



REPUBLIC OF SERBIA
CENTER FOR INVESTIGATION OF ACCIDENTS IN TRANSPORT
SECTOR FOR INVESTIGATION OF ACCIDENTS IN RAILWAY TRAFFIC
Nemanjina 11, 11000 Belgrade

No.: ŽS - 01/20

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Date: 20.11.2020.

FINAL REPORT
ON INVESTIGATION OF A SERIOUS ACCIDENT

Accident type:	Serious accident on the level crossing
Train No.:	Shunting composition MS-4
Place:	City of Pančevo, city settlement Stara Misa, area of the industrial track of the Oil Refinery Pančevo ("NIS" a.d. Novi Sad)
Date:	09.01.2020.
Time:	02:35



This report presents the results of investigation of serious accident, overtaking of this shunting composition MS-4 (railway undertaking “Srbija Kargo” a.d.) on the road passenger vehicle that occurred on 09.01.2020. at 02:35 on the industrial track of the Oil Refinery Pančevo (“NIS” a.d. Novi Sad) on the level crossing, secured with automatic level crossing device, located in the area of the city of Pančevo, in the city settlement Stara Misa.

The Working Group for investigation of this serious accident was formed by the Director of the Center for Investigation of Accidents in Transport RS, by Decision No. 340-03-1/2020-02-1-6 of 16.01.2020.

In accordance with the Article 33 of the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18) and the Article 23 of the Directive 2004/49/EC of the European Parliament and of the Council of EU (Railway Safety Directive), the Center for Investigation of Accidents in Transport (hereinafter referred to as: CINS) drafted and published this Final Report.

In this report, all sizes and measurements are expressed in accordance with the International System of Units (SI).

The meaning of abbreviations used in the text is explained in the Glossary.



CINS has been established in accordance with the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic ("Official Gazette of RS" No. 66/15). The founder is the Republic of Serbia and the holder of founding rights is the Government of the Republic of Serbia.

Sector for Investigation of Railway Traffic Accidents carries out tasks within the competence of CINS in relation to rail traffic with the aim of possible improvement of safety on the railway by issuing safety recommendations. The investigation procedure in the field of railway traffic is conducted on the basis of the provisions of the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic ("Official Gazette of RS" No. 66/15 and 83/18).

CINS conducts investigations following the serious accidents on the railway system with a view to possible improvement of railway safety and the prevention of new accidents caused by the same or similar causes. Serious accident in railway traffic 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, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety.

In addition to serious accidents, CINS may also investigate other accidents and incidents that could lead to a serious accident, including the technical failure of structural subsystems or interoperability constituents.

CINS has the discretion to decide whether to open an investigation of other accidents and incidents.

CINS is independent in its work and performs independent accident investigations. The aim of an investigation is to identify the causes and the possibility of improving safety on the railway and to prevent accidents by issuing safety recommendations.

Professional activities related to safety investigations are independent of judicial inquiry or any other parallel investigations which objective is to determine responsibility or the degree of guilt.



Glossary:

CINS	Center for Investigation of Accidents in Transport
IŽS	Serbian Railways Infrastructure
ZJŽ	Community of Yugoslav Railways
RS	Republic of Serbia
US	Constitutional Court
a.d.	Joint Stock Company
MUP	Ministry of Interior
OJT	Basic Public Prosecutor
JP	Public Enterprise
PU	Police Department
NIS	Petroleum Industry of Serbia
SS	Safety signalling
OC	Organizational Unit
RNP	Oil Refinery Pančevo
ZOVS	For rolling stock maintenance
ST	Traffic and transport
PP	Level crossing
SO	Medium repair
d.o.o.	Ltd.



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1. Summary

1.1. Short description of the serious accident

On 09.01.2020. at 02:35 on the industrial track of Oil Refinery Pančevo ("NIS" a.d. Novi Sad) on the level crossing secured with automatic level crossing device, it came to overtaking of the shunting composition MS-4 on the passenger road vehicle of brand Renault type Kangoo of license plates PA 086-LŠ.

Road passenger vehicle of the brand Renault type Kangoo of license plates PA 086-LŠ, was moving along the state road 1B rank, No. 14.: Pančevo- Kovin-Ralja-connection with the state road 33 which passes through the settlement of Stara Misa (St.Bavaništanski put in Pančevo), from the direction of the center of Pančevo to Kovin. Upon encountering the level crossing at km 2+231 of the own stationing of industrial track of Oil Refinery Pančevo ("NIS" a.d. Novi Sad), the road passenger vehicle did not stop in front of the level crossing, but continued driving and entered the profile of the track just before the MS-4 shunting composition arrived.

Shunting composition MS-4 was moving along the industrial track of the Oil Refinery Pančevo ("NIS" a.d. Novi Sad), from the direction of Marshalling Yard of Oil Refinery Pančevo to the direction of the station Pančevo Varoš. The shunting composition MS-4 consisted of shunting locomotive 661-155 and 21 (twenty-one) wagon-tanks of the series Za loaded with oil derivatives (motor gasoline and eurodiesel). On the shunting locomotive 661-155, in addition to the train driver, there were train driver assistant, a conductor and a shunter, employed by the railway undertaking "Srbija Kargo" a.d. By approaching the level crossing at km 2+231 of the own stationing of the industrial track, it came to overtaking of the shunting composition MS-4 on the road passenger vehicle, which just before encountering the level crossing, had entered the profile of the track. The overtaking occurred in a manner that right part of the front of the shunting locomotive 661-155 (front right bumper) hit the front right part of the side of the road passenger vehicle (viewed in the direction of driving of the shunting composition MS-4, that is, road passenger vehicle).

In this serious accident, 1 (one) person was fatally injured, 1 (one) person was seriously injured and 1 (one) person was lightly injured. The fatally and seriously injured persons were in a road passenger vehicle.

At the time of the occurrence of this serious accident, the automatic level crossing device was faulty and the traffic at the respective level crossing was provided by a shunter employed at the Pančevo Oil Refinery ("NIS" a.d. Novi Sad).

1.2. The causes of the serious accident determined by investigation

Direct and immediate cause of the occurrence of the respective serious accident is that the road passenger vehicle was on track just before arrival of the shunting composition MS-4, thus creating dangerous situation related to the occurrence of this serious accident.

Direct cause of this serious accident is non compliance with the Provision from the Articles 100, 132 and 187 of the Law on Road Traffic Safety ("Official Gazette of RS" No. 41/2009, 53/2010, 101/2011, 32/2013 - decision US, 55/2014, 96/2015 – other law, 9/2016 - decision US, 24/2018, 41/2018, 41/2018 - other laws and 87/2018) by the driver of the road passenger vehicle.



Considering that it was determined that the failure of the SS device at the level crossing lasted longer than 84 hours, according to the Article 36 of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic ("Official Gazette of RS" No. 89/2016), the owner of the industrial track and the road infrastructure manager were obliged to take all the necessary measures to indicate that the semi-barriers and traffic lights were not valid for participants in road traffic. It should be borne in mind that the road infrastructure manager of JP "Putevi Srbije" was not informed about the failure of the SS device at the level crossing by the owner of the industrial track of the Pančevo Oil Refinery "NIS" a.d. Novi Sad. The obligation to cover light signals that apply to road vehicles that due to failure can not signal prohibited driving over the level crossing also exists according to the provisions of Article 58 under 6 of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), which, in accordance with the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery, which was approved by the Directorate for Railways No. 340-1351/2019 of 03.10. 2019.), in use in the Pančevo Oil Refinery ("NIS" a.d. Novi Sad). Failure to act in this way could have contributed to the occurrence of this serious accident.

General Order I (S-20) No. 44 of 9.01.2020., issued by the train dispatcher of the station Pančevo Varoš for shunting compositions MS-3/MS-4, the driver of the shunting locomotive 661-155 of shunting composition MS-4 was not given notice of failure of the SS level crossing device at km 2+231 of own stationing of the industrial track of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) and no order or instruction was given on the procedure when crossing this level crossing because the Pančevo Varoš station was not informed about the failure of the level crossing device by the Pančevo Oil Refinery ("NIS" a.d. Novi Sad), as well as by the train drivers of the shunting composition of the railway undertaking "Srbija Kargo" a.d. who served the industrial track from 02.01.2020. when SS level crossing device failed (CINS has no evidence that the train drivers of the shunting compositions of the railway undertaking "Srbija Kargo" a.d. informed the Pančevo Varoš station and the Marshalling Yard of the Pančevo Oil Refinery about the failure of the device at the level crossing in a proven manner). Pursuant to the Provisions of Article 63 of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), the train driver was obliged to respect the aspect of a signal that showed the control signal KS 2 and to stop the shunting composition MS-4 in front of the level crossing. Failure to act in this manner could have contributed to the occurrence of this serious accident.

