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ANNUAL REPORT BY THE NATIONAL INVESTIGATING BODY OF THE REPUBLIC OF SLOVENIA IN RAILWAY TRANSPORT 2011

Ljubljana, 10 August 2012

INTRODUCTION

In the Republic of Slovenia, the national investigating body in railway transport became operational on 1 June 2008. Prior to this date all railway accidents and incidents were investigated solely by the manager of the railway infrastructure. From 1 June 2004 to 1 April 2012 investigations were carried out by the Railway Accident and Incident Investigation Division, an independent body within the Ministry of Transport.

On 1 April 2012, the investigating body in railway transport was merged with the investigating body in air transport. The Chief Investigator of Railway Accidents and Incidents now works within the Accident Investigation Service, a unit of the recently established Ministry of Infrastructure and Spatial Planning of the Republic of Slovenia.

The Chief Investigator investigates railway accidents and incidents in order to improve safety and prevent accidents in railway transport.

He operates in line with the Railway Safety Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004, which was transposed into Slovenia's legal order through the adoption of the Railway Transport Act, published in *Uradni list RS* [Official Gazette of the RS], No. 44/2007, on 21 May 2007, and the Safety of Railway Transport Act, published in *Uradni list RS*, No. 61/2007, on 10 July 2007.

The annual report on investigations in railway transport in Slovenia for 2011 includes a presentation of the organisation, the legal basis, an overview of investigated accidents and recommendations issued in 2011.

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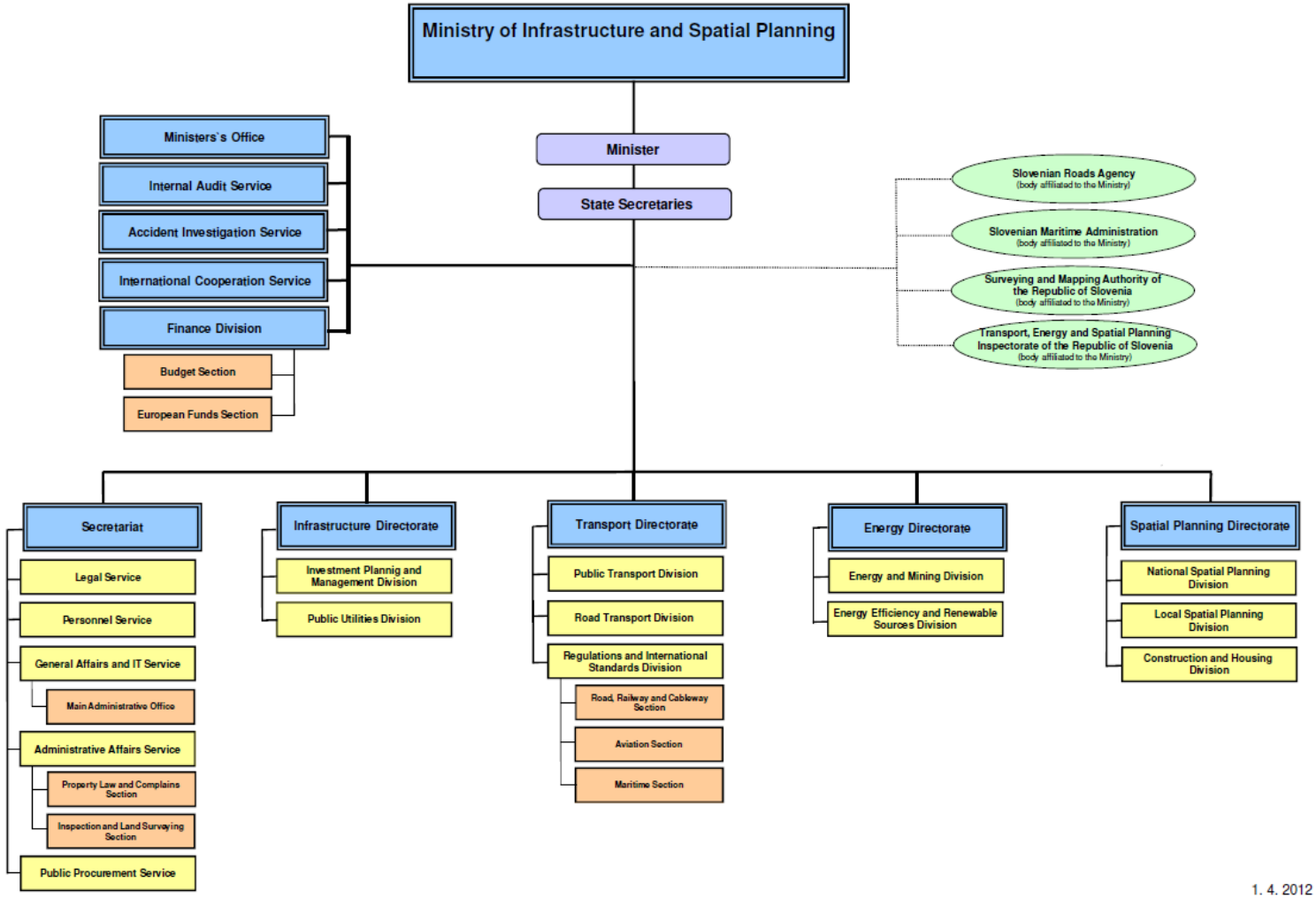
1 ABOUT THE NATIONAL INVESTIGATING BODY

The Chief Investigator of Railway Accidents and Incidents works in the Accident Investigation Service of the Ministry of Infrastructure and Spatial Planning of the Republic of Slovenia. The Service also investigates aviation accidents and is directly subordinate to the minister responsible for transport in Slovenia.

