Liikenne- ja viestintävirasto
Transport- och kommunikationsverket
Finnish Transport and Communications Agency

Annual Railway Safety Report 2020

NSA Finland

Traficomin julkaisuja
Traficoms publikation
Traficom Publications

32/2021

Table of contents

Finnish Transport and Communications Agency Traficom
Helsinki 2021
ISBN 978-952-311-774-7
ISSN 2669-8757 (online publication)

1 Introduction

1.1 Purpose of the Annual Railway Safety Report

This Annual Railway Safety Report 2020 of the Finnish Transport and Communications Agency Traficom (previously the Finnish Transport Safety Agency Trafi) describes the status of railway safety in Finland in 2020. The report also discusses key points related to Traficom's activities concerning rail transport authorisations, supervision and regulation in 2020.

The Annual Railway Safety Report is Traficom's annual report on railways referred to in section 17 of the Rail Transport Act (1302/2018). Under the Rail Transport Act, Traficom shall each year prepare a report on its operations and the development of railway safety in Finland in the previous year and submit the report to the European Union Agency for Railways (ERA) by 30 September. The report is also submitted to the Ministry of Transport and Communications and published on Traficom's website.

The sources of safety information presented in the Annual Railway Safety Report include the safety reports of infrastructure managers and railway operators, accident and incident reports, and the Safety Investigation Authority's accident investigation reports. Information on Traficom's operations has been gathered by interviewing its public officials and reviewing documents relevant to its operations.

The structure of the Annual Railway Safety Report follows the latest version of ERA's reporting guidelines issued in April 2020.

1.2 Summary of the safety situation in 2020

The status of railway safety was good in Finland in 2020, and the level of passenger safety, in particular, was excellent. When examined over a longer term, the safety of rail transport has clearly improved, and serious accidents are extremely rare. In 2020, one significant derailment occurred in rail transport, and there were no collisions. There was one significant fire in rail transport in 2020. Regardless of the low number of accidents, serious incidents occur in rail transport every year, including routing failures and passing of signals at danger.

The coronavirus pandemic that emerged in 2020 had an impact on the extent of operations, particularly in passenger transport, which means that data on 2020 is not comparable with data on previous years. Traffic volumes were significantly lower than usual, which was also reflected in safety.

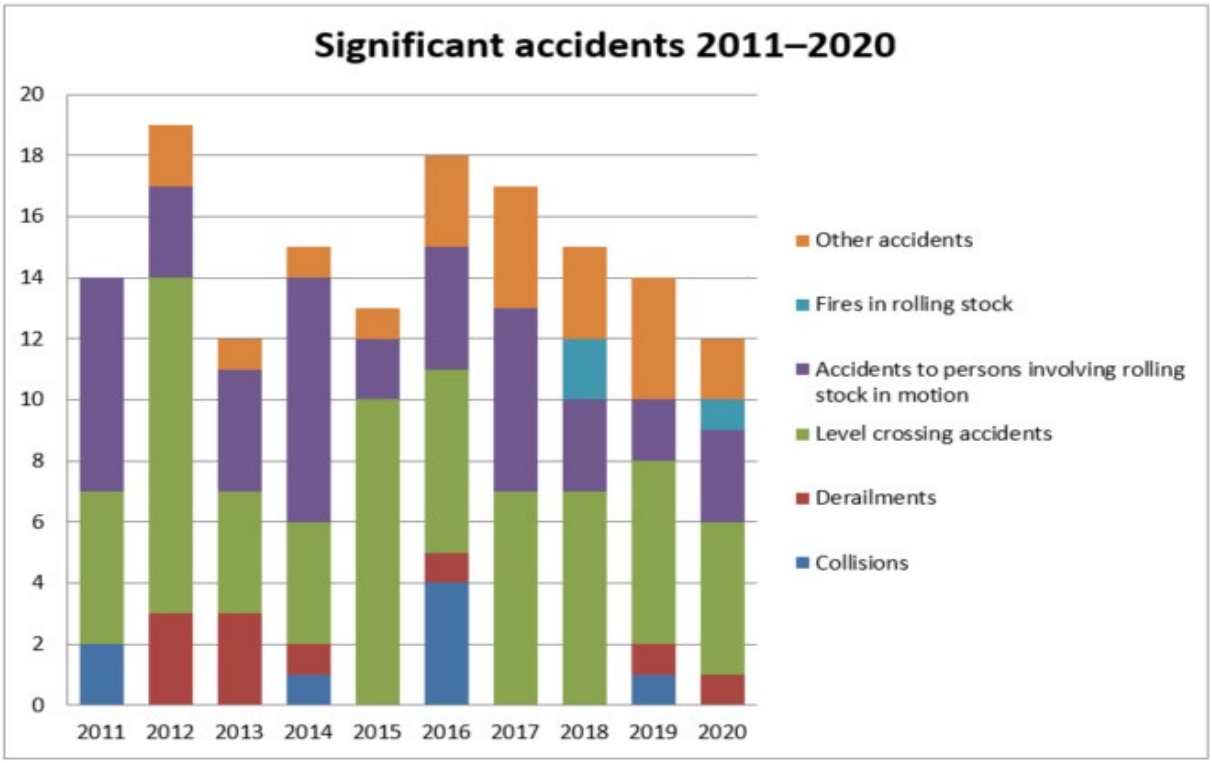

Figure 1. Significant railway accidents in Finland in 2011–2020

Most casualties on railways are caused by accidents to persons involving rolling stock in motion. No clear trend can be observed in the annual numbers of these accidents, which typically cause 50 to 60 fatalities every year. Most of these are deliberate.

Another accident type that claims several lives each year is level crossing accidents. In 2020, a total of 16 level crossing accidents were recorded. Five of them met the ERA criteria for significant accidents. The numbers of both accidents and related fatalities are slightly below the averages recorded in recent years. While the annual number of level crossing accidents has considerably declined in Finland in the 2000s, the safety situation of level crossings in Finland remains clearly worse than in Sweden and Norway, for example.

While there has been a clear improvement in shunting safety in Finland in the 2010s, many accidents and incidents continue to occur in this work. Unauthorised shunting operations and collisions between shunting units and rolling stock clearly decreased in 2020. During the year, two significant accidents occurred in shunting, and there was no significant change in the numbers of accidents and incidents compared to the previous year. The precursors of shunting accidents and incidents are often associated with the shunting foreman’s or driver’s incorrect practices.

Safe coordination of track work and train traffic has been a key challenge to railway safety for a number of years. While minor improvements have been achieved in the safety of track work, the pace of this change remains too slow. Typical occurrences related to track work, including unauthorised passing of the track work area, working without a track work permit, and errors in the opening of the track work site to traffic, pose risks to the safety of both train traffic and track maintenance workers. The factors causing safety incidents in track work often include lack of skills and deficiencies in safety culture.

A great deal of work has been done recently to improve competence and the safety culture in the rail sector. While change takes time, sustained efforts can help ensure sufficient competence across the sector and support the building of a good safety culture. A good safety culture promotes the sharing of safety information, which further facilitates learning and positive safety development across the sector.

2 Traficom's safety operations and organisation

2.1 Safety strategy and plans

Traficom produced its first Railway Safety Programme in 2019, and in spring 2020 it was extended to also cover urban rail transport (trams and metro). At this time, the Rail Transport Safety Programme was updated to cover the period between 2020 and 2022. When developing and updating the programme, Traficom took into account the work programmes of the European Commission and ERA, the special features and needs of the Finnish rail network as well as the views of operators in the field and the Ministry of Transport and Communications. Traficom monitors the Safety Programme's implementation on a quarterly basis and reports on progress to the Ministry of Transport and Communications.

The Safety Programme documentation describes the operators in the rail sector, their areas of responsibility and the legislative framework applicable to the railways. While the documentation has changed little since the year before, the measures of the actual programme have been re-grouped to clarify the programme. The Safety Programme now comprises eight comprehensive themes, which contain a total of approximately 30 detailed actions, through which Traficom strives to improve rail transport safety together with the railway sector operators. The themes for development are as follows:

1) Exerting a strong and diverse influence on trends in rail transport safety
2) Improving safety in the transport of dangerous goods
3) Creating a culture of reliability in rail transport
4) Developing the cyber security of rail transport comprehensively
5) Enhancing the efficiency of Traficom's supervisory measures
6) Helping stakeholders understand their responsibilities in rail transport
7) Bringing the use of accident and incident data up to a new level
8) Encouraging discussion on safety impacts of regulatory changes and bringing development proposals up for discussion.

Most of the actions in the Rail Transport Safety Programme were already included in last year's programme, and they will continue to be developed in the years to come. Themes that have grown in importance include improving reliability and cyber security, as society is placing increasing demands on these areas.

Responsibilities for implementing Safety Programme actions have been assigned to Traficom's personnel, a schedule for the actions has been prepared, and implementation is reviewed each quarter. Some of the actions have also been tied to Traficom's performance targets. In the future, the Safety Programme is to be updated as necessary.

The safety culture assessment model developed by ERA was piloted in Finland. In cooperation with three pilot organisations, the project aimed to investigate how the model could be used to improve railway operators' safety culture, whether the assessments are useful in terms of supervision, how well ERA's model meets the needs of Finnish rail transport and how effective the method is.

2.2 Actions taken on the basis of safety recommendations

Table 1 below lists the safety recommendations issued to Trafi/Traficom by the Safety Investigation Authority in recent years as well as the actions taken based on the recommendations.