The sent worker - on-duty shunter of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) was at the level crossing at km 2+231, dressed in a fluorescent suit and equipped with a hand-held flashlight and was stopping the participants in road traffic by showing manual traffic signs with a hand-held flashlight with a white flashing light. Pursuant to Article 58 of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), Article 124 of the Shunting Instruction 42 ("Official Gazette of ZJŽ" No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94) and item 6.6.10.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery defines the procedure or manner of giving aspects of signal for vehicles in road traffic in case of device failure at the level crossing (see items 3.3.7, 3.3.8, and 3.3.9). Giving manual traffic signs with white instead of red light, could have contributed to the occurrence of the respective accident. Also, giving manual traffic signs with a hand-held flashlight with a white flashing light by a sent worker - on-duty shunter of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) could have caused confusion among the train driver and train driver assistant.

In the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019) in item 2.3.13.1.2. it is stated that the level crossing at km 2+231 is equipped with level crossing barriers



and a red calm light in the middle of the barrier (which does not correspond to the situation on the site, semi-barriers are installed, see point 2.2.3.) and that the mentioned level crossing is permanently served by the shunter of the Marshalling Yard upon passing of the shunting composition. In the same point, it is stated that for the use of this level crossing, the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. is being used. (Registration No. 1/2018) - Annex 14 of the Act on the industrial track (hereinafter referred to as: The Instruction). Also, item 6.6.10.3. of the Act on the industrial track states that the organization of the work of the level crossing is performed according to the Instruction. In point 5.1.1. of the Instruction it is stated that this level crossing is served by the sent worker only in case of failure of the SS device at the level crossing. Non-compliance with the above provisions could have caused confusion of the train driver and the train driver assistant of the shunting composition MS-4, in terms of proper conduct.

1.3. Main recommendations and information on subjects to which the Report is submitted

With the aim of possible improvement of safety on the railway and prevention of occurrence of the new accidents, CINS has issued the following safety recommendations:

To the Directorate for Railways:

SR_01/20 Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to harmonize item 2.3.13.1.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019) with item 5.1.1. of the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018), in terms of the manner of securing the traffic at the level crossing, pursuant to Article 58, item 6 of the Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.3.3).

SR_02/20 Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to train the staff of the Marshalling Yard of the Pančevo Oil Refinery in terms of consistent compliance with the established procedure in item 5.1.2. Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018), and notifying the Manager of Public Railway Infrastructure “IŽS” a.d., in this case the monitoring station in which the industrial track is connected, i.e. the station Pančevo Varoš, about the malfunction of the level crossing device, that is, on the exceptional invalidity of the control signal and securing the level crossing by the level crossing keeper, all in order to timely inform the train staff (issuance of the General Order by the train dispatcher of the station Pančevo Varoš “IŽS” a.d.) on the procedure in front of the level crossing, pursuant to Article 34, item 29. Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.2.1.).



- SR_03/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to train the staff of the Marshalling Yard of the Pančevo Oil Refinery regarding compliance with the provisions of Article 58, item 6 of Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03), as well as the provisions of item 6.6.10.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019), which refer to manual aspects of a signal given to participants in road traffic by the level crossing keeper (see point 4.2.1.).
- SR_04/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to, in the capacity of railway infrastructure manager, establish cooperation with the road manager of JP “Putevi Srbije” and conclude an Agreement which regulates more closely the relations regarding the respective level crossing in accordance with the provisions of Articles 67 and 70 of the Law on Railways (“Official Gazette of RS” No. 41/2018) (see point 3.5.2.).
- SR_05/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) that in the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019) and the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018) to make corrections in terms of harmonizing the terminology “train” and “train staff” with the actual situation on the industrial track - “shunting composition” and “shunting staff” (see point 4.3.4.).
- SR_06/20** “Srbija Kargo” a.d. to conduct the training of the traction vehicle staff regarding the procedure in front of the level crossing equipped with control signals, pursuant to Article 143, Paragraph 2 of the Rulebook on types of signals, signal markings and markings on the railway track (“Official Gazette of RS” No. 51/20), and Article 61, Item 12 and Article 63, Item 5 of the Rulebook 2, Traffic Rulebook (“Official Gazette of the ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.1.).
- SR_07/20** “Srbija Kargo” a.d. to conduct the training of the train staff, that is, the train drivers and conductors, except train driver assistants and train shunters, regarding the procedure upon entering the station in case of crossing of the level crossing secured with control signals whose device is defective, pursuant to Article 4.2.3. of the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018) (see Point 4.3.4.).



Ministry of Construction, Traffic and Infrastructure:

SR_08/20 JP “Putevi Srbije” to, in the capacity of the road infrastructure manager, establish cooperation with the railway infrastructure manager of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) and conclude an Agreement which regulates more closely the relations regarding the respective level crossing, in accordance with the provisions of Articles 67 and 70 of the Law on Railways (“Official Gazette of RS” No. 41/2018) (see point 3.5.2.).

SR_09/20 JP “Putevi Srbije” to, in the capacity of the road infrastructure manager, on the level crossing at km 2+231 of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) harmonize the installed road signalization with the valid regulations on road signalization (see Point 4.3.4.).

SR_10/20 Ministry of Construction, Transport and Infrastructure to harmonize the provisions of Article 35, paragraph 1 under 2) of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic (“Official Gazette of RS” No. 89/2016) with Article 58. under 6. of the Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) and Article 124 of the Shunting Instruction 42 (“Official Gazette of ZJŽ” No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94) regarding the manner in which the sent railway worker at the level crossing directly regulates the traffic by giving manual traffic signs to road vehicles (see point 4.3.4.).

Note: Article 35 Paragraph 1 under 2) of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic (“Official Gazette of RS” No. 89/2016) refers to the regulations that regulate traffic safety on roads, and in these regulations the stated issue is not defined (it is defined only in cases of performing works).

2. Direct facts on the serious accident

2.1. Basic data on the serious accident

2.1.1. Date, time and place of the serious accident

The serious accident occurred on 09.01.2020. at 02:35 in the area of the city of Pančevo, in the city settlement Stara Misa, on the industrial track of the Oil Refinery Pančevo (“NIS” a.d. Novi Sad), on the level crossing secured with automatic level crossing device.

The appearance of the serious accident site is given in Fig. 2.1.1.1.

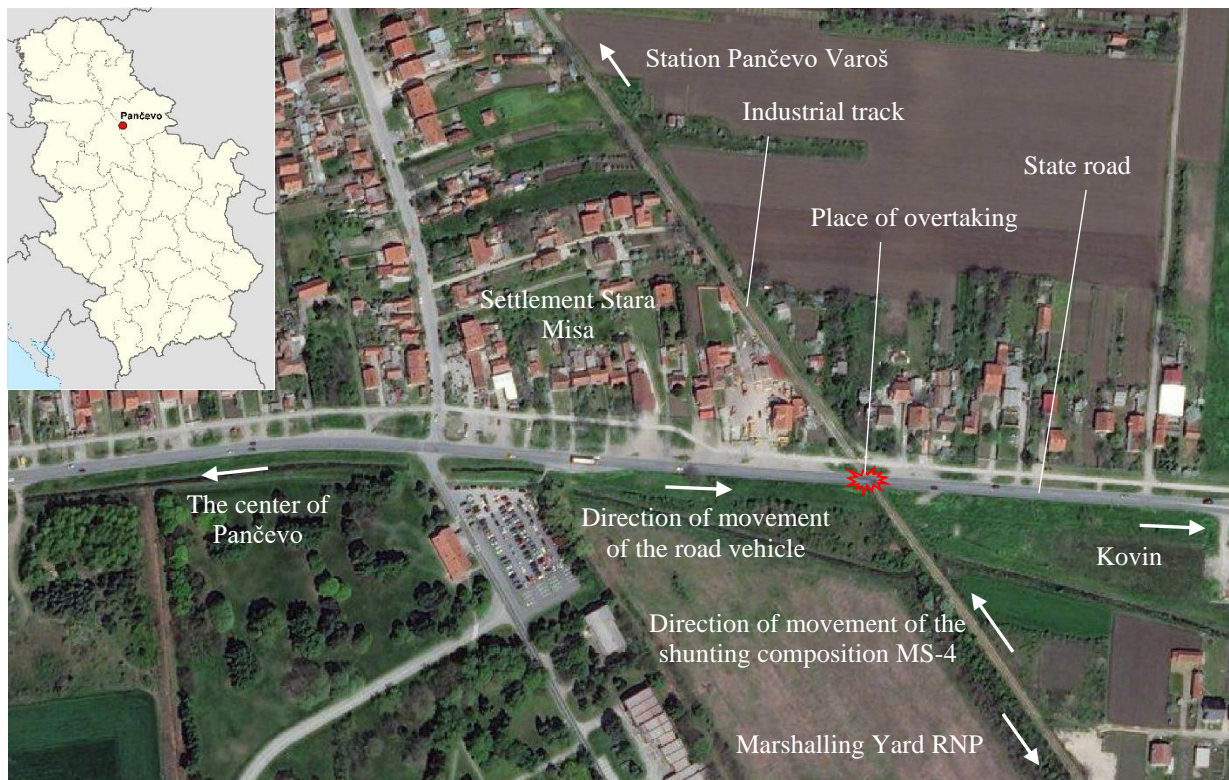


Figure 2.1.1.1: Appearance of the area of the serious accident site (*Bing maps*)

2.1.2. Description of the serious accident and the serious accident site and work of rescue and emergency services

The level crossing is located in the area of the city of Pančevo, in the city settlement Stara Misa, on the industrial track of the Oil Refinery Pančevo (“NIS” a.d. Novi Sad). It is secured with automatic level crossing device. At the time of occurrence of this serious accident the automatic level crossing device was not in function (semi-barriers were raised and the traffic lights regulating the level crossing of the road over the railway line were switched off). Securing the traffic at the level crossing in conditions when the automatic device is not in function was performed by a shunter, employed at Oil Refinery Pančevo (“NIS” a.d. Novi Sad) by direct regulation of road traffic at the level crossing.

