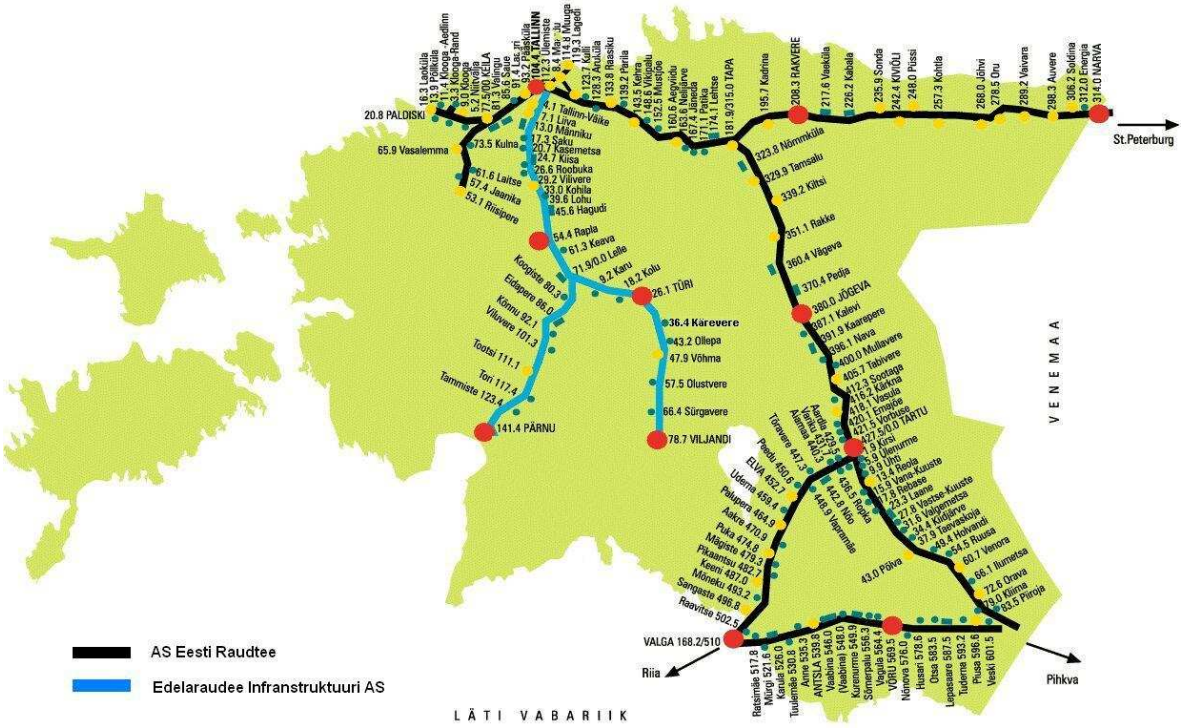
Ministry of Economic Affairs and Communications of the
Republic of Estonia
Emergency Management Department
Unit for Investigation of Railway Accidents

Annual report of railway accidents investigated in 2006

Tallinn
2007



Public railways in the Republic of Estonia

A. Summary

The Unit for Investigation of Railway Accidents of the Ministry of Economic Affairs and Communications investigated 20 railway accidents according to the classification of the Railways Act and the investigation reports of the accidents have been completed. The investigation of all the accidents was carried out by an executive officer of the Emergency Management Department in co-operation with railway undertakings, safety authorities, the police, emergency centres and other institutions

and undertakings as well as private persons. The investigator-in-charge was independent in decision-making.
Preparations for the application of Railway Safety Directive 2004/49/EC in Estonian judicial area continued in 2006. Not a single severe accident according to the classification of the Directive happened during the period which would have required reporting to the European Railway Agency.
18 of the total number of investigated accidents occurred at level crossings, of which in turn 6 at regulated or active level crossings and 12 at unregulated or passive level crossings. One derailment of rolling stock and one incident, which had caused immediate danger of collision because of ignoring prohibiting traffic lights, were investigated. Pursuant to Railway Safety Directive the latter could be classified as an incident. 15 people received injuries, of which two got serious bodily injuries in the nine of investigated railway accidents.
On behalf of the investigation unit the investigator-in-charge made 88 recommendations in their investigation reports for the improvement of railway safety. Recommendations were made to 29 institutions and undertakings of which seven were railway undertakings.
One recommendation was made concerning maintenance and arrangements of railway infrastructure, five proposals concerning maintenance, care and managing of rolling stock, seven proposals on the organisation of supervision, ten proposals on road traffic management and road traffic control devices, six proposals on carrying out winter maintenance, 14 proposals on the dissemination of traffic information, eight proposals on the amendments to legal acts and regulations, nine proposals on the operation of signalling installations and rail traffic control, four proposals on the organisation of operation of railway communication devices, two proposals on the professional qualifications of railwaymen and 22 proposals on other arrangements.
Five institutions and undertakings voluntarily submitted reports on the measures implemented or planned to be implemented based on the recommendations of the reports. Their follow-up reports covered all the 41 proposals made to them. The recommendations of the investigation unit were accepted on 25 occasions, proceedings continued in 15 occasions and one proposal was rejected.