Table 1. Actions taken by Trafi/Traficom on the basis of the Safety Investigation Authority's recommendations.

Safety recommendation	**Actions taken**	**Status of implementation**
2019-S47 The Finnish Transport and Communications Agency defines the approval process of level crossing risk assessments and supervises the implementation of corrective actions.	In Traficom's view, infrastructure managers assess the risks in their own processes. The risks associated with level crossings are assessed together with other risks.	Implemented
2019-S1 Railway operators, the Finnish Transport Infrastructure Agency and the competent authorities must develop ways of preventing backlogs in the transport of dangerous goods from Russia. The acquisition and exploitation of anticipation data should be improved, in particular.	Traficom's information system associated with the rolling stock used for interconnecting traffic is being upgraded, and an attempt will be made to integrate in it a tool that would enable better exploitation of existing rolling stock information.	Implemented
2018-S14 When approving examiners and railway operators' safety management systems, the Finnish Transport Safety Agency should ensure that their procedures for verifying competence are adequate and that competence verification is reported on comprehensively.	Trafi applies EU-level criteria for approving safety management systems. Evaluation has been harmonised in the EU area. In its audits, Trafi supervises that activities comply with the operators' safety management systems in accordance with EU Regulations. Competence and competence management are	Implemented

	a priority area in Trafi's supervision activities.	
2018-S18 The Finnish Transport Safety Agency should supervise the practical implementation of safety management systems.	Supervising the practical implementation of safety management system procedures is a specific target in Trafi's audits. However, with the current resources it is not possible to cover the entire safety management system in every audit.	Implemented
2018-S17 The Finnish Transport Safety Agency should require radio controls used in shunting to have a separate emergency stop button with no delay.	In Trafi's view, adding an emergency stop button to old locomotives would be time-consuming and costly, and there is no sufficient evidence of its presumed benefits.	Implemented
2018-S4 The Finnish Transport Safety Agency should specify in greater detail the checks to be carried out as part of rail worthiness inspections and the criteria for the competence and independence of the party carrying out the inspection.	The rail worthiness inspection is part of rolling stock maintenance procedures. The rolling stock maintenance procedures are described in the operator's safety management system, which Trafi supervises by means of audits. Rolling stock maintenance is included in Trafi's audit plan.	Implemented

2.3 Other safety measures

For other safety measures initiated by Traficom, see section 2.1.

2.4 Organisation of railway operations in central government administration and at the Finnish Transport and Communications Agency

The ministry responsible for transport matters in Finland is the Ministry of Transport and Communications. It drafts the policies, strategies and legislation concerning the transport sector. Traficom serves as the national railway safety authority. The Rail Regulatory Body, which ensures well-functioning markets and the fair and non-discriminatory treatment of operators, also operates in conjunction with Traficom.

The Finnish Transport Infrastructure Agency is the infrastructure manager of the state-owned rail network and also assumes responsibility for roads and waterways. Traffic management services are provided by Traffic Management Finland Ltd (TMF Ltd), a state-owned special task company whose subsidiary, Finrail Ltd (nowadays

Fintraffic Railway Ltd), is responsible for traffic management on railways. Other subsidiaries of TMF Ltd specific to each mode of transport are responsible for traffic management services for shipping, road traffic and aviation.

The Safety Investigation Authority, which operates in conjunction with the Ministry of Justice, is responsible for investigating rail transport accidents in Finland.

There were no changes to Traficom's organisation in 2020. However, a cooperation procedure (i.e. consultation between the employer and employees) was launched in December 2020. This was the first step towards the development of Traficom's organisation and activities to meet the slight modification needs identified after the previous organisational reform. In 2020, rail transport matters were covered by two separate teams. The Railway Operators team was responsible for processing safety authorisations and certificates as well as the supervision of railways. The Land Transport Infrastructure team was responsible for approvals for rolling stock and rail infrastructure. Both teams were part of the service area Rail Transport, Road Infrastructure and Mobility Services. The head of the service area also acted as the Director-General of the Rail Transport Sector. A few persons in other Traficom units also worked with tasks related to the regulation of railways and safety monitoring. Towards the end of 2020, Traficom's rail transport personnel highlighted the need to increase the visibility and resources of rail transport in the Agency. This has been taken into account when designing the new organisation.

At the end of the year, Traficom had more than 900 employees, and it operated in 15 cities. Approximately 30 Traficom employees worked exclusively with rail transport matters.

In 2020, Traficom had a shared competence management system, but it had to be given up at the end of the year because of information security reasons. The procurement of a new system is currently being prepared, and competence management processes are being carried out by temporary solutions. Competence management processes include information on qualifications and skills related to employees' tasks. This information is used for performance appraisal discussions with personnel. Traficom also maintains information on the need for and objectives of developing personnel competence.

3 Status of railway safety

3.1 Safety of train traffic

The safety of train traffic remained at a good level in Finland in 2020. Significant accidents in train traffic are rare, and the number of minor accidents is also low. The most typical accidents in train traffic leading to casualties are level crossing accidents and accidents to trespassers involving rolling stock in motion. Other accidents with typically less severe consequences that at times occur in train traffic include fires in rolling stock and collisions with an obstacle.

While the safety level is good and accidents are rare, major precursors of incidents are present in train traffic. The speeds and masses involved in train traffic are extremely great, which is why any accident may have very serious consequences. Normally, technical safety systems and staff competence are relied on to ensure train traffic safety, which is thus protected by several factors. However, situations occur every year in which inadequacies related to one or several protective factors leads to

serious incidents. In 2020, the Finnish Transport Infrastructure Agency recorded 12 significant accidents. The number was lower than in 2016–2019. The decrease was partly due to the coronavirus pandemic that reduced the volume of passenger transport, in particular.

Accidents in train traffic

According to the statistics compiled by the Finnish Transport Infrastructure Agency, there were a total of 19 cases in which a train collided with an obstacle in 2020, In 2019, the corresponding figure was as high as 326. This major difference is explained by the fact that prior to 2020 the category "collision with obstacles" included collisions with animals. Today, collisions with animals are classified in their own category called "animal collision". Like in many years, also in 2020 the largest group of collision accidents concerned the collisions of trains with animals: the Finnish Transport Infrastructure Agency recorded 258 animal collisions. While collisions with animals rarely affect the safety of trains, they have major negative effects on the punctuality of train traffic. Other typical obstacles causing collisions include trees fallen down across the tracks.

In VR Group's systems, collisions with animals are not included in the collision category, and in VR's statistics the category is more limited also in other respects than the corresponding category used by the Finnish Transport Infrastructure Agency. VR Group only reported 10 collisions with obstacles in 2020. In 2017–2019, VR Group reported on average 4.7 collisions with obstacles in its train traffic every year. One collision with an obstacle classified as a significant accident occurred in 2020, when a freight train collided with a tree that had fallen down across the tracks in Saarijärvi. In 2014–2019, collisions with obstacles classified as significant accidents have occurred on average 0.8 times a year.

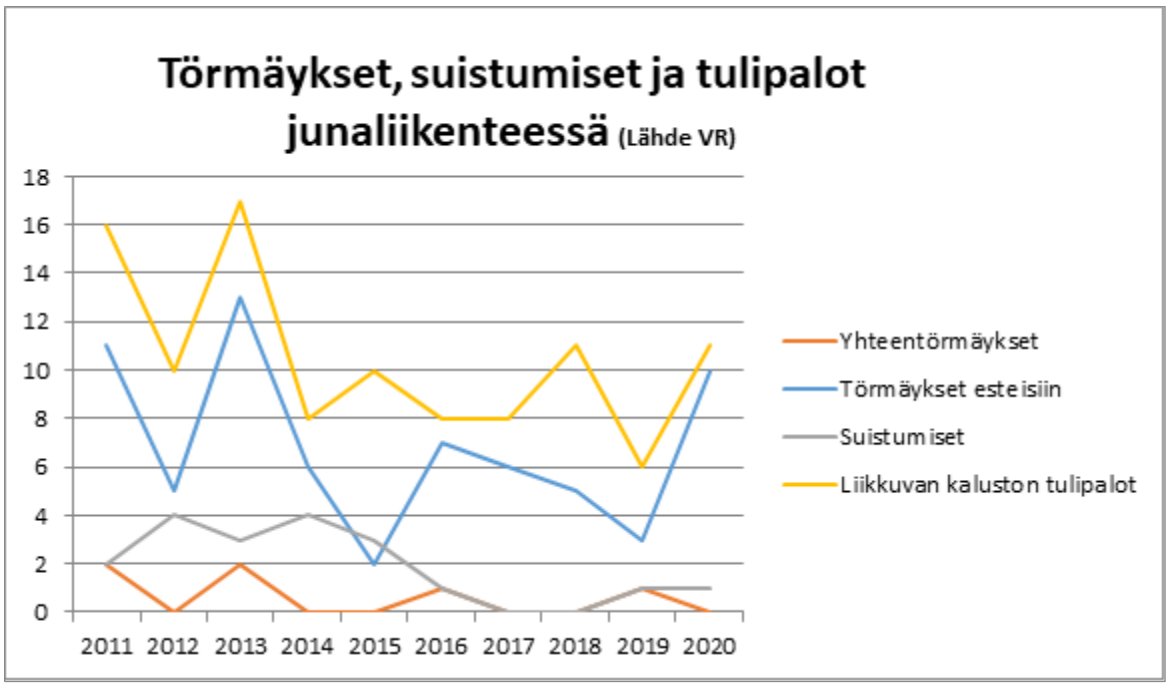

Figure 2. Collisions, derailments and fires in VR Group's train traffic in 2011–2020.