Road passenger vehicle of the brand Renault type Kangoo of license plates PA 086-LŠ, was moving along the state road 1B rank, No. 14.: Pančevo - Kovin - Ralja - connection with the state road 33 which passes through the settlement of Stara Misa (St.Bavaništanski put in Pančevo), from the direction of the center of Pančevo to Kovin. Upon encountering the level crossing at km 2+231 of the own stationing of industrial track of Oil Refinery Pančevo ("NIS"a.d. Novi Sad), the road passenger vehicle did not stop in front of the level crossing, but continued driving and entered the profile of the track just before the MS-4 shunting composition arrived.

Shunting composition MS-4 was moving along the industrial track of the Oil Refinery Pančevo ("NIS"a.d. Novi Sad), from the direction of Marshalling Yard of Oil Refinery Pančevo to the direction of the station Pančevo Varoš. By encountering the level crossing at km 2+231 of the own stationing of industrial track, it came to overtaking of the shunting composition MS-4 on the road passenger vehicle, which entered the profile of the track just before the MS-4 shunting composition arrived. The overtaking occurred in a manner that right part of the front of the shunting locomotive 661-155 (front right buffer) hit the front right part of the side of the road passenger vehicle (viewed in the direction of driving of the shunting composition MS-4, that is, road passenger vehicle).

After the overtaking, the shunting composition MS-4 continued its movement further at the length of 12m, after which it stopped (Figure 2.1.2.1.).



Figure 2.1.2.1: Appearance of the shunting locomotive 661-155 and the road passenger vehicle after the serious accident (view from the road, in the direction opposite to the direction of the road passenger vehicle movement, source: "NIS"a.d.)

After the collision, the shunting composition MS-4 threw the road passenger vehicle to the right side in relation to the direction of movement of the shunting composition MS-4, i.e., to the left side in relation to the direction of movement of the road passenger vehicle, in the next road lane, upon which the road passenger vehicle rotated 90°. On that occasion, the right side of the road passenger vehicle was significantly damaged (Figure 2.1.2.2).



Figure 2.1.2.2: Appearance of the road passenger vehicle after the serious accident
(view in direction of the road passenger vehicle movement, source: “NIS”a.d.)

In this serious accident, one person was fatally injured (a person in the passenger seat of a road passenger vehicle), one person was seriously injured (a person in the back right seat of a road passenger vehicle) and one person was lightly injured (driver of the road passenger vehicle).

Members of the MUP RS, PU in Pančevo, members of the MUP RS, the Sector for Emergency Situations, Fire and Rescue Unit of Pančevo, members of the OJT Pančevo and members of the Emergency Medical Service of the Pančevo Health Center came to the site.

2.1.3. Decision to launch the investigation, composition of the investigative team and conducting of the investigation

CINS has been informed immediately upon the occurrence of this serious accident. Main Investigator for Railway Traffic received the first notification of the accident occurred on 09.01.2020. at 03:52 via telephone by Head of the Marshalling Yard of the Oil Refinery Pančevo, and then also via telephone at 05:55 by the Main Wagon Dispatcher of “Srbija Kargo”a.d.

Based on the information received and the facts that the investigative team of CINS determined by on-site investigation of the serious accident, CINS has launched the investigation of the respective serious accident in accordance with the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18).

Composition of the Working group for investigation of the serious accident is determined by Decision No. 340-03-1/2020-02-1-6 of 16.01.2020. of the Director of CINS based on the Articles 6 and 32 of the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18).



2.2. Serious accident background

2.2.1. Involved railway staff, contractors, other persons and witnesses

The train driver, the train driver assistant, conductor and shunter of the shunting composition MS-4, employed at the railway undertaking “Srbija Kargo” a.d. participated in this serious accident, and also the shunter employed at the owner of the industrial track of the Oil Refinery Pančevo (“NIS” a.d. Novi Sad).

The driver of the road passenger vehicle of the brand Renault type Kangoo, of license plates PA 086-LŠ participated in this serious accident, and the passengers of the road passenger vehicle located at the passenger seat and at the right back seat of the road passenger vehicle.

2.2.2. Shunting composition MS-4 and the road passenger vehicle that participated in this serious accident and their composition

The MS-4 shunting composition and a road passenger vehicle of the brand Renault, type Kangoo with license plates PA 086-LŠ participated in the respective serious accident.

The MS-4 shunting composition consisted of the shunting locomotive 661-155 and 21 (twenty-one) wagon-tanks of the Za series loaded with oil derivatives (motor gasoline and eurodiesel). The shunting locomotive 661-155 was located at the head of the shunting composition MS-4 (traced shunting composition).

The Renault road passenger vehicle of Kangoo type with the license plates PA 086-LŠ is a multi-purpose road passenger vehicle with a flexible interior intended for the transport of persons and things, with approximate dimensions: length 4.0 m, width 1.7 m and height 1.85 m.

2.2.3. Infrastructure and SS system

According to the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery, which entered into force on 11.10.2019. (for which the Directorate for Railways gave its consent No. 340-1351/2019 from 03.10.2019.), the industrial track of the Pančevo Oil Refinery was built on the basis of Construction Permit No. 3234/1-65 from 06.09.1965. and 3235/1-65 of 06.09.1965. and is in accordance with the Law on Planning and Construction. It was put into operation on the basis of the Use Permit No. 04-351/3175-84 of 19.05.1989., No. 04-351/1049-88 of 13.10.1988., No. 04/351/2961-81 of 21.06.1982; and No. 04-351/3143-78 of 09.11.1984. and the Agreement on the connection of the industrial track to the public railway infrastructure (“IŽS” a.d. No. 1/2017-6405 of 10.11.2017 and “NIS” a.d. Novi Sad No. NM 040000/ud-os/13925 of 24.11.2017).

The industrial track of the Marshalling Yard in the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) starts from the switch No. 16 on the second track of the Pančevo Varoš station (km 18+774 of the main arterial line 107: Belgrade Center - Pančevo Glavna - Vršac - state border - (Stamora Moravita), i.e., km 0+000 of the own stationing of the industrial track). From the switch No. 1 at km 6+629.5 of the own stationing of the industrial track, in the factory circle of the Pančevo Oil Refinery, the industrial track branches into manipulative and shunting tracks of the Marshalling Yard station. The part of the industrial track between the switch No. 16 in the Pančevo Varoš station and switch No. 1 in the Marshalling Yard station in the factory circle of the Pančevo Oil Refinery is called the connecting track, on which there are a total of four curves with a radius of



not less than 400 m. The connecting track partly passes through the settlement (the city settlement of Stara Misa), and partly through the part that is not populated. The length of the connecting track is 6,629.5 m, and the total length of manipulative and shunting tracks in the area of the Pančevo Oil Refinery is 7,825.64 m, so that the total length of the track of the Pančevo Oil Refinery is 14,455.14 m. The tracks of the Pančevo Oil Refinery are capable of an axle load of 20 t/axle and a longitudinal load of 6.4 t/m. The speed of the shunting compositions along the entire length of the connecting track is 30 km/h.

According to the Business Order of the Pančevo Varoš station (record No. 15/2018-360 of 27.03.2018), the maximum speed of shunting compositions on the industrial track of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) is 20 km/h. From "IŽS" a.d. (letter of the OC for traffic affairs Pančevo No. 15/2020-19-183 of 13.02.2020) on the part of the industrial track of the Pančevo Oil Refinery from km 1+500 to km 1+700, on 01.06.2019. restricted speed running has been introduced with 10 km/h. CINS did not receive data from "NIS" a.d. on the introduced restricted speed runnings on the industrial track of the Pančevo Oil Refinery.