B. Introduction

The investigations of railway accidents of 2006 were conducted pursuant to the classification of railway accidents provided in the Railways Act. The accidents with more severe consequences are considered as first level accidents according to the classification. First level railway accidents are traffic accidents on railway which have caused at least one of the following consequences:

1) extensive fire;
2) significant pollution of environment;
3) one or more casualties (except in the case of accidents caused by rolling stock to persons, who were on rail tracks and which had not led to other consequences);
4) or interruption of railway traffic for more than 24 hours.

Second level railway accidents are:

1) collisions of passenger or freight trains with other trains or other rolling stock;
2) collisions of passenger or freight trains with other means of transport (motor vehicles);
3) collisions of passenger or freight trains with objects located in the railway structure gauge which render the rolling stock unfit for use;
4) derailment of rolling stock of train;
5) ignoring of prohibiting crossing traffic lights by rolling stock if it leads to immediate danger of collision with another train or another type of rolling stock.

Investigation of the railway accidents of both levels, which happened according to above characteristics, is mandatory. The classification of railway accidents in force in Estonia is to some extent different from the classification provided by Railway Safety Directive.

The Railways Act entered into force in Estonia on 31 March 2004. In drawing up the Railways Act several requirements of the then draft and later Railway Safety Directive 2004/49/EC were taken into account. With the entry into force of the Railways Act a structural unit (investigation unit) for the investigation of railway accidents or incidents was immediately established in the Ministry of Economic Affairs and Communications. The application of Railway Safety Directive in Estonian legislation has continued and amendments to the legal act were prepared in 2006.

C. Work organisation of the Unit for Investigation

The Unit for Investigation of Railway Accidents is a structural unit in the Emergency Management Department of the Ministry of Economic Affairs and Communications and is independent in their decisions related to investigation. The Emergency Management Department is subordinated to the Secretary General of the Ministry. There is no Ministry of Transport in Estonia, but the Roads and Railways Department of the Ministry of Economic Affairs and Communications is in charge of the regulation of the activities in the rail transport sector and is subordinated to the Deputy Secretary General of the Ministry. The Emergency Management Department and The Roads and Railways Department are independent of each other.

The investigation unit was obligated to investigate the first and second level railway accidents in 2006. The Unit for Investigation has discretion to decide whether to start investigation of a railway accident, railway incident or collision. In decision making the Unit for Investigation must consider the severity of accident, incident or collision. In the assessment of the severity of a railway accident, railway incident or collision the Unit for Investigation takes into account the opinion of the Railway Inspectorate and other circumstances. The main objective in the investigation of railway accidents or railway incidents is to identify the causes of the event in order to prevent such an accident in future. The Unit for Investigation has a right to involve experts in investigation and make proposals to the Minister of Economic Affairs and Communications for setting up investigation committees. The institutions related to

investigations are obligated, within their competence, to assist the Unit for Investigation, members of the investigation committee or experts.
The Railway Inspectorate is subordinated to the Ministry of Economic Affairs and Communications and is the authority responsible for safety. The Unit for Investigation of Railway Accidents is independent of the Railway Inspectorate.
The Unit for Investigation of Railway Accidents has been guaranteed access to the site of accidents or railway incidents, rolling stock, infrastructure, traffic control and signalling devices, and to the relevant information and documents. Based on the above the Unit for Investigation had co-operation with railway undertakings, the police, emergency centres and other institutions and undertakings.

D. Investigation process

The independence of the investigation process of railway accidents, outcome and conclusions of investigations has been guaranteed by legislation.
The Unit for Investigation has co-operation with railway infrastructure undertakings, transport operators, the police investigators, and if necessary, with investigators in criminal proceedings, regional emergency centres, medical institutions and private persons in the course of investigation. The co-operation involves sending information, documents and materials to the Unit for Investigation at their request. The Unit for Investigation will use them for drawing conclusions. At their request, the information the Railway Inspectorate (safety authority) has about the event will be made available to the Unit for Investigation.
The Unit for Investigation of Railway Accidents did not consider it necessary to set up an investigation committee for the investigation of any railway accident which happened in 2006. The Unit for Investigation did not make such a proposal to the Minister. None of the accidents was a serious accident for the purposes of the Railway Safety Directive and there was no extensive public interest involved. All accidents were investigated by an executive officer of the Emergency Management Department working in the capacity of the investigator-in-charge of the Unit for Investigation. The investigator-in-charge had the opportunity to visit the sites of accident. Nobody interfered with the process of investigation and drawing conclusions unless at the request of the investigator-in-charge.