The investigating body in railway transport is part of a joint Service and not a separate organisation. The Chief Investigator of Railway Accidents and Incidents works in the Accident Investigation Service.

The Chief Investigator of Railway Accidents and Incidents is independent in his work but organisationally part of the Accident Investigation Service. His work is financed from a budgetary item. He is in his work independent from investigating bodies in other transport branches, the national railway safety authority and the regulator of railways.

The Slovenian railway transport investigating body was established on 1 June 2008. Since 1 April 2012 the office of the Chief Investigator of Railway Accidents and Incidents is not an organisational unit on its own. He is part of a joint Accident Investigation Service with the air transport investigating body. The registered office of this Service is at the Ministry of Infrastructure and Spatial Planning of the Republic of Slovenia, Langusova ulica 4, Ljubljana.


Ministry of Infrastructure and Spatial Planning
Minister
State Secretaries
Ministers`s Office
Internal Audit Service
Accident Investigation Service
International Cooperation Service
Finance Division
Budget Section
European Funds Section
Slovenian Roads Agency
(body affiliated to the Ministry)
Slovenian Maritime Administration
(body affiliated to the Ministry)
Surveying and Mapping Authority of the Republic of Slovenia
(body affiliated to the Ministry)
Transport, Energy and Spatial Planning Inspectorate of the Republic of Slovenia
(body affiliated to the Ministry)
Secretariat
Legal Service
Personnel Service
General Affairs and IT Service
Main Administrative Office
Administrative Affairs Service
Property Law and Complains Section
Inspection and Land Surveying Section
Public Procurement Service
Infrastructure Directorate
Investment Plannig and Management Division
Public Utilities Division
Transport Directorate
Public Transport Division
Road Transport Division
Regulations and International Standards Division
Road, Railway and Cableway Section
Aviation Section
Maritime Section
Energy Directorate
Energy and Mining Division
Energy Efficiency and Renewable Sources Division
Spatial Planning Directorate
National Spatial Planning Division
Local Spatial Planning Division
Construction and Housing Division

1. 4. 2012

1.1. Legal basis (legal framework)

The legal basis for the work of the Chief Investigator of Railway Accidents and Incidents is provided in Article 26 of the Railway Transport Act (*ZZelP-UPB6*), *Uradni list RS* [Official Gazette of the RS], No. 11/2011 of 21 February 2011.

The Chief Investigator of Railway Accidents and Incidents is not independent in his organisation, but is independent in funding and legal structure from any infrastructure manager, railway undertaking, charging body, allocation body and notified body, and from any party whose interests could conflict with the tasks entrusted to the investigating authority. He is also functionally independent from the safety authority and from any regulator of railways.

1.2. Role (description of mandate) and objective (mission)

The Chief Investigator of Railway Accidents and Incidents of the ministry responsible for transport is appointed for an indefinite period of time on the basis of a contract and investigates serious accidents, accidents and incidents.

Serious accidents, accidents and incidents in railway transport are investigated with the objective of improving safety in railway transport. The Chief Investigator of Railway Accidents and Incidents cooperates with the investigating bodies of other railways in the European Union within the network of national investigating bodies that is managed by the European Railway Agency (ERA).

1.3. Internal structure and units

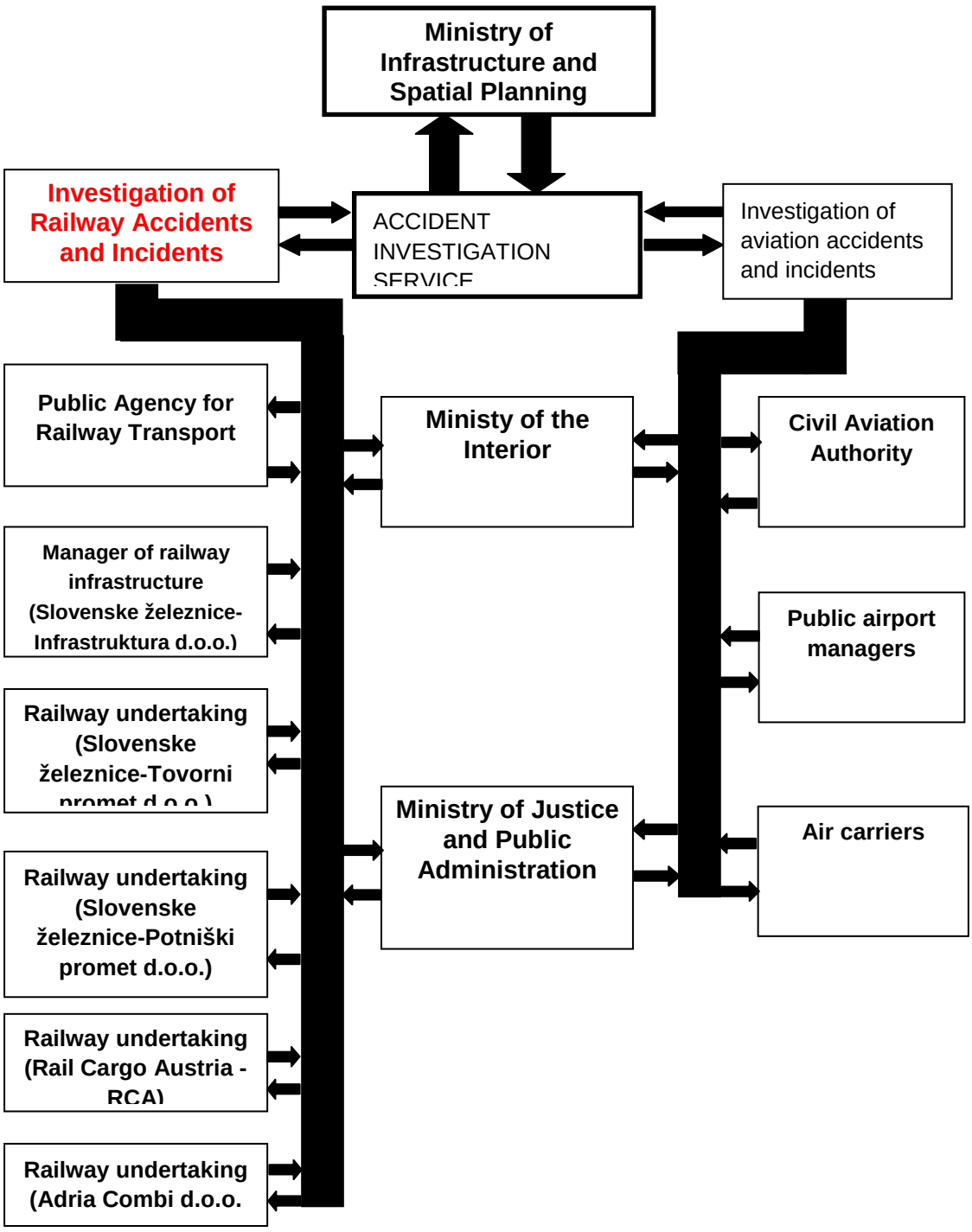
The Chief Investigator now works within the Accident Investigation Service of the Ministry of Infrastructure and Spatial Planning of the Republic of Slovenia that is responsible for transport. This Service does not have any subunits.

