



REPUBLIC OF SLOVENIA

MINISTRY OF TRANSPORT

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Number: 010-138/2008/402

Date: 27 November 2008

## FINAL REPORT ON THE INVESTIGATION INTO THE RAILWAY ACCIDENT AT THE CEŠČA VASPRI NOVEM MESTU LEVEL CROSSING ON 20 AUGUST 2008



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## SUMMARY

A freight train pulling off from the Straža railway station on the Straža – Novo Mesto railway line on 20 August 2008 shortly before 15.00, collided, at 15.02 at the Češca Vas level crossing, with a road freight vehicle travelling along the Straška Cesta – Češca Vas – Zalog – Vavta Vas – Resa local road, from the Novo Mesto direction towards Straža. The road freight vehicle drove onto the level crossing at the precise moment the freight train did.

The accident happened at an organised level crossing protected with a St Andrew's Cross road sign. According to witnesses, the driver of the road freight vehicle failed to notice the train and drove onto the level crossing without slowing down. The freight train locomotive driver started warning the driver of the road freight vehicle by sounding the locomotive whistle immediately when he noticed the road freight vehicle, and at the same time activated the high-speed brake; regrettably, he was not able to prevent the accident.

The driver of the road freight vehicle died in the accident, while the other occupant in the vehicle suffered severe injuries.

The direct cause of the accident was undoubtedly the non-observance of road traffic regulations on the part of the driver of the road freight vehicle; he failed to observe that, at a level crossing, the train always has right of way over road vehicles.

The indirect cause of the accident, revealed during the investigation, was the insufficiently marked level crossing, which does not warn road users, i.e. drivers of road vehicles, in good time of the approaching unprotected level crossing. A clear view over the level crossing is blocked by trees when they are in full leaf, as well as by an enclosed private area along the road where caravans were parked at the time of the accident. The view of the St Andrew's Cross sign is blocked by treetops for road vehicles travelling from the direction of Novo Mesto towards Zalog, and the sign only becomes visible 59 m before the level crossing.

Given the direct cause revealed by the accident investigation and in order to ensure the safety of road users, we recommend that additional signs should be installed at distances of 240, 160 and 80 metres.

### Copies of the accident report with recommendations to:

- the maintenance authority responsible for the Straška Cesta – Češca Vas – Zalog – Vavta Vas – Resa local road – the Municipality of Novo Mesto:
- the railway infrastructure managing authority – Slovenske železnice, d.o.o.
- Ministry of the Interior, Police, Novo Mesto Police Directorate
- Public Agency for Rail Transport of the Republic of Slovenia
- European Railway Agency



Figure no. 1: Bird's eye-view of the travelling direction of the car and the train

The red arrow shows the local road and the direction in which the road vehicle was moving, and the blue arrow shows the railway line and the direction in which the train was moving.



Photo no. 2: Visibility of the level crossing at the time of the accident.

## IMMEDIATE FACTS OF THE OCCURRENCE

Train no. 56367 crashed into the right-hand side of the road freight vehicle.

The road freight vehicle drove, without reducing speed onto the level crossing proper directly in front of the train.

## Date, exact time and location of the occurrence

Train no. 56367 crashed into the road freight vehicle on 20 August 2008 at 15.02 at the organised level crossing of the Straška Cesta – Češca Vas – Zalog – Vavta Vas – Resa local road with the single-track railway line, marked with traffic signs in the form of a St Andrew's Cross, at kilometre 4,236 of the railway line.

## Description of the events and the accident site

On 20 August 2008, a railway accident occurred at 15.02 according to the time recorded on the speedometer tape of locomotive no. 98 79 3732178-2 (732-178) of train no. 56367, on the Bršljin – Zalog local road in the built-up area of Češca Vas. The driver of a road freight vehicle drove in front of the train at the level crossing of the road with the railway line. The train hit the right-hand side of the freight vehicle with the front of its locomotive, pushing the vehicle a distance of 43 m, and then stopped.

The driver of the road freight vehicle was driving along the local road from the direction of Bršljin towards Zalog. At Češca Vas, in the immediate vicinity of residential house no. 40 where the local road crosses the railway line, in the clearly visible right-hand bend, the driver did not stop his vehicle before the St Andrew's Cross sign in order to give right of way to the train; instead, the driver drove onto the level crossing proper. Freight train no. 56367 was travelling along the Novo Mesto – Straža railway line from the direction of Straža. Immediately upon noticing the road freight vehicle approaching the level crossing, the locomotive driver made a "Caution!" sound signal using the locomotive whistle and activated the high-speed brake. Despite the high-speed brake having been activated, the train hit the right-hand side of the road freight vehicle with the front of the locomotive.