E. Investigations

During the year under examination the investigator-in-charge as the representative of the Unit for Investigation investigated all railway accidents which qualified as accidents for the purposes of the Railways Act. 18 accidents of the total number of accidents, which happened during the year, were investigated and in addition

investigation was completed of two investigations which had happened in December 2005. The investigator-in-charge finished the investigation of altogether 20 accidents.

Accidents of which investigation was completed in 2006

Table 1

Owner of rolling stock/ infrastructure	**Place name or open track**	**Site of accident**	**Date and time of accident**	**Description of accident**	**Accident by classification of Railways Act/Directive**
1	2	3	4	5	6
GoRail/Eesti Raudtee	Jõhvi – Oru open track	Toila level crossing 271,461 km	20.12.2005 19.38	Collision of passenger train with Scania truck with trailer	Level II/ accident
Maardu Raudtee/ Milstrand	Harutee Viimsi – Maardu station	Pärnamäe Road level crossing 8+301,2 km	27.12.2005 12.29	Collision of freight train with Scania truck	Level II/ accident
Eesti Raudtee/ Eesti Raudtee	Tallinna station	Switch no. 113	08.01.2006 09.18	Derailment of platform car in freight train	Level II/ accident
Edelaraudtee/ Edelaraudtee Infrastruktuur	Tootsi – Lelle open track	Viluvere level crossing 100,942 km	07.02.2006 18.00	Collision of passenger train with Scania truck	Level II/ accident
Põlevkivi Raudtee/ Põlevkivi Raudtee	Viru – Kohtla-Järve open track	Level crossing no. 17 186 picket	08.02.2006 12.55	Collision of freight train with a Volvo truck	Level II/ accident
Edelaraudtee/ Edelaraudtee Infrastruktuur	Liiva – Kiisa open track	Tõdva level crossing 23,264 km	03.03.2006 09.15	Collision of passenger train with Mitsubishi car with trailer	Level II/ accident
Edelaraudtee/ Eesti Raudtee	Tapa – Nõmmküla open track	Nõmmküla level crossing 323,005 km	10.03.06 07.59	Collision of passenger train with Mercedes Benz minibus	Level II/ accident

1	2	3	4	5	6
Rööbasteede Ehitus/ Eesti Raudtee	Muuga – Maardu open track	Muuga level crossing 12,556 km	22.03.2006 23.35	Collision of freight train with BMW car	Level II/ accident
Põlevkivi Raudtee/ Põlevkivi Raudtee	Ahtme – Jõhvi open track	Level crossing no. 51 35+52 picket	22.03.2006 17.25	Collision of freight train with Rover car	Level II/ accident
Eesti Raudtee/ Eesti Raudtee	Orava – Petseri open track	Matsuri level crossing 84,411 km	29.04.2006 11.59	Collision of freight train with VW car	Level II/ accident
Rööbasteede Ehitus/ Eesti Raudtee	Kärkna – Tartu open track	Betooni Street level crossing 426,075 km	19.05.2006 22.40	Collision of freight train with Audi car	Level II/ accident
Eesti Raudtee/ Põlevkivi Raudtee	Püssi – Maidla open track	Level crossing nr 33 17+98 picket	23.05.2006 13.33	Collision of freight train with Audi car	Level II/ accident
Eesti Raudtee/ Eesti Raudtee	Kärkna – Tartu open track	Tiksoja level crossing 423,631 km	21.06.2006 11.32	Collision of freight train with VW car	Level II/ accident
Elektriraudtee/ Eesti Raudtee	Kloogaranna – Klooga open track	Klooga-ranna level crossing 2,493 km	06.07.2006 10.25	Collision of passenger train with Sisu truck	Level II/ accident
Eesti Raudtee/ Eesti Raudtee	4km blockpost – Ülemiste open track	Soodevahe level crossing 3,934 km	31.08.2006 21.55	Collision of freight train with VW car	Level II/ accident
Edelaraudtee/ Edelaraudtee Infrastruktuur	Tallinn– Väike station	Tallinn– Väike station 3,026 km	01.09.2006 11.25	Departure of rolling stock for open track, danger of collision with another train	Level II/ incident (ignoring signal of prohibiting traffic lights)

1	2	3	4	5	6
Maardu Raudtee/ Maardu Raudtee	Maardu station – Maardu Raudtee open track	Üleoru Street level crossing 1+147,21 km	06.09.2006 11.20	Collision of freight train with Scania truck with trailer	Level II/ accident
Edelaraudtee/ Edelaraudtee Infrastruktuur	Võhma – Viljandi open track	Suure-Jaani level crossing 60,406 km	14.09.2006 11.11	Collision of passenger train with Volvo truck with trailer	Level II/ accident
Edelaraudtee/ Eesti Raudtee	Nõmmküla – Tamsalu open track	Alupere level crossing 326,974 km	23.10.2006 07.58	Collision of passenger train with Scania truck with trailer	Level II/ accident
Põlevkivi Raudtee/ Põlevkivi Raudtee	Viru – Kohtla-Järve open track	Level crossing no. 19 (Ereda) 128 picket	13.11.2006 09.02	Collision of freight train with Toyota minibus	Level II/ accident

