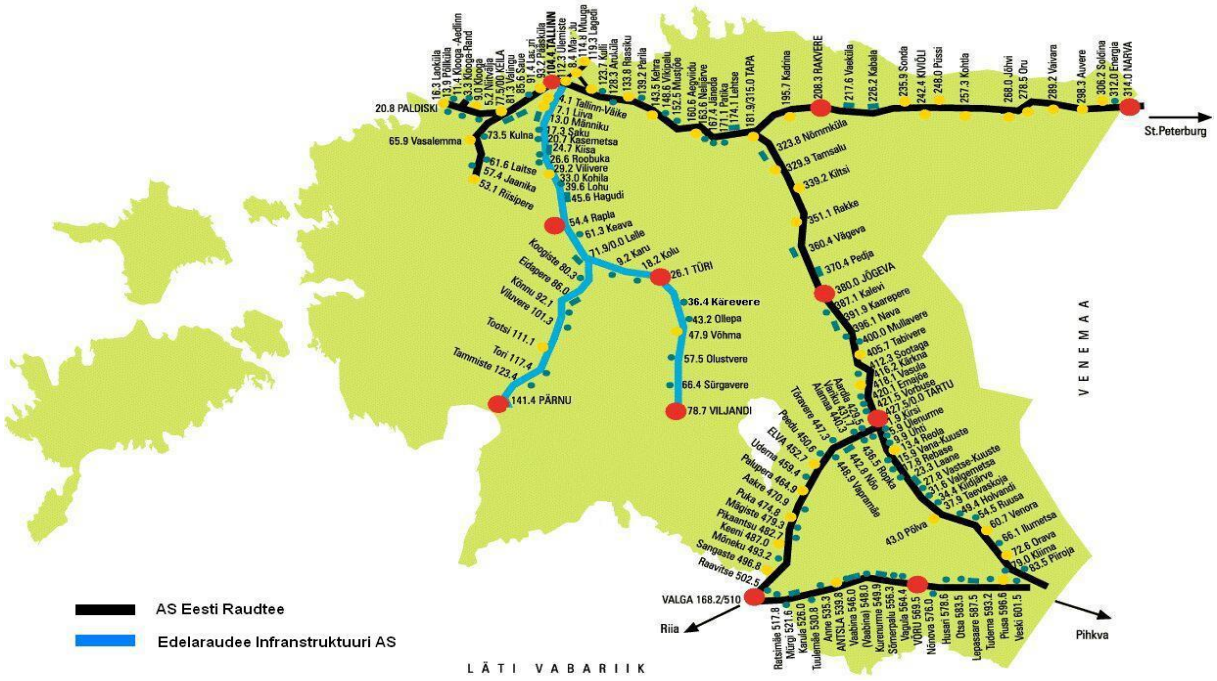
ESTONIAN SAFETY
INVESTIGATION
BUREAU

Report of the railway accidents investigated in 2014

Tallinn 2015



Public railways in the Republic of Estonia

Preface to the report

Safety investigations into railway accidents have been carried out in Estonia since 31 March 2004 when a relevant investigation unit was founded. A unified multi-modal Safety Investigation Bureau was formed on the 1 January 2012 in order to investigate maritime, aviation and railway accidents. Since the start of the safety investigations of railway accidents and incidents an annual report has been compiled of incidents investigated in the previous year.

In 2014 amendments to the Railways Act came into effect which established a new national classification of cases affecting railway safety which is now identical to the regulations of the Railway Safety Directive 2004/49/EC in terminology as well as content. The cases affecting railway safety are accident, serious accident and incident.

Legislation provides the role of the Investigation Bureau to increase railway safety by means of railway accident investigations. This is achieved by implementing measures based on the recommendations made during the course of safety investigations. At the same time the Safety Investigation Bureau works in cooperation with various partners and institutions for the same purpose.

The Safety Investigation Bureau is a functionally and fiscally independent structural unit of the Ministry of Economic Affairs and Communications carrying out specific tasks. It manages its work according to the international treaties, legislation, directives and an internal manual regulating its work.

In the reporting year, a serious accident took place on the Raasiku level crossing where as a result of a collision between a truck and a passenger train two people died and rolling stock derailed. When comparing the last five years there has been no increase or decrease in the number of deaths in the cases investigated. The number of deaths remains between 1 and 3. Vast majority of the cases are fairly straightforward and hence do not have any characteristics that would serve as a basis for a safety investigation. Therefore there have been no significant changes to the number of safety investigations in recent years.

The latest, 2014 safety investigation report had made 4 recommendations to various addressees and they presented formal reports about the proceedings to the Safety Investigation Bureau by 1 April pursuant to established procedure. Proceedings of three of the recommendations have finished by accepting and completing them and the proceedings of one recommendation continue. In connection with the amendments to the Railways Act from 1 April 2014 the Safety Investigation Bureau also began requesting reports about the recommendations the proceedings of which continued in 2013. So additionally, a report was presented about the results of the proceedings of two recommendations and it declared that these proceedings had been concluded.

Contents

1. Introduction to the Investigation Body

1.1 Legal basis

Simultaneously with the European Parliament and Council Railway Safety Directive 2004/49/EC the Railways Act came into force on the 31 March 2004 by which a Unit for Investigation of railway accidents was established at the Estonian Ministry of Economic Affairs and Communications. The amendments made on 2 March 2007 provided the cooperation between the Unit for Investigation, the European Railway Agency (ERA) and institutions and businesses. Principles of the safety investigation of railway accidents were provided by these documents.

Until the end of 2011 the safety investigations of railway and aviation accidents and incidents were conducted by the investigation units of the Ministry's Crisis Management Department, subsequently the safety investigation of maritime accidents was added. From the 1 January of the following year, 2012, safety investigations of all three modes of transport were combined into a single structural unit Estonian Safety Investigation Bureau (ESIB). In order to establish a single multimodal Safety Investigation Bureau amendments were made to the Aviation Act, Maritime Safety Act and Railways Act.