After the collision, the road freight vehicle, being pushed by the train, hit the metal railing of a railway bridge, sustaining further damage; because of the collision forces, one vehicle occupant fell out of the vehicle and died.

There was an emergency closure of the railway line immediately after the accident for fear of damage to the bridge structure. The railway line was closed from 15.01 until 20.55.

The scene of the accident was protected by the Novo Mesto traffic police for their own needs during their investigation; at the conclusion of the investigation, the scene of the accident was protected by railway staff until the arrival of the Chief Investigator of the Ministry of Transport.



Figure no. 2: The red arrow shows the direction of the travelling road freight vehicle while the blue arrow shows the direction of the travelling train.

## The body that established the investigation

The investigation of the railway accident was launched by:

- the Chief Investigator, Section for investigating railway accidents and incidents, Ministry of Transport of the Republic of Slovenia;
- police officers from the Novo Mesto Traffic Police Station; and
- investigators from the railway infrastructure managing authority – Slovenske železnice, d.o.o.

## The decision to establish an investigation, the composition of the team of investigators and the conduct of the investigation

The investigation procedure launched by the Ministry of Transport of the Republic of Slovenia as the chief investigation authority was launched in order to determine the direct and indirect causes of accidents happening at organised level crossings provided with traffic signs, of roads with railway lines. Established direct and indirect causes at this level crossing enable the elaboration of safety recommendations that will, if complied with, improve safety at similar crossings.



Figure no. 4: Level crossing at Češca Vas, which is an organised level crossing provided with traffic signs – two St Andrew's Crosses.

## The background to the occurrence

The accident involved the train staff and the driver and a passenger in the road freight vehicle. The train consisted of two loaded Eas wagons. The train was provided with the required braking mass, and the train speed did not exceed the statutory limit on this section of the railway line.

The road freight vehicle was a VW Crafter 2.5 TDI, duly registered, registration number NM G2-625. The vehicle was insured by the insurance company Triglav d.d., policy no. 90955.

### ***Staff involved***

Driver of the locomotive of train no. 56367, an employee of Slovenske železnice d.o.o., Poslovna enota Vleka, Sekcija za vleko Ljubljana, DE Novo Mesto;

Train manager of train no. 56367, an employee of Slovenske železnice d.o.o., Poslovna enota Tovorni promet, Sekcija za tovorni promet Ljubljana, DE Novo Mesto;

Shunting manager of train no. 56367, an employee of Slovenske železnice d.o.o., Poslovna enota Tovorni promet, Sekcija za tovorni promet Ljubljana, DE Novo Mesto;

Shunter of train no. 56367, an employee of Slovenske železnice d.o.o., Poslovna enota Tovorni promet, Sekcija za tovorni promet Ljubljana, DE Novo Mesto;

Driver of the company road freight vehicle, an employee of the company Begrad d.d., Novo Mesto;

Vehicle occupant in the company road freight vehicle, employee of the company Begrad d.d., Novo Mesto.

### ***The trains and their composition, including the registration numbers of the items of rolling stock involved***

Train no. 56376, travelling from the Straža station to the Novo Mesto station, consisting of a locomotive and two open-topped, loaded Eas wagons no. 31 79 595 1022 – 1 and 31 79 595 2211 – 9. The train was 28.1 m long, with 8 axles, its weight was 101.8 t, the number of the traction vehicle (locomotive) of train no. 56367 was 98 79 3732178-2 (732-178).

Wagon no. 31 79 595 1022 – 1, deadweight 20.9, loaded with logs for the Ilirska Bistrica station, freight weight 27000 kg.

Wagon no. 31 79 595 2211 – deadweight 21.9, loaded with logs to be carried abroad via the Jesenice border crossing, frontier station code 8142, freight weight 32000 kg.

### ***The description of the infrastructure and signalling system – track types, switches, interlocking, signals, train protection***

There are no integrated signalling and safety devices on the Straža – Novo Mesto railway line. Rail traffic is carried out by the train dispatcher of the Novo Mesto supervisory station directing only one train onto the railway line after making absolutely sure that the previous train has exited the line in its entirety. Only one train can be on the line at one and the same time. The train dispatcher of the Novo Mesto supervisory station sees to the safety of the train throughout its position on the railway line.

### ***Means of communication***

Locomotive no. 732-178 of train no. 56376 is not equipped with integrated means of communication. At the level crossings of this railway line, there are no built-in signal boxes containing telephones.

### ***Building works at the scene of the accident or in the vicinity***

At the time of the accident, there were no building works in progress at the scene of the accident or in the vicinity.