All accidents investigated during the year were accidents of level II for the purposes of the Railways Act. According to the classification of the Railways Act 18 collisions of passenger or freight trains with other means of transport were investigated. The collisions happened at railway level crossings. In addition a case of derailment of rolling stock in train and a case of rolling stock ignoring the prohibiting signal of traffic lights, thus causing immediate danger of collision with another train, were investigated. The investigation of accidents was based on the provisions of national legislation, the Railways Act in force.

We investigated 20 cases and according to the classification of Railway Safety Directive 19 were accidents. 18 cases were in the category of level crossing accidents, one was in the category of derailment and one was ignoring prohibiting signals and it can be categorised as an incident.

No severe accidents for the purposes of Railway Safety Directive happened in 2006, the investigation of which would have been mandatory for national investigation units and of which the Unit for Investigation should have reported to the European Railway Agency.

At the end of the year under examination two accidents happened for which the Unit for Investigation started investigations, but has not finished them.

Accidents of which investigation started in 2006

Table 2

Owner of rolling stock/ infrastructure	Place name or open track	Site of accident	Date and time of accident	Description of accident	Accident by classification of Railways Act/Directive
Eesti Raudtee/ Eesti Raudtee	Maardu - Muuga open track	Maardu level crossing 8,853 km	16.12.2006 00.57	Collision of freight train with BMW car	Level II/ accident
Eesti Raudtee/ Eesti Raudtee	Antsla station	Antsla level crossing 539,288 km	27.12.2006 13.57	Collision of freight train with Ford car	Level II/ accident

F. Content of investigation

1. Short description of accidents

Toila level crossing on 20.12.2005

The Tallinn – Moscow passenger train no. 0004 collided with a Scania truck at Toila unregulated level crossing at 19.38. The truck driver considered the train to be far away and decided, despite the traffic sign “Stop and give way”, to drive over the level crossing before train. Because of slippery road the truck managed to cross the rail tracks, but the trailer remained in the structure gauge of the train and its side was hit by locomotive.

There were no casualties in the accident. The road traffic signs, locomotive and trailer were damaged. Helper locomotive was called for the passenger train.

Pärnamäe Road level crossing on 27.12.2005

The locomotive of freight train and a Scania truck with trailer collided at Pärnamäe Road unregulated level crossing at 12.19. The truck had stopped before the sign “Stop and give way” but without making sure whether there was a train approaching started to cross the rail tracks. The locomotive started to brake at the speed of 25km/h and pushed the truck in front of it until stopping.
The passenger who was in the truck cab received slight injuries. The locomotive suffered minor damages. The truck and trailer were heavily deformed.

Tallinn station on 08.01.2006

At 09.18 a platform car of freight train no. 3443 was derailed with two first wheel-sets at switch no. 113 at Tallinn station. The train was leaving the station. The locomotive crew had removed one shoe brake before departure, but they had not removed the double shoe brake placed on the rail tracks. The derailment of the empty platform car in train started when the train started to move and touched the shoe brake. Instability and derailment lasted for quite a long time. The locomotive driver noticed the derailment of car at the curve and stopped the train.
The derailed car was damaged.

Viluvere level crossing on 07.02.2006

The leading car at the tail of passenger train no. 0232 collided with a Scania truck at unregulated Viluvere level crossing at 18.00. Because of slippery road the truck driver could not stop before the sign “Stop and give way”. The truck crashed into the side of the last car of the three-car diesel train.
There were no casualties in the accident. The motor car and truck which had collided suffered damages.

Level crossing no. 17 on 08.02.2006

Train no. 702 collided with a Volvo truck at automatically regulated level crossing no.17 at 12.55. The train consisted of a diesel locomotive and snow-clearing machine coupled to it. The Volvo truck crashed into the tail of the passing rolling stock. The road was slippery and the truck driver could not stop the truck immediately to red traffic lights.
The truck driver suffered slight injuries. The truck received damages and one side of the rear part of the snow-clearing machine, which suffered in the collision, was dented.

Tõdva level crossing on 03.03.2006

The passenger train no. 0241 collided with a Mitsubishi Pajero jeep with trailer at 09.15 at unregulated Tõdva level crossing. The car driver noticed the train coming from the forest, but because of slippery road could not stop the car before rail tracks. First the car and the front part of the motor car of diesel train collided and after that the train and the car trailer which had changed direction of movement.
The car driver suffered slight injuries. The car suffered damages and the trailer was wrecked. The front part of the motor car of diesel train suffered damages.