The amendments to the Railways Act that came into force on 1 April 2014 also include additional regulations regarding the independence and procedures of the safety investigations of railway accidents. According to Subsection 42 (1) of the Act safety investigations of accidents, serious accidents and incidents are conducted by the Safety Investigation Bureau which is a structural unit of the Ministry of Economic Affairs and Communications. The Safety Investigations Bureau is independent in conducting safety investigations and any subsequent decisions and is guided only by law and other legislation and any international treaties that are binding in Estonia. There is no supervisory control of the Safety Investigations Bureau's investigative activities. Independence of the Safety Investigation Bureau is also reflected in Subsection 48 (2) of the Aviation Act which provides that the director of the ESIB is appointed and relieved of its duties by the Government of the Republic on the recommendation of the Minister of Economic Affairs and Communications and the ESIB officials are appointed and relieved of their duties by the director of ESIB. State Budget Act of 2014 with item code 20SE07004 – an independent budget for the Safety Investigation Bureau is approved by the Parliament of the Republic of Estonia. According to the Statutes of the Safety Investigation Bureau the Ministry does not have a right to give the ESIB orders or tasks that compromise the independence of a safety investigation. Neither does the Ministry have the right to demand information from ESIB the publication of which compromises the independence of a safety

investigation and that may hinder current and future safety investigations. Ensuring it does not violate the principle of independence, EBIS is accountable to the Secretary General and the Minister of Economic Affairs and Infrastructure when using the Ministry's ancillary services. The requirement for independence for the investigative body is provided by Article 21 of the European Parliament and Council Directive 2004/49/EC on Railway Safety.

On the basis of the previous paragraph it can be stated that the Safety Investigation Bureau is independent of any railway infrastructure managers, railway undertakings, tax collection authorities, distribution authorities and notified bodies or any other party whose interests might conflict with the tasks given to the investigation body. In addition, it is also functionally independent of the safety authority and the railways regulatory body.

The framework for the investigations of railway accidents is provided by the Railways Act Section 42 "Safety investigations of accidents, serious accidents and incidents" and Section 43 "Investigation Reports". In addition, the subject of the safety investigation is specified and systemized according to its characteristics with Section 40 of the Act "Cases affecting railway safety". The Railways Act provides the authority to enforce the regulations of the Minister involved in the safety investigation. The existing regulations are "Safety investigation procedures" which came into force on 06.04.2014, "Procedures for providing written notification of accidents, serious accidents and incidents and format of written notifications and reports" which also came into force on 06.04.2014. The Statutes of the Safety Investigation Bureau were approved by the Ministry of Economic Affairs and Communications Directive No 14-0320. The previous statutes had been in force for 3 years. The aforementioned legislation forms the legal framework for conducting safety investigations of railway accidents.

Subsection 42 (3^1) of the Railways Act provides that the railway infrastructure managers or railway infrastructure possessors and railway undertakings will immediately notify the Safety Investigation Bureau of an accident, serious accident or incident via public means of communication. Updated information about an accident or a serious accident has to be presented in the form of a written notice to the Safety Investigation Bureau within three working days of the occurrence. Updated information about an incident has to be presented in the form of a written notice within three days of the Safety Investigation Bureau's request for this information.

Subsection 42 (2) of the Railways Act provides the Safety Investigation Bureau's right to involve experts to clarify circumstances which require special knowledge and form committees. In addition, the authorities involved in the safety investigation are obliged to offer necessary assistance to the safety investigation within their competence.

Subsection 43 (1) of the Railways Act - “Safety Investigation Reports” provides the requirement for the Safety Investigation Bureau to compile a written investigation report and publish it in the shortest time possible but not later than within 12 months of the occurrence. It also provides the obligation to forward the report to all relevant railway infrastructure managers, railway undertakings, the safety investigation body of another European Union member state, victims and their families, owners and producers of damaged property, Rescue Board, representatives of the employees and passengers and the European Railway Agency. The same Subsection (3) provides the obligation of the Technical Surveillance Authority and other authorities, businesses or organisations that were subject to the Safety Investigation Bureau’s recommendations, to submit a report by the 1st April of the following year on measures that had been implemented or planned based on the recommendations. Pursuant to Subsection 43 (4) of the Act the Safety Investigation Bureau has to publish an annual report on its website giving an overview of the cases investigated in the previous year, recommendations about railway safety and the measures implemented based on these recommendations.

Subsection 42 (11²) of the Railways Act provides the conditions when the Safety Investigation Bureau issues a safety alert during a safety investigation.

The Ministry of Economic Affairs and Communications Directive No 26 “Procedures for notifying of accidents, serious accidents and incidents and the format of the written notices and reports” came into force on 06.04.2014. Section 2 of the Directive provides the obligation to notify the Safety Investigation Bureau of an accident, serious accident or an incident. Immediate notification of all aforementioned occurrences will be made to the Safety Investigation Bureau verbally by the railway undertaking (infrastructure manager, carrier). Updated information about accidents and serious accidents will be duplicated and presented in writing within three working days in the format provided in the Directive. In the case of an incident, a verbal notification is still made immediately but a written report will only be presented to the Safety Investigation Bureau if the latter requests additional information. Annex of the Directive provides a relevant format for the report that is to be presented within 3 working days.

A new version of the Ministry of Economic Affairs and Communications Directive No 72 “Safety Investigation Procedures” came into force on 6 April 2014. The Directive covers the module investigation bureau’s all areas of transport. The Directive specifies the objective of a safety investigation, determines areas of a safety investigation and its coordinator, defines the start of a safety investigation and notification, formation of a safety investigation committee and its division of work, procedures for a safety investigation, raising a danger alert, the conditions and format of the safety investigation report, closing the safety investigation, principles of the proceedings of the safety recommendations and proposals and the format of the

report for presenting the results to the ESIB, reopening of the safety investigation and procedures for registration of the cases being investigated.

The formats in the annexes of the Directive are in accordance with the Railway Safety Directive 2004/49/EC annex 5 and the ERA “Guidance on Safety Recommendations in terms of Article 25 Directive 2004/49/EC”.