According to the Ministry's internal classification of positions, one position is defined for the chief investigator of railway accidents and incidents in the Accident Investigation Service. In addition to conducting investigations of railway accidents and incidents, he also manages funds earmarked in the budget for investigations of railway accidents and incidents.

The Chief Investigator has the necessary qualifications to perform all the functions required in an investigation procedure in the event of a railway accident or incident.

1.4. Flow chart or placement of the national investigating body

The Chief Investigator of Railway Accidents and Incidents of the ministry responsible for transport investigates accidents and incidents and is fully independent in his work.



He cooperates with other national investigating and judiciary bodies, the railway safety authority, infrastructure manager and all licensed railway undertakings in Slovenia.

Where necessary, he also collaborates with the investigating bodies of other railways in the European Union within the network of national investigating bodies that is managed by the European Railway Agency (ERA).

He collects the information required in an investigation procedure from the authorities listed in this chart. Since investigations of railway accidents are

carried out with as much openness as possible, all the parties involved and all stakeholders can give statements and share the investigation results.

The Ministry responsible for transport guarantees the Chief Investigator of Railway Accidents and Incidents, who is now part of the Accident Investigation Service, independence in his work by providing funds for his work from the budget. The Ministry also provides administrative support for his work. The Ministry does not interfere with the independence of the Chief Investigator of Railway Accidents and Incidents. Owing to the unclear organisational structure without any subunits, the organisational structure is disadvantageous and does not enable a long-term development of this field.

In accordance with Article 35 of the Safety of Railway Transport Act (*ZVZeIP-UPB1*) published in *Uradni list RS* [Official Gazette of the RS], No. 36/2010, on 4 May 2010, the infrastructure manager and railway undertakings must immediately notify the investigating body of any serious accident, accident or incident in railway transport.

The investigating body is first notified via a telephone call and later in writing on a special form.

1.5 Philosophy of conduct in an investigation (philosophy, approach to establishing an investigation in the country and the degree of mobility, readiness and timeliness)

Article 29 of the Safety of Railway Transport Act (*ZVZeIP-UPB1*) published in *Uradni list RS* [Official Gazette of the Republic of Slovenia], No. 36/2010, on 4 May 2010 stipulates that the competent authorities, railway undertakings, the infrastructure manager and other parties involved must enable the investigating body to perform its tasks in an efficient, speedy and independent manner. On the basis of past experience, it should be highlighted that all the participating parties comply with the provisions.

Under Article 26 of the Railway Transport Act (ZZelP-*UPB6*), *Uradni list RS* [Official Gazette of the RS], No. 11/2011 of 21 February 2011, the investigating body must investigate serious accidents.

The investigating body may, at its discretion, also decide to investigate those accidents and incidents which in similar conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of rail systems. In its decision, it takes the following issues into account:

a) the seriousness of the accident or incident;

b) whether it forms part of a series of accidents or incidents relevant to the system as a whole;

c) its impact on railway safety on the Community level; and

d) requests from infrastructure managers, railway undertakings and the safety authority or EU Member State.

The Chief Investigator of Railway Accidents and Incidents complies with all the provisions of the said Act. Because it is understaffed, the investigating body must carefully examine whether an accident or incident warrants an investigation.

The Chief Investigator of Railway Accidents and Incidents of the Ministry of Infrastructure and Spatial Planning that is responsible for transport is permanently on call outside his regular working hours.

The Chief Investigator identifies himself with a special service card or badge. The service card is prescribed by the minister.

For the purposes of mobility, the Chief Investigator has a service vehicle of the Accident Investigation Service. If this vehicle is not available, the Chief Investigator uses his own passenger vehicle or public transport.

Such an organisation of working hours and mobility guarantees that investigation procedures are launched in the proper time. It takes the Chief Investigator up to two hours by car to reach the farthest location on the railway network from the place of his residence or work, which in his case are both located in the centre of Slovenia.

