentioned by RUs when applying for a Part A Safety Certificate

The companies that applied for Safety Certificates in 2012 commented that the requirements regarding the description of the safety management system were too stringent. The evaluation criteria for safety management systems were felt to be difficult to understand. Detailed criteria for evaluating safety management system descriptions may lead to them not corresponding to reality. Some companies also expressed surprise at the amount of work required to apply for a Safety Certificate.

3.1.9 Feedback procedure (e.g. questionnaire) that allows RUs to express their opinion on issuing procedures/practices or to file complaints

Representatives from the Finnish Transport Safety Agency and companies applying for Safety Certificates are in regular contact, and the application process is interactive. Feedback is given and received during these meetings. Railway undertakings are also invited to participate in the Finnish Transport Safety Agency's annual customer satisfaction survey.

All decisions of the Finnish Transport Safety Agency can be appealed against in the Administrative Court of Helsinki.

3.2 Safety Certificate, Part B

3.2.1 Reasons for updating or amending Part B of Safety Certificates

No updates or amendments were made to Safety Certificates in 2012.

3.2.2 Main reasons for cases when the issuing time for Part B Safety Certificates exceeded the 4 months foreseen in Article 12(1) of the RSD /1/

Parts A and B of Safety Certificates are typically applied for simultaneously in Finland, so the processing of applications also proceeds at the same pace. The average processing time for Part B of Safety Certificates was 2.5 months from the date all required information had been delivered to Trafi.

3.2.3 NSA charging fee for issuing a Part B Safety Certificate

In 2012, the Finnish Transport Safety Agency collected fees in accordance with the Decree of the Ministry of Transport and Communications on fees charged for services provided by the Finnish Transport Safety Agency (Liikenne- ja viestintäministeriön asetus Liikenteen turvallisuusviraston maksullisista suoritteista 1185/2010). The Decree entered into force on 1 January 2011.

On the basis of the above-mentioned Decree, the fee charged for issuing a Safety Certificate depends on the extent and nature of the applicant's operations. Railway undertakings operating on several parts of the rail network are charged an hourly rate of EUR 140, while undertakings operating on a single part of the network are charged a fixed price of EUR 3,000. Museum traffic operators are also charged a fixed price, in this case EUR 1,000. The issuing of only Part B of a Safety Certificate for a railway undertaking operating on a single track costs EUR 1,500 and for museum traffic operators EUR 500.

3.2.4 Summary of the issues with using the harmonised formats for Part B Safety Certificates, specifically in relation to the categories for type and extent of service

The Finnish Transport Safety Agency received no notifications of problems caused by the harmonised format, nor did it experience any difficulties in using the harmonised format for Safety Certificates.

3.2.5 *Summary of the issues with using the harmonised formats for Part B Safety Certificates, specifically in relation to the categories for type and extent of service*

The Finnish Transport Safety Agency experienced no problems in processing Part B of the Safety Certificate in 2012.

3.2.6 *Summary of the issues mentioned by RUs when applying for a Part B Safety Certificate*

The companies that applied for Safety Certificates did not mention any problems specifically related to Part B of the Certificate.

3.2.7 *Feedback procedure that allows RUs to express their opinion on issuing procedures/practices or to file complaints*

Representatives from the Finnish Transport Safety Agency and companies applying for Safety Certificates are in regular contact, and the application process is interactive. Feedback is given and received during these meetings. Railway undertakings are also invited to participate in the Finnish Transport Safety Agency's annual customer satisfaction survey.

All decisions of the Finnish Transport Safety Agency can be appealed against in the Administrative Court of Helsinki.

3.3 Safety Authorisations

3.3.1 *Reasons for updating or amending Safety Authorisations*

No Safety Authorisations were updated or amended in 2012.

3.3.2 *Main reasons for cases when the issuing time for Safety Authorisations (restricted to these mentioned in Annex E and after having received all necessary information) exceeded the 4 months foreseen in Article 12(1) of the RSD /1/*

The average processing time for Safety Authorisations was 1.5 months from the date all required information had been delivered to Trafi.

3.3.3 *Summary of the issues/difficulties in application procedures for Safety Authorisations*

There is a great deal of variation in the quality of Safety Authorisation applications, particularly with regard to the safety management system description. Describing the safety management system in the detail required by the application process frequently presents a significant challenge, particularly to smaller operators. Several rounds of additional clarification are often required in the application process, due to poorly prepared applications.

In Finland, several individual private siding managers can apply for a Safety Authorisation using a shared application. In order to save money and time, sometimes very different private siding managers apply for a Safety Authorisation with a single application. The problem frequently presented by these applications is that they attempt to describe the operations of different types of operators using a single safety management system, which leads to no single operator possessing a description corresponding to actual operations.

3.3.4 *Summary of the issues mentioned by IMs when applying for a Safety Authorisation*

The companies that applied for Safety Authorisations in 2012 commented that the requirements regarding the description of the safety management system were too stringent. The evaluation criteria for safety management systems were felt to be difficult to understand. Detailed criteria for evaluating safety management system descriptions may lead to them not corresponding to reality. Some companies also expressed surprise at the amount of work required to apply for a Safety Certificate. Since some private siding managers applying for Safety Authorisations are very small operators, constructing even a simple safety management system is a considerable burden on their resources.

3.3.5 Feedback procedure that allows IMs to express their opinion on issuing procedures/practices or to file complaints

Representatives from the Finnish Transport Safety Agency and companies applying for Safety Authorisations are in regular contact, and the application process is interactive. Feedback is given and received during these meetings. Infrastructure managers are also invited to participate in the Finnish Transport Safety Agency's annual customer satisfaction survey.
All decisions of the Finnish Transport Safety Agency can be appealed against in the Administrative Court of Helsinki.

3.3.6 NSA charging fee for issuing a Safety Authorisation

In 2012, the Finnish Transport Safety Agency collected fees in accordance with the Decree of the Ministry of Transport and Communications on fees charged for services provided by the Finnish Transport Safety Agency (Liikenne- ja viestintäministeriön asetus Liikenteen turvallisuusviraston maksullisista suoritteista 1185/2010). The Decree entered into force on 1 January 2011.