Nõmmküla level crossing on 10.03.2006

Passenger train no. 0210 and a Mercedes Benz minibus collided at automatically regulated Nõmmküla level crossing at 07.59.
The minibus crashed into the motor car of the four-car diesel train on slippery road. The driver of the minibus had not managed to stop the minibus after seeing flashing red traffic lights. The minibus driver suffered serious injuries. The minibus became unfit for use. The motor car of diesel train suffered damages.

Muuga level crossing on 22.03.2006

A single locomotive travelling as the train no. 5212 collided with a BMW car at automatically regulated Muuga level crossing at 23.35. Ignoring flashing red traffic lights, the BMW car followed the car driving in front onto the level crossing. The first

car managed to drive over the crossing. The BMW car was blocked the way of the locomotive and was hit at the rear part. The locomotive braked at low speed and pushed the car in front until stopping.
The car driver suffered slight injuries. The locomotive was not damaged. The automatic signalling devices of level crossing and the BMW car suffered damages.

Level crossing no. 51 on 22.03.2006

A Rover car collided with a train at unregulated level crossing no. 51 at 17.25. The driver of the Rover car did not pay attention to the requirements of traffic sign “Stop and give way” and was driving at high speed to the level crossing and blocking the way of the locomotive. The locomotive braked at low speed and pushed the car in front until stopping.
There were no casualties in the accident. The rolling stock and infrastructure did not suffer any damages. The Rover car was damaged.

Matsuri level crossing on 29.04.2006

A Volkswagen Passat car collided with freight train no. 1786 at automatically regulated Matsuri level crossing at 11.59. While approaching the level crossing the driver was not focussing on what was in front, but he had been looking aside. Ignoring the signal of flashing red lights he crashed into the train driving over the level crossing.
There were no casualties in the accident. The locomotive and the first car of the train had some slight scratches and minor dents. The front part of the VW car suffered major damages. A picket post was knocked down.

Betooni Street level crossing on 19.05.2006

A Unimet traction unit travelling as a train no. 5202 collided with an Audi A6 car at automatically regulated Betooni Street level crossing at 22.40. Ignoring the signal of flashing red lights the Audi A6 car crashed into the side of the Unimat tamping machine. The car was hooked to the stairs of the traction unit and was dragged until stopping.

There were no casualties in the accident. The special rolling stock and the Audi car suffered damages.

Level crossing no. 33 on 23.05.2006

A single locomotive travelling as train no. 4201 collided with an Audi 80 car at unregulated level crossing no. 33 at 13.33. The locomotive was leaving the curve of the level crossing at low speed and seemed to stop for a moment before the sign “Stop and give way”, but continued driving until it collided with the locomotive.
There were no casualties in the accident. The Audi 80 car was damaged. Railway infrastructure and the locomotive remained intact.

Tiksoja level crossing on 21.06.2006

A track-laying machine travelling as train no. 5202 and a Volkswagen Polo car collided at automatically regulated Tiksoja level crossing at 11.32. The car driver ignored the flashing red traffic lights and drove to the level crossing. He could not stop the car before reaching the structure gauge of the traction unit. The collision was between the front part of the car and the rear part of the track-laying machine.
There were no casualties in the accident. The rolling stock, railway infrastructure and locomotive remained intact. The front part of the Volkswagen Polo car was damaged.

Kloogaranna level crossing on 06.07.2006

Passenger train no. 0522 collided with a Sisu truck at unregulated Kloogaranna level crossing at 10.25. The truck, loaded with gravel, crashed into the electric train between the second and third car. The car driver had reduced speed before the level crossing, but had not made sure that there was no train approaching.
There were no casualties in the accident. Gravel had fallen off the truck. Railway infrastructure, two motor cars of electric train and the Sisu truck suffered damages.

Soodevahe level crossing on 31.08.2006

A single locomotive travelling as train no. 4231 collided with a Volkswagen Caddy car at unregulated Soodevahe level crossing at 21.55. It was raining and the car ignored the traffic sign “Stop and give way” and drove to the level crossing without making sure that no rolling stock was approaching. After noticing the approaching train the driver stopped the car and wanted to free the rail tracks by reversing. The locomotive drove into the side of the car.
The car driver suffered slight injuries in the accident. The car, locomotive and roadside marking posts were damaged.

Tallinn-Väike station on 01.09.2006

At 11.25, without permission a diesel train, during shunting, left the boundaries of Tallinn-Väike station to open track, beyond the access traffic lights. On the open track there was train no. 9075 which was approaching Tallinn-Väike station and the train which had stopped beyond the traffic lights. There was immediate danger of collision of the two trains.
There were no casualties and material damage in the accident.