2 INVESTIGATION PROCEDURE

2.1 Cases where investigation is obligatory or optional under Articles 19 and 21 of the Railway Safety Directive

The investigating body carries out investigations of serious accidents, accidents and incidents in railway transport. Under the Railway Transport Act (ZZelP-*UPB6*), *Uradni list RS* [Official Gazette of the RS], No. 11/2011 of 21 February 2011, the investigating body must investigate all serious accidents. The investigating body may, at its discretion, decide to investigate also those accidents and incidents which in similar conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of rail systems.

According to the Safety of Railway Transport Act (*ZVZeIP-UPB1*), *Uradni list RS* [Official Gazette of the RS], No. 36/2010 of 4 May 2010, a serious accident means any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety. Extensive damage means damage that can immediately be assessed by the Chief Investigator of Railway Accidents and Incidents to cost at least EUR 2 million in total.

The Chief Investigator of Railway Accidents and Incidents complies with the provisions of the aforementioned Acts and investigates all serious accidents, accidents and incidents which in similar conditions might have led to serious accidents or accidents. He decides to investigate accidents and incidents at his discretion.

2.2 Institutions participating in investigations (on a regular or extraordinary basis)

The Chief Investigator of Railway Accidents and Incidents at the ministry responsible for transport always includes in his investigation the reports of the Ministry of the Interior and occasionally also the reports of judicial authorities.

Where analyses of chemical substances or other materials are required, the Jožef Stefan Institute and the Institute for Research of Materials participate in the investigation procedure.

The Institute of Forensic Medicine participates in the investigation procedure when a post mortem examination of a victim is required.

For the purposes of reproducing recordings of verbal communication, the Chief Investigator collaborates with experts of the infrastructure manager and railway undertakings using the relevant recording devices.

2.3 Investigation procedure or investigating body's approach (identical to 1.5 but more detailed)

Article 29 of the Safety of Railway Transport Act (*ZVZeIP-UPB1*), *Uradni list RS* [Official Gazette of the Republic of Slovenia], No. 36/2010 of 4 May 2010, stipulates that the competent authorities, railway undertakings, the infrastructure manager and other parties involved must enable the investigating body to perform

its tasks in an efficient, speedy and independent manner. All the parties involved have complied with this requirement. lnemu organu dolžni pristojni organi, prevozniki, upravljavec in druge vpletene osebe omogočiti učinkovito, hitro in neodvisno opravljanje njegovih nalog, kar po dosedanji praksi vsi vpleteni spoštujejo. The Chief Investigator identifies himself with a special service card or badge. The service card is prescribed by the minister.

Article 29 of the Safety of Railway Transport Act (*ZVZeIP-UPB1*), *Uradni list RS* [Official Gazette of the Republic of Slovenia], No. 36/2010 of 4 May 2010, defines the duties of the competent authority, railway undertakings, the infrastructure manager and other parties involved in relation to the investigating body, which must be provided with:

a) unlimited access to the site of the serious accident, accident or incident as well as to the rolling stock involved, the related infrastructure and traffic control and signalling installations;

b) the right to an immediate listing of evidence and controlled removal of wreckage, infrastructure installations or components for examination or analysis purposes;

c) access to and use of the contents of on-board recorders and equipment for recording of verbal messages and registration of the operation of the signalling and traffic control system;

d) access to the results of examination of the bodies of victims;

e) access to the results of examinations of the train staff and other railway staff involved in the accident or incident;

f) the opportunity to question the railway staff involved and other witnesses;

g) access to any relevant information or records held by the infrastructure manager, the railway undertakings involved and the safety authority.

Under Article 26 of the Railway Transport Act (ZZelP-*UPB6*), *Uradni list RS* [Official Gazette of the RS], No. 11/2011 of 21 February 2011, the investigating body must investigate serious accidents.

The investigating body may, at its discretion, decide to investigate also those accidents and incidents which in similar conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of rail systems. In its decision, it takes the following issues into account:

a) the seriousness of the accident or incident;

b) whether it forms part of a series of accidents or incidents relevant to the system as a whole;

c) its impact on railway safety on the Community level; and

d) requests from infrastructure managers, railway undertakings and the safety authority or EU Member State. The Chief Investigator of Railway Accidents

and Incidents complies with all of the regulatory provisions on the investigating body. Because it is understaffed, the investigating body must carefully examine whether an accident or incident warrants an investigation.

3 INVESTIGATIONS

3.1 Review of investigations completed in 2011

In 2011, the Railway Accident and Incident Investigation Division investigated only three accidents:

– collision of freight train no. 42772 with a passenger vehicle, a Renault Clio, on 5 September 2009 at 02:40 in Vnanje Gorice at a level crossing of the local road with the double-track railway line between Brezovica and Preserje stations that is protected with half-barriers; the driver of the passenger vehicle died of injuries sustained in the accident.

Type of investigated accidents	**No. of accidents**	**Human consequence**		**Damage in € (estimated)**	**Trend compared to 2009**
		Fatalities	**Seriously injured**		
Collision	0	0	0	0	0
Derailment	0	0	0	0	0
Other	3	2	1	9076.11	< 2

3.2 Investigations started and completed in 2010

In 2010, six investigations of accidents were started, of which two were completed in 2011. One investigation started in 2010 was completed in 2012.

Investigations completed in 2011				
Date of accident	Type of accident	Site of accident	Legal basis	Date of completion
27.01.2010	collision of passenger train with passenger vehicle	Maribor Studenci station	Article 26 of Railway Transport Act (*ZZelP*)	09.06.2011
25.02.2010	collision of freight train with passenger vehicle	between Dankovci and Murska Sobota stations	Article 26 of Railway Transport Act (*ZZelP*)	01.12.2011
10.06.2010	collision of passenger train with passenger vehicle	between Brezovica and Preserje stations	Article 26 of Railway Transport Act (*ZZelP*)	26.04.2012

In 2011, the Railway Accident and Incident Investigation Division launched investigations of six accidents pursuant to Article 19(2) of Directive 2004/49/EC of 29 April 2004.

