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Ministry of Economic Affairs and Communications

Emergency Management Department

Unit for Investigation of Railway Accidents

Annual report of railway accidents investigated in 2010

Estonia

Tallinn 2011

Preface

In Estonia the Unit for Investigation of Railway Accidents was set up in 2004 and it is an integral part of the Ministry of Economic Affairs and Communications. The function of the Unit for Investigation is to investigate all serious railway accidents pursuant to the Railway Safety Directive 2004/49/EC and also accidents and incidents pursuant to section 42 of the Estonian Railways Act. In spring 2010, the Ministry of Economic Affairs and Communications Directive “Procedures for Investigating Railway Accidents, Railway Incidents and Collisions” entered into force. Since then, investigations into accidents and preparation of the annual report have been conducted pursuant to the requirements established in this directive. The directive conforms to the European Union laws.

This report contains a summary of all accidents investigated by the Unit for Investigation, which are three accidents that occurred on level crossings. In all these cases a person died. None of the investigations concluded during this year qualifies as a serious accident pursuant to the Safety Directive. A collision between two rolling stocks occurred at the end of the year, investigation of which started in 2010 but will continue in 2011.

In classification of investigated cases this report is proceeding from the categories defined in the Safety Directive which creates a common understanding of the cases investigated in the European Union.

During the year, 14 recommendations were made to six addressees for improvement of railway traffic safety. All parties concerned presented reports on the proceedings of the recommendations which are reflected here. By the time of the presentation of this report 36% of recommendations had been accepted and implemented.

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1. Introduction to the Investigation Body

1.1 Legal basis

Organisation of safety investigations into railway accidents and incidents in the Republic of Estonia is carried out pursuant to the provisions of the Railway Safety Directive 2004/49/EC of the European Parliament and Council. The requirements of the Directive were applied to the Railways Act and they entered into force on 2 March 2007.

For the purposes of investigating railway accidents or railway incidents the Ministry of Economic Affairs and Communications has established a structural unit (unit for investigation) which is independent in its decisions made in investigations. Independence of the investigation is in accordance with the requirements of Article 21 of the European Parliament and Council Directive 2004/49/EC on Railway Safety.

The Unit for Investigation makes a decision on the commencement of the investigation after determining the severity of the case, including approaching the severity from the pan-European perspective. Before commencing the investigation the Unit for Investigation also considers other important facts in its decision-making, consults the Technical Surveillance Authority and the RU. In addition to the right to selective investigating pursuant to established procedures the Unit for Investigation is obliged to investigate accidents in the first degree according to the Railways Act which include serious accidents according to the Directive as well as accidents which lead to the necessity to make amendments to railway safety regulations or changes in ensuring railway safety.

The activities of the Unit for Investigation of Railway Accidents are regulated by subsection 41 (5) and sections 42 and 43 of the Railways Act.

Investigation of cases is conducted pursuant to the Ministry of Economic Affairs and Communications Directive No 24 "Procedures for Investigating Railway Accidents, Railway Incidents and Collisions" of 14 April 2010.

According to subsection 43 (4) of the Railways Act, the Unit for Investigation has the obligation to publish an overview of implementation of recommendations made in the investigation reports of railway accidents and incidents of the previous year. The addressees of all recommendations submit a report by 1 April of the following year of measures implemented or planned which are based on the recommendations. Format for the report has been established in Annex 2 of the Minister's Directive "Procedures for Investigating Railway Accidents, Railway Incidents and Collisions".

1.2 Role and aim

Pursuant to Subsection 42 (3) of the Railways Act, the main objective and purpose of the Unit for Investigation of Railway Accidents is to identify the causes of a railway accident or incident and collision, if required, in order to prevent the re-occurrence of such accidents, incidents or collisions in the future. The objective of the investigation is not to determine anyone's guilt or responsibility.

Depending on the circumstances of the case to be investigated, subsection 2 (2) of the Minister of Economic Affairs and Communications Directive regarding the procedures for investigating railway accidents and incidents stipulates whether an investigator-in-charge or an investigation committee appointed by the Minister will conduct the investigation. The Unit for Investigation has the right to make proposals to the Minister of Economic Affairs and Communications for setting up investigation committees and involve experts in their investigations. Members of the Unit for Investigation, investigation committee or experts have the right of access to the scene of the case, all relevant information and documents. The institutions involved in investigation are obligated to give assistance, within their competence, to the Unit for Investigation, members of the investigation committee or experts.

To achieve the objective the investigator-in-charge or the investigation committee will, if necessary, work in cooperation with central and local government institutions, the RU, IM and other persons in order to utilise information and materials at their disposal in the investigation process.

The objective of the investigation has been achieved when the required final document – investigation report has been compiled based on the information collected and analysed. Persons conducting the investigation are responsible for the conduction of full investigation and its quality, for objectivity and validity of the conclusions as well as the quality of the format of the investigation report. When compiling the investigation report, the structure of investigation reports which has been provided in Annex 1 of the Minister of Economic Affairs and Communications Directive establishing the procedures for investigating railway accidents must be adhered to as much as possible. The structure provided in Annex 1 of the Directive is in accordance with the investigation report templates provided in Annex V of the Safety Directive.