For 2020, VR reported no collisions of trains and with other rail transport vehicles. Such collisions have been rare in recent years, and only two cases belonging to this category occurred in 2014–2019.

Two derailments occurred in train traffic in 2020. The first one was caused by a tree fallen down on the track, derailing a freight wagon's first bogie. The second derailment took place when a train was departing and a stop block had accidentally been left on the track. In 2014–2019, on average 1.6 derailments occurred every year, including cases with minor consequences.

There were 11 fires in rolling stock in 2020, and one of these is classified as a significant accident. In 2014–2019, on average 10 such fires have been reported yearly. Typically, fires in rolling stock start in locomotive engine rooms or passenger carriages' heating equipment.

Incidents in train traffic

As accidents in train traffic are rare and random variations play a major role in their yearly numbers, over the short term the trend in accident numbers is not the best indicator for the development of safety. Incidents happen more frequently, and by monitoring their numbers and risk levels, a more accurate picture can be obtained of the development of safety. A change in the number of reported incidents may indicate not only changes in the safety situation but also in the culture of reporting occurrences. In recent years, however, no major changes have occurred in the total numbers of incidents in train traffic.

Safety in train traffic has improved from the level in 2019. However, the development is partly due to the coronavirus pandemic and its impact on the decrease in passenger transport volumes, in particular. Despite improved safety, the poor coordination of train traffic and track work resulted in incidents also in 2020. For more information about these incidents, see the section on the safety of track work.

According to VR Group's train traffic statistics, there were 18 cases of passing a signal at danger in 2020. This number is considerably smaller than in 2014–2018, when an average of 49.2 cases were reported. However, traffic volumes in 2020 were considerably lower than in previous years, which means the figures are not comparable. None of the cases of passing a signal at danger caused an immediate collision risk in 2020. These incidents occur at low speeds, and the automatic train protection (ATP) device stops the rolling stock as soon as the signal has been passed. When operating without ATP, however, the risks of passing a signal at danger are higher.

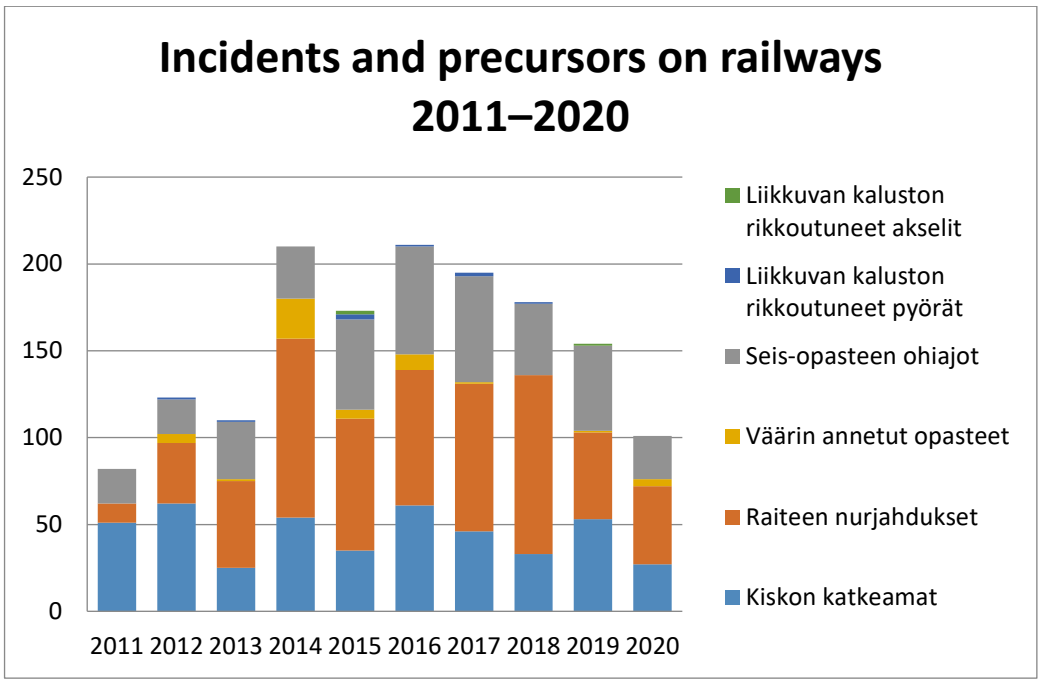

Figure 3. Incidents and precursors on railways according to the EU Common Safety Indicators in 2011–2020.

In 2020, 102 routing failures occurred. The most typical consequence of a routing failure is that a train is directed to wrong tracks. Routing failures may also result in serious risks. According to the Finnish Transport Infrastructure Agency's analyses, frequently occurring precursors of routing failures are work induction situations, situations related to track work or shunting, and situations involving different changes, including exceptional stops and timetable adjustments.

The state-owned railway network has a number of line sections and yards with no safety equipment; instead, manoeuvres are based on communication between traffic management and engine drivers. Many of these yards are using an operating model for traffic management in yards, which was introduced in 2016. These yards are not highlighted in statistics as major problem areas.

A wrong side signalling failure means any situation arising from a technical failure where the signalling information given to the train is less restrictive than that demanded. Four wrong side signalling failures were reported in 2020. In previous years, the number of these cases has varied between zero and 23. The large variation in the number of failures reported may partly be explained by the definition of these incidents being open to interpretation. The coronavirus pandemic has also contributed to the decrease in train traffic and shunting volumes.

There was a clear downward trend in the annual number of broken rail cases in 2016–2018, but in 2019 their number increased compared to previous years. In 2020, only 27 cases of broken rails were reported, which was significantly less than in the year before.

The Finnish Transport Infrastructure Agency focused particular attention on the traffic safety of bridges in 2019 and 2020. For example, the new Saimaa Canal railway bridge was opened to traffic in Midsummer 2020. The project is scheduled to be completed in the summer of 2021.

The current safety equipment of the railway infrastructure belong to a class B system according to CCS TSI. The implementation of pilot track A is being prepared in connection with the Digirail project. The reliability of safety equipment has been examined in collaboration with the National Emergency Supply Agency and the Finnish Transport Infrastructure Agency. The objective has been to ensure that the railway infrastructure remains operational even in the event of different failures and that traffic can be ensured at least between key operating points with the help of a signal box.

Incidents involving rolling stock

In 2020, no broken wheels on rolling stock were reported, which was the case also in 2019. No axles broke on rolling stock during the year either. The previous case of a broken axle was reported in 2015. In the worst case, a broken axle or wheel may result in derailment.

In 2020, there were 9 reported cases of doors of rolling stock left open. The number of such incidents increased in 2018 and 2019. In 2019, there were 25 reported cases of doors of rolling stock left open. The most significant factor contributing to the decrease has been the coronavirus pandemic that has resulted in low volumes of passenger transport.

A total of eight cases where wagons became uncoupled were reported in 2020. The risks associated with the uncoupling of wagons are usually fairly low because the uncoupling will lead to the emptying of the brake pipe, application of brakes, and the stopping of the train.

There were no serious accidents involving the transport of dangerous goods in 2020. The average of these cases observed in 2014–2019 was one a year. A total of 19 minor leakages (dripping) were reported.

3.2 Safety of shunting

Shunting refers to the moving and sorting of vehicles to support train traffic. More accidents and incidents usually occur in shunting work than in train traffic because, unlike in train traffic, technical safety systems play only a minor role in shunting, and the responsibility for ensuring the safety of the work mainly lies with shunting staff. Because of the low speeds involved, however, the consequences of shunting accidents are usually less serious than those occurring in train traffic. Extremely serious accidents may also occur in shunting, too, because of the great masses of the vehicles and the potential of dangerous goods being present.

A clear decreasing trend can be discerned in the numbers of shunting accidents and incidents in the 2010s. The factors contributing to increased safety have included at least improved work instructions and working practices and the improved condition of private sidings. In recent years, the decreasing trend in the number of shunting incidents appears to have stalled.

The causal factors of shunting accidents and incidents are frequently associated with the shunting foreman’s or driver’s incorrect practices, such as keeping insufficient lookout or using excessive speed. Incorrect work practices are often a result of a feeling of being in a rush, tiredness, a poor level of alertness or challenging winter conditions, for example.

In 2020, one derailment classified as a significant accident occurred in shunting. The safety culture took great steps forward in 2020, and the focus in development efforts has moved more and more on the work of individual persons and compliance with instructions.

According to VR Group's statistics, 49 derailments occurred in shunting work in 2020. Even though the statistics compiled by VR Group do not cover all shunting work performed in Finland, they currently provide the most comprehensive data on the subject. The number of derailments was slightly smaller than the average in 2017–2019 (68 cases a year).