On the basis of the above-mentioned Decree, the price charged for a Safety Authorisation depends on the size of the infrastructure managed by the applicant. The Finnish Transport Safety Agency charges the infrastructure manager of state-owned network EUR 140 per hour for the processing of the Safety Authorisation application. Managers of private sidings are charged a fixed price corresponding to the size of the siding. Consortiums that manage the harbour sidings of several owners or a minimum of three separate private sidings are charged EUR 3,000 for a Safety Authorisation, while other private sidings are charged EUR 1,000.

G. Supervision of railway undertakings and infrastructure managers

G.1 Description of the supervision of railway undertakings and infrastructure managers

1.1 Audits and inspections

The Finnish Transport Safety Agency's department responsible for railway supervision was radically reorganised during 2012. Two additional railway supervisors were recruited, which boosted the strength of the railway supervision team to one team leader and three supervisors. A gradual shift was also begun in the focus of monitoring, from inspections of individual sections of the railway system towards comprehensive safety management system audits.

The first such audit was carried out at the end of 2012, and more have been performed during 2013. In the future, the target is to carry out four comprehensive and 15 narrower audits each year. Active supervision was also carried out in the field. The scope of the subject in relation to the supervisory authority's limited resources presents a challenge to supervision. For this reason, the agency is striving to risk-oriented supervision, focusing on critical parts of the system.

1.2 Main targets of supervision

The first safety management system audits paid particular attention to the practical implementation of the audited system, and to the functionality of risk management and incident reporting. Field supervision targets in 2012 included dangerous goods transport rail yards, the training of people employed in transport safety tasks, communication procedures, the condition of rolling stock, the loading of wagons and compliance with traffic regulations.

G.2 Description of the coverage of the legal aspects within the annual reports from the RUs and IMs – availability of the annual reports before 30 June according to Article 9(4) of the RSD /1/

The Finnish Transport Agency and VR Group delivered their safety reports to the Finnish Transport Safety Agency in good time before the due date. The Finnish Transport Safety Agency reminded other actors by letter of their obligation to deliver safety reports, and a record number of 15 reports were consequently received. Safety reports were not received from all operators by any means, but the Agency is pleased with the moderately positive development in this area. All major operators delivered safety reports, including the most significant rail maintenance and museum traffic operators. There are thus no great gaps in the data, even though a large number of minor operators failed to deliver a safety report.

There was considerable variance in the comprehensiveness of the safety reports submitted. Some operators had drawn up extremely comprehensive reports, while others contented themselves with rather less. It has been interesting to note that the scope and comprehensiveness of a safety report did not necessarily correspond to the size of the operator or the extent of its operations. The majority of safety reports nevertheless contained the basic information required, and Trafi's regulation regarding safety reports will further clarify content requirements.

G.3 Summary of the relevant corrective measures related to safety aspects following these audits and inspections

The safety management system audit conducted at the end of 2012 was targeted at a rail maintenance company that operates small-scale railway traffic related to rail maintenance work. The company had experienced difficulties in its Safety Certificate application process, and there was reason to doubt the practical functionality of its safety management system. Because of safety management system deficiencies identified during the audit, a deadline for rectifying the deficiencies was set for the operator, under threat of Safety Certificate revocation.

The field supervision carried out by the Finnish Transport Safety Agency did not result in significant corrective measures. Some shortcomings were identified with regard to issues such as the condition of leak-containment equipment at dangerous goods transport rail yards, the condition of private sidings, communications during shunting and the marking of HMT wagons. When deficiencies are identified as a result of supervision, the operator is requested to deliver a report to Trafi on rectification of the problem. As a result of supervision, the Finnish Transport Safety Agency also issued comments and recommendations related to safety issues.

H. Reporting on the application of the CSM on risk evaluation and assessment

From 19 July 2010, the application of the common safety method (Commission Regulation (EC) No 352/2009) to risk evaluation has been mandatory in cases of significant technical changes to railway vehicles or structural subsystems. This obligation has not applied to projects that were already at an advanced stage when the Risk Management Regulation entered into force.

The Finnish Transport Agency applied the common safety method for risk evaluation to more than 40 changes during 2012. The change-related risks to which the method was applied included the following:

- New operators in the railway freight transport market
- A new signalling system

- The Seinäjoki–Oulu railway improvement project
- Several evaluations related to safety device systems
- The Ring Rail line

In the Finnish Transport Safety Agency's experience, there remains room for improvement in compliance with the common safety method for risk evaluation. The method is felt to be foreign, and its procedures have not yet taken root in the sector.

The rail maintenance company Destia Rail drew up a risk assessment of the implementation of its safety management system for transport and rolling stock maintenance, using the common safety method. According to Destia Rail’s experience, assimilating the common safety method for risk evaluation was a major learning process. The correct adoption and use of the risk register needed to be completely relearnt, since the review was organisational and functional in nature. According to Destia Rail, all residual risks were successfully reduced to an acceptable level after risk identification and evaluation and the implementation of safety measures.

The common safety method for risk evaluation was first applied in the VR Group in 2012, when a risk evaluation of the modification of the nose structure of Pendolino trains was carried out. As the modification and related risk evaluation are still under way there are no experiences to report so far.

I. Alternative measures through derogations regarding ECM certification scheme

The first ECM certificate in Finland was granted to VR Group Ltd on 31 May 2013. No exceptions to the certification of the unit responsible for maintenance, as provided for in Article 14(8) of the Railway Safety Directive (2004/49/EC), have been resorted to in Finland.

J. National Safety Authority's conclusions on the reporting year

In 2012, railway safety remained at a fairly good level in Finland. No passengers or railway personnel lost their lives or were seriously injured in accidents. There were 19 significant accidents, slightly less than the 2007–2011 average of 22. Railway safety has gradually been improving when viewed over the long term.

The most serious accidents in 2012 were the overturning of turnout transport wagons in Riihimäki on 22 May and in Kouvola on 28 June. These incidents resulted in derailment, significant damage to rolling stock and infrastructure and serious disruptions to traffic. A serious railway-traffic incident occurred in Vammala on 19 October when a freight train was directed on to a track where rail maintenance machinery was being stored. The freight train's driver managed to stop the train and avoid a collision. The most serious shunting accident of 2012 was the collision of some freight wagons with stationary wagons at the Ilmala rail yard on 14 January. Four people sustained minor injuries in the accident, which also caused considerable damage to rolling stock.