On the industrial track, viewed from the direction of the Marshalling Yard of the Pančevo Oil Refinery towards the station Pančevo Varoš (in the direction of the decreasing stationing), before encountering the respective level crossing, the railway line is in the direction in a length of approximately 2200 m, while after the respective level crossing the track is in the direction in a length of approximately 360 m. In the zone of the respective level crossing, the industrial track is in the direction.

From the direction of the Marshalling Yard of the Pančevo Oil Refinery to the Pančevo Varoš station (viewed in the direction of decreasing stationing), before encountering the respective level crossing, the track is horizontal (slope level is 0.00‰) in the length of 340 m, while after the respective level crossing the track is horizontal in the length of 89 m. At the place of the level crossing, the track is also horizontal.

The level crossing at the level at km 2+231 (stationing given according to the data obtained from "NIS" a.d. Novi Sad) is a place of intersection at the level of the industrial track of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) and part of the state road 1B rank, No. 14: Pančevo - Kovin - Ralja - connection with the state road 33 which passes through the settlement Stara Misa (St. Bavaništanski put in Pančevo).

The road markings are given according to the Regulation on the categorization of state roads ("Official Gazette of RS" No. 105/2013, 119/2013 and 93/2015).

The track and the road intersect at an angle of 51°. The drive ramps on both sides of the road are covered with asphalt, and rubber panels for heavy traffic load have been made at the intersection with the railway.

The state road is made of asphalt pavement. Near the level crossing, viewed from the direction of the center of Pančevo in the direction of Kovin, the width of the road is 7.2 m on the part of the road in front of the level crossing and 7.8 m on the part of the road behind the level crossing. The road at the level crossing is made of rubber panels for heavy traffic load. The total width of the set rubber panels is 11.5 m, and the length is 4.0 m, viewed in the direction of the road.

The condition of the asphalt pavement near the level crossing is in order, without any noticeable damage. Near the level crossing, the state road is horizontal. The road at the level crossing itself is horizontal. The illumination of the level crossing during the night is provided by the city lighting. The level crossing is not equipped with video surveillance.

On the mentioned state road, in the immediate vicinity of the level crossing, on both sides of the level crossing, in the middle of the road, there is a full dividing line in the length of 50 m, which, at a distance of more than 50 m, continues into a broken dividing line. There are no other road markings (longitudinal, transverse and others).

The appearance of the level crossing, viewed from the road, is shown in Figures 2.2.3.1. and 2.2.3.2.

The sketch of the level crossing is shown in Figure 2.2.3.3.



Figure 2.2.3.1: Appearance of the level crossing
(viewed from the direction of the center of Pančevo)



Figure 2.2.3.2: Appearance of the level crossing
(view from the direction of Kovin)

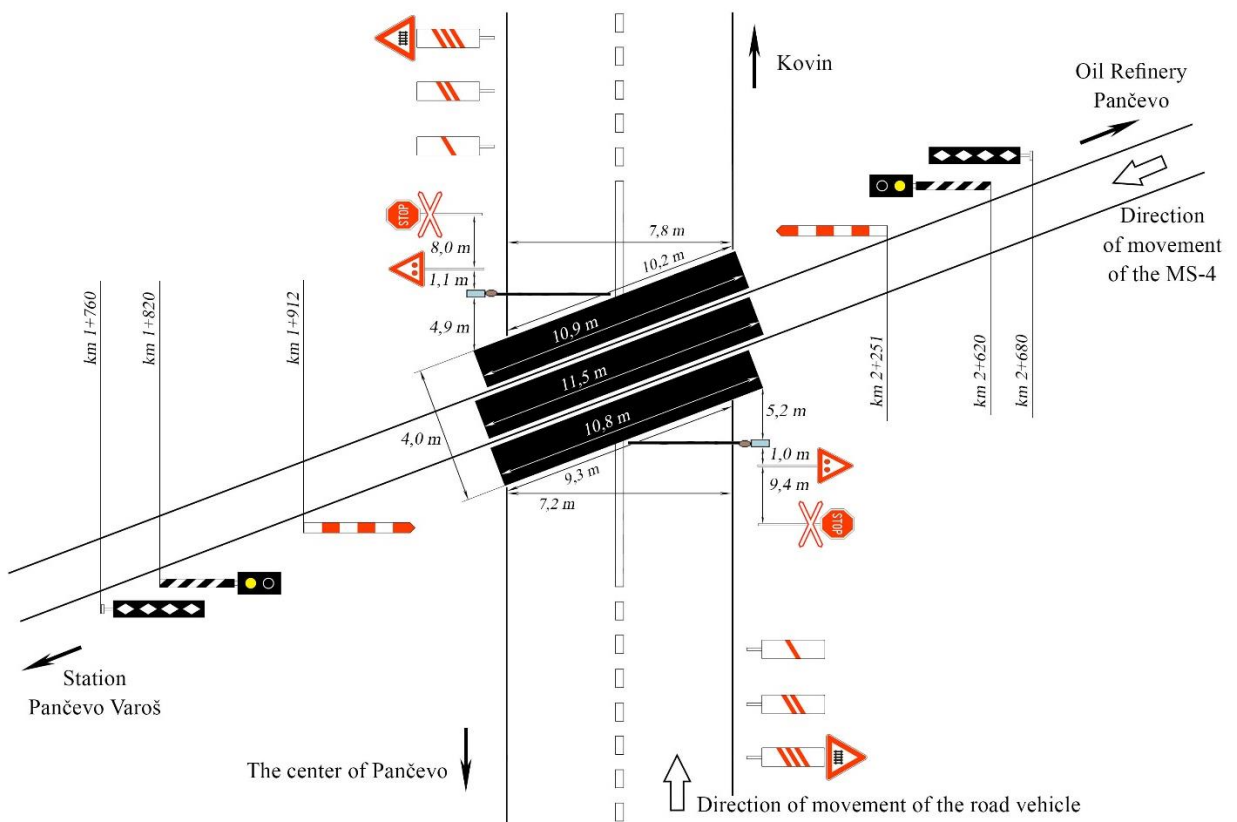


Figure 2.2.3.3: The sketch of the level crossing

On the respective state road, before encountering the level crossing from the direction of the center of Pančevo to Kovin, on the supporter, which is located on the right side of the road next to the roadway and is approximately 240 m away from the level crossing, traffic signs are set: I-32: “Crossing of a railway line with barriers or semi-barriers” and I-35: “Approaching the point of crossing of the road and the railway line” (Figure 2.2.3.4.). On the supporter, which is located on the right side of the road next to the roadway, and is approximately 160 m away from the level crossing, there is a traffic sign: I-35: “Approaching the point of crossing of the road and the railway line” (Figure 2.2.3.5.). On the supporter, which is located on the right side of the road next to the roadway and is 80 m away from the level crossing, there is a traffic sign: I-35: “Approaching the point of crossing of the road and the railway line” (Figure 2.2.3.6.). On the supporter, which is located on the right side of the road next to the roadway and is 15.6 m away from the level crossing (the beginning of the rubber panel), traffic signs are set: I-34: “Andrejin krst” and II-2: “Obligation of stopping”, on the supporter, which is located on the right side of the road next to the roadway and is 6.2 m away from the level crossing (the beginning of the rubber panel), a traffic light is set: IV-9 which regulates the crossing of the road over the railway at the same level (used for announcement of approaching train and announcing the lowering of the barrier) and on the right side of the road next to the roadway and 5.2 m away from the level crossing (the beginning of the rubber panel) a half-barrier supporter has been set at the level crossing (Figure 2.2.3.7).



Figure 2.2.3.4: Appearance of the traffic signalization
(view from the direction of the center of Pančevo)



Figure 2.2.3.5: Appearance of the traffic signalization
(view from the direction of the center of Pančevo)



Figure 2.2.3.6: Appearance of the traffic signalization
(view from the direction of the center of Pančevo)



Figure 2.2.3.7: Appearance of the traffic signalization
(view from the direction of the center of Pančevo)

On the respective state road, before encountering the level crossing from the direction of Kovin to the center of Pančevo, on the supporter, which is located on the right side of the road next to the roadway and is approximately 240 m away from the level crossing, traffic signs are set: I-32: “Crossing of a railway line with barriers or semi-barriers” and I-35: “Approaching the point of crossing of the road and the railway” (Figure 2.2.3.8.). On the supporter, which is located on the right side of the road next to the roadway and is approximately 160 m away from the level crossing, there is a traffic sign: I-35: “Approaching the point of crossing of the road and the railway” (Figure 2.2.3.9.). On the supporter, which is located on the right side of the road next to the roadway and is approximately 80 m away from the level crossing, a traffic sign: I-35 is set: “Approaching the point of crossing of the road and the railway” (Figure 2.2.3.10.). On the supporter, which is located on the right side of the road next to the roadway and is 14.0 m away from the level crossing (the beginning of the rubber panel), traffic signs are set: I-34: “Andrejin krst” and II-2: “Obligation of stopping”, on the supporter, located on the right side of the road next to the roadway and is 6.0 m away from the level crossing (the beginning of the rubber panel), the traffic light is set: IV-9 which regulates crossing of the road over the railway line at the same level (it serves for announcement of approaching of the train and lowering the semi-barriers) and on the right side of the road next to the roadway, 4.9m away from the level crossing (the beginning of the rubber panel) the supporter of semi-barrier is set on the level crossing (Fig. 2.2.3.11.).