1.3 Organisation

The Unit for Investigation of Railway Accidents is a structural unit at the Ministry of Economic Affairs and Communications set up by the Government of the Republic with the purpose of organising investigations into railway accidents or railway incidents. The Unit for Investigation of Railway Accidents fulfils the obligations of a permanent body in a Member State for investigating accidents and incidents pursuant to Article 21 of the Railway Safety

Directive. In order to set up the Unit for Investigation of Railway Accidents an executive officer has been employed in the Emergency Management Department to perform the tasks of an investigator-in-charge in the investigation process. The executive officer who is involved with the activities of the Unit for Investigation examines the initial circumstances of the railway accidents and incidents and evaluates them from the point of view of feasibility of commencement of investigation, makes decisions concerning commencement of investigation, organises investigation and investigates cases, represents the Unit for Investigation, develops recommendations and measures for ensuring railway safety, reviews international normative documents when required, and makes proposals for amendments to Estonian legal acts.

The executive officer dealing with the investigations of railway accidents is subordinate to the Head of the Emergency Management Department.

In order to make the decision of commencement of investigation the Unit for Investigation consults the national safety authority, the railway infrastructure undertaking and rail transport undertaking. The Unit for Investigation has the right to involve experts in their investigation, commission expert assessments, work in cooperation with law enforcement and other authorities. The Unit for Investigation has the right to access any information regarding the case from all legal and private persons. The investigator-in-charge or the investigation committee are independent in their decisions regarding the investigation.

The investigation of a case is completed by signing the investigation report. A signed investigation report is the result of the investigation performed by the investigator-in-charge or the investigation committee and does not need to be approved by another official or state authority. The investigation report is considered to be public information and is published on the Ministry website.

The Emergency Management Department has 4 employees. The Department is lead by the Head of the Department who, in cooperation with a subordinate adviser, works towards addressing problems of risk analysis, emergency and crisis regulation and development of cooperation with military and civil agencies. Investigations of aircraft accidents are conducted by an executive officer who works under the Head of Department but the investigations of railway accidents are conducted by another executive officer working under the Head of Department. Each member of the Department works independently according to their specific field.

All necessary running costs of the Emergency Management Department are covered from the budget of the Ministry of Economic Affairs and Communications. The Unit for Investigation of Railway Accidents does not have its own budget.

1.4 Organisational flow

In Estonia the Ministry of Economic Affairs and Communications performs the duties of a ministry of transport. The Emergency Management Department is one of the functional departments of the Ministry. Politically, the Ministry is lead by the Minister and organisationally, the Secretary General. Departmental Deputy Secretaries General or Heads of Departments are subordinated to the Secretary General in charge of the administration of the Ministry.

The Emergency Management Department is reports directly to the Secretary General of the Ministry.

The Road and Railways Department is a functional part of the Ministry and is subordinated to the Secretary General via the Deputy Secretary General for Transport. The main objective of the Department in the railway field is participating in the development of improvement plans, ensuring their implementation and preparing draft legislation for the field.

The function of the national safety authority is performed by The Technical Surveillance Authority which is a separate state authority under the Ministry. The Technical Surveillance Authority has a separate budget.

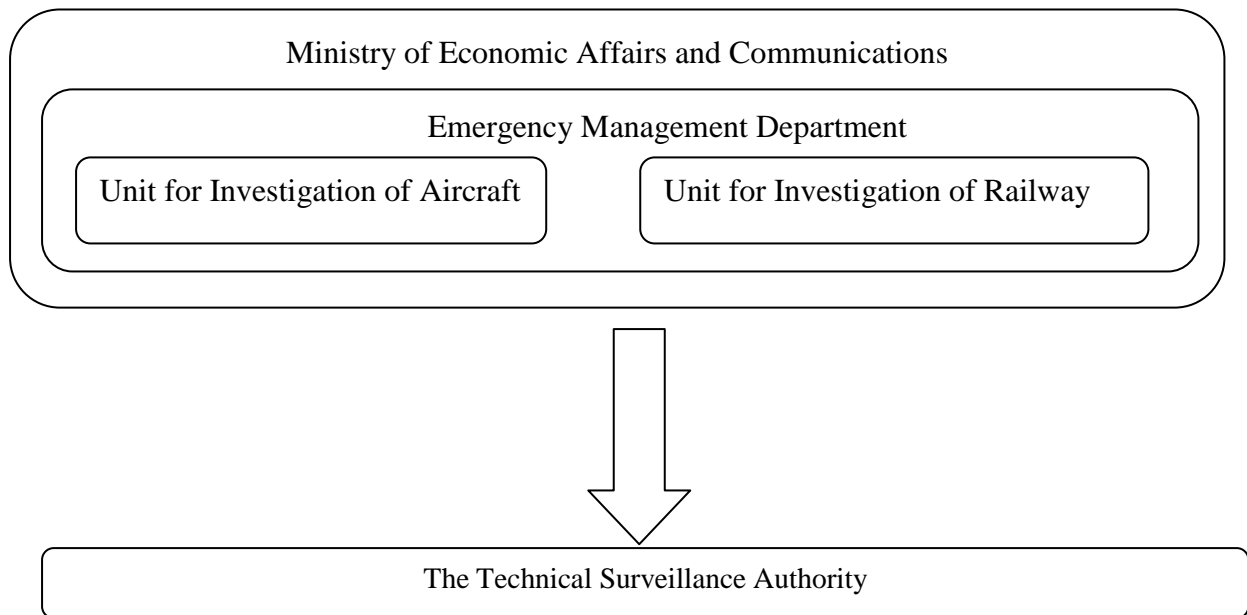


Figure 1. Investigation units and the safety authority in the organisational structure of the Ministry.

Railway infrastructure managements and rail transport undertakings are independent legal persons. The Technical Surveillance Authority exercises state supervision over them.