There were 51 level crossing accidents in 2012, of which 11 were significant. Six people were killed and another six seriously injured in these accidents. Although a higher figure than for the last three years, the number of level crossing accidents remained consistent with the ten-year average. No explanation apart from random variation has been identified for the fluctuation in the number of accidents.

The relatively low number of significant accidents fails to provide a complete picture of railway safety, however. Hundreds of incidents occur each year, especially during rail maintenance work and shunting. The prevalence of incidents between rail maintenance work and train traffic is particularly alarming. Such incidents are typically related to the location of rail maintenance sites, quality of rail maintenance notifications, correct form of communications related to rail maintenance work and the safety competence of rail maintenance workers. The incidence of minor accidents during shunting is decreasing slightly, but derailments and collisions are still frequent.

The clarity, unambiguity and proper form of communications is an issue that requires special attention of the various parties, since communication problems are reported in practically every accident or incident report and investigation. The increase in vandalism and problems in turnout maintenance are also noteworthy.

The railway system will be faced with more adjustments in the coming years because of changes in regulations and the field of operators. These changes will further emphasise the operators' responsibility for the safety of their operations and for cooperation with other actors in order to ensure safety. The adoption of safety management systems by the various operators is an indispensable tool for the systematic management of safety. A significant challenge faced by both operators and Trafi in the near future is to ensure that these systems are genuinely functional tools for adapting to changes in a safe manner.

K. Other sources

- Safety reports of infrastructure managers and railway undertakings
- The Finnish Transport Safety Agency's electronic document management system (Trafi Tweb)
- Finlex, the electronic statute databank of Finland <*www.finlex.fi*>

L. Annexes

ANNEX A: Map of the state-owned railway network

ANNEX B: The Finnish Transport Safety Agency's organisational diagram and relations with other actors

ANNEX C: Common safety indicators

ANNEX D: Important changes to safety legislation and regulations

ANNEX E: Safety Certificates and Safety Authorisations – numerical data

ANNEX A: Information on the Finnish railway system

A.1 Map of the state-owned railway network

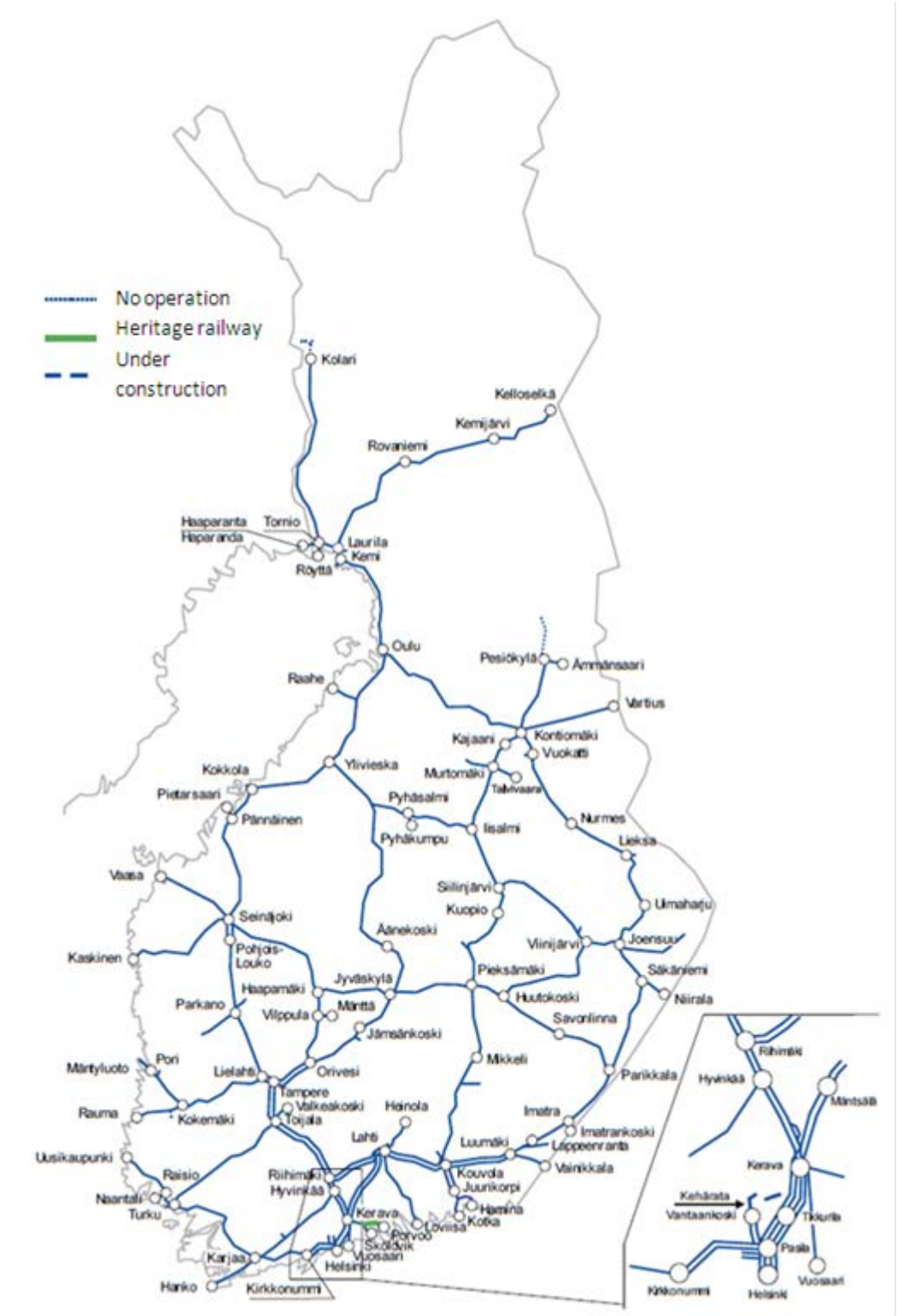


Figure A.1 Map of the state-owned railway network[6]

[6] Rataverkon kuvaus 1.1.2012 (in Finnish). Liikenneviraston väylätietoja 4/2011, Helsinki 2011