Üleoru Street level crossing on 06.09.2006

A Scania truck collided with a freight train at unregulated Üleoru Street level crossing at 11.20. The Scania truck with semi-trailer was driving to the level crossing without stopping at the sign “Stop and give way”. The front part of truck had already crossed the level crossing when the locomotive of freight train hit the trailer. Sand fell off the truck and the semi-trailer sank to one side as a result.
There were no casualties in the accident. The locomotive and rail tracks suffered damages. The Scania truck and its trailer with cargo suffered damages.

Suure-Jaani level crossing on 14.09.2006

Passenger train no. 0421 and a Volvo truck with trailer collided at unregulated Suure-Jaani level crossing at 11.11. The driver had stopped at the sign “Stop and give way”, but without making sure that there was no train approaching, started to cross the rail tracks. When the truck started motion it was hit by the passenger train and as a result the driver was thrown off the truck.
The truck driver suffered slight injuries. The motor car of the diesel train and the Volvo truck suffered damages. Railway infrastructure remained intact.

Alupere level crossing on 23.10.2006

Passenger train no. 0210 collided with a Scania truck with trailer at unregulated Alupere level crossing at 07.58. The Scania driver was drunk and was driving the truck loaded with cargo of long dimensions without having permission for such cargo for that road section. He drove to rail tracks without making sure that no train was approaching. The Scania truck had already driven over the level crossing when the leading car of passenger train drove with automatic clutch and front part of body into the rear third of the trailer. The leading car of train hit the large high-dimensional concrete structures in cargo.
As a result of collision the leading car and motor car trailer of diesel train were derailed, and the motor car at the end of train was also partially derailed. The locomotive driver and six passengers suffered slight injuries. The whole rolling stock, rail tracks for 50 m, level crossing and traffic control devices were damaged. The truck, trailer and cargo were damaged.

Level crossing no. 19 (Ereda) on 13.11.2006

A track-laying machine travelling as train no. 5102 collided with a Toyota Hiace minibus at unregulated Ereda level crossing at 09.02. The minibus driver was driving at inappropriate speed and not considering the slippery road. He was unable to stop the bus before the sign “Stop and give way”. He noticed the approaching rolling stock too late, drove at low speed to the level crossing and the left side of the minibus collided with the track-laying machine which had reached the level crossing.

The minibus driver was seriously injured as a result of accident. The minibus suffered damages. The rolling stock and infrastructure remained intact.

2. General observations of investigations

All railway traffic accidents for the purposes of the Railways Act were investigated during the year under examination. Consequently, the annual summery is complete and will allow us to draw general conclusions.
The accidents investigated during the year may be assigned to five owners of railway infrastructure. The following table gives the breakdown of accidents by infrastructure owners.

Accidents by infrastructure owners

Table 3

Infrastructure owner	**Accident at regulated level crossing (active level crossing)**	**Accident at unregulated level crossing (passive level crossing)**	**Derailment of rolling stock**	**Danger of collision by ignoring prohibiting signals**
Edelaraudtee Infrastruktuur	-	3	-	1
Eesti Raudtee	5	4	1	-
Maardu Raudtee	-	1	-	-
Milstrand	-	1	-	-
Põlevkivi Raudtee	1	3	-	-
Total	6	12	1	1

The largest number of accidents happened in the infrastructure of AS Eesti Raudtee, which is the biggest in Estonia. Edelaraudtee Infrastruktuuri AS and AS PõlevkiviRaudtee are the next largest railway undertakings owning infrastructure and thus the number of accidents corresponds to their size.
Both in the above and in the following table the accidents have been categorised according to primary characteristics. As a result of one collision of rolling stock and road vehicle rolling stock was derailed. Both in the table above and in the following table it has been presented as an accident which happened at unregulated (passive) level crossing.
The following table will show the accidents by breaking them down by owners of rolling stock. GoRail and Edelaraudtee belong to AS GoGroup.

Accidents by rolling stock owners

Table 4

Owner of rolling stock	Accident at regulated (active level crossing)	Accident at unregulated level crossing (passive level crossing)	Derailment of rolling stock	Danger of collision by ignoring prohibiting signals
GoGroup	1	5	-	1
Eesti Raudtee	2	2	1	-
Maardu Raudtee	-	2	-	-
Põlevkivi Raudtee	1	2	-	-
Elektriraudtee	-	1	-	-
Rööbasteede Ehitus	2	-	-	-
Kokku	6	12	1	1

In the above table all the accidents of the rolling stock owner GoGroup (including Edelaraudtee AS) and Elektriraudtee AS happened to passenger trains. The accidents with the passenger trains of GoGroup happened in the infrastructure of both Edelaraudtee Infrastruktuuri AS and AS Eesti Raudtee. The accidents to the passenger trains of Elektriraudtee AS and rolling stock travelling as train of Rööbasteede Ehitus AS happened in the infrastructure of AS Eesti Raudtee. The trains of AS Eesti Raudtee collided with road vehicles both at level crossings of AS Eesti Raudtee and AS Põlevkivi Raudtee. Railway accidents to the trains of Maardu Raudtee AS happened both in their own infrastructure and in the infrastructure of AS Milstrand.