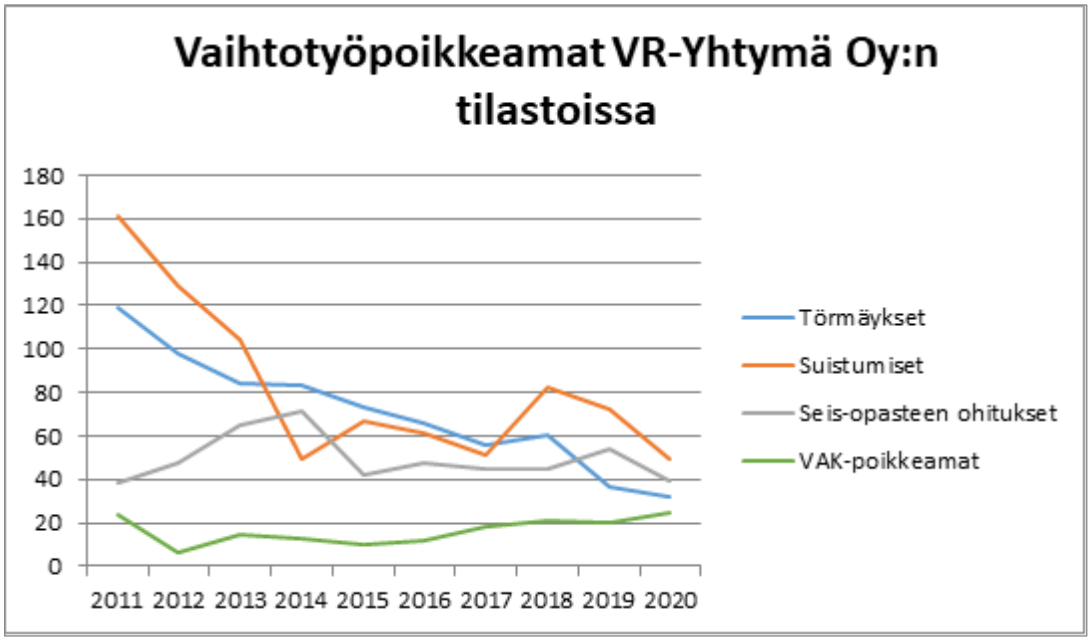

Figure 4. Shunting occurrences in VR Group's statistics in 2011–2020.

According to VR Group's statistics, there were a total of 32 collisions in shunting work in 2020. In 2017–2019, on average 50 collisions occurred every year. In the early 2010s, an average of almost one hundred collisions occurred in shunting annually; thus, there is a clear downward trend in collision numbers. Collisions in shunting are typically caused by errors in shunting work, including excessive speeds or keeping insufficient lookout.

VR Group reported 39 cases of passing a signal at danger in shunting work in 2020. In 2017–2019, an average of 48 incidents where signals were passed at danger in shunting were reported each year.

Occurrences related to the transport of dangerous goods in shunting (i.e. derailments, collisions and leaks) numbered 25 according to VR Group's statistics for 2020. There were no accidents in 2020 that caused leaks of dangerous substances.

Systematic efforts have been made to improve shunting safety, for example, by promoting the development of a positive safety culture and attempting to ensure the use of safe work practices. While some improvements have been achieved in shunting safety in recent years, the high number of incidents shows that a great deal still remains to be done.

3.3 Safety of transport of dangerous goods

While the volumes of dangerous goods transported have remained more or less the same in recent years (4.8–5.2 million tons a year), they have somewhat decreased from the 1990s level. Dangerous goods are transported almost across the entire railway network, but railway sections in Southeast Finland are a clear focal point for these operations. Services from Russia to Finland represent approximately 40% of the dangerous goods transported on the Finnish railways. Transit traffic from Russia via Finnish ports accounts for roughly one third of the transports of dangerous goods on the Finnish railways, and the remaining quarter is comprised of internal domestic transport. Services for the chemical industry account for a majority of the dangerous goods carried by rail. In 2020, 59% of the dangerous goods transported by rail were inflammable liquids, followed by corrosive substances (20%) and gases (15%). Other categories accounted for much smaller shares of the transport volumes.

The most comprehensive statistics on accidents and incidents related to the transport of dangerous goods by rail are currently contained in VR Group's railway safety report, which is a compilation of data from VR's accident and incident reports. VR Group is responsible for most transports of dangerous goods in Finland, and the company's statistics thus provide a relatively comprehensive picture of occurrences in the field.

Apart from leaks, accidents related to the transport of dangerous goods are rare, whereas incidents occur from time to time. Most incidents related to the transport of dangerous goods occur during shunting.

Leaks have in recent years been the most common occurrence category in shunting associated with the transport of dangerous goods. Most of the leaks of dangerous goods occurring during shunting have concerned liquids leaking via inlet and discharge valves. Collisions have been the second most common shunting occurrence type related to the transport of dangerous goods in recent years. Most of the collisions in shunting took place as an engine was pushing wagons. Typically, shunting collisions related to the transport of dangerous goods have resulted from a human error made by a shunting worker.

The most serious accident relating to the transport of dangerous goods by rail in recent years took place at Kinni traffic operating point in Mäntyharju on 7 April 2018. 50 tanker wagons, which were in temporary storage at the traffic operating point, started moving and collided with a buffer stop. The wagons crushed the buffer stop, and two of them were derailed. The tank of one of these wagons was broken in the collision, and approximately 35,000 kilograms of MTBE used for manufacturing petrol leaked into the ground. The number of stop blocks used to secure the wagons had been insufficient to hold the wagons once the weather became warmer and humidity affected the blocks' holding ability. There was also a strong wind blowing downhill. The leak caused extensive damage to environment.

No clear trend can be observed in the total number of occurrences in the transport of dangerous goods by rail. The consequences of a typical occurrence are minor; derailments do not usually result in leaks, and any leaks are mainly minor ones through valves. As a rule, the dangerous goods most often involved in accidents and incidents are the same as the ones most commonly transported over the railway network – inflammable liquids, corrosive substances and gases.

In addition to VR Group, there is another operator (Operail Oy) transporting dangerous goods in Finland. A third operator (Fenniarail) has the ability to begin transporting dangerous goods on the Finnish railway network.

3.4 Safety of work on tracks

Work on tracks refers to work carried out on the tracks or in their vicinity that may affect traffic safety. The safe coordination of work on tracks and train traffic has been a key challenge to railway safety for a number of years.

Typical occurrences related to work on tracks, such as working without a track work permit, inadequate protection of the work site and errors in the opening of the track work site to traffic, pose risks to the safety of both rail transport and track work.

The majority of track work in Finland is carried out on the state-owned railway network, which is managed by the Finnish Transport Infrastructure Agency. The Finnish Transport Infrastructure Agency gauges the development of the safety situation in track work by occurrence frequency, in which the number of accidents, incidents and human errors in railway infrastructure management is examined in proportion to the number of track work permits. In 2020, the occurrence frequency in track work slightly decreased compared to 2019 (Table 2). The modest positive trend that began in 2018 has continued for three years already.

One significant accident relating to railway infrastructure management was reported in 2020: an on track machine was derailed at a track work site in Lapua.

Table 2. Occurrence trends in the Finnish Transport Infrastructure Agency's (FTIA) railway infrastructure management in 2017–2020.

	Occurrence frequency in FTIA's track work in 2017–2020 per 100,000 track work permits	**Safety occurrences in railway infrastructure management in 2017–2020, total**
Year	**Occurrences**	**Occurrences**
2017	189	582
2018	151	436
2019	144	585
2020	133	644

The increase in the number of occurrences in railway infrastructure management is mainly explained by the fact that damages caused by the work are reported more frequently. Compared to previous years, there were fewer occurrences that were directly related to and had an impact on the safety of rail transport.

Safety has improved in terms of the following occurrences, for example:

- track work initiated completely without a track work permit
- errors in opening a track work site to traffic
- errors in determining the location of track work sites
- track work machines and other obstacles on a track in use.

The safety situation has remained the same or taken a turn for the worse in terms of the following occurrences:

- work machines crossing a site reserved for track work
- errors and shortcomings in the use of safety men

- errors and shortcomings in indicating speed limits and installing related ATP balises.

The number of occurrences suggests that safety has improved. The decrease in occurrence volumes is partly explained by improvements in organisations' safety cultures and improved awareness of the risks involved in their operations.

The use of the electronic RUMA system has been extended, and this has improved the safety of track work. The RUMA system promotes safety by providing key information on track work projects, the sites affected and track work permits. The functionality of the system has been continuously improved in cooperation with Finrail Ltd. RUMA supports the safe performance of track work, but there are indications that the system is not used to its full potential even though instructions have been provided and its use is required by the Safety instructions for railway infrastructure management (TURO).

Even though the number of safety occurrences, such as track work without a permit, has decreased, they still occur. Key risks in the safety of railway infrastructure management by the Finnish Transport Infrastructure Agency concern the use of on track machines and the implementation of speed limits. Risks are also involved in ensuring the track is in operable condition after track work, even though this is not separately visible from the statistics.

The number of cases of unauthorised passing of the track work boundary increased in 2019 compared to previous years, and the negative trend continued in 2020 as the number of cases has increased.

The number of occurrences concerning the protection of the track work area by traffic control has slightly increased from the year before. The threshold of reporting occurrences is low, which is a major factor explaining the high number of occurrences. Fintraffic Railway Ltd, the operator responsible for traffic control in rail transport, conducted an extensive risk analysis about occurrences. It identified several contributing factors associated with current systems. These factors create a setting where a single human error may result in an occurrence. Based on the analysis, the company has drafted a separate action plan to significantly reduce the number of occurrences related to track work in the coming years.