2. Investigation process

2.1 Cases to be investigated

Following an accident The Unit for Investigation will give an evaluation to the accident. Accidents are subject to an investigation if at least one of the following consequences has occurred:

- 1) extensive fire;
- 2) significant pollution of environment;
- 3) damage to assets or environment, if the damages resulting from the accident, assessed by the Unit for Investigation, are at least 31.3 million EEK (ca 2 million euros);
- 4) loss of one or several lives (except in cases where a rail vehicle runs down a person on the railway and there are no other consequences);
- 5) physical harm to five or more people
- 6) or interruption of railway traffic for more than 12 hours.

Based on the initial information regarding the accident the Unit for Investigation is also obliged to investigate railway traffic accidents that lead to amendments to railway safety regulations or changes in ensuring railway safety. The Unit for Investigation has the right to conduct an investigation of a railway accident, incident or collision if the circumstances which occurred or circumstances similar to these could have caused an accident with aforementioned consequences, including in a case of component failure in Trans-European conventional or high-speed rail system.

2.2 Institutions involved in investigations

The Railways Act and the Directive regarding the procedures for investigations of railway accidents provide that the investigation shall be conducted by the investigator-in-charge or the investigation committee. The investigator-in-charge or the investigation committee are responsible for the conduction of full investigation.

Involvement of experts, necessity for and forms of cooperation with other institutions will be decided by the Unit for Investigation or the investigation committee in the course of the investigation.

According to set practice it has been necessary to work in cooperation with various state institutions. During the course of the investigation the investigator-in-charge has been able to

exercise his right to gain information from various sources. When cooperating with police investigators, neither side has intervened in the other's work. Safety investigation has retained independence while cooperating with other institutions. Materials available to the police have been used in the course of investigations of railway accidents. Other state institutions have been used as sources of information, e.g. Safety Authority, Emergency Services, local governments and others.

All investigations have been conducted on the initiative and decision of the Unit for Investigation. Safety investigations of railway accidents have been conducted separately and independent from of any other body's or institution's procedures of the given case.

Important sources of information are railway infrastructure undertakings and railway transport undertakings whose infrastructure was the location of the accident or whose rolling stock was involved but also other undertakings involved in the case.

2.3 Investigation process and approach of the Investigation Body

The Technical Surveillance Authority makes the initial notification of the case to the Unit for Investigation and based on that the Unit for Investigation collects specific preliminary information in order to make a decision on the commencement of investigation. Procedures preceding the commencement of investigation are pursuant to the Safety Directive and provided in the Railways Act and the Minister's Directive regarding procedures for investigating railway traffic accidents.

Section 3 of the Minister's Directive "Procedures for Investigating Railway Accidents, Railway Incidents and Collisions" provides the organisation of investigations. To identify the circumstances of the case to be investigated, the investigator-in-charge or the investigation committee work, if necessary, in cooperation with state and local government authorities, railway undertakings and other persons in order to use information and materials at their disposal in the course of the investigation. Upon commencement of investigation necessary investigative activities and their content, as well as necessary safety and security requirements are determined, the members of the committee responsible for performing the investigative activities are appointed and deadlines for the activities are established. Upon learning of the commencement of an investigation the railway undertaking is obliged to keep and when necessary, present the speed recorder tape of the locomotive, leading wagon or any other self-propelled railway rolling stock, consignment note of the train, inspection certificate of the train's brakes, data regarding speed limits, log book of the locomotive, records of the exchange of information between the locomotive crew and dispatch and other necessary documents.

Section 4 of the Directive grants the investigator-in-charge or the investigation committee the right to make a danger alert if necessary circumstances become evident.

Section 5 of the Directive provides the investigation activities. During the course of the investigation a sketch of the scene of the accident will be drafted which will contain, depending of the circumstances of the case, location of the breaking of rail tracks, location of where the locomotion and the wagons stopped, traces of derailment of rolling stock which are connected with the mileage and the pickets and other necessary objects and items. Items which are important from the perspective of the investigation are recorded by way of photographs. Legal documents concerning the technical conditions of rolling stock, rail track, dispatch centralization and other equipment which are significant in identifying the causes of the occurrence are considered as investigation materials. Written explanations and statements from persons involved in the incident which may be of help in identifying the causes of the case are considered as investigation materials. Weather and environmental conditions at the time of the accident are ascertained in the course of investigation.

The investigator-in-charge or the investigation committee makes the decision to involve a person performing expert technical assessment or any other expert and tests to be performed. Based on information collected, the investigator-in-charge or the investigation committee determines the parties of the case and analyses all circumstances related to non-compliance of safety requirements in order to identify the causes of the case and make conclusions and formulate recommendations regarding improvement of railway safety.

3. Investigations

3.1 Overview of investigations completed

In 2010 the investigations of three cases were completed of which all were railway accidents. A year before, in 2009, four cases were investigated and one case in 2008. The Unit for Investigation acquired greater rights for deciding which case to investigate after amendments made to the Railways Act entered into force in 2007. Changes in legislative regulations lead to the safety investigations becoming more thorough. Depending on the case, more consideration is given to various aspects of railway safety in the course of investigation and the period of investigation has therefore increased.

There have been no significant changes in the amount of cases investigated in the last few years. The Unit for Investigation has concentrated on investigating cases provided by the Act. The Act guarantees investigation of all accidents classified as serious according to the European Union classification. In 2010 the most important criterion for commencement of an investigation was occurrence of death in the accident.

The classification of data in the tables included in the annual report is pursuant to the provisions of the Railway Safety Directive 2004/49/EC and guidance documents of the European Railway Agency.