### ***Trigger of the railway emergency plan and its chain of events***

Calling on his mobile phone, the train manager informed the Novo Mesto Operation and Communication Centre of the accident, as well as the head of the Novo Mesto supervisory station and the head of the Novo Mesto freight transport unit, Ljubljana freight transport section. The Novo Mesto Operation and Communication Centre launched a rescue operation in order to attend to the injured person in the road freight vehicle.

### ***Trigger of the emergency plan of the public rescue services, the police and the medical services and its chain of events***

After the communication on the part of the train manager, emergency response measures were taken. Further communication was undertaken by the head of the Novo Mesto supervisory station, who immediately visited the scene of the accident.

The officer on duty at the Operation and Communication Centre of the Novo Mesto Police Directorate launched the procedure to rescue the injured person and notify those responsible for eliminating the consequences.

The allegedly injured passenger in the road freight vehicle was attended to by firemen from the Novo Mesto Fire and Rescue Centre.

The road freight vehicle was removed from the railway line by employees of the company



Begrad d.d. Novo Mesto.

## Fatalities, injuries and material damage

The driver of the company road freight vehicle was killed in the accident, while his fellow passenger was seriously injured.

In the accident the railway bridge railing was damaged while the road freight vehicle was totally wrecked; the train locomotive was also damaged.

According to a non-expert assessment, the damage caused to the road freight vehicle amounted to approximately EUR 20,000.00, to the train locomotive approximately EUR 10,000.00 and to the bridge structure approximately EUR 2,000.00.

## External circumstances

Weather conditions at the time the accident occurred: Sunny, +25°C, unimpeded visibility.

From the Novo Mesto direction, the road crossing the railway line runs in a clearly laid out, slight right bend, crosses the railway line at an obtuse angle of approximately 120°, and starts running parallel to the railway line immediately after the level crossing.

The vegetation and caravans in the yard in the vicinity of the road strongly hindered a clear view of the level crossing of both road users as well as train drivers. At this time of year, there is dense vegetation.



Figure no. 7: View of the level crossing, obstructed on account of the lush vegetation causing poor visibility.

## RECORD OF INVESTIGATIONS AND INQUIRIES

On 20 August 2008 at 20.30, the Chief Investigator of the Ministry of Transport inspected the scene of the accident.

On 2 September 2008, the Chief Investigator of the Ministry of Transport carried out measurements of the visibility at the level crossing.

Investigation material was acquired from Slovenske železnice d.o.o., Sekcija za vodenje prometa Ljubljana (Ljubljana Traffic Management System) no. 2.1.4.-5639/2008-2.1.AM dated 15 September 2008.

Also acquired was the analysis of the record of locomotive run no. 732-178 from Slovenske železnice d.o.o., Sekcija za vleko Ljubljana (Ljubljana Traction Section), no. 3.3.4.-12760/2008-9/4 dated 22 September 2008.

Investigation material was acquired from the Ministry of the Interior, Police Directorate Novo Mesto, no. 224-557/2008/2 (3J611-02) dated 24 September 2008.

A letter from the Ministry of the Interior, Traffic Police Station Novo Mesto, "Findings and Proposals", no. 224-557/2008/3 (3J611-02) dated 4 November 2008, was also acquired.

### Summary of testimonies

The locomotive driver of train no. 56367 indicated in his statement that the train ran into a multipurpose road vehicle and that the recording tape of the train run was given to police officers.

The train manager of train no. 56367 indicates in his statement that, during the train journey, they were in the locomotive driver cab; the train manager goes on to add that, when approaching the level crossing, the locomotive driver sounded the warning signal for "Caution!" and, on realising that the road vehicle was not decreasing speed, applied the high-speed brakes. After the collision, the train pushed the road vehicle 40 metres. He also stated that the Notification Centre (telephone 112) was notified immediately. In the continuation, he explains that there was heavy traffic passing through the level crossing and that visibility was poor. The shunting manager of train no. 56367 indicates in his statement that he was in the locomotive driver's cab during the train journey and that the locomotive driver applied high-speed brakes when he realised that the road freight vehicle would not stop before the level crossing; despite this, the locomotive driver could not prevent the collision.

The shunter of train no. 56367 indicates in his statement that, immediately before the collision, he was in the locomotive driver's cab during the train journey, on the right-hand side. In the continuation of his statement he says that they caught sight of the road freight vehicle approximately 100 metres before the level crossing, and on noticing that the vehicle was not slowing down, the locomotive driver sounded the locomotive whistle with the warning sign "Caution!" and started applying the brakes. He also states that the road vehicle driver did not respond to the sounded "Caution!" signal and drove onto the road crossing proper.