Overall, the safety occurrences related to track work indicate that individual errors and mistakes are made at all stages of track work processes. It is important to identify those errors that may either directly cause an accident or trigger a chain of events and mistakes that is difficult to stop.

Most steps in a track work process are still dependent on successful human action, and no comprehensive support from technical systems is yet available. Therefore, the Finnish Transport Infrastructure Agency has in its field of operation made efforts to prevent human errors by improving know-how, competences and the safety culture, increasing awareness about human and organisational factors (HOF), and examining operating methods, guidelines and opportunities to develop technical systems.

3.5 Level crossing safety

In the light of key figures on level crossing safety, the year 2020 seemed to be better than previous years. There were 20 level crossing accidents in Finland in

2020, of which 16 took place on the state-owned railway network. The number of accidents seems to have decreased compared to the average of the previous five years (2015–2019), approximately 29 accidents per year. The number of serious casualties caused by level crossing accidents also appears to be lower than in previous years, but the numbers are so small that differences can be explained by random variation. Over a longer term, the number of level crossing accidents has decreased. In the past 15 years, there have been an average of 36 level crossing accidents each year. Figure 5 illustrates the declining trend in level crossing accidents.

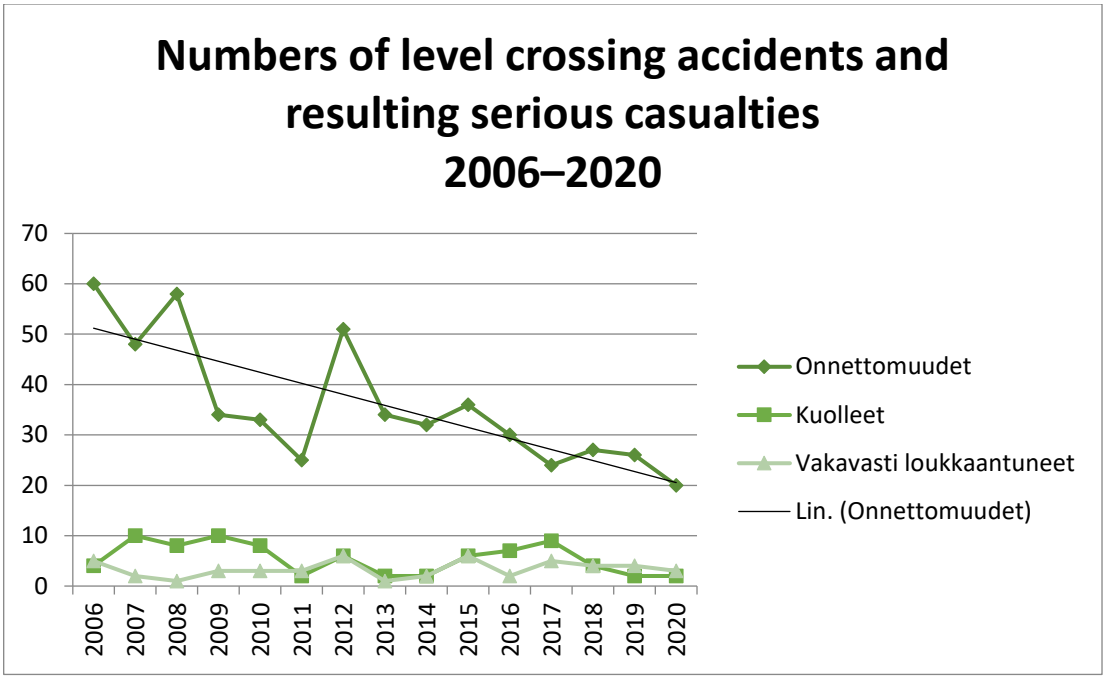

Figure 5. *Numbers of level crossing accidents and resulting casualties in 2006–2020.*

Despite having become less frequent, level crossing accidents still constitute one of the most significant risks to the safety of the railway system. They account for almost a half of all significant accidents occurring on the Finnish railway network. In addition to casualties and material damage, level crossing accidents also reduce the punctuality of traffic.

In 2020, level crossing accidents resulted in two fatalities, and three persons sustained serious injuries. In the previous five years (2015–2019), there were an average of six fatalities in level crossing accidents each year, while four persons sustained serious injuries. Four of the level crossing accidents that occurred in 2020 are classified as significant accidents because of the serious casualties they caused and one because of the material damage caused. One of the significant level crossing accidents in 2020 took place at a crossing equipped with half barriers. The remaining four significant level crossing accidents occurred at passive level crossings. No level crossing accidents in 2020 resulted in several deaths.

The most effective way of improving level crossing safety is eliminating level crossings. Consequently, the reduction in the number of level crossing accidents over the last few decades is largely explained by the reduction in the number of level crossings. Other methods for improving level crossing safety include equipping crossings with warning devices and improving visibility in level crossing environments.

As the infrastructure manager of the state-owned rail network, the Finnish Transport Infrastructure Agency has drawn up a programme for improving level crossing safety for 2018–2021. Level crossing safety will be improved by eliminating level crossings and by technical means (e.g. by increasing the number of level crossings with half barriers and improving visibility). In the course of the programme, 225 level crossings will be eliminated or improved and 42 warning devices will be installed. The programme will be continued to 2022. Once the programme is fully completed, a total of 411 level crossings will have been eliminated or improved. Of these, 57 cases involve the installation of warning devices.

3.6 Safety of private sidings

Private sidings refer to railway networks other than the state-owned network. The most important private sidings are managed by ports, municipalities or industrial undertakings. At the end of 2020, Finland had 79 managers of private sidings holding a safety authorisation. Moreover, 51 different private sidings were covered by a notification procedure under Finnish national legislation.

The length of private sidings varies from less than a hundred metres to networks of dozens of track kilometres.

The safety of many private sidings in Finland was quite poor in the late 1990s and early 2000s, and the bad condition of the sidings caused a small number of accidents. Over the past ten years, however, infrastructure managers have understood their responsibilities better and paid attention track maintenance, in particular.

Only a small proportion of the occurrences on private sidings are reported, and the reported number does not correspond to the actual number of occurrences.

Thus, the only way to evaluate the safety of private sidings has been to conduct audits. Some needs for improvement have been identified in the ability of private siding managers to carry out their responsibilities regarding the operation of traffic and traffic management.

The most common accident types on private sidings are derailments and level crossing accidents and damages. Derailments are often caused by the accumulation of snow, ice or litter on grooved rails. Derailments caused by the failure of support structures have also been reported. Level crossing incidents and accidents are typically caused by vehicle drivers, but the contributing causal factors often include challenging conditions at level crossings on private sidings. On private sidings, the track often crosses a road at an acute angle and the visibility is poor.

There have also been some reports about uncontrolled collisions with vehicles, buffer stops or gates on private sidings. These are often caused by insufficient lookout or excessive speed when visibility is poor.

Private siding managers also report to Traficom on safety development in their annual safety reports. A safety report for 2020 was submitted to Traficom by 68 managers of private sidings. According a majority of the reports, no significant changes had taken place in the safety situation or occurrence figures during the reporting year.

The safety targets of private sidings are often associated with the number of accidents and incidents. Zero rail accidents is a common target. The targets are often also linked to indicators measuring an industrial plant's occupational safety occurrences, for example. Other common targets include issues related to railway network maintenance and development, such as track renovations or improving level crossing safety.

3.7 Casualties in railway accidents

In 2020, four persons lost their lives in railway accidents, while four sustained serious injuries. These numbers are small and vary from year to year. Deliberate trespasser casualties are discussed separately at the end of the section, and they are not included in the above figures.

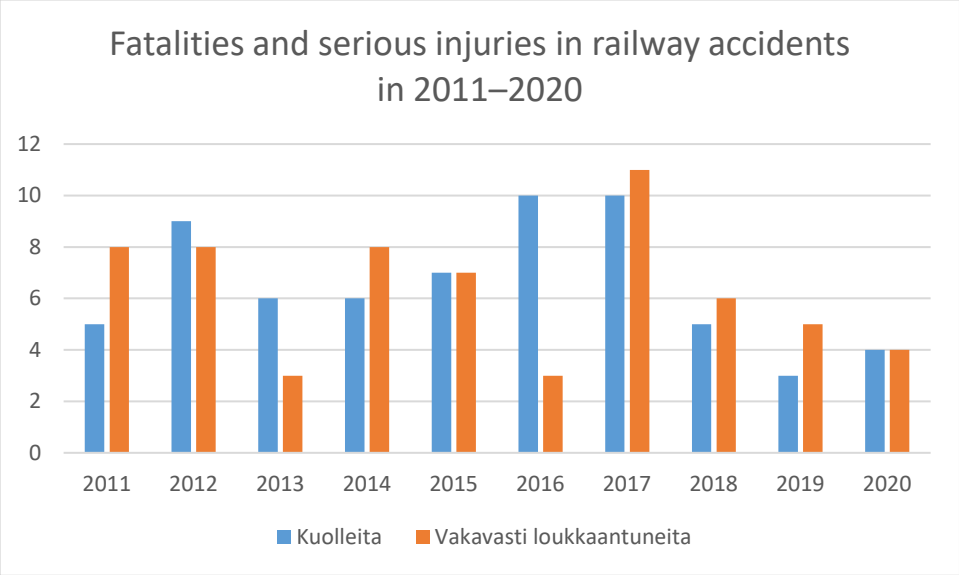

Figure 6. Fatalities and serious injuries in railway accidents in 2011–2020

A moderate declining trend can be seen in the number of serious casualties caused by railway accidents in 2011–2020. However, there are certain uncertainties associated with the casualty numbers in terms of the seriousness of the injuries and the deliberateness of accidents to persons involving rolling stock in motion, for example. Additionally, annual variations in the numbers of fatalities and serious injuries caused by railway accidents are rather great, and a single serious accident may cause a large part of the casualties in that year. Thus, the figures do not allow for extensive conclusions on the development of railway safety.