The following table gives an overview of investigated cases:

Summary of completed investigations in 2010

Table 1

Type of accidents investigated	Number of accidents	Number of victims		Damages in € (approximation)	Trends in relation to previous years
		Deaths	Serious injuries		
Accident on level crossing	3	3	-	44110	increased

In 2009 two level crossing accidents were investigated. Compared to this, investigations of accidents on level crossing have increased. Other railway accidents or incidents have not been investigated which constituted their decrease. The damages of the accidents investigated during the year have decreased as a whole. In the last two years, damages from accidents on level crossing are in the same region and are approximately 44 000 euros in both years.

3.2 Investigations completed and commenced in 2010

Investigation of three cases was completed during 2010. One of them had happened at the end of 2009. Two investigated accidents occurred on the same level crossing about six months apart.

All investigations were commenced pursuant to Article 21 (6) of the Railway Safety Directive 2004/49/EC that allows Member States to investigate other cases in addition to serious accidents. The accidents investigated are considered accidents on level crossing for the purposes of the Safety Directive.

In national legislation commencement of investigation of accidents is laid down in subsection 42 (4) of the Railways Act which provides that the Unit for Investigation has the obligation to investigate all accidents in the first degree. One of the consequences of an accident in the first degree is death which occurs as a result of a collision between a train and another vehicle. All cases investigated had this characteristic.

During 2010 the investigations were concluded as described in the following table:

Investigations completed in 2010

Table 2

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis	Completed (date)
21.11.2009	Collision of a truck and a passenger train, level crossing accident on Liiva – Kiisa open track on Männiku level crossing, km 14,599.	i	14.05.2010
21.01.2010	Collision of a car and a passenger train, level crossing accident on Kaarepere – Tabivere open track on Pikkjärve level crossing, km 393,3	i	01.06.2010
16.04.2010	Collision of a truck and a passenger train, level crossing accident on Liiva – Kiisa open track on Männiku level crossing, km 14,599.	i	15.11.2010

Basis for investigation: i = according to the Safety Directive

On 23rd of December 2010 there was a collision of a freight train and electric rolling stock on Kehra – Aegviidu open track as a result of which the driver of the electric rolling stock died. According to the Railway Safety Directive 2004/49/EC this case is classified as a serious accident and investigation of this accident is based on Article 19 of the Directive.

According to national legislation a fatal collision between two train compositions is considered as an accident in the first degree and its investigation is obligatory according to subsection 42 (4) of the Railways Act.

Investigations commenced in 2010

Table 3

Date of occurrence	Title of the investigation (Occurrence type, location)	Legal basis
23.12.2010	Collision of an electric rolling stock and a freight train, collision of trains on Kehra – Aegviidu open track, km 157,880	i

Basis for investigation: i = according to the Safety Directive

An investigation committee was formed to investigate this accident. Investigation continues in 2011.

3.3 Summaries of investigations completed in 2010

Männiku 21.11.2009

On Saturday, 21 November 2009 at 08.15am there was a collision between a passenger train and a MAZ truck on the unregulated Edelaraudtee Infrastuktuuri AS Männiku level crossing (km 14,599). The railway traffic intensity on the Männiku level crossing is less than 26 units and the highway traffic intensity less than 50 units per 24 hours. A five-car diesel train travelling from Tallinn to Viljandi as fast train No 0041 engaged emergency brakes at 82 km/h. The truck had been driving on a road parallel to the railway and immediately prior to reaching the level crossing, performed a right turn at low speed at a sharp bend as a result of which the truck did not stop at a priority sign “Stop and give way” but continued driving to the crossing at a speed less than 5 km/h. The distance of the nearest rail from the road sign was 7,9 m. Upon reaching the crossing the driver noticed the train approaching from the right

and stopped the truck on the rail tracks. Before the truck started to move it was hit from the right by the braking passenger train.



Due to the light rail traffic the truck driver, a frequent user of the Männiku crossing, had lost the sense of danger. The cause of the accident was human error on the part of the truck driver.

The truck was thrown off the road, its load of sand fell off, and the driver was killed.

The car became unfit for use. The driver of the locomotive sustained minor injuries, front of the railcar trailer DR1B-3713 of the railway rolling stock suffered damage but the railway infrastructure remained intact.

For improvement of railway traffic safety the investigation report contained altogether 7 recommendations to the IM, Safety Authority and the police for the development and equipment of the new level crossing and organisation of travel supervision.

Pikkjärve 21.01.2010

On Thursday, 21 January 2010 at 09.55 am there was a collision between an express train No 0010 and a Volkswagen Passat car on the regulated AS EVR Infra Pikkjärve level crossing (km 393,3). Railway traffic intensity is 42 trains in 24 hours and highway traffic intensity is 3599 units in 24 hours. The level crossing is equipped with warning road signs, automatic barriers and crossing traffic lights.



Tallinn – Tartu five-car passenger train and the car approached the crossing at an acute angle to each other. Pikkjärve crossing was technically operational. The driver of the car who did not slow down on a sloping bend had increasing glare from the low sun in his eyes. The diesel train on the express route engaged emergency brakes at 96 km/h. The car applied the brakes only immediately before the collision with the train and it had not stopped at the prohibiting traffic light or the lowered

barrier. The road was dry but the braking took place too late. The car was wedged between the snow plough and the bogie of the train's railcar. The train dragged the car for almost a kilometre before stopping.

The driver of the car had been using the crossing over a longer period of time for journeys to work and home. While driving round a sloping bend he did not judge adequately the impact of the setting sun and the changing angle of its rays to the visibility in front. The direct cause of the accident was human error on the part of the driver of the car.