A.2 List of IMs and RUs

A.2.1 IMs

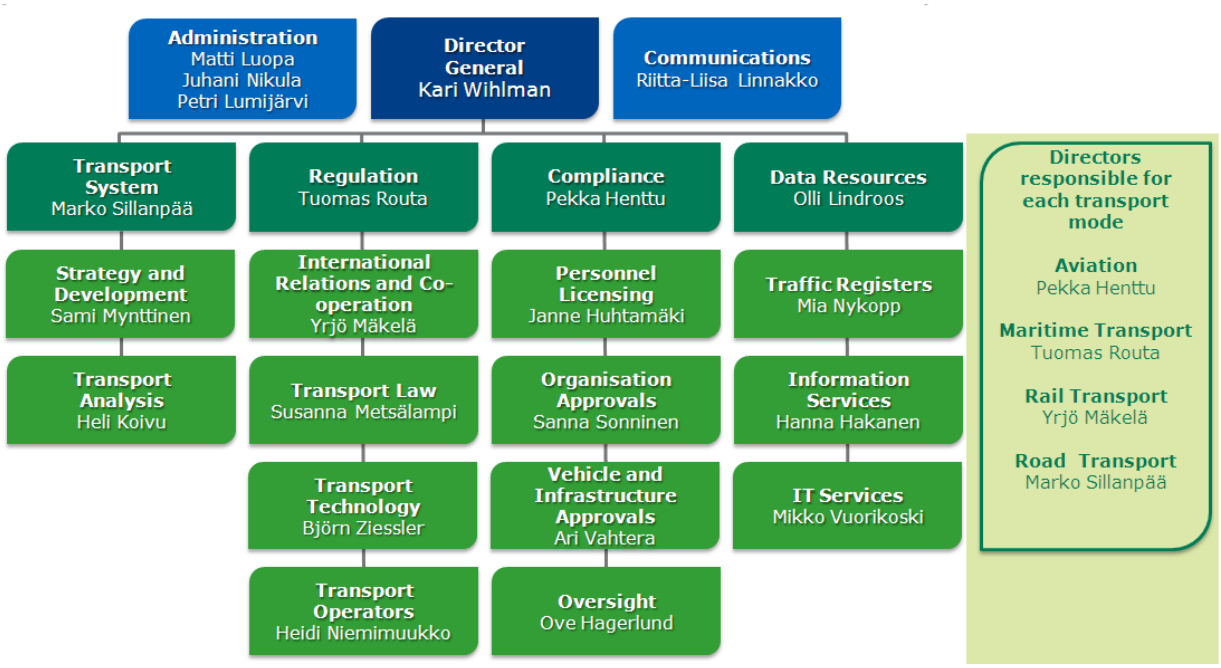
Name	Address	Website	*Safety Authorisation (Number/ Date)*	*Start date of commercial activity*	*Total Track Length/ Gauge*	*Electrified Track Length/ Voltages*	*Total Double/ Simple Track Length*	*Total Track Length HSL*	*ATP equipment used*	*Number of LC*	*Number of main (light) signals*
Finnish Transport Agency (state owned railway network)	PL 33, 00521 Helsinki, Finland	www.liikennevirasto.fi	Trafi/18997/05.02.09.01/2011 / 20.4.2012	1 January 1995	5,944 km/1,524 mm	3,072 km/ 25kV	573 km/5,371 km	0 km	Bombardier	3,116	11,000
There are also a few hundred privately owned sidings in Finland. The track length of sidings varies between 200 metres and 40 kilometres. Traffic on sidings consists of shunting.											

A.2.2 Railway undertakings

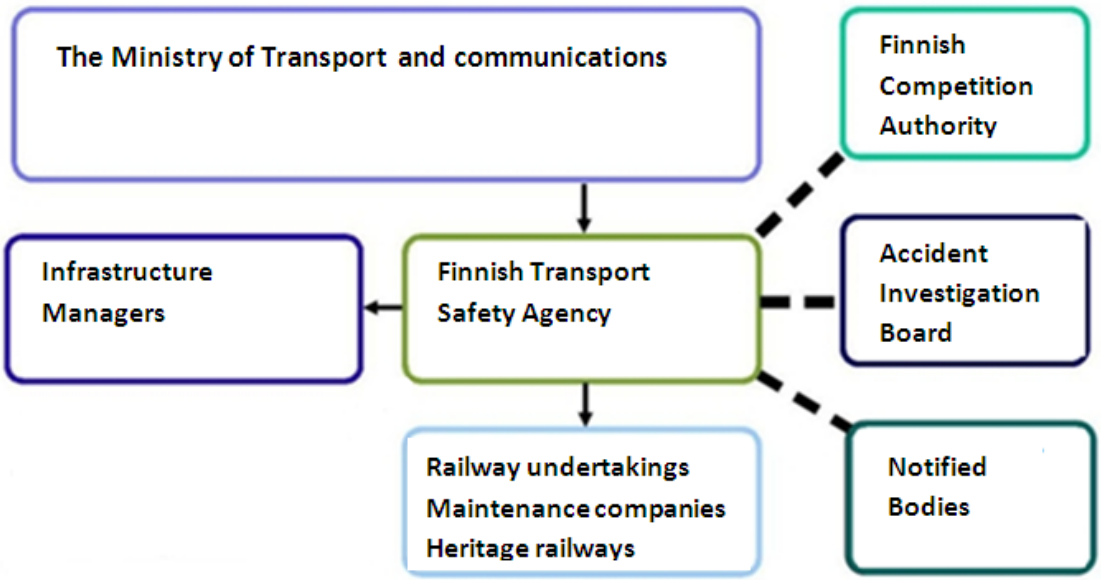
Name	Address	Website	*Safety Certificate A-B 2004/49/EC (Number/ Date)*	*Start date of commercial activity*	*Traffic Type (freight, etc.)*	*Number of Locomotives*	*Number Of Railcars/ Multiple Unit sets*	*Number of Coaches/ Wagons*	*Number of train drivers/ safety crew*	*Volume of passenger transport*	*Volume of freight transport*
VR Group Ltd	PL 488, 00101 Helsinki, Finland	www.vr.fi	FI112012000 2 / 20.4.2012	01/07/1995	Passenger, freight	643	448	11,466	1,730/~4,300	68.4 million trips	34,800 tonnes
Rata-rahti Oy	Hilkankatu 3, 55100 Imatra, Finland	-	FI112011000 02	Has not started operations. The first test runs were made in 2012.	Shunting	-	-	-	-	-	-