Figure 2.2.3.8: Appearance of the traffic signalization
(view from the direction of Kovin)



Figure 2.2.3.9: Appearance of the traffic signalization
(view from the direction of Kovin)



Figure 2.2.3.10: Appearance of the traffic signalization
(view from the direction of Kovin)



Figure 2.2.3.11: Appearance of the traffic signalization
(view from the direction of Kovin)

On the left side of the state road, seen in the direction from Pančevo to Kovin, there is a concrete pedestrian and bicycle path. Traffic at the crossing of pedestrian and bicycle path over the industrial track is secured with bypasses and traffic signs at level crossings for pedestrians and cyclists. On the pedestrian and bicycle path, the drive ramps are made of concrete, and at the level crossing itself there are stacked granite cubes (cobblestones). Bypasses exist on both sides of the level crossing and are painted red and white. On the pedestrian and bicycle path, before encountering the level crossing from the direction of Kovin to the center of Pančevo, on the same supporter, which is located on the right side next to the pedestrian and bicycle path, the traffic sign II-2: “Obligation of stopping” is set, as well as supplementary table: “Watch out of the train”. Before encountering the level crossing for pedestrians and cyclists from the direction of the center of Pančevo towards Kovin, there are no traffic signs set in front of the level crossing (Figures 2.2.3.12. and 2.2.3.13.).



Figure 2.2.3.12: Appearance of the pedestrian and bicycle path (view from the direction of Pančevo)



Figure 2.2.3.13: Appearance of the pedestrian and bicycle path (view from the direction of Kovin)

The level crossing (stationing given according to the data obtained from “NIS” a.d. Novi Sad) is a place of crossing at the level of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) and part of the state road 1B rank, No. 14: Pančevo - Kovin - Ralja - connection with the state road 33 which passes through the settlement of Stara Misa (St. Bavaništanski put in Pančevo).

At the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), traffic is provided with automatic semi-barriers with light traffic signs to which sound signals and traffic signs on the road are added, by which participants in road traffic are directly announced of the arrival of railway vehicles and warned to adjust the movement so that they must unconditionally stop in front of the level crossing because the passage of the railway vehicle is imminent. An SS device for level crossings (device for providing traffic at the level crossing) of the type “ELC - Electronic Level Crossing” manufactured by “Signalling & Control d.o.o.” was built on the industrial track. At this level crossing, the SS device functions automatically when the railway vehicle arrives via on or off devices - sensors, and there is also the possibility of direct operation of the control device on the spot, in the house of the level crossing. There are no other SS devices on the industrial track of the Pančevo Oil Refinery.

On the industrial track, before encountering the respective level crossing from the direction of the Marshalling Yard of the Pančevo Oil Refinery to the Pančevo Varoš station, at km 2+680, the switch-on point signal was installed, aspect of a signal 57: “Switching point, expect control signal”, and at km 2+620, the control light signal KS 2 was installed (Figure 2.2.3.14) and at km 2+521 the signalling mark 209 was installed: “Watch out, the level crossing” (Figure 2.2.3.15).

The mentioned signals and the signalling mark are installed on the right side of the track, viewed in the direction of the descending stationing, that is, viewed in the direction of movement of the MS-4 shunting composition.



Figure 2.2.3.14: Appearance of the signal on the industrial track (view from the direction of Pančevo Oil Refinery)



Figure 2.2.3.15: Appearance of the signalling mark 209 (view from the direction of Pančevo Oil Refinery)

On the industrial track, before encountering the respective level crossing from the direction of the Pančevo Varos station to the Marshalling Yard of the Pančevo Oil Refinery, at km 1+760, the switch-on point signal was installed, aspect of a signal 57: “Switching point, expect control signal”, at km 1+820, the control light signal KS 1 was installed (Figure 2.2.3.16) and at km 1+912 the signalling mark 209 was installed: “Watch out, the level crossing” (Figure 2.2.3.17). These signals and signalling mark are installed on the right side of the track, viewed in the direction of increasing stationing.



Figure 2.2.3.16: Appearance of a signal on the industrial track (view from the direction of the station Pančevo Varoš)



Figure 2.2.3.17: Apparency of the signalling mark 209 (view from the direction of the station Pančevo Varoš)

The stationing of signals and signalling marks is determined according to signalling mark 227: “Kilometer and hectometer mark” placed on the spot next to the track.

2.2.4. Communication tools

On the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), communication between the staff that regulates the traffic (train dispatcher of the Pančevo Varoš station, “IŽS” a.d. and the on-duty shunting operator of the Marshalling Yard of the Pančevo Oil Refinery “NIS” a.d. Novi Sad) is performed by telephone via the fixed telephone line of the fixed telephony operator (at the Pančevo Varoš station, the fixed telephone line is connected to the register device located at the Pančevo Main Station). Communication between the train dispatcher of the Pančevo Varoš station (“IŽS” a.d.) and the on-duty shunting operator of the Marshalling Yard of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) is also possible via official mobile phones via the network of mobile telephony operators. Communication between the staff of the Pančevo Oil Refinery, the shunting operator in the Marshalling Yard of the Pančevo Oil Refinery and the shunter that secures the level crossing at km 2+231 (“NIS” a.d. staff) is done by mobile phone via the network of mobile telephony operators. Communication between the staff of the traction vehicle (railway undertaking “Srbija Kargo” a.d.) and the staff that regulates the traffic (the staff of “IŽS” a.d. and Pančevo Oil Refinery) is possible only via mobile phones through the network of mobile telephony operators.

2.2.5. Works performed on or near the serious accident site

In the vicinity of this serious accident no works were performed.

2.2.6. Activation of the emergency plan on the railway and sequence of events

The owner of the industrial track of the Pančevo Oil Refinery (“NIS” a.d.) has immediately after the occurrence of the serious accident informed CINS, i.e., the Main Investigator for Railway Traffic, and then the same was done by the railway undertaking “Srbija Kargo” a.d. The owner of the industrial track of the Pančevo Oil Refinery (“NIS” a.d.) and the railway undertaking “Srbija Kargo” a.d. have, in accordance with the Law on Railway Traffic Safety (“Official Gazette of RS” No. 41/2018), formed a joint investigative committee, which conducted investigation of the respective serious accident. Upon completion of the investigation, on 31.01.2020. Investigation Report was drafted, which was signed by all the members of the investigative committee, but the Report does not have an official reference No.

Immediately after the occurrence of the serious accident, the conductor employed at the railway undertaking “Srbija Kargo” a.d. who was on the shunting composition MS-4, has via official mobile telephone by calling via the mobile telephone network operator, informed the train dispatcher of the station Pančevo Varoš. Upon the received notification, the train dispatcher of the Pančevo Varoš station informed the Department for Operational Affairs of Pančevo (“IŽS” a.d.) and the on-duty shunting operator of the Marshalling Yard of the Pančevo Oil Refinery about the accident, after which he annulled the given order to secure the driving route for entrance of the shunting composition MS-4 to Pančevo Varoš station. The train driver employed by the railway undertaking “Srbija Kargo” a.d. who was on the shunting composition MS-4 informed the head of the Section for traction of trains Pančevo (“Srbija Kargo” a.d.) about the accident occurred via his official mobile phone, by calling through the network of mobile telephony operator.



Considering that there were police officers from the PU in Pančevo in the vicinity of the accident site (on assignment), who immediately after the occurrence of this serious accident called the emergency services, provided first aid to the injured and secured the site of the serious accident, employees of the industrial track owner and of the railway undertaking were not able to take special measures (providing aid to the injured and securing the site).

After the work of the emergency services was completed and the investigation procedure was performed, the shunting composition of the MS-4 was started from the spot, on 09.01.2020. at 04:27 in the direction of the station Pančevo Varoš, with which the work on the industrial track and traffic on the state road was re-established. The MS-4 shunting composition arrived at the Pančevo Varoš station at 04:45.

2.2.7. Activation of the emergency plans of public rescue services, police and medical services and sequence of events

Due to this serious accident, members of the MUP RS, the Police Department in Pančevo, the Traffic Police Department in Pančevo, the Traffic Police Office in Pančevo, members of the MUP RS, the Emergency Situations Department, the Pančevo Fire and Rescue Unit, members of the Pančevo Health Center and the Pančevo Emergency Medical Service and members of OJT Pančevo were hired.