Two of those who died in railway accidents in 2020 lost their lives in level crossing accidents and two as a consequence of an accident involving rolling stock in motion. Two thirds of those who lost their lives in railway accidents in 2011–2020 were level crossing users (Figure 7).

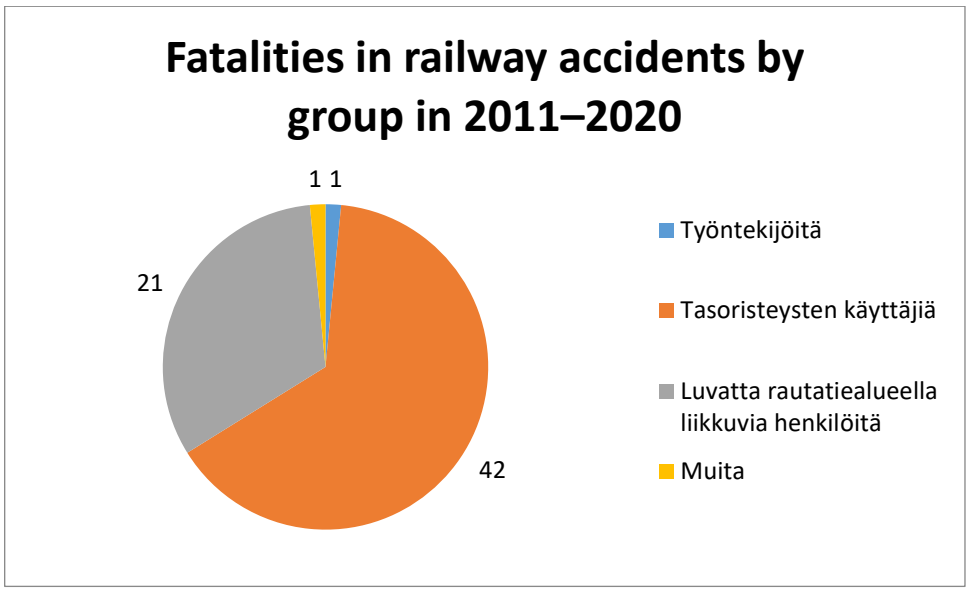

Figure 7. Fatalities in railway accidents by group in 2011–2020

Of the serious injuries sustained in 2020, three were caused by level crossing accidents and one person was hit by a train. Over the past ten years (2011–2020), slightly more than a half of those who sustained serious injuries in railway accidents were level crossing users, and one quarter were trespassers (Figure 8).

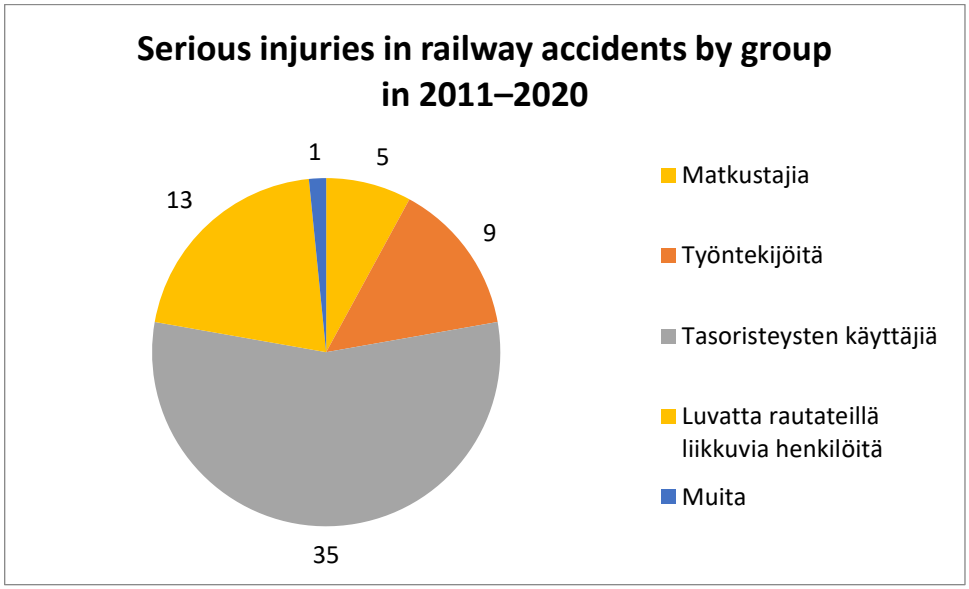

Figure 8. Serious injuries sustained in railway accidents by group in 2011–2020

In 2020, 53 persons lost their lives as a result of a deliberate accidents involving rolling stock in motion (trespasser fatalities), which is close to the average figure for the previous ten years. Classifying accidents to persons involving rolling stock in motion as deliberate or accidental is always a matter of some uncertainty, and the railway authorities do not necessarily have detailed information about the nature of individual cases.

Deliberate trespasser fatalities account for 89% of fatalities caused by all railway accidents in Finland in 2011–2020. Accidents to persons involving rolling stock in motion are a complex problem, and their consequences concern a broad range of different operators and authorities. To reduce the number of these accidents,

Traficom has convened a multidisciplinary cooperation group. The group started operating in 2019 and continued its work in 2020. The objectives of this cooperation group include improving information exchanges between different actors and promoting relevant research and measures. In addition to rail sector operators, participants include representatives of the police, research institutes and the social and health care sector. The cooperation group has begun promoting the implementation of a personnel training measure.

4 Changes in legislation

There were no changes to the content of the Rail Transport Act in 2020 as a result of the implementation of EU-level regulation.

In 2020, Traficom issued three national regulations on rail transport. Of these, the regulation to repeal the regulation on loading platforms in the railway system (entered into force on 3 February 2020) contributed to the goal of gradually removing national rules. The regulation on the application for a licence for a railway undertaking was also updated. Moreover, a regulation was issued under national competence on the organisation of preparedness planning in the transport system.

In 2020, work was also launched to prepare amendments to the Rail Transport Act and the Act on Transport Services regarding the needs for specification identified in connection with the application of the provisions implementing the 4th Railway Package. In the same connection, amendments were drafted to take into account the provisions of Commission Implementing Decision (EU) 2018/1614 (vehicle registers) and Commission Implementing Regulation (EU) 2019/777 (the register of railway infrastructure).

As in previous years, Traficom organised, for example, cooperation group meetings and an information session concerning the regulatory amendments to ensure that the drafting process would be as open and transparent as possible. Traficom also engaged in active cooperation to improve cyber security in rail transport, which clearly emerged as a new need for joint development efforts in 2020. Discussions on the topic were also begun with ERA and the national safety authorities of other EU Member States. In Traficom's view, this collaboration was fruitful and a necessary precondition for the successful development of legislation.

Even though Finland implemented the EU legislation of the 4th Railway Package already in 2019, Traficom continued to monitor regulatory fitness in 2020. Based on Traficom's own observations and discussions with its stakeholders, the new regulatory framework is mainly functioning well, even though it has not yet delivered on all the expectations for it in Finland.

5 Certificates and authorisations

5.1 Safety certificates and authorisations

Safety certificates

The year 2020 was the first full year when the changes brought along by the 4th Railway Package were applied to safety certificates. During the year, Traficom issued eight single safety certificates: three new certificates, four renewed certificates and

one amended certificate. No safety certificates were revoked in 2020. In August 2021, 30 railway operators had valid safety certificates in Finland, of which three are railway undertakings with commercial rail traffic operations. The largest groups among safety certificate holders are shunting operators, track maintenance companies and operators of rolling stock in historical use.

On 16 June 2019, an information system maintained by ERA was introduced in the processing of safety certificate applications. Applicants submit their safety certificate applications to the One Stop Shop (OSS), and they can choose to have their applications processed by either ERA or Traficom. If the applicant operates in more than one Member State, ERA will be automatically selected. In 2020, no applications were addressed to ERA in which the operating area was Finland.

From an authority's point of view, ample experience has accumulated on the use of the OSS in the processing of safety certificate applications. No major problems have been detected in the system, but there is still room for improvement in the usability of the process for requesting additional clarifications, for example. In minor issues, help has been quickly provided by the ERA service point.

In the assessment of safety certificate applications, increasing attention has been focused on operational guidance. Other focus areas include risk management and monitoring, because these are the areas where audits have revealed the most room for improvement. Overall, safety management systems have improved considerably over the past years.

Safety authorisations

At the end of 2020, 79 infrastructure managers had valid safety authorisations. The number of safety authorisations decreased significantly because the majority of managers of private sidings may, if they wish, opt for a simpler notification procedure under national legislation. In 2020, safety authorisations were issued to three infrastructure managers. Two holders of safety authorisations decided to discontinue their operations and cancel their authorisations. Managers who had transferred to the notification procedure were not required a separate application to cancel their safety authorisations.