APPENDIX B: The Finnish Transport Safety Agency's organisational diagram and relations with other actors

B.1 The Finnish Transport Safety Agency's organisation in 2012



B.2 The Finnish Transport Safety Agency's relations with other national authorities



ANNEX C: Common safety indicators

C.1 Overview of safety development

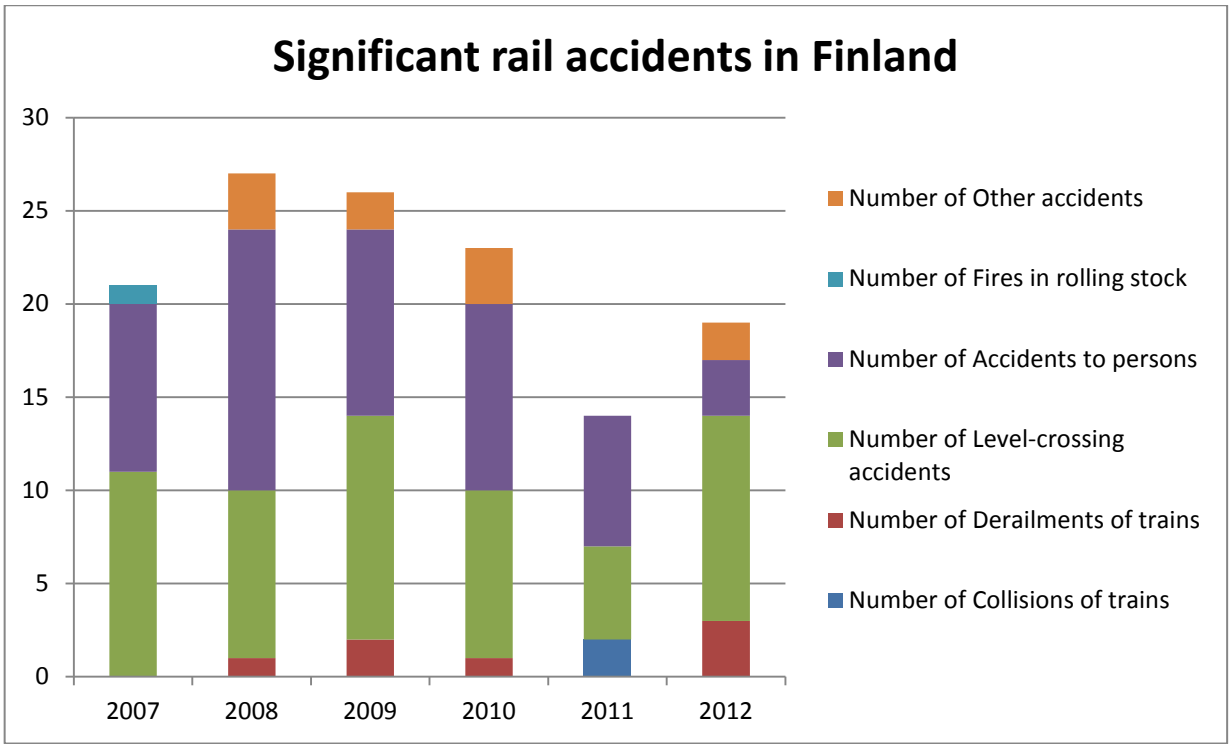


Figure C.1.1 Significant railway accidents by type, 2007–2012.

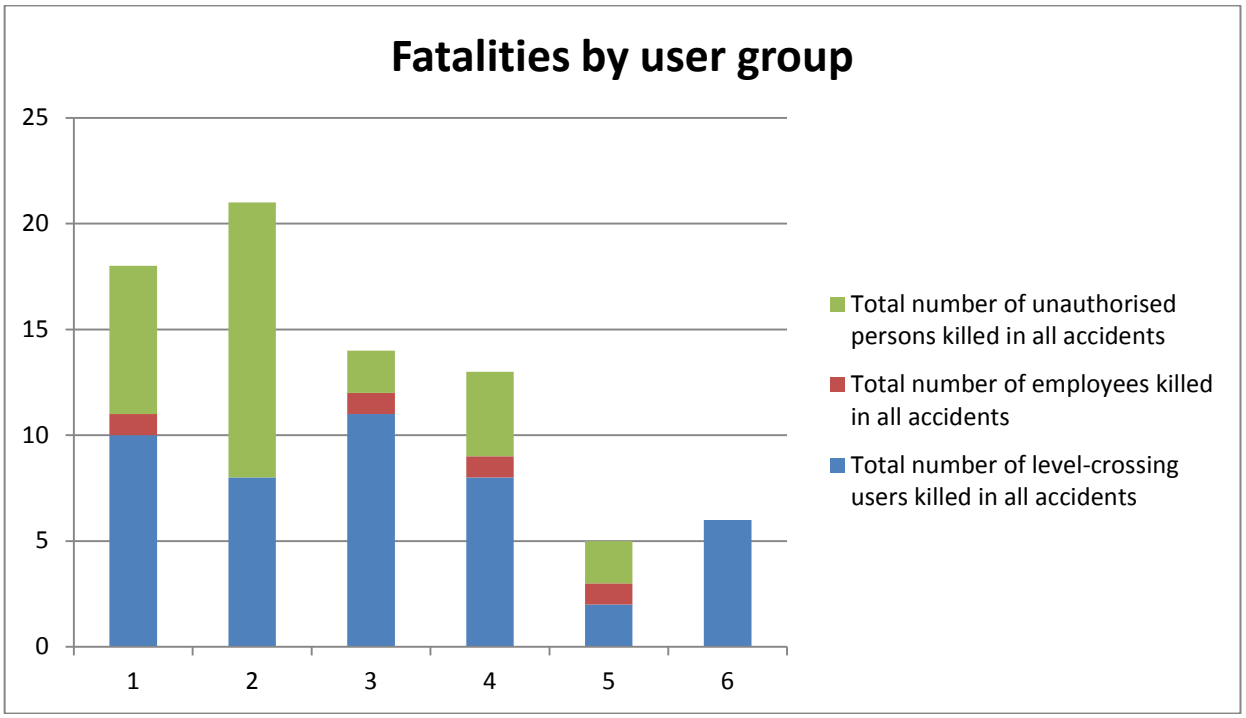


Figure C.1.2 Fatalities in railway accidents by victim type, 2007–2012.