The driver of the car was killed in the accident, the passenger sustained minor injuries. Railway infrastructure suffered damages, mainly in the form of damages to the barrier. Of the railway rolling stock, the front end of the railcar trailer DR1BJ-3706 suffered damages. The Volkswagen Passat car became unfit for use.

Two recommendations were made to the IM and the road manager for improving railway traffic safety.

Männiku 16.04.2010

On Friday, 16 April 2010 at 08.13 am there was a collision between the passenger train No 0014 and a MAN truck at the rural automatically unregulated Edelaraudtee Infrastruktuuri AS Männiku level crossing on the Liiva - Kiisa open track (km 14,599). The road and the rail tracks run across each other at the Männiku level crossing. The crossing is equipped with a warning road sign “Level crossing” and a priority sign “Stop and give way”“.



The diesel train travelling as fast train was approaching the Männiku level crossing at a permitted speed of 85 km/h. Approximately 20 m before the nearest track the truck had performed a sharp right turn to the level crossing and might not have been parallel to the longitudinal axis of the road prior to reaching the rail tracks whereby the driver's view of the train approaching from the right was limited. The truck driver did not hear the train's second warning signal and started crossing the level crossing without

stopping. During the collision with the train the truck was hit from the right in the area between front and rear wheels. The train pushed the truck on the tracks in front of it for approximately 0,5 km until it stopped.

As a result of the accident at Männiku level crossing the truck driver was killed and one train passenger sustained minor injuries. The cause of the accident was human error on the part of the truck driver.

The front side of the body, snow plough, the beam of the automatic signalling system receiver coils, the drive of the speed recorder and the compressed air pipeline of the railcar DR1B-3703 at the head of the 5-car diesel train suffered damages, the front windscreen of the locomotive driver's cab was shattered. The railway infrastructure remained intact. The damage to the train made it impossible for the train to continue its scheduled journey. Following the inspection the train was moved back to the depot with the aid of the railcar at the other end of the train.

The MAN truck had broken into three separate parts which where the container, cab and chassis of the truck. The cab and the chassis were completely deformed and had become unfit for use.

Five recommendations were made to the IM and local government for improving railway traffic safety.

3.4 Comments on investigations

Investigations of three cases were completed during the year. One of these investigations had started in the previous year. The duration of all the investigations fitted into one year. No investigations commenced during the year that were suspended. In December of the reported year there was a serious accident the investigation of which continued in the following year.

All three investigated accidents took place on two level crossings. One of these level crossings had a relatively high road and railway traffic intensity. The other level crossing where two accidents occurred had lower traffic intensity. Each of the three cases had one fatality.

In all investigated cases the driver of the car or truck drove either into the front of the train or into a side of the train. In all cases the truck/car driver was familiar with the road and had used the level crossing from both sides on numerous occasions. Due to their manner of driving, in all these cases the truck/car drivers did not consider it necessary to exercise particular caution prior to approaching the level crossing. The truck/car drivers did not follow requirements set by the traffic control devices very familiar to them. They did not drive in such a manner as to ensure traffic safety, did not ensure sufficient field of view of the railway that they should have done. They did not stop, and had no intention to do so, where it was required to stop and evaluate the traffic situation on the railway. Among the other circumstances leading to all three fatalities the insufficient traffic safety culture of truck/car drivers was significant.

The following table describes the number of injured and deaths of the investigated accidents in the last five years:

Total number of deaths and the injured

Table 4

Year	Deaths	Injured in road vehicle / of them seriously	Injured in rolling stock / of them seriously
2006	-	8	7
2007	4	6/2	5/1
2008	1	-	-
2009	2	-	-
2010	3	1/-	2/-
Total	10	15	14

The above table shows that in the last five years the number of fatalities has been less than five each year. There are no definite trends in the changes in fatality numbers which would characterize the five years as a whole. At the same time the addition of one fatality per year can be noted among the cases investigated.

Except for the years 2008 and 2009, there were damages to rolling stock as well as road vehicles. All injuries to people were minor.

By summarizing the number of deaths and the injured it is noticeable that in the years prior to and after 2008 and 2009 the total number was higher. At the same time the total number of deaths and the injured in 2010 did not exceed the figures of 2006 and 2007.

The breakdown of the injured 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				
		2006	2007	2008	2009	2010
Deaths	Passengers	-	-	-	-	-
	Staff	-	-	-	-	-
	Other persons	-	4	1	2	3
	Total	-	4	1	2	3
Injured	Passengers	6	1	-	-	1
	Staff	1	4	-	-	1
	Other persons	8	6	-	-	1
	Total	15	11	-	-	3

The above table shows that only third persons have died in the investigated accidents. All deaths have occurred as a result of a collision between a car and a train. There are no railway staff or train passengers among the fatalities; they have all been persons in the car or truck – truck/car drivers.