By the letter of the Pančevo Health Center, Emergency Medical Service Pančevo, No. 01-675/20 of 28.02.2020., the data were submitted that on 09.01.2020. at 02:42, the dispatcher of the Pančevo Emergency Medical Service received a call on the accident, overtaking of the shunting composition MS-4 on the road passenger vehicle, on the level crossing. Immediately after receiving the call, two emergency teams from the Pančevo Emergency Medical Service went to the site of the accident. Upon arrival, they found members of the MUP and three injured persons in a passenger vehicle on the site. After securing the access point to the injured, they performed a quick medical triage according to the degree of urgency. Two people who were lightly injured at that moment were pulled out of the passenger vehicle, given professional medical assistance and transferred to the General Hospital in Pančevo with surgical and orthopedic injuries. The third person, who was most seriously injured and who was showing signs of life (heartbeat and breathing), was transferred using a spinal board with the help of the fire brigade and members of the police (and under the supervision of medical staff who also participated in rescuing the victim from the passenger vehicle) on an ambulance and transported to the General Hospital in Pančevo. The person succumbed to his injuries at the Pančevo General Hospital.

By the letter of the MUP RS, Sector for Emergency Situations No. 217-325 of 12.02.2020., data were submitted that on 09.01.2020. at 02:47 Fire and Rescue Unit of Pančevo received a report from the duty service of the PU in Pančevo that it is necessary to remove a person from a vehicle that participated in a traffic incident in the St. Bavaništanski put bb in Pančevo. At 02:48, 2 (two) vehicles with 6 (six) firefighters-rescuers from the Pančevo Fire and Rescue Unit were sent to the site. Arriving at the site at 02:53, members of the Pančevo Fire and Rescue Unit established that the incident occurred due to a collision between a train and a road passenger vehicle in which one injured person was in the passenger seat, after which they started releasing the injured person. The teams of the Traffic Police and the Emergency Medical Service were present on the site, as well as the train driver and the person who was driving the motor vehicle. Information was obtained from them that one person, who was also in a damaged road passenger vehicle, had already been transported to the hospital. The intervention ended at 04:25 and at 04:35 members of the Pančevo Fire and Rescue Unit returned to the unit.



By letter from OJT Pančevo KT No.274/20 of 09.03.2020., data were submitted that OJT Pančevo, was notified on a traffic incident, which occurred on 09.01.2020. at 02:45 in Pančevo in St. Bavaništanski put, passage of the state road 1B rank, through the settlement, state road No. 14 Pančevo - Kovin - Ralja, 1 km and 200 m, at the crossing of the road over the railway line at the same level of the industrial railway track of the Pančevo Oil Refinery, by the duty service of the PU in Pančevo. The Deputy Public Prosecutor on duty came to the site and attended the on-site investigation carried out by the police officers of the Pančevo Police Department.

From the MUP RS, PU in Pančevo, the Traffic Police Department in Pančevo, the Traffic Police Office in Pančevo, CINS did not receive data on engagement on the site.

2.3. Dead, injured and material damage

2.3.1. Passengers, third parties and the railway staff including contractors

In this serious accident, out of a total of 3 (three) persons who were in the road passenger vehicle, 1 (one) person was fatally injured (passenger seat in the road passenger vehicle), 1 (one) person was seriously injured (the passenger in the back seat in road passenger vehicle) and 1 (one) person was lightly injured (driver of a road passenger vehicle).

No railway workers were injured or fatally injured among the railway workers on the shunting composition No. MS-4.

Table 2.3.1.1: Review of fatally injured and injured persons

	Passengers	Railway staff	Third parties	Total
Fatally injured	-	-	1	1
Seriously injured	-	-	1	1
Lightly injured	-	-	1	1

Data on fatally injured and injured persons were submitted by the OJT in Pančevo (letter KT No. 274/20 of 09.03.2020).

2.3.2. Goods, luggage and other assets

In this serious accident there were no damages to the luggage of the shunting composition MS-4. There are damages on the road passenger vehicle. CINS does not have data on the assessment of damage to a road passenger vehicle.

2.3.3. Railway vehicles, infrastructure and the environment

In the respective serious accident, there was no material damage on the railway vehicles and infrastructure.



2.3.4. External conditions – weather conditions and geographic characteristics

The place of occurrence of the respective serious accident is located in the area of the city of Pančevo in the city settlement of Stara Misa, on an industrial track located on a geographically plain terrain.

The geographical coordinates of the accident site are: 40° 52' 17.04" N and 20° 41' 0.38" E.

The part of the track on which the level crossing is located is in the direction and horizontal.

By the letter of the Republic Hydrometeorological Institute No.: 925-1-16/2020 from 21.02.2020., data were submitted that on the basis of measurements and observations at the Meteorological Stations that are climatologically representative of the area of Pančevo, 09.01.2020., in the required area, the maximum air temperature was -2.1°C, and the minimum temperature at 5 cm above the ground was -2.3°C. The ground was frozen until 11 A.M. Meteorological visibility was 2 to 10 km. A light wind was blowing with gusts of 3.4 to 5.4 m/s from the south. A moderate haze was observed from 00:00 to 12:30. Light salt was observed from 00:00 to 08:30. Weak frost was present from 00:00 to 01:30.

At 02:00 it was completely cloudy. The air temperature was -1.9°C. Visibility was 8 km. The ground was frozen. Weak haze and light frost were observed.

At 03:00 it was completely cloudy. The air temperature was -1.8°C. Visibility was 8 km. The ground was frozen. Weak haze and light frost were observed.

Meteorological visibility is the horizontal transparency of the atmosphere, which is expressed at the greatest distance at which the observer of normal vision can recognize objects known to him in the environment, when observing during the day, and light sources when observing at night.

At the time of the on-site investigation of the respective serious accident by the CINS' investigative team, it was day. The weather was partly cloudy, without wind and precipitation. Visibility was good. The air temperature was around 3°C.

3. Minutes on the investigation and interviews

Data, facts and evidence regarding the occurrence of the respective serious accident were collected and determined on the basis of:

- On-site investigation by the investigative team of CINS;
- materials submitted by infrastructure manager "IŽS" a.d.;
- materials submitted by railway undertaking "Srbija Kargo" a.d.;
- materials submitted by the owner of the industrial track "NIS" a.d. and
- materials submitted by the OJT Pančevo.

For the respective serious accident, the on-site investigation and investigation was performed by the joint investigative committee of the owner of the industrial track of Oil Refinery Pančevo "NIS" a.d. and the railway undertaking "Srbija Kargo" a.d.

Members of MUP RS in Pančevo, Traffic Police Department in Pančevo and members of OJT Pančevo conducted the on-site investigation.



3.1. Summary of testimonies

Working group of CINS has conducted hearing of employees involved in this serious accident at the CINS' premises. From the employees of "Srbija Kargo" a.d., on 26.05.2020. the train driver was questioned, on 28.05.2020. the train driver assistant was questioned and on 29.05.2020. the conductor and shunter were questioned. All the employees were on the shunting composition MS-4 at the time of occurrence of the respective serious accident. From the employees of Oil Refinery Pančevo ("NIS" a.d. Novi Sad) on 29.05.2020. the shunter, who at the time of the serious accident secured the traffic on the level crossing at km 2+231, was questioned.

From "Srbija Kargo" a.d., "NIS" a.d. Novi Sad and "IŽS" a.d.; the Minutes on hearing of all employees who were on the shunting composition MS-4 (train driver, train driver assistant, conductor and shunter), on-duty shunter who was on the level crossing at km 2+231 (shunter of the Oil Refinery Pančevo) and staff that regulated the traffic on the industrial track of Oil Refinery Pančevo (train dispatcher of the station Pančevo Varoš and on-duty shunting operator at the Oil Refinery Pančevo) were obtained.

From "IŽS" a.d. the Report of the train dispatcher on irregularities during operation (SP-9) No. 1/2020 of 09.01.2020. issued by the dispatcher of trains of the station Pančevo Varoš who was on duty at the time of occurrence of the respective serious accident.

Summaries of testimonies for the train driver, train driver assistant, conductor and shunter who were on the shunting composition MS-4 and for the on-duty shunter of Oil Refinery Pančevo who was at the level crossing at km 2+231 is given according to the hearing conducted by the working group of CINS, while the summaries of testimonies for the train dispatcher of the station Pančevo Varoš and shunting operator at the Oil Refinery Pančevo were given according to the Minutes of hearing submitted by "IŽS" a.d. and "NIS" a.d. Novi Sad.