Investigations started in 2011				
Date of accident or incident	Type of accident or incident	Site of accident or incident	Legal basis	Envisaged date of completion of investigation
20.02.2011	collision and derailment of shunting composition	Ljubljana Zalog station; track no. 10a	Article 26 of Railway Transport Act (*ZZelP*)	28.03.2012
24.06.2011	collision of freight train with passenger vehicle	between Ptuj and Moškanjci stations	Article 26 of Railway Transport Act (*ZZelP*)	12.04.2012
26.08.2011	collision of freight train with passenger train	Jesenice station; points no. 3	Article 26 of Railway Transport Act (*ZZelP*)	03.08.2012
23.09.2011	passenger hit by freight train	Ormož station; track no. 1	Article 26 of Railway Transport Act (*ZZelP*)	23.09.2012
10.10.2011	derailed wagon of a train	between Ljubljana Zalog and Ljubljana stations; points no. 19	Article 26 of Railway Transport Act (*ZZelP*)	10.10.2012
10.10.2011	collision of passenger train with the trailer of road freight vehicle	between Ljubljana Rakovnik and Škofljica stations	Article 26 of Railway Transport Act (*ZZelP*)	10.10.2012

3.3 Research studies (or safety studies in case of serious accidents) commissioned and completed in 2011

No investigation procedures requiring research studies of safety on the railway network in Slovenia were launched in 2011.

No accident similar to the derailment of the shunting composition on 20 February 2011 has occurred on the railway network in Slovenia in the past ten years.

The collision of two passenger trains on 18 April 2008 was caused by a similar factor as the collision on 26 August 2011. A research study on safety was not required since the causes of the two collisions were investigated in detail and defined. Additional investigations are not necessary despite this similarity, since we definitely cannot claim that these two cases raise concern and similar accidents are possible in future.

Two accidents occurred at level crossings that are constructed and marked with traffic signs for road users. The in-depth investigation has shown that in the case of one level crossing, a house built in the visibility triangle obstructs a road user's view. The construction of this house was approved by the railway infrastructure manager. In the case of the second level crossing, visibility is obstructed by crops.

The two isolated cases involving a passenger who was hit by a train in a station and derailment of a wagon do not require any special studies.

3.4 Summaries of investigations completed in 2011. Brief descriptions, photos, tables and safety studies

Collision of locomotive train no. 96366 with a passenger vehicle at a level crossing in Mariborci Studenci station

On 27 January 2010 at 20:45, locomotive train no. 96366 passed at danger the US-C entry signal at Maribor Studenci station, and then at the Ljubljanska ulica level crossing at km 0+819 collided with a road passenger vehicle crossing the railway line.

The railway line between Maribor and Prevalje international border has a single track. The railway line runs in the shape of a triangle between Maribor, Maribor Tezno and Maribor Studenci stations. The lines from the directions of Maribor and Maribor Tezno run parallel from km 0+600 towards Maribor Studenci station. The extended station tracks are parallel when they cross Ljubljanska ulica/Ljubljanska street at km 0+819.

Locomotive train no. 96366 was travelling from Pragersko to Maribor Studenci. The train switched from the main Zidani Most–Šentilj international border railway line onto the regional Maribor–Prevalje line at the Ptujska cesta junction, and then travelled along the branch line towards Maribor Studenci station.

The Ptujska cesta junction is located between Maribor Tezno and Maribor stations at km 592+142 and is for the branch line from the direction of Maribor Tezno–Prevalje international border the start or km 0+000 on the railway line from the Ptujska cesta junction to Prevalje international border.

Locomotive train no. 96366 was travelling from Maribor Tezno station towards Maribor Studenci station.

The Ljubljanska ulica level crossing is equipped with mechanical double-leaf barriers and illuminated road signs. The barriers are lowered by two levers installed in the box of the level crossing guard. The box is located on the left-hand side of the line next to

the right-hand pavement in Ljubljanska ulica viewed from the direction of Ulica Moše Pijada towards Ulica Pariške komune.

The Ljubljanska ulica level crossing at km 0+819 was not protected at the time of the accident; the barriers were not closed.

The driver of the passenger vehicle drove along the correct right-hand lane in Ljubljanska ulica from the direction of Ulica Moše Pijada towards Ulica Pariške komune. She entered the level crossing on the right-hand side of the locomotive train viewed from its travelling direction.

After the collision, the locomotive pushed the passenger vehicle forward for 49 m before the vehicle came to a halt in the area between the two tracks while the locomotive came to a halt next to the road vehicle after another 10.8 m.

The driver of the passenger vehicle sustained minor injuries and was taken by ambulance to Maribor University Medical Centre.

The direct cause of the accident was a malfunction in a brake on the locomotive train, which resulted in inadequate braking performance, and the locomotive driver of the train involved in the accident not being able to control his speed between the PS-C pre-entry signal and the US-C entry signal at Maribor Studenci station, and to stop in a safe and timely manner in front of the US-C entry signal at Maribor Studenci station, which was displaying signal 1: "Stop".
The indirect cause of the accident was the marking of the US-C entry signal indicating the distance of the railway line between the PS-C pre-entry signal and the US-C entry signal at Maribor Studenci station that measures 668 m and the prescribed distance is 700 m with a permitted reduction of 5%. The PS-C pre-entry signal at Maribor Studenci station is not properly marked with signal 25 as prescribed: "Pre-signal marking" located at a distance that is up to 5% shorter than the braking distance, which is misleading for locomotive drivers.