The owner of a nearby restaurant states that, at the time of the accident, the locomotive driver sounded several "Caution!" warning signals using the locomotive whistle.

### The safety management system

The organisational and technical management of rail traffic on the Straža – Novo Mesto railway line is the responsibility of the Novo Mesto supervisory station. The rail traffic is organised on a

one-train-only-system basis, which means that only one train may be on the entire length of the line at one and the same time.

The level crossing at Češca Vas is not protected with barriers or half-barriers and there are no warning lights for road users to be alerted to approaching trains. There are only road signs – a St Andrew's Cross on either side of the railway line at the level crossing.

## Rules and regulations

Crossings of the road and the railway at unprotected level crossings are governed by Articles 51 and 52 of the Safety of Railway Transport Act (Uradni list RS [Official Gazette of the Republic of Slovenia], No. 61/2007) dated 10 July 2007, and Articles 50 and 51 of the Safety of Road Transport Act (Uradni list RS, No. 56/2008) dated 6 June 2008.

Crossings of roads and railways at level crossings are regulated in more detail in the Rules on railway level crossings published in Uradni list RS, No. 85/2008, dated 29 August 2008.

## Functioning of rolling stock and technical installations

There is a Hasler speed recorder incorporated into the locomotive of train no. 56367, recording speeds up to 100 km/h as well as the operation of individual features of braking and safety devices. A train speed of 38 km/h was recorded by the speed recorder immediately before the accident. The braking distance recorded was less than 50 m, which confirms the fact that the locomotive driver started braking immediately before hitting the road vehicle.

The maximum permitted train speed and the statutory train speed at this railway line is limited to 40 km/h on account of technical features of the railway line and its devices.

The width of the local road at the level crossing is 8 metres. The width of the carriageway in the direction of Zalog is 3.95 metres. There is a broken white line, 0.15 m wide, in the middle of the road. At a point 5.8 m ahead of the level crossing, there is a traffic sign in the form of a St Andrew's Cross, alerting road users to the vicinity of the level crossing of the road with the railway line.

## Documentation on the operating system

No operating systems or other safety systems are installed on the Novo Mesto – Straža railway line and the level crossing at Češca Vas.

## Man-machine-organisation interface

Locomotive drivers and drivers of road vehicles operate their vehicles by pressing or releasing the accelerator and applying braking devices.

The locomotive driver of train no. 56376 who was involved in the railway accident at the level crossing at Češca Vas on 20 August 2008 at 15.01 had passed all the required qualifying examinations to operate traction vehicle no. 732-138; he was physically and mentally fit for driving, had had the statutory rest break between the two working shifts involved and had not exceeded the working hours in the shift.

The driver of the road freight vehicle who was involved in the above railway accident was a holder of a statutory driving licence, category B, which complies with the regulations for the operation of the road vehicle of this type.

The driver of the road freight vehicle was wearing the safety belt.

## Previous occurrences of a similar character

Until this accident happened in 2008, there had been three similar accidents at organised level crossings fitted with road signs, with one fatality among road users:

- on 3 April 2008, between the stations Škofljica and Ljubljana Rakovnik at a level crossing situated at km 147,591;
- on 10 April 2008, between the stations Murska Sobota and Ljutomer, at a level crossing situated at km 41,664; and
- on 11 April 2008, between the stations Moškanjci and tuž, at a level crossing situated at km 25,357.

## ANALYSIS AND CONCLUSIONS

Two analyses were conducted: of the visibility of the level crossing, and of the reaction time and braking distance available to motorists when driving along the local road from the Novo Mesto – Straža direction over the level crossing with the railway line at Češca Vas.

It was found that, if driving at the maximum permitted speed through built-up areas, i.e. 50 km/h, and taking into account the most unfavourable weather conditions, motorists can stop in good time ahead of the railway line at the level crossing if they perceive the St Andrew's cross at least at a distance of 41 metres.

In the case of the accident under consideration, it was possible to perceive the St Andrew's Cross road sign at a distance of 58.9 metres, provided that motorists fully concentrated on their driving. This distance is enough for a driver to stop a vehicle without fail in front of a level crossing on a flat, asphalt-coated road surface that is dry at the time of the accident.

Since it is impossible to accurately determine at what distance ahead of the level crossing the driver of the road freight vehicle perceived either the St Andrew's Cross or the level crossing itself, it is consequently impossible to claim with certainty that in this case the available distance for a safe stop before the level crossing would have been enough. In such cases an additional "I-37" road sign (approaching the crossing of the road with a railway line without barriers or half-arm barriers) to mark the level crossing would perhaps be enough so that road users would be alerted to the approaching level crossing in good time.