There have been some delays in the processing of safety authorisation applications in 2020. This is partly due to the fact that infrastructure managers, or the consultants assisting them, have not identified sufficiently well the requirements of the updated assessment criteria, which entered into force on 16 June 2019. The managers of private sidings have felt that the requirements for the safety management system are too complex considering the nature of their operations. Traficom has also suffered from a major shortage of staff, which has contributed to the delays in the processing of applications.

The safety authorisation of the Finnish Transport Infrastructure Agency, which manages the state-owned railway network, was renewed in 2019 as a conditional authorisation. The Agency met the conditions for its authorisation in 2020.

By the end of 2020, Traficom had received a total of 51 notifications submitted by managers of private sidings under national regulation. Of these, 24 were submitted in 2019 and 27 in 2020. The number of infrastructure managers under the notification procedure will exceed the number of safety authorisation holders in 2021.

Vehicle authorisations for placing in service or on the market

Since mid-2019, Traficom has mainly issued authorisations for placing on the market in accordance with the new Directive. These authorisations are processed in the European OSS system. For vehicles governed by national regulation, authorisations for placing in service may also still be issued.

Traficom issued an authorisation for placing in service or on the market to 86 vehicles in 2020. Most of these authorisations were for renewed vehicles. First authorisations (vehicle type authorisations and vehicle authorisations for placing on the market) were issued to new locomotives and on track machines, for example. Traficom also issued 14 authorisations for placing in service under national legislation.

Traficom engages in active and instructive interaction with applicants throughout the authorisation process. Consequently, few problems have come up in the actual applications, and none have been rejected.

5.2 ECMs

In 2020, the vehicle register maintained by Traficom included approximately 35 entities in charge of maintenance (ECMs). Two of these (VR Kunnossapito Oy and Teräspyörä Oy) have been issued with ECM certificates for freight wagon maintenance.

The ECMs in Finland are railway operators' internal entities or separate undertakings. Excluding the two certified ECMs, the activities of maintenance entities are small in scale, and their clients mainly consist of a single operator. By virtue of derogations granted under the ECM Regulation and section 74 of the Rail Transport Act, most of these operators will remain outside the scope of mandatory certification in the future, even if the EU Regulation extends the ECM certification obligation to all vehicles in 2022.

A large part of the operation in Finland is railway traffic between Finland and Russia, which takes place within the framework of an agreement on a direct international rail link between the two countries. Under this agreement, the freight wagons used in traffic between the countries are inspected at the border crossing before being used on the Finnish railway network. As vehicles approved and registered in Russia do not have an ECM determined under EU regulation, three railway undertakings (VR Group, Fenniarail Oy and Operail Finland Oy) have been granted a derogation from the ECM obligations under Article 15 of the Railway Safety Directive.

5.3 Train driving licences

In 2020, Traficom issued 33 new train driving licences. One duplicate was issued, two licences were renewed or amended, and 260 were revoked. The reasons for the revocations were the driver's retirement, moving to other tasks and failure to meet the medical requirements. One applicant withdrew their licence application. In total, 2,769 train driving licences had been issued in Finland by the end of 2020, and 2,420 licences were valid at year end.

5.4 Authorisations for placing structural subsystems in service

In 2020, Traficom issued 29 authorisations for placing fixed structural subsystems in service. This figure is similar to the numbers of authorisations issued in previous years. The scope and complexity of railway projects issued with authorisations for placing in service vary greatly from comprehensive track improvement projects to smaller-scale sites concerning individual tracks. During the year, no authorisations for placing in service were granted to new track routes in Finland.

Authorisations for placing fixed structural subsystems in service are processed as set out in the Interoperability Directive (2016/797/EU) and the national Rail Transport Act (2018/1302).

5.5 Information exchanges between Traficom and operators

An effort has been made to keep the threshold for information exchanges between Traficom and the railway operators very low. Channels for liaising with operators include information events organised by Traficom for stakeholders, one-to-one meetings between Traficom and operators, and direct discussions between Traficom public officials and an operator's representatives. Traficom holds regular one-to-one cooperation meetings with the largest operators to discuss topical issues. There is also a great deal of more informal cooperation where necessary, and Traficom liaises almost constantly with VR Group and the Finnish Transport Infrastructure Agency, in particular. Contacts with smaller operators are more irregular and focus on information events and, for example, meetings associated with authorisation renewals. In 2020, Traficom also continued holding regular meetings with individual operators, including operators of rolling stock in historical use and managers of private sidings. During the year, Traficom also started planning bilateral safety dialogues with the largest operators. The purpose of these dialogues is to focus on each operator’s topical safety issues.

On operators’ requests, Traficom coordinates cooperation forums. These include, for example, the network for human and organisational factors in rail transport, the rail transport safety and analysis group and the group on reducing accidents to persons involving rolling stock in motion. Traficom also coordinated the work of several cooperation groups on different themes. The purpose of these groups is to convene all operators in the rail transport sector to discuss topical issues. Groups have been established to address qualifications, traffic operation, vehicles and safety certificates, to name a few themes.

The discussions between Traficom and its stakeholders in 2020 were guided by actions defined in the Railway Safety Programme and the ways in which they can be promoted. The questions discussed included the responsibilities and risk management of railway system operators, improving the effectiveness of operators’ safety management systems and, in particular, the implementation of (internal) monitoring, which was also analysed based on surveys. Other discussion topics included practical questions concerning safety authorisations, safety certificates and other licences.

6 Supervision

6.1 Supervision plan

Each year, Traficom prepares a supervision plan for the railways. Following this plan, Traficom supervises rail sector operators by means of audits, inspections and complementary means of supervision, such as safety discussions. The primary focus of supervision is on auditing railway operators' and infrastructure managers' safety management systems and inspecting their operations. The operations of ECMs are also supervised.

In addition to railway operators, infrastructure managers and ECMs, Traficom also supervises training organisations in the sector as well as the work of railway doctors and psychologists.

Traficom reviews the implementation of its rail transport supervision plan quarterly. If necessary, the schedule of the supervision plan is modified, and certain targets may be prioritised during the validity of the plan. The emergence of new risks and exceptional events, for example, may make it necessary to update the plan. The recommendations of the Safety Investigation Authority may also redirect supervision.

In 2020, the audits carried out in connection with rail transport supervision focused particularly on the following themes: operator's internal monitoring, its results and links with risk management; operational indicators; supervision of service providers; management of qualifications; operation of transport and traffic management procedures; amendments to legislation, their implementation and links with the management of change; reliability and particularly the related foresight; subsystems and inspections of yards used for the transport of dangerous goods; continuous improvement; occurrence reporting and the use of such reports.

The audits conducted by Traficom are planned in cooperation with the organisations audited. The objective is to ensure that audits are supportive and encouraging. During the audit, Traficom strives to arrive at a shared view with the audited organisation of the audit observations and possible deviations.

In 2020, Traficom decided to launch a project to develop is supervision duties.

ERA audited Traficom's activities in December 2020.

A representative from Traficom also participated in an ERA audit of the Croatian national railway safety authority.

6.2 Supervision results

Traficom audited the safety management systems of 12 railway operators and infrastructure managers in 2020. The decrease in the number of audits was partly due to the coronavirus pandemic.

In addition, Traficom audited two ECMs and one training organisation. Three yards used for the transport of dangerous goods were inspected.

A majority of deviations found in the audits were classified as minor, and serious deviations were clearly less frequent. In 2020, the main development needs identified in the audits of safety management systems involved risk management,

the management of risks caused by third parties, and the implementation of operational activities and the issuance of related instructions.

Traficom's interaction with the larger operators, including the Finnish Transport Infrastructure Agency and VR Group, has been continuous and issues related to supervision are also discussed at one-to-one cooperation meetings. These discussions have concerned topical matters, such as supervision procedures and changes in the operating environment or operations.

Contacts with smaller operators are less systematic, and in some cases limited to supervisory actions.

6.3 Supervisory cooperation with other EU Member States' national safety authorities

Traficom did not engage in cooperation related to supervision with other Member States' national safety authorities in 2020.

7 Application of Common Safety Methods

7.1 Application of the Common Safety Method for safety management systems

Overall, the quality of safety management by operators has clearly improved for several years. Because the Finnish railway sector includes operators of different types and sizes, there is naturally some variation. Quality depends greatly on the available resources and the willingness to invest in safety.

Larger organisations have more resources for safety management, which makes them better equipped for developing their activities than smaller organisations with scarce resources. In large organisations, challenges may be posed by the increasing complexity of operations and taking safety management practices from the management level to the level of practical work. Low hierarchies, on the other hand, enable closer cooperation between the management and employees, and the practical implementation of safety management may be easier than in large organisations.

Operators have begun focusing more on human and organisational factors, but substantial improvements are still needed regarding competences and the definition of a systematic, comprehensive approach, in particular.

7.2 Application of the Common Safety Method for risk assessment and evaluation

An infrastructure manager or a railway operator applying for an authorisation for the placing in service of a subsystem must assess the significance of the change to be made in the early stages of the project. If the change is considered to be significant, the operator must carry out a risk assessment in compliance with the Common Safety Method (Regulation (EU) No 402/2013). If the change is not significant, the risk assessment should be carried out following the applicant's safety management system.

When an operator applying for an authorisation for the placing in service of a structural subsystem considers the change to be significant, they must submit to Traficom a safety assessment report prepared by an independent assessment body as proof of having applied the Common Safety Method.