Figure: The red arrow shows the direction of the train while the blue arrow shows the direction of the passenger vehicle, and the black cross the site of collision

Recommendations:

1. In the case of regular or extraordinary maintenance of traction vehicles, especially the maintenance of their vital components (i.e. braking systems, tread profiles and safety devices), traceability must be provided on the basis of detailed internal

regulations for individual types of vehicles.

2. Maribor Traction Section (*Sekcija za vleko Maribor*) must amend the EV-41 record of track information with section 30-34, the curve between Tezno and Maribor Studenci, a regional railway line without an autostop device at the US-C entry signal.

3. The PS-C pre-entry signal Maribor Studenci must be marked with signal 25 as prescribed: "Pre-signal marking" located at a distance that is up to 5% shorter than the braking distance.

4. Instructions, including a detailed description of the device and how to operate it, should be drawn up for devices (chain spindles) used by guards at level crossings protected with half-barriers or barriers, for the lowering or raising of these barriers manually.

Collision of freight train no. 42083 with a passenger vehicle at a level crossing protected with half-barriers between Dankovci and Murska Sobota stations

On 25 February 2010 at 11:14, freight train no. 42083 collided with a road passenger vehicle at the NPr-44+4 level crossing in Puconci between Dankovci and Murska Sobota stations at km 44+435; at the time of the collision, the passenger vehicle was driving over the level crossing after it had turned onto the incorrect or opposite lane at the junction and circumvented the lowered half-barrier.

The main railway line no. 41 from Ormož via Murska Sobota to Hodoš international border (T-69) has a single track. The junction of Šalamenci–Puconci–V Lokaj local road with the road bypassing Puconci settlement and running next to the railway line is located immediately ahead of the level crossing. At the junction, the road from the direction of Šalamenci settlement (the road bypassing Puconci settlement) and V Lokaj street runs onto the level crossing in the direction of Puconci settlement and Varoša.

Freight train no. 42083 was travelling from Hodoš international border to Koper freight station.

The driver of the passenger vehicle and his wife seated in the passenger seat were driving along the local road from Šalamenci settlement. At the aforementioned junction, he turned left onto the opposite lane of the main road running through Puconci settlement and proceeded towards the level crossing protected with two half-barriers.

The NPr-44+4 level crossing is equipped with mechanical single-leaf half-barriers and flashing or illuminated road signs. When the half-barriers are lowered across the road, they protect the lane in the travelling direction of road vehicles. If the device is in perfect working order and trains pass all the switches at the level crossing, the half-barriers are mechanically lowered when the train's first axle passes the switch from either of the two directions.

The device protecting the NPr-44+4 level crossing at km 44+435 was in perfect working order at the time of the accident; the half-barriers were lowered across the road.

The railway line from the direction of Hodoš international border station runs in a straight line for the last 1000 m before the level crossing, and immediately after the level crossing continues into a left curve that is 200 m long. For the last 110 m, the local road runs towards the level crossing from the direction of Šalamenci in a slight 'S' curve at an angle of 30°. Before the curve, the road runs parallel to the railway line for 140 m at a distance of 60 m from the track. Immediately after the junction, the road crosses the railway line in the direction of Puconci settlement at an angle of 90°, then turns towards the settlement at an angle of 40° and runs parallel to the railway line for 200 m at a distance of 100 m from the tracks.

The train had been catching up with the passenger vehicle travelling parallel to it for 140 m, and for the last stretch of 110 m, the train was catching up with the passenger vehicle at an angle of 30 °.

At the level crossing the train hit the left-hand side of the passenger vehicle, pushing it forward for 286.6 m, where it stopped with the vehicle wedged under the locomotive's right fender.

The driver of the road vehicle and his passenger were wearing seat belts and died of the injuries sustained in the collision at the site.

Pursuant to the protocol of the post-mortem examination of the deceased driver performed by the Pathology Department of Murska Sobota Hospital, the direct cause of the accident may have been cardiac arrest, since morphological and pathological modifications of the myocardium were detected.

If the driver did not experience cardiac arrest, the indirect cause of the accident could be assigned to unsuitable protection of the level crossing; since the level crossing is located within the area of the junction, and the noise barriers significantly diminish visibility at the level crossing, the ensuing traffic conditions require drivers to process a great amount of information within a very short period of time, which implies that the level crossing should be protected with four half-barriers closing all the lanes. It is also possible that the driver made an incorrect assessment of the given traffic situation. Perhaps he decided to drive over the level crossing because he was paying attention to the road traffic and was therefore unable to register the signalling devices at the level crossing in a split second. When driving on the opposite lane, he decided to cross the railway line, because he was not stopped by the half-barrier.

The physical and mental functions of road users diminish with age and poor physical fitness. When designing traffic arrangements, the most vulnerable groups of road users (children and the elderly) should be taken into consideration in the first place. Children are reckless and lack experience, while the elderly often react inappropriately to the given situation owing to their diminished physical and mental abilities.