1.2 Role and aim

The role of the Safety Investigation Bureau is to contribute towards increasing maritime, aviation and railway safety. For this reason, its primary objective is to investigate maritime accidents, aviation accidents and incidents and railway accidents and incidents. In the process of a safety investigation they have to determine the causes and if necessary, make recommendations for increasing traffic safety. One of the tasks of the Safety Investigation Bureau is to participate in formulation of legislation related to its areas of activity, and if necessary, make recommendations for amending legislation. ESIB also has the task to participate in formulation and implementation of projects, policies, strategies and development plans related to its areas of activity, including international projects as well as participate in their preparation.

The statute has defined the following obligations for the Safety Investigation Bureau:

1) Complete all its tasks in a timely manner and to a high standard.
2) Ensure the confidentiality of the professional information pursuant to legislation.
3) Utilize any assets and resources that it has been allocated purposefully and rationally.
4) Ensure it does not violate the principle of the independence and confidentiality of the safety investigation, forward to other structural units of the Ministry information that is necessary for them to perform their tasks.

The objective of the safety investigation of railway accidents and incidents has been provided by Subsection 42 (3) of the Railways Act and Section 1 of the Minister’s Directive “Safety Investigation Procedures”, according to which the objective of the safety investigation is to determine the causes of the case being investigated in order to prevent the occurrence of such accident or incident in the future and not to appoint blame or liability.

1.3 Organisation

In Estonia the safety investigations of maritime, aviation and railway accidents are conducted by The Estonian Safety Investigation Bureau which is a structural unit of the Ministry of Economic Affairs and Communications with a specific task. The ESIB is independent in conducting safety investigations and making any decisions associated with these. The Ministry ensures the ancillary services necessary in the work of the ESIB. The ESIB's activities are in accordance to its work schedule and in cooperation with other structural units of the Ministry in accordance with the Ministry's work schedule. The Safety Investigation Bureau has its own letterhead, website and logo. Every Safety Investigation Bureau official has a certificate of employment.

The Safety Investigation Bureau has the right to

1) Access documents and information necessary for fulfilling the tasks assigned to the Safety Investigation Bureau from ministers, secretaries general and deputy secretaries general, other departments, government authorities within the jurisdiction of the Ministry and legal persons governed by private law which are subject to the Ministry's founding, membership, stockholder or shareholder rights.
2) Engage employees of other departments in resolving issues within the Safety Investigation Bureau remit.
3) Receive relevant ancillary services from the Ministry's departments.
4) Work in cooperation with other government and local authorities and legal persons governed by private law and make recommendations to form committees and working groups within its areas of activity.
5) Within limits of its competence, communicate information to other authorities and persons.
6) Make proposals for contracts required for fulfilling its tasks.
7) Get further training in order to improve the professional level of the Safety Investigation Bureau employees.
8) Receive necessary office equipment, resources and literature and technical and information support.
9) To enter into collaboration agreements with other ministries, government departments and experts.

In the course of fulfilling its main objective The Safety Investigation Bureau

1) Works in cooperation with other government departments, local government units, foundations, non-profit associations, business and consumer

organisations, businesses, private persons and respective authorities of other countries and international organisations.

2) Represents the state in the international organisations related to its areas of activity.
3) Takes part in fulfilling any duties of the Republic of Estonia pursuant to the international agreements relating to the ESIB areas of activity.
4) Prepares the draft budget for ESIB and the report on the execution of the previous year's budget.
5) Develops and implements its development plan and work schedules.
6) Monitors, analyses and assesses the situation in its areas of activity and informs relevant bodies, Ministry's departments and other authorities and businesses of its conclusions.
7) Performs tests and expert analysis on machinery, engines, equipment, its details and assemblies and other devices to assess their compliance with requirements in order to clarify the circumstances of a case under investigation.
8) Makes recommendations and takes decisions within its jurisdiction provided by law.
9) Ensures the confidentiality of information containing business and technical details and personal data if legislation does not provide that it should be published.
10) Implements measures for witness protection.
11) Performs the duties assigned by legislation as a chief or authorised processor of the database of cases investigated.
12) Preserves the items, equipment, assemblies and details in its possession that are relevant to ascertaining the causes of the case.
13) Organises information days about safety and development activities.
14) Possesses, uses and disposes of public property in its possession in cases provided by and in accordance with legislation.
15) Advises individuals in matters relating to the Safety Investigation Bureau's areas of activity.
16) Performs other tasks assigned by legislation.

The following rights have been established to define the jurisdiction of the official appointed by the Safety Investigation Bureau to conduct the safety investigation of a railway accident or incident:

1) Immediate access to the scene of the rolling stock, railway infrastructure and traffic control and signalling devices involved in an accident, serious accident or incident.
2) Restrict unauthorised access to the scene of the accident and prohibit handling, removing or destroying items from the scene of the accident.

3) Ensure the immediate inventory of all evidence and controlled removal of the wreck, rolling stock, infrastructure equipment or components for investigation or analysis.
4) Immediate access to the on-board and other recording equipment and their recordings and to subject them to their control.
5) Immediately receive into their disposal the autopsy reports of the casualties and the results of the analysis of any samples taken from the deceased.
6) Question witnesses and persons who might have important information regarding the safety investigation and demand confirmation or provision of information necessary for the safety investigation.
7) Access to all relevant information and documents independently or in cooperation with the authority conducting the preliminary criminal investigation.
8) Immediate access to the testimony of persons associated with the incident and to the analysis results of any samples taken from these persons.

At the end of 2014 four officials worked at the Safety Investigation Bureau. In addition to the director an expert was hired to investigate aviation accidents. A chief specialist who investigates marine accidents and a chief specialist who investigates railway accidents continued working for the unit.

The decision whether to launch an investigation or not is made by the Safety Investigation Bureau. A safety investigation is completed by the safety investigation report which is signed by the members of the committee or the investigator-in-charge and the director of the Safety Investigation Bureau. The report is published on the ESIB website 12 months after the occurrence at the latest. If it is not possible to publish the investigation report within this time frame, an interim report is published.