Figure C.1.3 Serious injuries sustained in railway accidents by accident type, 2007–2012.

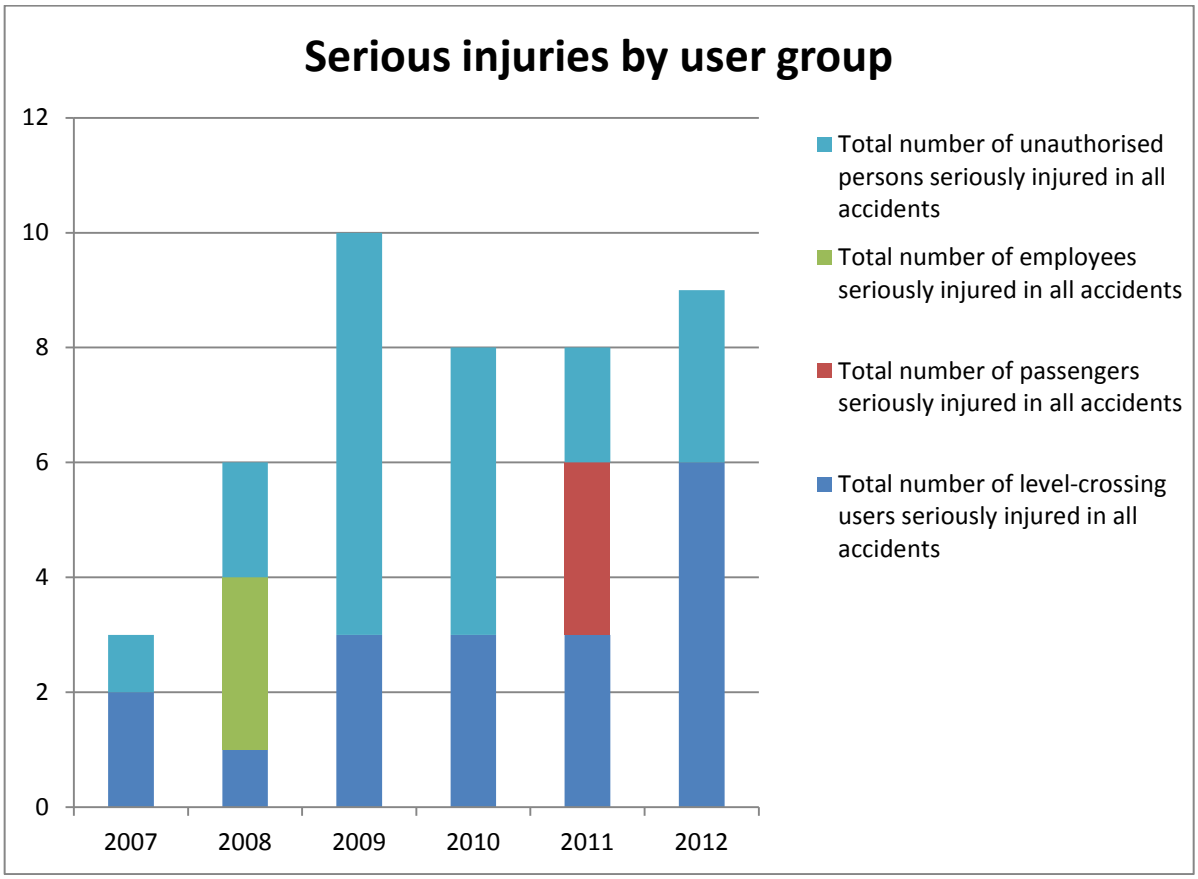


Figure C.1.4 Serious injuries in railway accidents by victim type, 2007–2012.

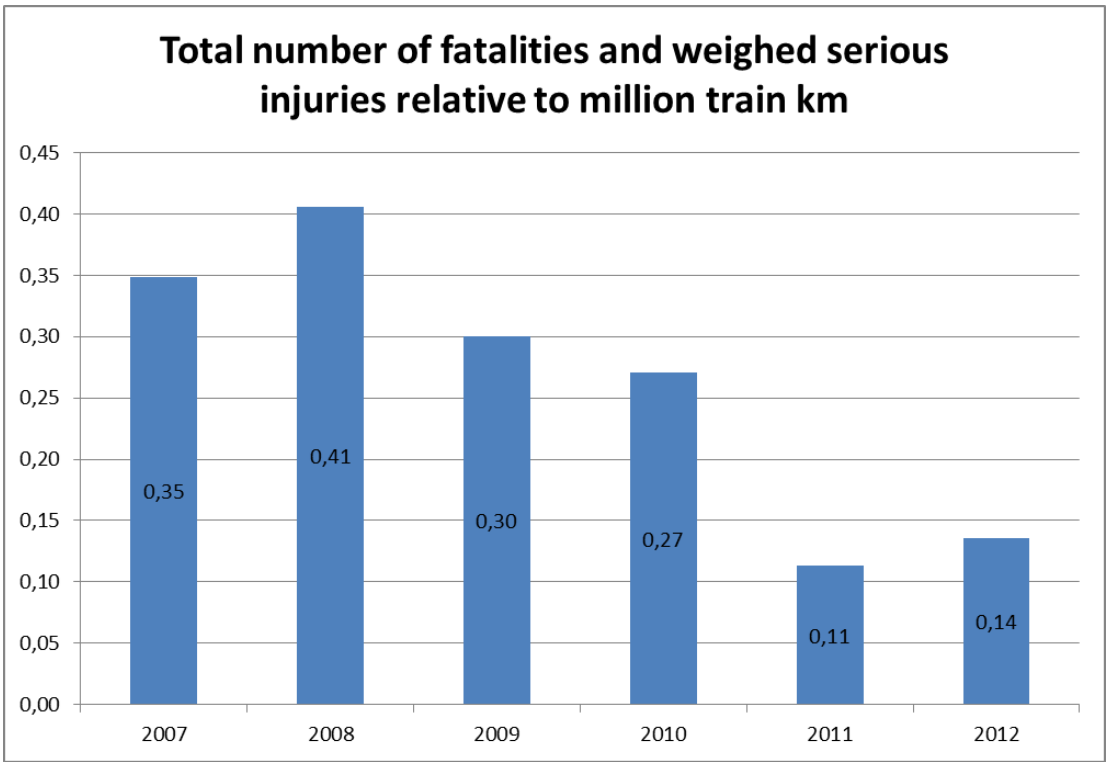


Figure C.1.5 Weighted number of fatalities and serious injuries per billion train-kilometres, 2007–2012. For Finland, the national reference value[7]

[7] COMMISSION DECISION of 23 April 2012 on the second set of common safety targets as regards the rail system (2012/226/EU).