### Final account of the event chain

Motorists driving towards the level crossing at Češca Vas from the Bršljin – Straža direction have the possibility of noticing the crossing of the road with the railway line marked by the St Andrew's Cross road sign, at a distance of only 58.92 metres before the level crossing. Unfortunately, the traffic sign is blocked by vegetation (trees along the road) and caravans parked in the yard next to the road, while the railway track is hidden by high grass and shrubs along the line.

The above can substantially reduce the possibility of the drivers of road vehicles perceiving the approaching level crossing in time.

It is, however, possible to prove with a simple calculation that, at the permitted maximum speed of 50 km/h, it is possible to stop a road vehicle, taking into account the reaction time of one second, on a straight road with a dry asphalt-coated road surface after 27.6 metres at most. This should have been enough, taking into consideration the circumstances at the time and provided the driver had been concentrating fully.

It is, however, necessary to take into consideration the fact that the driver may not have been concentrating fully since the accident happened after his 8-hour working day. In such a case, the required available safe stopping distance may increase considerably.

### Discussion

It is a fact that motorists cannot be expected to be fully concentrating on traffic signs throughout the duration of their journey. There is a series of distractions that drivers wittingly or unwittingly pay attention to, such as looking at the scenery, operating car gadgets, perhaps using a mobile phone, chatting with other vehicle occupants, etc.

Traffic signs must therefore be erected so as to enable motorists to react in good time to approaching danger.

### Conclusions

It was established during the investigation that the direct cause of the collision between the train and the road freight vehicle at Češca Vas on 20 August 2008 at 15.01 was the lack of concentration on the part of the driver of the road freight vehicle, who was driving towards the level crossing without slowing down and drove in front of the train with undiminished speed.

One of the indirect causes of the accident was the insufficiently marked level crossing, which – at this time of year on account of the lush vegetation – is not clearly visible and the railway line hardly noticeable when the train is travelling from the direction of Straža towards Novo Mesto and road vehicles from the direction of Bršljin towards Zalog.

Another indirect cause of the accident was poor visibility at the level crossing due to parked caravans blocking the view of road and rail drivers alike.

## Additional observations

Paragraph 5 of Article 51 of the Safety of Railway Transport Act stipulates that it is the duty of the road or path manager to ensure at level crossings provided with traffic signs only sufficient visibility from the road onto the railway line in order to enable road users to cross, with due caution, such a level crossing safely and without hindrance.

Paragraph 2 of Article 51 of the Road Traffic Safety Act stipulates that, at unprotected level crossings of the road with the railway line, road users:

- shall have sufficient clear distance with respect to the speed of trains on this section of the railway line, and

- shall have the possibility of noticing the approaching train easily and in good time.

The above provisions are laid down in more detail in the Rules on railway level crossings (Uradni list RS, No. 85/2008) dated 29 August 2008, paragraph 4 of Article 29, which comprises a table with indicated stopping distances for road vehicles, expressed in metres. It is indicated in the table that the stopping distance of road vehicles travelling at a speed of 50 km/h is 41 metres. The stopping distance consists of the thinking distance and the braking distance. There are, however, no exact rules on the distance at which the St. Andrew's Cross traffic sign should be visible, which, at this level crossing, is visible to vehicles travelling from the direction of Novo Mesto only at the point of 58.92 metres, while the railway line cannot be noticed at this time of year on account of dense vegetation along the entire route until coming onto the level crossing proper.

## Measures that have been taken

There is no record on any measures having been previously taken or taken as a result of the accident at this level crossing.

## Recommendations

On account of poor visibility of the railway line and of the St. Andrew's Cross road sign, blocked by vegetation at the Češca Vas level crossing from the direction Bršljin towards Zalog, we recommend:

- additional marking of the level crossing for the benefit of road users by means of I-37 road signs (approaching the level crossing of the road with a railway line without barriers or half-barriers);
- reducing the maximum permitted speed of road vehicles at an appropriate distance before the level crossing, for the Bršljin-Zalog direction, from the present 50 km/h down to a maximum 30 km/h.

## REFERENCES

Safety of Railway Transport Act, Uradni list RS No 61 of 10 July 2007;  
Road Traffic Safety Act, Uradni list RS No 56/2008 of 6 June 2008;  
Rules on railway level crossings, Uradni list RS, No 85/2008 of 29 August 2008;  
Website of Slovenske železnice d.o.o., [www.intranet.slo-zeleznice.si](http://www.intranet.slo-zeleznice.si).

Chief Investigator of Railway Accidents and  
Incidents

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