3.5 Accidents and incidents investigated during the last five years (2006 – 2010)

In the last five years all the investigations which commenced based on Article 21 of the Railway Safety Directive 2004/49/EC have been concluded and they are reflected in the following table:

Breakdown of investigated cases by years

Table 6

Title of the case	Year, number of investigations					
	2006	2007	2008	2009	2010	Total
Train collision	-	-	-	-	-	-
Train collision with an obstacle	-	1	-	-	-	1
Train derailment	1	1	-	1	-	3
Level crossing accident	18	12	1	2	3	36
Accident to person caused by RS in motion	-	-	-	-	-	-
Fire in rolling stock	-	-	-	-	-	-
Involving dangerous goods	-	-	-	-	-	-
Incident	1	-	-	1	-	2
Total	20	14	1	4	3	42

4. Recommendations

4.1 Short review and presentation of recommendations

Recommendations made in investigation reports for improvement of railway safety depend on the distinctive characteristics of the case and connections between the circumstances. The following table gives an overview of recommendations by years:

Recommendations for improvement of safety

Table 7

Field of activity of recommendation	Year, number of recommendations				
	2006	2007	2008	2009	2010
Maintenance and care of railway infrastructure	1	-	1	-	-
Care, maintenance and managing of rolling stock	5	-	-	1	-
Organisation of supervision	7	2	1	5	1
Road traffic management, road traffic control devices	10	7	-	-	3
Winter maintenance of roads	6	6	-	-	-
Dissemination of information concerning traffic, training	14	3	-	-	1
Amendments to legal acts and regulating instructions	8	5	2	5	1
Operation of traffic lights, railway traffic control	9	7	-	4	-
Organisation of operation of railway communication devices	4	1	-	-	-
Professional qualifications of railwaymen	2	1	-	1	-
Other arrangements	22	19	-	7	8
Total	88	51	4	23	14

During the year recommendations for improving railway safety were made to six addressees. All of them have submitted reports on the implementation of recommendations to the Unit for Investigation in the prescribed manner.

The largest number of recommendations was made to Edelaraudtee Infrastruktuuri AS, whose infrastructure was the location of two of the accidents investigated during the year. Out of the six recommendations made to the undertaking, three had been accepted and implemented by the time of submitting the report, proceedings of three recommendations were continuing.

Out of the three recommendations made to Saku Rural Municipality one was accepted and proceedings of two recommendations were continuing. Proceedings of the two recommendations made to the Technical Surveillance Authority were continuing at the time of submitting the report. Proceedings of the one recommendation made to each AS EVR Infra and Northern Prefecture were continuing and the one recommendation made to Southern Region of the Road Administration was accepted and implemented.

Implementation of recommendations

Table 8

Recommendations issued		Recommendation implementation status							
		Implemented		In progress		Not to be implemented		No information	
Year	No	No	%	No	%	No	%	No	%
2006	88	25	28,41	15	17,04	1	01,14	47	53,41
2007	51	21	41,18	28	54,90	-	-	2	03,92
2008	4	4	100	-	-	-	-	-	-
2009	23	6	26,09	17	73,91	-	-	-	-
2010	14	5	36,00	9	64,00	-	-	-	-
Total	180	61	33,89	69	38,33	1	0,56	49	27,22

4.2 Recommendations 2010

During the year, 14 recommendations were made to six addressees. All the recommendations are grouped by addressees who received the recommendations.

Edelaraudtee Infrastruktuuri AS manages the level crossing which was the location of two accidents investigated during the year. The following recommendations were made to Edelaraudtee Infrastruktuuri AS:

1. To consider development of the state-of-the-art Männiku level crossing as a priority.
2. In cooperation with Technical Surveillance Authority and Saku Rural Municipality, to implement measures for resolving any legal problem to ensure the connection of the level crossing with the existing road network.
3. To ensure that the planned level crossing is equipped with automatic crossing traffic lights.
4. To implement measures to close other nearby level crossings upon the new level crossing being put into service.
5. To coordinate the timing of the development of the new Männiku level crossing with the completion of the paving with asphalt of the access roads organised by the Northern Region of the Road Administration.
6. To arrange the closure of the existing Männiku level crossing from the moment the new level crossing is open to traffic.

There is a level crossing located on the territory managed by Saku Rural Municipality where, over the years, there have been numerous fatal collisions between a train and a car or truck. The following recommendations were made to Saku Rural Municipality:

1. To inform the authorities and undertakings which use Männiku level crossing most often of the accidents that have taken place in recent years with a plea to brief their drivers further about the dangers at the level crossing.
2. To consolidate the positions and resources of the parties concerned in order to construct an access road from the side of the quarries to the modern Männiku railway crossing which is being built.
3. To implement temporary measures until the closure of Männiku level crossing to prevent the cars and trucks going through the inside bend when making a right turn by the quarries. That would ensure better visibility for the driver at the priority sign.

Technical Surveillance Authority is the national safety authority in Estonia. In connection with the one level crossing accident the following recommendations were made to Technical Surveillance Authority:

1. To monitor that the installations of the level crossing being built comply with traffic safety requirements.
2. To implement measures for closure of level crossings in the given area which have low traffic intensity in order to direct traffic to the new, safer level crossing.

In connection with the accident which occurred on the level crossing which is part of AS EVR Infra railway infrastructure, the following recommendation was made:

1. To evaluate the visibility of signalling lights in case of low blinding sun and in cooperation with Technical Surveillance Authority increase the measurements of background screens of the signalling lights, especially for the autumn-winter-spring periods of the next couple of years.

As a result of the accident which occurred on the level crossing in the area managed by the Southern Region of the Road Administration, the following recommendation was made to them:

1. To consider grade separating Pikkjärve level crossing and organising the redirection of road traffic from nearby level crossings to the viaduct as a priority and to implement measures for the timely completion of the viaduct.

The Northern Prefecture conducts the traffic supervision in the region which is the location the level crossing where the accident occurred and as the result of which the following recommendation was made to the prefecture.

1. To increase frequency of traffic supervision inspections on Männiku level crossing on observance of established speed limits by road vehicles.