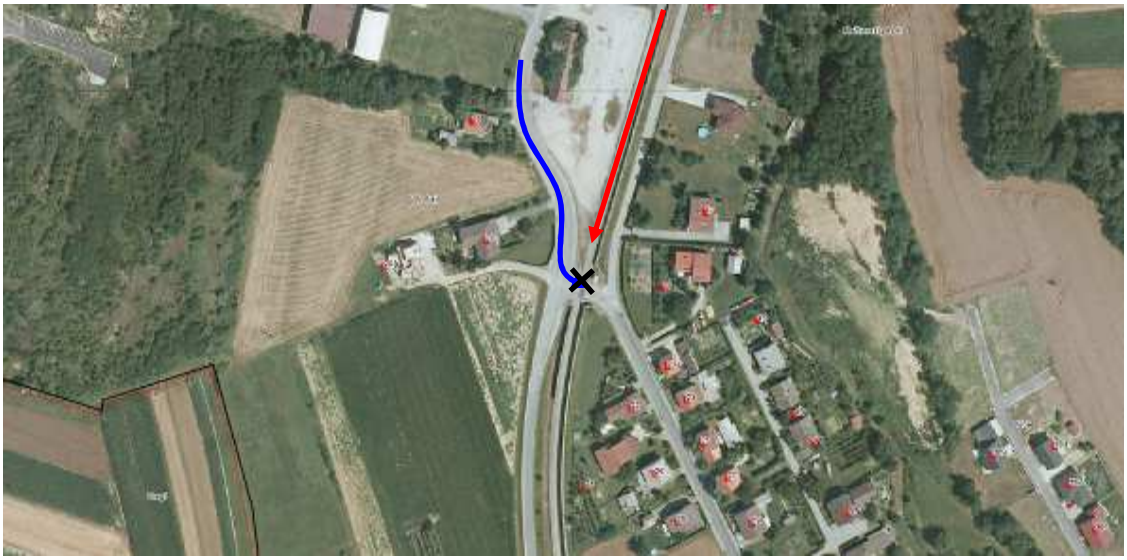


Figure: The red arrow shows the direction of the train while the blue arrow shows the direction of the passenger vehicle, and the black cross the site of collision

Recommendation:

Protection at Puconci 2 level crossing at km 44+435 between Murska Sobota and Dankovci stations should be upgraded – owing to the micro-location of the level

crossing and noise barriers (the level crossing is located within the area of the junction and noise barriers diminish the ability to register the colour of half-barriers) – with half-barriers for all the lanes.

Collision of passenger train no. 2615 with a road freight vehicle at a level crossing protected with half-barriers between Preserje and Brezovica stations

On 10 June 2010 at 18:45, regional passenger train no. 2615 hit the right-hand side of a road freight vehicle, a Citroen Jumper 2.2 HDi, at a level crossing of the municipal road with the railway line which is protected with half-barriers. The accident occurred in Podpeška cesta/Podpeška street in Vnanje Gorice at the level crossing of the municipal road with the main double-track railway line from Ljubljana to Sežana.

The driver of the freight vehicle, a Citroen Jumper 2.2 HDi, was driving along the municipal road from the direction of Brezovica pri Ljubljani towards Vnanje Gorice.

Regional passenger train no. 2615 was travelling along the correct right-hand side track of the double-track railway line from Sežana to Ljubljana.

The level crossing between Brezovica and Preserje stations at km 575+460 is protected for road users with Iskra (remote control) signalling and safety device.

Ahead of the level crossing, the driver of the freight vehicle turned onto the opposite lane, circumvented the half-barrier and drove onto the right-hand side track precisely when regional passenger train no. 2615 was driving along this track.

At a speed of 100 km/h, train no. 2615 hit the right-hand wheel of the freight vehicle with the front of its locomotive, and the freight vehicle rotated by 180° while sliding along the left flank of the electric motor unit. The freight vehicle then overturned onto its right-hand side perpendicular to the railway line at a distance of 12 m from the edge of the carriageway of the level crossing, and the rear of the freight vehicle was on the ballast at a distance of 0.5 m from the outer track. The forward facing train came to a halt at km 575+101 or at a distance of 359 m from the level crossing.

The driver of the road vehicle suffered fatal injuries and died at the scene of the accident.

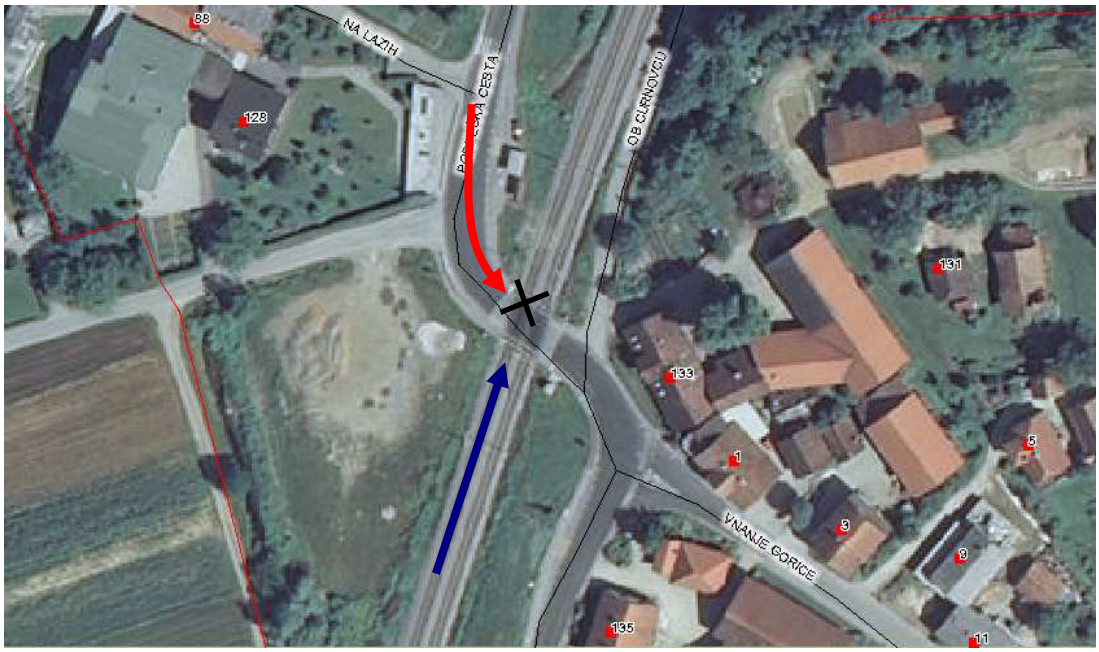


Figure: The blue arrow indicates the travelling direction of the train while the red arrow shows the freight vehicle and the black cross the site of the collision

Cause:
The direct cause of the accident was the driver's tempting of fate when he circumvented the lowered half-barrier and drove onto the right-hand side track where regional passenger train no. 2615 was driving at that very moment.
The indirect cause of the accident can be attributed to the method of protection at the level crossing, since it allows road users to circumvent the lowered half-barriers and thus drive onto the tracks. Special attention should be paid to level crossings in urban areas.