3.1.1. The railway staff

Train driver of the shunting composition MS-4 stated that after leaving the circle of the Pančevo Oil Refinery, approaching the level crossing, he noticed a light control signal that showed a yellow light all the time, which meant that the crossing did not work. He states that, in addition to the control signal, in front of the level crossing there was also a sign that there was a level crossing nearby, a red and white pillar. Approaching the level crossing, he was giving the aspect of a signal "Watch out". The shunting composition was moving at a speed below 20 km/h. He saw that a man from the Refinery, who was at the level crossing, was stopping the road vehicles on both sides and then was giving an aspect of a signal "Forward" with a lamp. He points out that a man from the Refinery entered the track, was giving the aspect of a signal "Forward", and stepped away. At the moment when the locomotive arrived at the level crossing, the train driver assistant had introduced fast braking, but they did not manage to stop, so the car flew in front of them. In the locomotive, viewed in the direction of movement, he was on the right side and did not see the car coming from the left side. He informed his boss from Pančevo about the occurrence of the serious accident.

Train driver assistant of the shunting composition MS-4 stated that they started from the Pančevo Oil Refinery in the direction of the Pančevo Varoš station. He was on the left side of the locomotive and was watching his side. Since the control signal in front of the level crossing was on the right side (on the train driver's side), he did not see the control light signal or what it shows, but the train driver told him which aspect of a signal the control signal showed. He points out that



the level crossing was faulty both when they came to the Pančevo Oil Refinery and when they returned and that they knew that the level crossing was faulty. When they came across the level crossing, they were giving the aspect of a signal “Watch out” several times. There is speed limit of 20 km/h, but he thinks they didn't go even that far. At the level crossing, he saw a man from the Refinery, who was wearing an orange suit, helmet and lantern (lamp) and was standing right at the level crossing. He was giving that the crossing was secured, that the train could pass, he was giving an aspect of a signal “Forward”. When they came across the crossing, he noticed a road passenger vehicle on his left side, which was moving at high speed towards the level crossing, and he introduced fast braking. He noticed that the man securing the level crossing was literally jumping, and that the road passenger vehicle did not brake, and that the passenger vehicle hit a barrier on the right side of the locomotive. When he was, in the previous period, driving on this industrial track, there was always a man at the respective level crossing, regardless of whether the level crossing was correct or not.

The conductor of the MS-4 shunting train stated that after departure of the MS-4 shunting composition from the Pančevo Oil Refinery, he was sitting in a locomotive on a chair in the middle of the driver's cab from where he had no view in the direction of movement. When approaching the level crossing, the train driver was driving slowly. He heard that the train driver assistant said that he could go forward and that the level crossing was secured. The train driver was driving normally further and suddenly he only heard a blow and the locomotive stopped a few meters from the place when he heard the blow.

The shunter of the shunting composition MS-4 stated that before the departure of the MS-4 shunting composition from the Pančevo Oil Refinery, he entered the locomotive and sat on the auxiliary seat in the middle of the driver's cab, from where nothing could be seen in the direction of movement, after which they left the Pančevo Oil Refinery. During the ride, he heard that the drivers (the train driver and the train driver assistant) commented that a level crossing was secured. He heard that the train driver told the assistant that a level crossing was secured because a man from the Refinery was on it and that he was giving an aspect of a signal “forward”. The shunting composition was moving very slowly. He didn't feel anything in the locomotive, he didn't even move from the seat, he didn't hear anything. The shunting composition stopped very quickly at the level crossing, after which the train driver commented that they hit the car. He thinks (he's not sure but he thinks) that the train driver was on the right. He notes that the employee of the Pančevo Oil Refinery always secures a level crossing, regardless of whether the device at the level crossing is correct or defective.

On-duty shunter of the Pančevo Oil Refinery that was on the level crossing stated that in agreement with the on-duty shunting operator from the Pančevo Oil Refinery, he went to the level crossing and after the on-duty shunting operator informed him that the MS-4 shunting composition had left the Pančevo Oil Refinery, he went to the level crossing at 02:20, where he also saw the police who were nearby. According to his allegations, when he saw the composition coming, he went out in the middle of the road on the side of the track closer to the city of Pančevo in full equipment, with a fluorescent suit and a lamp he was giving the aspect of a signal to the road vehicles, waving left and right by horizontal movements at waist level with a white flashing lamp light to stop the road vehicles. The driver of the car from the direction of Kovin saw that and stopped. However, as the locomotive approached, another vehicle from Pančevo appeared, and he was still on the road in the middle of the crossing. He also warned him to stop and heard that the train driver was giving the siren. As he estimated that the car from the direction of Pančevo probably will not stop, he set aside so that the car would not hit him. After that, a collision of the shunting composition MS-4 in the road vehicle happened, where the locomotive stops at the level crossing itself. When asked which aspects of signal he was giving and to whom, he said that he



was not facing the shunting composition MS-4 and he did not give any aspect of a signal for the shunting composition MS-4, but only for road vehicles coming from the direction of Kovin and the direction of Pančevo. He states that the staff of the Refinery goes to the level crossing both when it is correct and when it is defective, in order to secure the level crossing, that is, to stop participants in road traffic when the shunting composition arrives.

On-duty shunting operator at the Marshalling Yard of Pančevo Oil Refinery stated that he informed the on-duty shunter who was at the level crossing at km 2+231 about the departure of the MS-4 shunting composition from the Pančevo Oil Refinery in the direction of the Pančevo Varoš station and that the shunter confirmed that he understood the notice of the shunting composition's departure. Fifteen minutes after that conversation, he received a call from the on-duty shunter from the level crossing who informed him about the occurrence of the accident.

On-duty train dispatcher of the station Pančevo Varoš stated that, when giving consent for the traffic of shunting composition MS-3/MS-4, the on-duty manager of the Pančevo Oil Refinery did not inform him that the automatic level crossing at km 2+231 of the industrial track of the Pančevo Oil Refinery is faulty and that it is necessary to inform the shunting staff on the issue. He points out that the train dispatcher at the Pančevo Varoš station was never informed about the condition of the respective automatic level crossing on the industrial track (whether it is correct or faulty), nor did the representative of the Pančevo Oil Refinery request, upon giving consent for the traffic of shunting composition, that the shunting staff be informed about the condition of the level crossing.

3.1.2. Other witnesses

Witnesses of this serious accident (third parties) were not questioned, and no statements were taken from them.

3.2. Safety management system

3.2.1. Organizational frame and manner of issuing and executing orders

In accordance with the applicable Rulebook of Safety Management System, "Srbija Kargo" a.d. has informed CINS on the serious accident occurred.

In accordance with the Law on Railway Traffic Safety ("Official Gazette of RS" No. 41/2018) and Law on Investigation of Accidents in Air, Railway and Waterborne Traffic ("Official Gazette of RS" No. 66/15 and 83/18), "NIS" a.d. has informed CINS on the serious accident occurred.

The owner of the industrial track "NIS" a.d. and the railway undertaking "Srbija Kargo" a.d. have, in accordance with the Law on Railway Traffic Safety ("Official Gazette of RS" No. 41/2018), formed the joint investigative committee which conducted the investigation of the respective serious accident. Upon completion of the investigation, on 31.01.2020. Report on Investigation was made, which was signed by all the members of the investigative committee, but it is not registered (it does not have official reference No.)



3.2.2. Requirements to be fulfilled by the railway staff and the manner they are applied

“Srbija Kargo” a.d. has through the Safety Management System Manual (SMS) secured by its management that all the employees directly involved in conducting of the railway traffic and that have responsibility in the safety management system, are trained and competent, in order to ensure efficient, effective and safe execution of set goals.

Regarding the respective serious accident, in which the train driver, train driver assistant, conductor and shunter were involved, employed at “Srbija Kargo” a.d., all activities related to professional training, competence and planning of the workload are conducted in accordance with the applicable regulations.

3.2.3. Procedures for internal audits and controls and their results

“Srbija Kargo” a.d. as a railway undertaking has established Safety Management System Manual. The general purpose of the Safety Management System (SMS) is to secure that “Srbija Kargo” a.d. achieves its business goals of providing transportation services on the railway in the safe manner. These goals must be met in today's ever-changing and complex railway environment, providing evidence that “Srbija Kargo” a.d. meets all safety requirements applicable to it.

In addition to safety, the adoption of a structural method enables the identification of hazards and the continuous management of risks associated with transport business activities, in order to prevent accidents and incidents. Adequate implementation of all relevant elements of the safety management system “Srbija Kargo” a.d. provides the necessary assurance that, at all conditions, it controls, and will continue to control, all identified risks associated with its activities.

“Srbija Kargo” a.d. must approach the safe performance of maintenance within the various processes. Exchange of information within the safety management system with the Person in charge of maintenance (ECM) in “Srbija Kargo” a.d. implies operational information regarding the safety of maintenance and control of the technical correctness of the vehicle.

Requirements regarding the maintenance of rolling stock (locomotives, freight cars and plants, equipment and devices) are described in the approved procedure as well as the procedure for their maintenance which will be declared on the basis of legal conditions, technical documentation and the manner of use and the required performance of the vehicles in terms of reliability and availability.