Annexes

Annex 1/1

Proceeding of recommendations – Männiku, 21.11.2009

Date and time	21.11.2009, at 08.15		
Location	Edelaraudtee Infrastruktuur AS infrastructure Männiku level crossing on Liiva – Kiisa open track, km 14,599.		
Type of occurrence	Level crossing accident, collision of a passenger train with another vehicle which had one human casualty.		
Train type and number	Fast train No 0041		
Road vehicle	Truck MAZ (dumper)		
		In the train	In the road vehicle
Number of persons (on board the train and vehicle)	Crew	3	1
	Passengers	90	-
Fatally injured	Crew	-	1
	Passengers	-	-
Seriously injured	Crew	-	-
	Passengers	-	-
Slightly injured	Crew	1	-
	Passengers	-	-
Damages of rolling stock	Damage to railcar DR1B-3713 front side of the body, windscreen, snow plough, beam of the automatic signalling system receiver coils, compressed air pipeline.		
Damages of track equipment	-		

Other damages		MAZ truck became unfit for use
Summary: A truck drove in front of the passenger train No 0041 on a level crossing.		
Final report issued		14.05.2010
Recommendation No. 01	There are several different interests involved in developing Männiku level crossing which does not contribute to reaching a unified solution.	
	To consider developing the state-of-the-art Männiku level crossing as a priority.	
Date	Status	Explanation
Commenced in 2009	Accepted and implemented	Tallinn – Saku road construction project includes the level crossing with its new location along with an access road. Construction on the road has commenced.
Recommendation No. 02	A new level crossing was planned but the development of all the communication routes had not been resolved.	
	In cooperation with the Technical Surveillance Authority and Saku Rural Municipality, to implement measures for resolving legal problems to ensure the connection of the level crossing with the existing road network.	
Date	Status	Explanation
31.08.2010	Accepted and implemented	Construction permit has been issued by the Technical Surveillance Authority.
Recommendation No. 03	In case of low traffic intensity automatic equipment on level crossings is not required.	
	Ensure the equipment of the planned level crossing with automatic crossing traffic lights.	
Date	Status	Explanation
05.05.2010	Accepted and implemented	The design drawings of the level crossing with crossing traffic lights has been developed by T-Model OÜ.
Recommendation No 04	Traffic safety can be improved by directing traffic through the state-of-the art level crossing instead of the several unequipped level crossings which are currently used.	

	To implement measures to close other nearby level crossings upon the new level crossing being put into service.	
Date	Status	Explanation
21.02.2011	Proceedings continue	Edelaraudtee Infrastruktuur AS has filed an application to the Technical Surveillance Authority for closure of two level crossings (Männiku and Karjääri).
Recommendation No 05	The supervision authority can monitor compliance with necessary agreements and requirements.	
	To monitor compliance of the equipment of the constructed level crossing with traffic safety requirements.	
Date	Status	Explanation
Spring 2010 – to date	Proceedings continue	The owner of the level crossing infrastructure has filed an application to TSA for building a new level crossing and its automatic traffic light signals. Visibility triangles complying with the requirements of Annex 4 of the Rules for Technical Use of Railway and the compliance of the road that is crossing the level crossing with requirements has been ensured. It has been planned to equip the level crossing according to the higher category as according to the current, lower category the installation of traffic light signals is not compulsory. Construction permits have been issued by TSA. Following the commencement of construction work it has been planned to commence additional supervision to ensure accordance of the construction work with the construction project. The owner of the installations has the responsibility to apply for a user permit from TSA upon completion.
Recommendation No. 06	The supervision authority can influence the processes for improving railway safety.	

	To implement measures for closure of level crossings in the given area which have low traffic intensity in order to redirect traffic to the new, safer level crossing.	
Date	Status	Explanation
Spring 2010 to date	Proceedings continue	Edelaraudtee Infrastruktuuri AS applications for construction permits in order to close and dismantle the Karjääri and Männiku level crossings after the completion of the new level crossing are being processed by TSA. The applications are being coordinated with the police. TSA will monitor the dismantling of the currently used level crossings after completion of the new level crossing. The deadline for completion of the new level crossing is unclear and is dependent on planning activities of the local government and community.
Recommendation No. 07	Traffic supervision by the police encourages compliance with traffic rules on a road section which has low traffic intensity but is highly dangerous.	
	To increase frequency of traffic supervision inspections at Männiku level crossing on observance of established rules by road vehicles.	
Date	Status	Explanation
28.05.2010 29.05.2010 30.05.2010 31.05.2010 03.06.2010 15.06.2010 22.09.2010 05.11.2010	Proceedings continue	Traffic violations committed by drivers on the level crossing have been ascertained and the aim is to prevent further violations. In the course of traffic supervision 19 violations by drivers have been detected.

Proceeding of recommendations – Pikkjärve, 21.01.2010

Date and time	21.01.2010, at 09.55		
Location	At AS EVR Infra infrastructure, on Kaarepere – Tabivere open track on Pikkjärve level crossing, km 393,3.		
Type of occurrence	Level crossing accident, collision between a passenger train and another vehicle which involved one human casualty.		
Train type and number	Fast train No. 0010		
Road vehicle	Volkswagen Passat		
		In the train	In the road vehicle
Number of persons (in the train and road vehicle)	Crew	4	1
	Passengers	67	1
Fatally injured	Crew	-	1
	Passengers	-	-
Seriously injured	Crew	-	-
	Passengers	-	-
Slightly injured	Crew	-	-
	Passengers	-	1
Damages of rolling stock	Front right corner of the body, beam of the automatic signalling system receiver coils, and staircase of the engine room of railcar DR1B-3706 were damaged, speed recorder's drive was broken.		
Damages of track equipment	Barrier of the level crossing deformed, connecting cables of rail-box and rail broken.		