Recommendation:
Since lowered half-barriers are often circumvented at level crossings where the lowered half-barrier protects only half of the road, i.e. the lane in the travelling direction of a road vehicle and not the opposite lane, a gradual modification of protection at this type of level crossings with half-barriers for both lanes from both directions or barriers extending over the entire width of the road is recommended.

The investigations of the accidents described above did not require any special studies or diagrams.

3.5 Explanation and introduction, or the background to investigations

The Railway Accident and Incident Investigation Division was not able to complete investigation procedures started in 2010 by the prescribed deadline in 2011 owing to a long sickness leave of the Chief Investigator as a consequence of injuries sustained in a car accident.

Investigations started in 2011 but not completed					
Date of accident	Type of accident	Site of accident	Legal basis	Reason for not completing or abandoning investigation	Who, why, when (decision)
01.04.2010	incident – incorrect connection of points during maintenance works	Lesce Bled station	Article 26 of Railway Transport Act (*ZZelP*)	investigator on sick leave	investigator on sick leave, anticipated for 31.12.2012
10.06.2010	collision of passenger train with passenger vehicle	between Ljubljana Šiška and Ljubljana Vižmarje	Article 26 of Railway Transport Act	investigator on sick leave	investigator on sick leave, anticipated for 31.12.2012

		stations	(*ZZelP*)		
14.07.2010	collision of freight train with passenger vehicle	between Straža and Novo mesto stations	Article 26 of Railway Transport Act (*ZZelP*)	investigator on sick leave	investigator on sick leave, anticipated for 31.12.2012
23.09.2011	passenger hit by freight train	Ormož station, track no. 1	Article 26 of Railway Transport Act (*ZZelP*)	by the prescribed deadline	investigator, anticipated for 23.09.2012
10.10.2011	derailed wagon of a train	between Ljubljana Zalog and Ljubljana stations, line no. 1	Article 26 of Railway Transport Act (*ZZelP*)	by the prescribed deadline	investigator, anticipated for 10.10.2012
10.10.2011	collision of passenger train with the trailer of road freight vehicle	between Ljubljana Rakovnik and Škofljica stations	Article 26 of Railway Transport Act (*ZZelP*)	by the prescribed deadline	investigator, anticipated for 10.10.2012

3.6 Accidents and occurrences investigated in the past five years (between 2007 and 2011)

Overview of investigated railway accidents between 2007 and 2011: serious accidents, accidents, occurrences and safety studies, including information for the period from 2007 to 2011, according to types – train collision with another train, train collision with an obstacle, derailment, accidents involving persons and rolling stock in motion, fire in rolling stock, accidents involving dangerous goods, and other accidents (item 3.1 should be supplemented with trends established in investigations of accidents).

Investigated accidents		2007	2008	2009	2010	2011	Total
Serious accidents Article 19 (1+2) of	collision					1	1
	derailment					1	1
	level crossing						

Railway Safety Directive	persons and rolling stock in motion						
	fire in rolling stock						
	other						
	dangerous						
Other accidents Article 21(6) of Railway Safety Directive	collision			1			1
	derailment					1	1
	level crossing		1	4	5	2	12
	persons and rolling stock in motion			1		1	2
	fire in rolling stock						
	other						
	dangerous						
TOTAL			1	6	5	6	18

Since the Slovenian railway transport investigating body became operational on 1 June 2008, the presentation of accident investigation trends is not complete for the past five years. Only one accident was investigated in 2008, six accidents and one incident were investigated in 2009 and, similar to 2008, only one accident was investigated in 2010 owing to the long-term sickness leave of the Chief Investigator. Because it was necessary to collect investigation material for investigations of accidents initiated in 2010, only three accidents were investigated in 2011.

No special safety studies of railway transport were made in the period 2006-2011 since the investigating body became operational on 1 June 2008. From this date until the end of 2011, accidents of a similar or identical type requiring a detailed study did not occur on the railway network in Slovenia.

4 RECOMMENDATIONS

In 2011, the Railway Accident and Incident Investigation Division issued six recommendations:

- two recommendations refer to the upgrading of signalling devices and protection at level crossings;
- one refers to traceability of maintenance works on locomotives;
- one refers to traceability of locomotive drivers' licences;
- one refers to the upgrading of the main signal; and
- one refers to drawing up internal instructions for the safety device at the level crossing.

Recommendations issued		Follow-up of recommendations					
		implemented		being implemented (or are prepared)		will not be implemented (rejected)	
YEAR	no.	no.	%	no.	%	no.	%
2006							
2007							
2008	2	2	100				
2009	16	14	87.5	2	12.5		
2010	3	2	66.7	1	33.3		
2011	6	4	66.6	2	33.3		
TOTAL	27	22	81.5	5	18.5		

Daniel Lenart, Undersecretary
Chief Investigator of Railway
Accidents and Incidents