1.4 Organisational flow

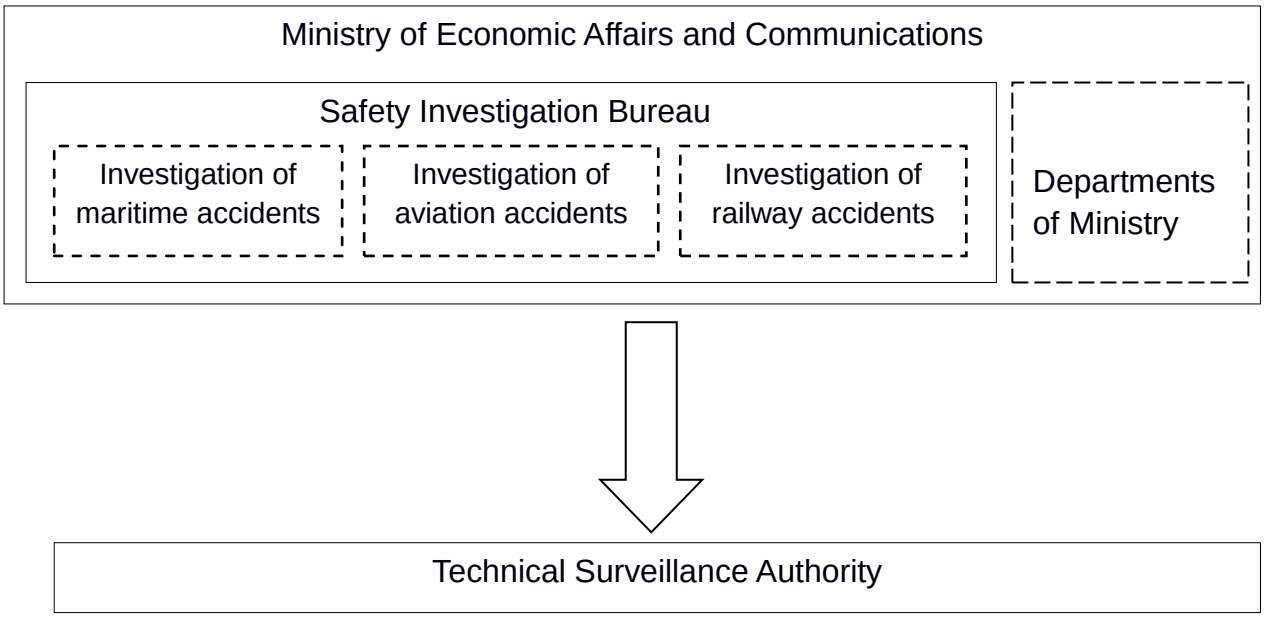


Figure 1 The Safety Investigation Bureau in the organisational structure of the Ministry

Safety investigations of aviation and railway accidents are conducted only by the Safety Investigation Bureau. The investigations of accidents by law enforcement and others authorities are not related to the safety investigations conducted by the Safety Investigation Bureau.

The Technical Surveillance Authority which performs the function of the railway safety authority in Estonia is an independent unit of the Ministry of Economic Affairs and Communications with a separate budget and management.

Railway infrastructure managers and rail operators are independent manufacturing enterprises acting as legal persons. The Ministry of Economic Affairs and Communications is a shareholder for only in the railway infrastructure manager Estonian Railways Ltd, railway undertakings AS EVR Cargo and AS Eesti Liinirongid (Elron). The state does not participate in the ownership of the rest of the infrastructure and freight companies. The relationship between the Safety Investigation Bureau and railway undertakings is regulated by legal acts and directives.

2. Investigation processes

2.1 Cases to be investigated

On 1 April of the reporting year, 2014, the amendments to the “Railways Act“ came into force and with these a classification of occurrences affecting railway safety identical to the Railway Safety Directive 2004/49/EC was established. The previous classification applied in accordance with the Directive and the former version of the Railways Act was replaced by classifying occurrences as accidents, serious accidents and incidents.

The “Railways Act“ provides the Safety Investigation Bureau’s obligation to investigate serious accidents. The Safety Investigation Bureau has the legal right to investigate accidents or incidents if the circumstances that arose or similar circumstances might have caused a serious accident, including significant physical harm to five or more people, at least one death, also technical failure in the subsystem of the Trans-European conventional or high-speed rail system or interoperability constituent.

When making the decision the Safety Investigation Bureau takes into account the severity of the case, including from the pan-European perspective and other important circumstances. The Safety Investigation Bureau considers the applications submitted by a safety investigation body of another European Union member state, the Technical Surveillance Authority and infrastructure managers and railway undertakings in its assessment of an accident or incident.

The above shows that the Railways Act of 01.04.2015 uses the same wording and terminology as Article 19 of the Safety Directive and is also in accordance with Article 21.

2.2 Institutions involved in investigations

Principles of involvement in safety investigations are specified in the Railways Act. Institutions involved in the investigation are obliged to provide assistance to the Safety Investigation Bureau within the limits of their competence. Railway undertakings and third persons are obliged to present any relevant information in their possession if requested by the Safety Investigation Bureau. Third persons may

be natural or legal persons. The Safety Investigation Bureau has the right to involve experts and set up committees to determine circumstances requiring specialist knowledge. Experts or committees involved in the safety investigation take part in the safety investigation under the guidance and supervision of the official conducting the safety investigation.

The Directive “Safety Investigation Processes“ provides the function of the investigator-in-charge as organiser of cooperation and information exchange between the various individuals, authorities, committee members, experts and advisors.

On the principle of the legal basis described in the two previous paragraphs safety investigation practice has evolved where any institutions have been involved in the interests of the safety investigation in order to pass information to the investigator-in-charge. A few specialists and experts from various institutions have been included short-term in the investigation. Integration of fact-based information with the rest of the investigation material has always been the task of the investigator-in-charge.

More frequently, the Technical Surveillance Authority, the police and the Rescue Board have been sources of information. Information relating to the case from these institutions has been a good reference point and for relating with information obtained from railway infrastructure managers and railway undertakings.

In order to determine the nature and extent of injuries the ESIB has worked in cooperation with hospitals, to determine damage to private property, with insurance companies, to specify weather conditions, the meteorological service and in other circumstances with local authorities, government departments, other authorities, businesses and organisations.

None of the institutions have participated in the analysis of the data or in the processes of developing conclusions or recommendations. Neither has the investigator-in-charge or a member of the investigation committee been part of a police criminal investigation, internal investigation of an infrastructure manager or the supervision or misdemeanour proceedings of the Technical Surveillance Authority.