Nobody was killed in the investigated railway accidents. Injuries were suffered only in the railway accidents which happened at level crossings.

Injured

Table 5

Infrastructure owner	Killed	Injured in road vehicles	Injured in railway rolling stock
Edelaraudtee Infrastruktuur	-	2	-
Eesti Raudtee	-	3	7
Maardu Raudtee	-	-	-
Milstrand	-	1	-
Põlevkivi Raudtee	-	2	-
Total	-	8	7

Nine out of 20 investigated cases ended with injuries and the number of people injured was 15. People who were in road vehicles suffered bodily injuries more often. Seven people, one of them was a railwayman, suffered slight injuries in one accident while travelling in the train. People who were either in trucks or cars suffered injuries in eight accidents, of which on two occasions drivers had serious injuries. All the rest of accidents caused only slight injuries.
People who are in rolling stock suffer injuries only as a result of relatively serious accidents. The accident with seven people injured was the most serious accident of the year, but with regard to damage it was considered as a slight accident and pursuant to the Railways Act satisfied the characteristics of level II accident.

Material damage
incurred by accidents

Table 6

Damages	**Collision with truck**	**Collision with car or minibus**	**Derailment of rolling stock**
Rolling stock damaged	8	5	1
Infrastructure damaged	2	2	-
Road vehicle damaged	8	10	-
Road and traffic control device damaged	2	1	-

The table summarised 19 investigated accidents. On one occasion when there was immediate danger of collision due to ignoring prohibiting traffic lights no material damage was incurred.
Road vehicles were damaged in all the 18 accidents which happened at level crossings. Rolling stock remained intact in five accidents. All accidents were collisions of trains and cars. Damages to rolling stock were often slighter than damages to road vehicles.

G. Recommendations

1. General information concerning recommendations

The Unit for Investigation of Railway Accidents was established in the spring of 2004. Since then recommendations have been made in investigation reports to improve railway safety. The following table gives systematized recommendations by years. The table also shows the number of accidents investigated during the year.

Recommendations
for improvement of safety

Table 7

Field of activity of recommendation	Year, number of proposals		
	2004	2005	2006
Number of accidents investigated	12	27	20
Maintenance and arrangements of railway infrastructure	7	8	1
Care, maintenance and managing of rolling stock	8	4	5
Organisation of supervision	18	9	7
Road traffic management, road traffic control devices	12	33	10
Winter maintenance of roads	-	7	6
Dissemination of information concerning traffic, training	6	17	14
Amendments to legal acts and regulating instructions	6	17	8
Operation of crossing traffic lights, railway traffic control at level crossings	11	17	9
Organisation of operation of railway communication devices	-	6	4
Professional qualifications of railwaymen	2	2	2
Other arrangements	-	32	22

The recommendations made by independent investigator were referring to railway infrastructure and transport undertakings, road owners, owners of road vehicles, Railway Inspectorate and in individual cases to other institutions and undertakings. The number of recommendations made for improvement of railway traffic safety in 2006 amounted to 88.

2. Overview of recommendations made during the year

During the year one recommendation was made on behalf of the investigation unit to improve maintenance and arrangements of railway infrastructure and it concerned renovation and re-mounting of a road sign.
The recommendations made by independent investigator referring to care, maintenance and managing of rolling stock were twice drawing the attention of railway undertakings to manning the locomotive crews of rolling stock with two people as required by regulations. A recommendation was made to consider the possibility of connecting the start in motion of locomotive to switching on floodlights

and retaining the information in the database of locomotive. Recommendations were made with regard to guaranteeing due operation of speed recorder of diesel trains and diesel locomotives.

With regard to proposals on the organisation of supervision, recommendations were given to enforcement bodies to assess, based on the outcome of annual examination of level crossings, the provision of level crossings with traffic control devices, rules of procedure for using complementary communication by railway undertakings, the work and rest regime of locomotive crews. The enforcement bodies were recommended to verify the compliance of the provision of level crossings with devices according to established rules, the progress of design of level crossings and compliance with applicable requirements. Railway undertakings were recommended to follow the regulations established for the validity of driving licences and to re-examine the principles of the use of shoe brakes in the undertaking.

Three suggestions were made with regard to the road traffic management and traffic control devices. The relevant undertakings were recommended to have co-operation in the provision of level crossings with a sufficient number of traffic control devices. In order to improve visibility it was recommended to change the location of traffic control devices. Provision a level crossing with a barrier was proposed. A recommendation was made to build a two-level crossing. On two occasions it was recommended to fix the level crossing temporarily with additional traffic signs for the time of reconstruction. Two proposals were made on the renovation and re-mounting of traffic control devices.