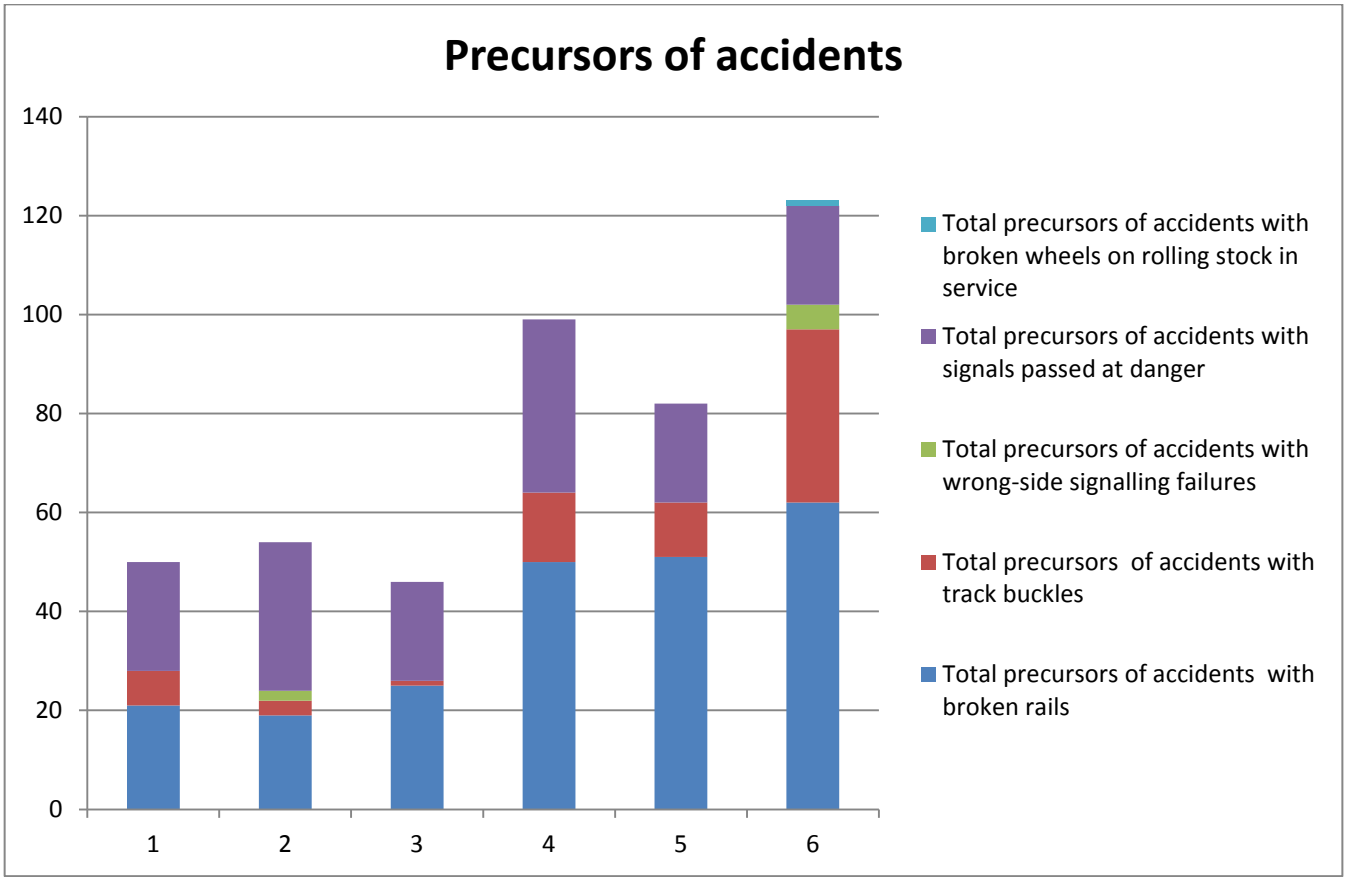


Figure C.1.6 Precursors to accidents by type, 2007–2012.

C.2 Terminology used in the Annual Railway Safety Report and the calculation of the financial impacts of accidents

The terminology used in the Annual Railway Safety Report has been defined in the Appendix to Annex 1 of the Railway Safety Directive 2004/49/EC.

The costs incurred from significant accidents have been calculated using the method presented in Annex 1 to the Railway Safety Directive 2004/49/EC and its Appendix.

The estimated costs incurred by society from fatalities and serious injuries are based on the unit values for personal damages presented in Tieliikenteen ajokustannusten yksikköarvot (Unit costs for road traffic) 2010, published by the Finnish Transport Agency[8]. The value for 2010 was converted into that for 2012 by adjusting it for the change in gross national product. The gross national product of Finland grew by 2.7% in 2011 and diminished by 0.8% in 2012[9].

2010 fatality, original value: EUR 1,919,000
2011 fatality: EUR 1,970,813
2012 fatality: EUR 1,955,046

2010 serious injury, original value: EUR 248,000 (serious temporary injury)
2011 serious injury: EUR 254,696
2012 serious injury: EUR 252,658

The information on the costs of damages to rolling stock and infrastructure caused by accidents are based on figures reported by the railway undertaking and infrastructure manager in their safety reports.

The calculated costs of delays caused by accidents are based on the number of minutes that trains involved in accidents were late, as reported by the infrastructure manager. The values used for saved travel time, both for travel during work and other travel, are based on Tieliikenteen ajokustannusten yksikköarvot 2010, published by the Finnish Transport Agency. The percentage of work-related travellers (12%) is based on the European Commission report that examines the development of the railway market in the EU[10].