Authorities and institutions as well as private individuals who have become involved in a case or developed a role in the implementation of the recommendations made as a result of the safety investigation have had an opportunity to express their opinions and understanding of the safety investigation.

The safety investigation process does not involve a restricted list of institutions that information should be obtained from regardless of the nature of the case. Whether one or another institution is approached by the investigator-in-charge has depended on the requirement for additional information once connections have been established when processing the primary and subsequent information. The

investigator-in-charge assesses each case individually and decides the help of which institutions is required and which to cooperate with.

2.3 Investigation process and approach of the Investigation Body

The Safety Investigation Bureau has made public the number of the 24-hour telephone service that railway infrastructure managers and possessors and railway undertakings call immediately after an accident, a serious accident or an incident has taken place to make a notification. A written, updated notification of an accident or a serious accident is made in an agreed format within three working days. They will make a written notification of an incident in an agreed format within the same timeframe if the Safety Investigation Bureau requests this. Written documents and materials will be stored within a digital document management system.

The verbal notification will be received by one of the officials of the Safety Investigation Bureau which often is the official conducting safety investigations of railway accidents (investigator-in-charge). Upon receiving the initial notification the Safety Investigation Bureau will start the case proceedings. The investigator-in-charge will analyse and clarify the initially known circumstances of the case. If necessary he will turn once again to the individual who made the notification and will make a conclusion whether the characteristics of the case necessitate his attendance of the scene or not. Based on the verbal information the investigator-in-charge forwards his observations and opinions and makes his recommendations regarding launching or not launching an investigation or the requirement for additional information about the case in writing to the Director of the Safety Investigation Bureau. In the case of a serious accident the investigator-in-charge notifies the Director of the Safety Investigation Bureau immediately by telephone. The Director of the Safety Investigation Bureau maintains records of notifications received and if necessary, requests additional information from the investigator-in-charge. The Director has the right to change the position of the investigator-in-charge as to whether begin or not begin a safety investigation of an occurrence.

During the initial proceedings the investigator-in-charge will gather additional information about the occurrence from the parties concerned and if necessary, the safety authority. Pursuant to the Railway Safety Directive 2004/49/EC and Subsection 42 (8) of the Railways Act, the Safety Investigation Bureau must make a decision whether or not to begin an investigation maximum one week after receiving notification of an occurrence. The Safety Investigation Bureau shall notify the European Railway Agency within a week of the decision to begin an investigation. Usually the decision about a safety investigation is made before a week has passed.

The investigator-in-charge notifies the European Railway Agency by entering the relevant information to the agency database ERAIL.

The Safety Investigation Bureau has developed a unified multi-modal approach to the organisation of safety investigations of maritime accidents, aviation accidents and railway accidents which has been provided by the Ministry Directive “Safety Investigation Procedures”. The latter is supplemented and specified by the “Safety Investigation Manual” which the bureau’s officials have drawn up for themselves. Usually the investigator-in-charge of the specific area of transport leads the safety investigation and is responsible for the success of the safety investigation. The investigator-in-charge has to conduct the proceedings at the scene of the accident in a shortest possible time so that the railway infrastructure manager can restore the infrastructure and open it to the train service as quickly as possible. Once the decision has been taken to begin the safety investigation the investigator-in-charge informs the relevant parties of the decision, drafts an investigation plan and sets out to fulfil it. The investigator-in-charge coordinates the activities necessary, gathering, storage and analysis of data and evidence and the contracting of experts.

During the safety investigation the investigator-in-charge uses various means of communication in order to obtain information. He communicates with legal as well as natural persons. The latter are usually the victims or their families. In order to ascertain the circumstances of the case to be investigated the investigator-in-charge works in cooperation with state and local government authorities, businesses and organisations. Most important information is recorded. Upon receiving notification of the investigation the railway undertaking has the obligation to retain all evidence and details of items, technical circuits, documents, recordings of the data recording equipment and other information which might be important in determining the causes of the occurrence. If requested by the investigator-in-charge, these must be presented to him. Information about the safety investigation is generally issued by the investigator-in-charge, or, with prior agreement, a member of the investigation committee or the Director of the Safety Investigation Bureau. If circumstances indicating persistent high risk become evident, the organiser of the safety investigation makes a safety alert on behalf of the Safety Investigation Bureau.

The safety investigation is conducted as publicly as possible to ensure that all parties and individuals concerned are heard. Depending on the characteristics of the case the investigator-in-charge turns to the businesses concerned, the safety investigation authority of another member state, victims, their families, owners of any damaged property, manufacturers, rescue authority, insurance company and the representatives of the employees and the passengers to find out their view of the occurrence and an opportunity to present their attitude, position and opinions on the proceedings of the safety investigation and its developments. The investigator-in-charge discloses the details and developments of the safety investigation to those concerned to the extent where it does not jeopardize the basic requirement which is

to establish the causes of the case and to develop recommendations to increase safety. During and after the safety investigation information that has restricted access pursuant to cases specified by The Public Information Act is not disclosed.

The investigator-in-charge is responsible for ensuring the timely completion of the investigation report or, if the safety investigation lasts more than a year, an interim report that complies with the nationally and internationally agreed format. So far, all safety investigations have been completed within the prescribed one year time limit.

If necessary, the Director of the Safety Investigation Bureau may form a safety investigation committee, specialists of safety investigation or a narrower field of expertise will be appointed as members of the committee. It is not allowed to appoint any of the following as members of the committee: representative or employee of the manufacturer, operator or insurer connected to the accident, representative of the casualties or the victims or any other person who has conflicting interests with the safety investigation; also a person who is involved in the proceedings to establish blame or responsibility for the accident. The Safety Investigation Bureau will appoint the investigator-in-charge or the Director of the Safety Investigation Bureau as the chairman of the committee. The Safety Investigation Bureau will also appoint the members of the committee and assign their duties. The meetings of the committee will be called by the chairman. All meetings are recorded in the minutes which record the progress of the safety investigation, questions or versions which have arisen, decisions taken, instructions given by the chairman and differences of opinion between the members of the committee. The minutes of the meeting are signed by all members of the committee who took part in the meeting. A designated representative of a foreign safety authority has the right to participate in the work of the committee.