Other damages		The Volkswagen Passat car became unfit for use.
Summary: After a sloping bend, in the conditions of the blinding sun, a Volkswagen Passat car drove into the side of the passenger train No. 0010.		
Final report issued		01.06.2010
Recommendation No. 01	In the case of the low blinding sun the driver's ability to distinguish traffic lights on the light background of the sky is hampered.	
	To assess the visibility of signal lights in the case of low blinding sun and in accordance with the Technical Surveillance Authority's position to increase the measurements of the background screens of the signal lights, especially for the autumn-winter-spring periods of the next couple of years.	
Date	Status	Explanation
2011	Proceedings continue	Before completion of the Kaarepere viaduct, the short term objective is to ensure safe crossing of the railway by means of surveys and if necessary, by implementing measures following the surveys (improving visibility).
Recommendation No. 02	Pikkjärve level crossing is located on one of the most important communication roads of Estonia, however traffic intensity is lower than on some of the other roads crossing railways.	
	To consider grade separating of Pikkjärve level crossing and organising directing of road traffic from nearby level crossings to the viaduct as a priority and to implement measures for the timely completion of the viaduct.	
Date	Status	Explanation
03.09.2010	Accepted and implemented	Public procurement was announced.
15.12.2010		A contract was signed to carry out design and construction works.
01.03.2011		Contractor AS Nordecon has commenced work.
03.01.2012		Deadline for completion of works.

Proceeding of recommendations – Männiku, 16.04.2010

Date and time	16.04.2010, at 08.13am		
Location	At Edelaraudtee Infrastruktuuri AS infrastructure on Liiva – Kiisa open track on Männiku level crossing, km 14,599.		
Type of occurrence	Level crossing accident, collision between a passenger train and another vehicle which involved one human casualty.		
Train type and number	Fast train No. 0041		
Road vehicle	MAN truck		
		In the train	In the road vehicle
Number of persons (in the train and the road vehicle)	Crew	4	1
	Passengers	81	-
Fatally injured	Crew	-	1
	Passengers	-	-
Seriously injured	Crew	-	-
	Passengers	-	-
Slightly injured	Crew	-	-
	Passengers	1	-
Damages of rolling stock	Front side of the body, snow plough, beam of the automatic signalling system receiver coils, drive of the speed recorder and compression pipeline of the railcar DR1B-3703 were damaged, front windscreen of the cabin was shattered.		
Damages of track equipment	-		

Other damages		The MAN truck became unfit for use
Summary: A MAN truck was hit from the right by a passenger train on a level crossing.		
Final report issued		15.11.2010
Recommendation No. 01	To close infrequently used level crossings nearby upon the new level crossing being put into service.	
	To coordinate the timing of completion of the new Männiku level crossing with the completion of the surfacing works of the access roads organised by the Northern Region of the Road Administration.	
Date	Status	Explanation
2011 – according to plan	Proceedings continue	Construction of the level crossing has been included in the Edelaraudtee Infrastruktuuri AS work schedule for 2011. The design project is ready and the construction permit has been granted. Construction works on the road have commenced.
Recommendation No. 02	Postponing the closure of a level crossing to a later date can often result in the closure not happening at all.	
	To arrange closure of the current Männiku level crossing from the moment the new level crossing is open to traffic.	
Date	Status	Explanation
2011 – according to plan 20.02.2011	Proceedings continue	Closure of two level crossings, Männiku and Karjääri, has been scheduled for 2011. To file an application to the Technical Supervisory Authority.
Recommendation No. 03	Recent accidents on the level crossing have involved road vehicles which use the crossing frequently.	
	To inform authorities and undertakings which use Männiku level crossing most often of the accidents taken place in recent years with a plea to brief their drivers further about the dangers at the level crossing.	
Date	Status	Explanation

18.11.2010	Accepted and implemented	Meeting with the most frequent users of the level crossing. At the meeting participants were informed of the accidents which had taken place in the recent years, the design of the new level crossing which is being built and the changes to the logistical solutions which it involves.
Recommendation No. 04	Resources for building an access road to the level crossing were partially unavailable.	
	To consolidate the positions and resources of the parties concerned in order to construct an access road from the side of the quarries to the state-of-the-art Männiku railway crossing which is being built.	
Date	Status	Explanation
February 2011	Proceedings continue	Consultations with the designer of the Männiku level crossing on the Tallinn – Lelle – Pärnu railway have taken place regarding the geometry and pavement of the access road in view of changing the type of pavement in order to reduce construction costs.
April 2011		Change of the pavement type has been discussed with the proprietors in the vicinity of the new level crossing.
		A quotation has been received for building an access road with gravel covering.
May 2011		A further quotation has been requested for building a gravel access road from the undertaking which will be building the Männiku road.
		A follow-up meeting has been planned with the most frequent users to consolidate the positions and resources of the parties concerned in order to resolve queries regarding construction of an access road.

Recommendation No. 05	Better visibility of the train approaching from the right by the driver of the truck increases traffic safety except for when it is in the field of vision of the opaque parts of the cabin.	
	To implement temporary measures until the closure of Männiku level crossing in order to prevent cars and trucks going through the inside bend when making a right turn by the quarries. That would ensure better visibility for the driver near the priority sign.	
Date	Status	Explanation
2011	Proceedings continue	After the spring decay of roads has finished, the geometry of the road for making a right turn will be changed. As a result of the implemented measure the visibility of railway by drivers near the priority sign will improve.