The persons responsible for winter maintenance of roads were recommended on six occasions to re-examine the contractual conditions with providers of winter maintenance services in order to take more efficient measures for sufficient de-icing at level crossings.

The proposals with regard to dissemination of traffic information and training were made on 14 occasions, mainly to the owners of road vehicles in order to improve their traffic knowledge and awareness, to further enhancement of traffic culture and information of the public.

The recommendations which would prepare for amendments to legal acts were about safety criteria at level crossings, more flexible conditions for provision of level crossings of low traffic intensity and limited visibility with traffic lights and additional devices, specification of driving rights of different types of rolling stock. A proposal was made to update *Railway signalling guidelines* considering present needs and possibilities in order to provide the right to use modern signalling device. Railway undertaking were asked to specify in their regulating instructions requirements to passport data of level crossings and in the technical specifications of stations to specify the layout of train compositions on tracks of departure and tracks of departure-shunting. They were advised to develop a safety management system in their undertakings.

Five proposals were made with regard to the operation of signalling devices and organisation of railway traffic. It was recommended to supply level crossings with traffic lights. On three occasions recommendations were made concerning the location of traffic lights at level crossings and adjustment of the visibility of departure

traffic lights. It was recommended to mount shunting traffic lights and departure traffic lights at the station.
While evaluating the functioning of radio communications and organisation of the operation of communication devices a proposal was made to take measures in order to ensure reliable radio communication in conformity with instructions to reduce communication disturbances between locomotive crews and train dispatchers. On two occasions proposals were made to record information exchange on train traffic and shunting on data recorders.
With regard to the professional qualifications of railwaymen it was recommended to make the training of locomotive crews more effective and to establish a comprehensive training system in the undertaking for better understanding of technical specifications of stations and for compliance with the requirements on driving experience of locomotive crews. It was necessary to draw attention to the importance of the development of rational driving habits for locomotive crews in compliance with regulations and ensuring traffic safety.
Other arrangements, which were not categorised, are related to two proposals on the closure of level crossings and work arrangements of truck drivers at a road transport undertaking. On nine occasions it was considered necessary to study traffic intensity, on eight occasions it was recommended to adjust the passport data of level crossings. In addition it was proposed to cut the brush in the vicinity to improve visibility. It was pointed out that it was necessary to keep the evidence related to accidents until investigation was completed by an independent investigator.

3. Implementation of recommendations

The recommendations made by independent investigator were referred to 29 institutions and undertakings. Seven of them were railway infrastructure and railway transport undertakings. The application process of the requirements of Railway Safety Directive 2004/49/EC in Estonian legislation was not completed during the year. Submitting information to the Unit for Investigation on the implemented or planned measures based on recommendations was voluntary. Two bigger railway infrastructure and railway transport undertakings, AS Eesti Raudtee and Edelaraudtee AS submitted reports on the proceedings of the recommendations given by the Unit for Investigation. Railway Inspectorate as the safety authority also submitted their report. We received an overview of the proceedings of our recommendations from five institutions and undertakings. 21 recommendations were made to AS Eesti Raudtee. The undertaking has accepted 14 recommendations and is continuing proceedings of six recommendations. One recommendation was rejected. The opinion of the undertaking is that it is not practical to include in the electric circuits of locomotive an additional blocking linked to flood lights. Such inclusion of blocking would be an additional cause for failures and will essentially reduce the general reliability of the operation of locomotives. Similarly, it will not be possible to do shunting with such locomotives. Therefore, the recommendation to consider in future connecting the start in motion of locomotive to switching on of floodlights in the driving direction was rejected.

Seven recommendations were made to Edelaraudteele AS. Proceedings have been completed for six recommendations by taking necessary measures for improvement of traffic safety. They are continuing proceedings of one recommendation.
Nine proposals were made to the Railway Inspectorate concerning supervision and preparation of amendments to legislation. Five of the recommendations were accepted. They have examined the proposals, made analysis and prepared necessary amendments to legislation. They accepted the recommendation concerning paying special attention to one specific level crossing. They are continuing proceedings of four recommendations by evaluating the situation and making analysis. The Railway Inspectorate has not rejected any recommendations.
One recommendation was made to the Labour Inspectorate which they are continuing proceeding.
Rae Rural Municipality Government, the owner of the road, crossing railway, was made three recommendations. The Rural Municipality Government is continuing proceedings of recommendations in co-operation with the railway infrastructure undertaking.
The Unit for Investigation made 88 recommendations and has received response to 41 recommendations. Proceedings of 25 recommendations made by an independent investigator have been completed by the implementation of necessary measures, proceedings are continuing of 15 recommendations and one recommendation was rejected with reasoning.