3. Safety Investigations

3.1 Overview of completed investigations

During the year in question there was a safety investigation of one serious accident conducted by the Safety Investigation Bureau which was launched and completed in the same year. As a result of a heavy lorry colliding into the side of a train travelling at full speed the driver of the lorry was killed as well as one passenger and the train was derailed. The Safety Investigation Bureau classified this case as a serious accident and conducted a mandatory safety investigation on the basis of the Railways Act.

The investigator-in-charge assessed the damage in this case up to 2 million euros, 90% of which was damage to the rolling stock. It must also be noted that as a result of the possible repairs to the rolling stock it will not be possible to achieve its prescribed operational period of 30 years. The damaged rolling stock had been operational for a few months only.

Summary of the safety investigations completed in 2014

Table 1

Type of case investigated	Number of cases	Casualties		Estimated losses (EUR)	Trend compared to last year
		Deaths	Seriously injured		
Level crossing accident	1	2	-	< 2000000	same

Both in 2013 and 2014 the Safety Investigation Bureau conducted a safety investigation of one accident that resulted in a fatality, therefore the number of cases investigated over two years remained unchanged. Since 2004 when railway safety investigations started to be carried out in Estonia there have been 2 serious railway accidents, first of which took place on 23 December 2010 and the other on 16 April of the year in question. With few fluctuating parameters in the cases investigated the changes in the trend can be considered incidental.

3.2 Safety investigations completed and commenced in 2014

During the reporting year there were no completions of safety investigations commenced in 2013.

During the year in question, a safety investigation was conducted of one level crossing accident that resulted in derailment of rolling stock and two fatalities. The safety investigation of the serious accident was commenced pursuant to Article 19 of the Railway Safety Directive 2004/49/EC which provides that an investigative body of a member state conducts an investigation of a serious railway accident the purpose of which is the possible improvement of railway safety and avoidance of accidents.

Nationally, pursuant to Subsection 40 (3) of the Railways Act the case investigated is a serious accident. Pursuant to Subsection 42 (4) of the Act the Safety Investigation Bureau is obliged to conduct a safety investigation in the case of a serious accident.

Safety investigations completed in 2014

Table 2

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis	Completed (date)
16.04.2014	Collision of a truck and a passenger train on the Raasiku level crossing km 134,582	i	27.10.2014

Basis for investigation: i = pursuant to the safety directive

The following table shows that there were no safety investigations launched in 2014 which would have continued the following year.

Safety investigations commenced in 2014

Table 3

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis
-	-	i

Basis for investigation: i = pursuant to the safety directive

3.3 Summary of the safety investigations completed in 2014

Raasiku 16.04.2014

On Wednesday 16 April 2014 at 15.19 there was a collision of a truck and an AS Eesti Liinirongid (Elron) passenger train resulting in a death of the truck driver and one passenger on the second track of an automatically set (active) three-track level crossing (km 134,582) which is situated on the rural territory of the Raasiku station managed by Estonian Railways Ltd. Two carriages and the engine unit of the diesel passenger train derailed.

Photo 1. Diesel train Stadler Flirt DMU 2428 after the accident.

The train formation Stadler Flirt DMU 2428 which was travelling as a passenger train on the Tallinn – Tartu route consisted of four carriages and an engine unit and was on its way non-stop through the Raasiku station when a vehicle MAN TGA01 with a semitrailer BENALU SPT34C collided with the train on the side of carriage number 3.

The train was approaching the level crossing at the permitted speed of 115,1 km/h when the vehicle collided into the side of the train while braking at 60 km/h. The locomotive driver driving the train was alone in the driver's cab as was the driver of the vehicle. The locomotive driver observed all regulations and signals. As a result of the collision the automatic system of the train performed an emergency stop and its braking distance was 257 m.

The railway vehicle is equipped with a B-class ALSN-type control-command and signalling system VEPS. The automatic block with traffic lights is switched into a central dispatch system NEMAN.

The MAN truck was approaching the level crossing, which had the red prohibiting traffic lights flashing, at a speed of 90 km/h which is higher than the permitted speed of 70 km/h and started braking immediately before the collision. The vehicle driver had not responded adequately to the requirements positioned on the approach to the level crossing by means of various traffic control devices.

There were 129 passengers and one customer service operator on the train. In addition to the two fatalities, 12 other passengers sustained minor injuries. Two carriages and the engine unit of the diesel train as well as railway infrastructure suffered damages. The truck became unfit for use, 30 private individuals claimed damages from the insurer.

In order to perform repairs, train traffic was completely suspended in two stages for a total time of over 10 hours and partly suspended for approx. 37 hours. 33 passenger trains were cancelled, in addition passenger trains were delayed for a combined time of approx. 14,5 hours and freight trains over 277 hours.

The safety investigation report made altogether 4 recommendations to various addressees for increasing railway traffic safety.

3.4 Comments of investigations

The time from the moment the accident took place to the signing of the investigation report of the accident was a little over 6 months in the reporting year. This is completely reasonable since the safety investigation report of the previous serious accident took just under 11 months to complete. Safety investigations of cases with less severe consequences have been completed within six months. In the reporting year there were no safety investigations launched which were subsequently suspended.

The accident on which the investigation report was compiled in 2014 took place on a three-track railway level crossing, two of which were main tracks passing through the station. The previous railway accident resulting in a death that was investigated by the Safety Investigation Bureau took place a year before on the same level crossing. The number of fatalities in the cases investigated over the past five years has been between 0 and 3. There is no tendency for change in the number of fatalities. There were no serious injuries in this time period. The case investigated in the reporting year had the largest number of minor injuries.

Total number of deaths and injuries

Table 4

Year	Deaths	Injured in road vehicle / of them seriously	Injured in rolling stock / of them seriously
2010	3	1/-	2/-
2011	1	-	1/-
2012	-	-	-
2013	1	-	-
2014	2	-	12/-
Total	7	1/-	15/-

When comparing the personalised breakdown of the fatalities over the past five years, it must be noted that only in 2014 a passenger who had been on a passenger train perished and only the investigation report completed in 2011 identified railway personnel, i.e. the driver of a freight train as a fatality. The remainder of the fatalities have been third persons who were in a road vehicle which collided with a train.