[8] Tieliikenteen ajokustannusten yksikköarvot (in Finnish). Liikenneviraston ohjeista 21/2010. Finnish Transport Agency 2010 Helsinki. *<http://www2.liikennevirasto.fi/julkaisut/pdf3/lo_2010-21_tieliikenteen_ajokustannusten_web.pdf>*. Retrieved on 6 September 2012.

[9] The Statistics Finland website. *< http://www.tilastokeskus.fi/tup/suoluk/suoluk_kansantalous.html> Retrieved on 16 August 2013.*

[10] 2012 Report from the Commission to the Council and the European Parliament on monitoring development of the rail market. European Commission, 2012 Brussels.

ANNEX D: Significant changes to safety legislation and regulations

	Legal reference or Notif-IT code	Date legislation comes into force	Reason for introduction (Additionally specify new law or amendment to existing legislation)	Description
General national railway safety legislation				
Legislation concerning the National Safety Authority	No change			
Legislation concerning notified bodies, assessors, third parties bodies for registration, examination, etc.	No change			
National regulations concerning railway safety				
Regulations concerning national safety targets and methods	No change			
Rules concerning requirements on SMS and safety certification of RUs	Finnish Transport Safety Agency Regulation on the Safety Management Systems of the Railway Undertaking and Infrastructure Manager (TRAFI/1065/03.04.02.00/2012)	1 January 2013	Replaced the Finnish Transport Safety Agency Regulation on the Safety Management Systems of the Railway Undertaking and Infrastructure Manager (TRAFI/5223/03.04.02.00/2011)	Implementation of Annex III to the Railway Safety Directive (49/2004/EC).
Rules concerning requirements on SMS and Safety Authorisation of IMs	Finnish Transport Safety Agency Regulation on the Safety Management Systems of the Railway Undertaking and Infrastructure Manager (TRAFI/1065/03.04.02.00/2012)	1 January 2013	Replaced the Finnish Transport Safety Agency Regulation on the Safety Management Systems of the Railway Undertaking and Infrastructure Manager (TRAFI/5223/03.04.02.00/2011)	Implementation of Annex III to the Railway Safety Directive (49/2004/EC).

Rules concerning requirements for wagon keepers	No change			
Rules concerning entities in charge of maintenance	No change			
Rules concerning requirements for maintenance work-shops	No change			
National safety rules for RUs* and safety rules for other railway actors	No change			
Rules concerning requirements for the authorisation of placing in service and maintenance of new and substan-tially altered rolling stock, including rules for exchange of rolling stock between RUs, registration systems and requirements on testing procedures	No change			
Common operating rules of the railway network, including rules relating to the signalling and traffic procedures	Finnish Transport Safety Agency Regulation on Operation and Rail Maintenance Work in the Railway System (TRAFI/16561/03.04.02.00/2012)	1 January 2013	Replaced the previous Finnish Rail Agency Regulation on Operation and Rail Maintenance Work in the Railway System (RVI/1092/412/2009)	The previous regulation was up-dated with regard to the automatic train protection device.
Rules laying down requirements on additional internal operating rules (company rules) that must be established by the IMs and RUs	No change			
Rules concerning requirements on staff executing safety critical tasks, including selection criteria, medical fitness and vocational training and certification	Act amending the act on transport safety tasks in the railway system (Laki rautatiejärjestelmän liikenne-turvallisuustehtävistä annetun lain muuttamisesta 860/2009) Finnish Transport Safety Agency Regulation on the Psychological Suitability of Employees with Duties Related to Railway Transport Safety, and the Psycho-logical Evaluation of Such Em-	1 January 2013 15 May 2012	Amendment to the Act on transport safety tasks in the railway system (Laki rautatiejärjestelmän liikenneturvallisuustehtävistä 1664/2009) New regulation	Implementation of Commission Decision (2011/765/EC) Implementation of Para-graph 3, Article 11 and Paragraph 2, Annex II of the Train Driver Directive (2007/59/EC), and of Para-graphs 4.7.4.1.2 and 4.7.4.2.3 of Chapter 4.7.4 of

	ployees (TRAFI/8037/03.04.02.02/2012)			OPE-TSI (2011/314/EU)
Rules concerning the investigation of the accident and incidents including recommendation	No change			
Rules concerning requirements for national safety indicators including how to collect and analyse the indicators	Finnish Transport Safety Agency Regulation on the Safety Management Systems of the Railway Undertaking and Infrastructure Manager (TRAFI/15772/03.04.02.00/2011)	15 February 2012	New regulation	Implementation of the Appendix to Annex 1 of the Railway Safety Directive (2004/49/EC).
Rules concerning requirements for authorisation of placing into service infrastructure (tracks, bridges, tunnels, energy, ATC, radio, signalling, interlocking, level crossing, platforms, etc.)	The Railway Infrastructure Register (TRAFI/2127/03.04.02.00/2012)	16 March 2012	New regulation	Implementation of the Commission Implementing Decision of 15 September 2011 on the common specifications of the register of railway infrastructure (2011/633/EU)

ANNEX E: Safety Certificates and Safety Authorisations – numerical data

E.2 Safety Authorisations according to Directive 2004/49/EC

	Total number of authorisations
E.2.1. Number of valid Safety Authorisations issued to Infrastructure Managers in the reporting year and in previous years and remain valid at the end of the year 2012	4

		A	B	C
E.2.2. Number of applications for Safety Authorisations submitted by Infrastructure Managers in year 2012	New authorisations	27		13
	Updated/amended authorisations			
	Renewed authorisations			

A = Accepted application, authorisation is already issued
R = Rejected applications, no authorisation was issued
P = Case is still pending, no authorisation was issued so far

E 2.3 Number of Safety Authorisations revoked in 2012	0

E.3 Procedural aspects – Part A of the Safety Certificate

		New	Updated/amended	Re-newed
The average time after receiving of the application with the required information and the final delivery of a Safety Certificate Part A in year 2012 for Railway Undertakings		2.5 months		

E.4 Procedural aspects – Part B of the Safety Certificate

		New	Updated/amended	Renewed
The average time after receiving the application with the required information and the final delivery of a Safety Certificate Part B in year 2012 for RUs	Part A issued in Finland	2.5 months		
	Part A issued in another Member State			

E.5 Procedural aspects – Safety Authorisations

		New	Updated/amended	Renewed
The average time after receiving the application with the required information and the final delivery of a Safety Authorisation in year 2012 for IMs		1.5 months		