A majority of changes are considered not significant. Involving an independent assessment body incurs expenses, which may be one reason why changes are often considered not significant. The significance of the change is assessed based on six criteria, which leave operators scope for interpretation in deciding on whether the change is significant.

The infrastructure projects of the Finnish Transport Infrastructure Agency, which is the infrastructure manager of the state-owned rail network, contain changes, some of which are considered to be significant and some not significant. Many of the changes are considered not significant, but the largest projects are considered significant changes. When assessing the risks of changes that are not significant, the Finnish Transport Infrastructure Agency applies a procedure that is almost identical to the risk assessment of significant changes, with the difference that the former does not contain the input of an independent assessment body. The projects carried out by managers of private sidings include a higher number of not significant changes. Very small-scale projects on private sidings are not required to apply for an authorisation for placing in service.

No changes were made to the national guidelines or processes related to the Common Safety Method for risk evaluation and assessment in 2020.

7.3 Application of the Common Safety Method for monitoring

Traficom has published guidelines for operators on preparing safety reports (TRAFICOM/89239/03.04.02.01/2019). The guidelines contain a short description of what the report should contain in terms of monitoring actions:

- the organisation's experiences of applying the Common Safety Method for monitoring, including internal inspections or internal audits of the safety management system and internal investigations of incidents and accidents
- the planned priority areas for monitoring
- actual targets covered by monitoring
- monitoring results
- actions taken on the basis of monitoring in order to improve safety management
- results of measuring the effectiveness of measures taken.

Almost all of the operators who submitted a safety report also reported on monitoring. However, the descriptions varied greatly. Some operators followed the guidelines closely, while others only included a single sentence noting that monitoring had been carried out in 2020.

Approximately one in three of the operators who included a description of their monitoring reported on its results using a table prepared in a specific format, listing first the management reviews and internal audits carried out, followed by the operator's monitoring priorities, targets and results, any further actions and an assessment of effectiveness. Most operators describe these aspects in free form.

Most operators described their key monitoring priorities, while some included no information on their priorities in the descriptions of their monitoring activities. The monitoring priorities of those operators who used the table template for reporting on their monitoring were very similar. Among infrastructure managers, the most common monitoring priorities were risk management, effectiveness of internal audits of the safety management system, documentation, railway network maintenance and achievement of safety targets. For railway operators, the most common monitoring priorities included monitoring driver activities, qualifications, fitness for work, and traffic communication.

Key monitoring targets listed by infrastructure managers included, for example, checking the completion of the maintenance file, maintaining a hazard record, examining the track's operability, management reviews and compliance with the maintenance plan, which is supervised by spot checks. Correspondingly, railway operators listed, for example, the following monitoring targets: shunting operations, fitness for work or complementary certificates / train driving licences. Little information was provided on the indicators used to monitor the targets.

In the case of many operators, it also remained unclear how the monitoring had been carried out or what the targets of internal audits and possible findings were if the operator had included them as monitoring actions.

Those operators who used the table template for reporting on their monitoring also provided the clearest descriptions of the findings. Based on the monitoring results reported by the operators, the indicators used in monitoring were qualitative rather than quantitative. The clearest descriptions of actions and their evaluation were also provided by those operators who used the table template for describing the monitoring activities in their safety reports. Some operators had noticed that monitoring had helped them improve safety.

To sum up, the safety reports indicate that some of the operators understand, plan, implement and report on methodical monitoring in the spirit of Regulation (EU) No 1078/2012. Based on the descriptions in the safety reports, some operators only partly carried out monitoring as required under the Regulation. It is also likely that some operators struggle to understand the concept of monitoring and its role in following and developing their own activities. Observations on monitoring based on the safety reports also support audit findings regarding the heterogeneous nature of monitoring.

In 2020, Traficom conducted a brief survey on monitoring for operators covered by the notification and authorisation procedure. A link to the survey was sent to 53 operators in total, and 14 of them responded. Two thirds of the respondents said monitoring had helped them find concrete ways to improve their activities. Two thirds of the operators had updated their plans for monitoring based on the results. On the other hand, a third of the operators had not updated their plans at all based on the information obtained about their own activities. Based on the results of the analysis, Traficom updated its safety programme for 2021. Monitoring was added as a theme for safety dialogues.

The safety reports and the monitoring survey suggest that Traficom should continue its efforts not only to verify that operators' descriptions of their monitoring activities are compliant with the Regulation but also to ensure that operators have understood

the purpose of monitoring and they plan and carry it out as required under the Regulation.

8 Safety culture

8.1 Evaluation and monitoring of safety culture

The largest operators are conducting an extensive, multi-annual project on including human and organisational factors and the promotion of positive safety culture in the safety management systems and implementing these objectives in practice. In the years to come, smaller operators will prepare safety culture strategies as required under the assessment criteria for safety management systems.

Traficom commissioned a report on the development of a method for surveying safety culture. The work was carried out by the Finnish Institute of Occupational Health, and it was completed in 2020. In addition to rail transport, it also covered aviation and maritime transport. In the project, a survey method was developed for Traficom to assess safety culture.

In 2020, Traficom launched a project examining how safety culture and human factors can be taken into account in safety management systems. The project will compare ERA's safety management and safety culture models and find interconnections between elements in the models. The project will also propose an approach for Traficom to assess safety culture employing different assessment methods and ERA models. The work will be completed in 2021. Preliminary results have already been presented to ERA.

8.2 Safety culture development projects

Traficom participated as an expert in the process of developing a safety culture model led by ERA. The model was piloted on a full scale by Traficom in 2018–2020, during which period Traficom evaluated the safety culture of three volunteer operators using the first version of the ERA model. The results were reported in autumn 2019 and early 2020. A feedback event was held for the operators' management, an evaluation report was produced, and a PowerPoint presentation was prepared based on the report. A feedback event was held in 2020 to discuss how the evaluation went and how the results were presented.

Traficom participated in drawing up a safety climate survey based on ERA's safety culture model.

The operators that participated in the pilot project on safety culture evaluation will develop their good safety cultures based on the assessment results. VR Group is implementing a multiannual project to promote a good safety culture, and the Finnish Transport Infrastructure Agency is also working towards the same objective.

8.3 Communication about safety culture development projects

The survey based on ERA's safety culture model has been presented to the Network on human and organisational factors in rail transport coordinated by Traficom, and it has been discussed in the network. The interactive version of the safety culture model has also been presented to the network.

A representative from Traficom took part in a webinar organised by ERA at the end of the year to discuss safety culture and safety leadership.

Traficom also organised information sessions on safety culture at its own events and events organised by other operators.

ANNEX: Progress with Interoperability

Please provide the following information as it is at the 31st December of the reporting year.

Please refer to the Appendix for definitions.

1. Lines excluded from the scope of IOP/SAF Directive (end of year)

1a	Length of lines excluded from the scope of application of the IOP Directive [km]	17
1b	Length of lines excluded from the scope of application of the SAF Directive [km]	17

Please provide the list of lines excluded: Olli-Porvoo (Line used only for heritage traffic)

2. Length of new lines authorized by NSA (during the reporting year)

2a	Total length of lines [km]	0

3. PRM adapted stations (end of year)

3a	PRM TSI compliant railway stations	27
3b	PRM TSI compliant railway stations - partial TSI compliance	3
3c	Accessible railway stations	2
3d	Other stations	163

4. Train driver licenses (end of year)

4a	Total number of valid European licenses issued in accordance with the TDD	2420
4b	Number of newly issued European licenses (first issuance)	33

5. Number of vehicles authorized under the interoperability Directive (EU) 2008/57 (during the reporting year)

5a	**First authorization - total**	See OSS
5aa	Wagon	See OSS
5ab	Locomotives	See OSS
5ac	Hauled passenger vehicles	See OSS
5ad	Fixed or pre-defined formation	See OSS
5ae	Special vehicles	See OSS
5b	**Additional authorization - total**	See OSS
5ba	Wagon	See OSS
5bb	Locomotives	See OSS
5bc	Hauled passenger vehicles	See OSS
5bd	Fixed or pre-defined formation	See OSS
5be	Special vehicles	See OSS
5c	**Type authorization - total**	See OSS
5ca	Wagon	See OSS
5cb	Locomotives	See OSS
5cc	Hauled passenger vehicles	See OSS
5cd	Fixed or pre-defined formation	See OSS
5ce	Special vehicles	See OSS
5d	**Authorizations granted after upgrade or renewal - total**	See OSS
5da	Wagon	See OSS

5db	Locomotives	See OSS
5dc	Hauled passenger vehicles	See OSS
5de	Fixed or pre-defined formation	See OSS
5df	Special vehicles	See OSS

6. ERTMS equipped vehicles (end of year)

6a	Tractive vehicles including trainsets equipped with ERTMS	34[1]
6b	Tractive vehicles including trainsets – no ERTMS	651[2]

7. Number of NSA staff (full time equivalent employees) by the end of year

7a	FTE staff involved in safety certification	5
7b	FTE staff involved in vehicle authorization	3
7c	FTE staff involved in supervision	5 (same people do safety certification and supervision
7d	FTE staff involved in other railway-related tasks	22

[1] ETCS equipment installed, but locomotives are used in B Class system using STM. Only short test track available trackside.

[2] Official stat is not published yet for 2019, but this a close estimate.