Among the injuries the highest number was in the case investigated in the reporting year when 12 people sustained minor bodily injuries. Personnel have sustained minor injuries on two occasions; both were members of the locomotive crew. There has been one case where a person in a car has sustained minor injuries. There have been no serious injuries in the accidents investigated over the past five years. There were no injuries at all in the cases investigated in 2012 and 2013.

The breakdown of injuries and deaths over the past five years is presented in the following table:

Breakdown of the injured and deaths

Table 5

Breakdown by type of persons		Year, number				
		2010	2011	2012	2013	2014
Deaths	Passengers	-	-	-	-	1
	Staff	-	1	-	-	-
	Third parties	3	-	-	1	1
	Total	3	3	-	1	2
Injured	Passengers	1	-	-	-	12
	Staff	1	1	-	-	-
	Third parties	1	-	-	-	-
	Total	3	3	-	-	12

3.5 Accidents and incidents investigated during the past five years (2010 – 2014)

During the past five years 6 safety investigations have been conducted. Of these, 4 were safety investigations of accidents and 2 of serious accidents. Of the serious accidents, one was a collision of trains and the other, a level crossing accident. Since the safety investigations began in the spring of 2004 there have only been 2 serious accidents in Estonia, both of which are within the described five year period.

During a year, usually several different accidents and incidents take place in Estonia but their consequences and characteristics have been such that there was no reason, requirement of purpose for a safety investigation. Pursuant to the Railways Safety Directive there is a direct obligation to investigate only serious accidents. The criteria to begin an investigation of the four accidents were defined in the Railways Act and in Article 21 of the Safety Directive.

Breakdown of investigated cases by years

Table 6

Title of the case		Year, number of investigations					
		2010	2011	2012	2013	2014	Total
Art 19.1,2	Train collision	-	1	-	-	-	1
	Train collision with an obstacle	-	-	-	-	-	-
	Train derailment	-	-	-	-	-	-

	Level crossing accident	-	-	-	-	1	1
	Accident to person caused by RS in motion	-	-	-	-	-	-
	Fire in rolling stock	-	-	-	-	-	-
	Accident involving dangerous goods	-	-	-	-	-	-
Art 21.6	Train collision	-	-	-	-	-	-
	Train collision with an obstacle	-	-	-	-	-	-
	Train derailment	-	-	-	-	-	-
	Level crossing accident	3	-	-	1	-	4
	Accident to person caused by RS in motion	-	-	-	-	-	-
	Fire in rolling stock	-	-	-	-	-	-
	Accident involving dangerous goods	-	-	-	-	-	-
Incident		-	-	-	-	-	-
Total		3	1	-	1	1	6

4. Recommendations

4.1 Short review and presentation of recommendations

Throughout the years, the railway accident investigation reports have contained various recommendations for improvement of railway safety. The recommendations have been developed depending on the characteristics of a specific case, traffic conditions and circumstances on the scene of the occurrence.

In 2014 four recommendations were made, the classification of these along with earlier ones is shown in the following table.

Recommendations for improvement of safety

Table 7

Field of activity of recommendation	Year, number of recommendations				
	2010	2011	2012	2013	2014
Maintenance and care of railway infrastructure	-	-	-	-	-
Care, maintenance and managing of rolling stock	-	1	-	-	-
Organisation of supervision	1	4	-	-	-
Road traffic management, road traffic control devices	3	-	-	1	1
Winter maintenance of roads	-	-	-	-	-
Dissemination of information concerning traffic, training	1	-	-	-	1
Amendments to legal acts and regulating instructions	1	4	-	-	-
Operation of traffic lights, railway traffic control	-	-	-	1	2
Organisation of operation of railway	-	1	-	-	-

communication devices					
Use of information recording equipment	-	2	-	-	-
Professional qualifications of railwaymen	-	3	-	-	-
Other arrangements	8	3	-	-	-
Total	14	18	-	2	4

Pursuant to Estonian Railways Act, the Technical Surveillance Authority as well as all authorities, enterprises and organisations who have been subject to the Safety Investigation Bureau's recommendations, have to submit by 1 April an annual report of the measures implemented or planned based on the recommendations made in the previous year report. This requirement is in force as of 1 April 2014. Previously, the addressees had to present only a report on the proceedings of the recommendations made to them in the previous year. Consequently, the recipients of recommendations submit an annual report on the status of the proceedings until these have been completed.

The following table reflects the proceedings of the recommendations based on the reports submitted as of 1 April. There was also a supplementary report received for the proceedings of the recommendations from 2013 the results of which have also been included in the following table.

Implementation of recommendations

Table 8

Recommendations issued		**Recommendation implementation status**							
		Implemented		**In progress**		**Not to be implemented**		**Implementation suspended**	
Year	**No**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
2010	14	5	36,00	9	64,00	-	-	-	-
2011	18	8	44,44	8	44,44	2	11,12	-	-
2012	-	-	-	-	-	-	-	-	-
2013	2	2	100	-	-	-	-	-	-
2014	4	3	75,00	1	25,00	-	-	-	-
Total	38	18	47,37	18	47,37	2	5,26	-	-

4.2 Recommendations made in 2014

Development of the recommendations for the year was based on the comparison of the causes and connections of the circumstances regulating the activities of the driver of the railway vehicle as well as the road user. The occurrence was caused by the actions of the car driver and for this reason, the recommendations were mainly aimed at influencing the road users' alertness.

The following recommendation was made to Estonian Railways Ltd as the possessor of railway infrastructure:

- Develop a position about a location for a whistle signalling device on the territory of the station for trains approaching the Raasiku level crossing from the direction of Tallinn.

The following recommendation was made to the Estonian Road Administration as the road traffic organiser:

- Develop a position about improving road vehicle drivers' perception of a dangerous situation in the traffic environment on the approach to the Raasiku level crossing that would contribute to the driver opting for a rational and safe manner of driving and observing all requirements set by the traffic control devices.

The following recommendation was made to the non-profit association Operation Lifesaver Estonia as the organisation advocating railway traffic safety:

- Develop educational materials for addressing railway safety as part of driving instruction.

The following recommendation was made to the Technical Surveillance Authority as the safety authority:

- Develop general positions and if necessary plan measures for implementation of the positions by installing traffic signals on the side road joining the road leading to the level crossing immediately before the level crossing.

Annexes

Annex 1

Proceeding of recommendations – Raasiku, 16.04.2014

Date and time	16.04.2014 at 15:19		
Location	Estonian Railways Ltd infrastructure, Raasiku station, II main track, rural area, km 134,582.		
Type of occurrence	Level crossing accident, serious accident		
Train type and number	Passenger train No 0290		
Road vehicle	MAN truck with BENALU trailer		
		On the train	In the road vehicle
Number of persons (on board the train and vehicle)	Crew	2	1
	Passengers	129	-
Fatally injured	Crew	-	1
	Passengers	1	-
Seriously injured	Crew	-	-
	Passengers	-	-
Slightly injured	Crew	-	-
	Passengers	12	-
Damages to rolling stock	Damage to the roof, side wall, frame, bogie and passenger compartment of A- and D- carriages. Minor damage to the engine unit and M- and C-carriages.		
Damages to track equipment	15 m of track, 421 concrete sleepers, 71 tons of aggregate, 1 point, 257 m of plant for transforming and carrying electric power for train haulage, 4 throttle transformers and 1 electric drive of the communication		

	system.	
Other damages	MAN TGA01 truck and BENALU SPT34C trailer were deformed and became wreckage.	
Summary: Ignoring the prohibiting traffic lights on a level crossing a MAN truck drove into the side of the third carriage of 4-carriage Stadler Flirt DMU 2428 diesel passenger train.		
Final report issued	27.10.2014	
Recommendation No 01	The locomotive driver is obliged to give a signal before the level crossing by blowing the whistle but there is no warning sign, therefore choosing the location for giving the audible warning is down to the locomotive driver.	
	Develop a position about a location for a whistle signalling device on the territory of the station for trains approaching the Raasiku level crossing from the direction of Tallinn.	
Date	Status	Explanation
Summer 2014	Accepted and implemented	Estonian Railways Ltd installed an additional warning sign for whistle signalling 584 m before the railway level crossing on the approach from Tallinn.
Recommendation No 02	There has been an identical accident on the Raasiku level crossing caused by a road user two years running. It would be appropriate to assess the traffic environment on the approach to the level crossing as a whole.	
	Develop a position about improving car drivers' perception of a dangerous situation in the traffic environment on the approach to the Raasiku level crossing that would contribute to the driver opting for a rational and safe manner of driving and observing all requirements set by the traffic control devices.	
Date	Status	Explanation
24.04.2014 11.07.2014	Accepted and implemented	50 km/h speed limit has been introduced before the warning signs on the section of the road approaching the level crossing from both directions. After the barriers had been installed the warning sign 112 "Level crossing without

Mai 2015		a barrier“ was replaced by signs 111 “Level crossing with a barrier“. Road surface markings 979a “Rumble device“
Recommendation No 03	The truck driver was competent and very knowledgeable of the Traffic Act but did not adequately estimate the dangers of the railway when electing a manner of driving.	
	Develop educational materials for addressing railway safety as part of driving instruction.	
Date	Status	Explanation
01.04.2015	Proceedings continue	Educational materials to the driving schools have been compiled and forwarded to the specialists of the Road Administration for suggestions on amendments and additions.
Recommendation No 04	Before the level crossing there are shared traffic lights for both the road crossing the level crossing and the side road joining the road. The traffic lights are visible but the question is if they are sufficiently visible.	
	Develop common positions for installing traffic signals immediately before the level crossing on the road joining to the road crossing the level crossing and if necessary, plan measures for their implementation.	
Date	Status	Explanation
26.03.2015	Accepted and implemented	Pursuant to Annex 4 Subsection 9 (8) of the rules for technical use of railway the level crossing traffic lights have to be visible on all roads leading to the level crossing. The Technical Surveillance Authority checks this requirement in the proceedings for the construction licence and permits of use of level crossing traffic light systems. The compliance with this requirement on existing level crossings is also checked by the annual level crossing committees.

Annex 2

Proceeding of recommendations – Raasiku, 23.08.2013

Date and time	23.08.2013 at 14:30		
Location	Estonian Railways Ltd infrastructure, Raasiku station, II main track, rural area, km 134,582.		
Type of occurrence	Railway level crossing accident		
Train type and number	Express train No 0012		
Road vehicle	Car Nissan Micra		
		On the train	In the road vehicle
Number of persons (on board the train and vehicle)	Crew	4	1
	Passengers	150	-
Fatally injured	Crew	-	1
	Passengers	-	-
Seriously injured	Crew	-	-
	Passengers	-	-
Slightly injured	Crew	-	-
	Passengers	-	-
Damages to rolling stock	The snow-guard and the right-hand corner of the frame of the carriage were squashed, superficial colour damage, broken compressed air pipe.		
Damages to track equipment	One joint sleeve and cables broken.		
Other damages	The chassis and the outer parts of		

		the car completely deformed, the car is unfit for use.
Summary: Ignoring the prohibiting traffic lights, a Nissan Micra car drove onto the level crossing in front of a five-carriage passenger train.		
Investigation report issued		10.12.2013
Recommendation No 01	The traffic lights used on the Raasiku level crossing are incandescent lamps, the irradiance of which is smaller than that of LED lamps and due to this they are harder to see. The legislator has given the company until 2018 to replace the traffic lights.	
	Consider replacing the traffic lights on the Raasiku level crossing with LED traffic lights as a matter of priority.	
Date	Status	Explanation
10.07.2014	Accepted and implemented	The automatic signalling lights of the Raasiku level crossing have been replaced with new automatic signalling lights.
Recommendation No 2	According to regulations, Raasiku level crossing does not require barriers. There is a planned speed increase in train transport and it will be appropriate for an infrastructure with two main tracks to install a barrier as well as replacing the traffic lights as part of the reconstruction of the level crossing.	
	Find a way to equip the Raasiku level crossing with barriers as part of the modernisation process.	
Date	Status	Explanation
10.07.2014	Accepted and implemented	Raasiku level crossing has been equipped with barriers.