Regarding the respective serious accident, regular and corrective maintenance of locomotive 661-155 at “Srbija Kargo” a.d. was performed in accordance with the applicable regulations.

3.3. Relevant international and national regulations

3.3.1. Road Traffic Safety Law (“Official Gazette of RS” No. 41/2009, 53/2010, 101/2011, 32/2013 – decision US, 55/2014, 96/2015 - other law, 9/2016 - decision US, 24/2018, 41/2018, 41/2018 - other law and 87/2018 and 23/2019)

IV Traffic rules

...

1. General provisions



Article 20 (excerpt):

Traffic participants are obliged to act in accordance with:

the meaning of the sign, i.e. the order issued by the authorized person who directly regulates the traffic,

...

Traffic participants are obliged to act in accordance with the meaning of the sign, i.e. the order given by the authorized person who directly regulates the traffic and when by that they deviate from the meaning of the light traffic sign or the meaning of another traffic sign or the meaning of the road and sidewalk sign or traffic rules.

...

23. Traffic on the crossing of the road over the railway line

Article 100:

At the crossing of the road over the railway line, the driver is obliged to pass the rail vehicle moving on the railway line.

A driver approaching a level crossing with a vehicle is obliged to adjust the movement of the vehicle so that he can stop it in front of the device for closing the traffic at the crossing or in front of the device for giving signs announcing the approach of the train, i.e. to stop the vehicle before stepping on the railway line.

...

VII traffic signalling

1. General provisions

Article 132 (excerpt)

...

Traffic participants are obliged to, at the places, that is, sections of the road marked by the danger signs, adjust their movement to the dangers that these signs warn them of.

...

6. Marking the crossing of the road over the railway line

Article 153 (excerpt)

The crossing of the road over the railway line must be marked with the prescribed traffic signalization.

At the crossing of the road with a modern road pavement (asphalt, concrete, cube, etc.) over the railway line, traffic lights announcing the approach of the train must be placed.

...

IX TECHNICAL TRAFFIC REGULATION

...

8. Signs and orders given by authorized persons



Article 166

Traffic participants must act according to signs and orders given by a police officer or another person authorized by law to directly regulate or control traffic.

Signs are given by hands, i.e. by the position of the body of the authorized person, devices for giving light and sound signs, a table or a flag for regulating traffic, and orders are given orally.

Signs and orders can also be given from the vehicle.

On the part of the road on which the works are performed and where an obstacle has arisen that cannot be removed immediately, traffic regulation can be performed by at least two designated workers of the contractor, i.e. the road manager.

Traffic regulation in the case referred to in paragraph 4 of this Article shall be done with red and green flags, which have the following meaning:

- 1) raised green flag - free passage for vehicles from the direction where that flag is raised,
- 2) raised red flag - forbidden passage for vehicles from the direction where that flag is raised.

The contractor, i.e. the road manager and the workers determined to regulate the traffic are responsible for the regulation of the traffic referred to in paragraph 4 of this Article in the prescribed manner.

Signs and orders are given in the prescribed manner and must be clear, unambiguous, observable, i.e. audible, and have priority in relation to traffic signals and prescribed traffic rules.

More detailed regulations on the appearance, manner of giving signs given by the persons referred to in paragraph 4 of this Article shall be prescribed by the Minister in charge of traffic affairs.

Signs and orders given by a police officer, their meaning and manner of giving shall be prescribed in more detail by the Minister of the Interior.

...

XI Drivers

5. Psychophysical conditions for driving a motor vehicle

Article 187:

A driver who is incapable of safe driving, i.e. so tired or ill, or is in such a mental state that he is not able to drive safely, must not drive a vehicle in traffic.

The driver must not drive a vehicle on the road or start driving if he is under the influence of alcohol and/or psychoactive substances.

Under the influence of alcohol is the driver, i.e. a person for whom the analysis of an appropriate blood sample determines the presence of alcohol greater than 0.20 mg/ml or if the presence of alcohol in the body is determined by appropriate means or devices for measuring alcoholism (breathalyser, etc.). which corresponds to the presence of alcohol in blood greater than 0.20 mg/ml.



3.3.2. Law on Railway (“Official Gazette of RS” No. 41/2018)

...

III Calculation of access prices and allocation of railway infrastructure capacity

...

8. Level crossing, reconstruction and level crossings maintenance

Article 62 (excerpt):

At the level crossing, railway infrastructure and railway traffic are managed by the railway infrastructure manager (infrastructure manager, service facility operator, owner, i.e. authorized industrial track manager who is part of the railway infrastructure), and road, street and pedestrian infrastructure and traffic are managed by the road infrastructure manager, so that each manager is obliged to create conditions for safe crossing of the crossing point on the infrastructure he manages.

...

Article 67 (excerpt):

The railway infrastructure manager and the road infrastructure manager are obliged to conclude an agreement which, in more detail, regulates the mutual relations in terms of level crossings and within that framework determines the type and scope of road maintenance works and the time of execution of these works, the amount of costs for ensuring safe and undisturbed traffic at the level crossing, the method of payment of costs and regulate other issues from these relations.

The contract referred to in Paragraph 1 of this Article shall be concluded for a period of maximum ten years with the possibility of renewal, and the Annex to the contract referred to in Paragraph 1 of this Article must be signed no later than 31.12. of the current year for the next year.

...

Article 68 (excerpt):

The railway infrastructure manager, as well as the road manager are obliged to implement measures for safe and undisturbed traffic at the level crossing and to maintain the level crossings in a condition that ensures safe and uninterrupted traffic flow, in accordance with the laws governing railway traffic safety and road traffic safety.

...

Article 69 (excerpt):

The infrastructure manager takes care of maintaining the part of the level crossing, as well as ensuring safe and undisturbed traffic at the level crossing, with the provision that the road at the level crossing must be maintained so that safe and undisturbed road traffic can be performed over it.

...

The zone of visibility in the gauge of the level crossing is maintained by the railway infrastructure manager.



Article 70 (excerpt):

The provisions of Art. 61-69 of this Law shall accordingly apply to level crossings on industrial railways and industrial tracks for own needs, as well as on tracks located within railway repair workshops, depots or garages for locomotives, and especially with regard to the rights and obligations of a company or other legal entity that manages the industrial railway, as well as the owner, i.e. the user of the industrial track for its own needs.

...

11. Industrial railway and industrial track

Article 77 (excerpt):

...

The owner, i.e. the user of the industrial track, is obliged to pass an act determining the manner of organizing and regulating the shunting work, maintenance and protection of the industrial track, the person responsible for implementing the act, maintenance of railway vehicles and other means used on the industrial track, according to previously obtained consent of the Directorate.

...

3.3.3. Law on Railway Traffic Safety (“Official Gazette of RS” No. 41/2018)

II Railway vehicles

1. Technical conditions

...

Traction vehicle devices and equipment

Article 51. (excerpt)

Locomotive must possess:

...

8) sound signaling device;

XIII Crossing of railway lines and roads

...

Article 96 (excerpt):

...

Traffic at level crossings is provided with traffic signs for participants in road traffic. On the railway line, in front of the level crossing, the prescribed aspects of a signal must be placed to inform the train staff about the approach of the train to the level crossing. The train has the right of priority in relation to participants in road traffic.

...

Conditions for crossing of the railway line and road, pedestrian, or bicycle path



Article 97 (excerpt)

The conditions for the crossing of the railway line and the road, in terms of the place where the crossing can be made and the measures for safe traffic regulation at the level crossings, depend on the traffic density, visibility of the railway, speed on the railway and on the road and on local conditions.

...

XVI. Industrial railway, industrial tracks, tourist-museum railway

...

2. Industrial track

Article 106 (excerpt):

The industrial track can be connected to the public railway infrastructure. The manager determines the manner of connection and traffic-technical conditions for the connection of the industrial track to the public railway infrastructure, as well as the safety measures that need to be implemented regarding the connection. Traffic-technical conditions and safety measures for connecting the industrial track to the public railway infrastructure include:

...

4) the necessary means of communication between the monitoring station and the industrial track;

5) acquainting the staff of the traction vehicle of the railway undertaking serving the industrial track with the local conditions on the industrial track;

6) acquainting the shunting staff of the owner, i.e. the user of the industrial track with the business order of the monitoring station;

...

3.3.4. Rulebook on traffic signalization (“Official Gazette of RS” No. 85/17)

1. Traffic signs

...

1.1. Danger signs

Article 17

Danger signs serve to warn participants in traffic of the danger that threatens them at a certain place, i.e. part of the road, and to inform them about the nature of the danger.

Article 18 (excerpt)

Danger signs are:

...

27) sign “crossing of the road with the railway line with barriers or semi-barriers” (I-32), denotes encountering the crossing of the road with the railway line at the level, provided by barriers or semi-barriers;



I-32

29) sign “Andrejin krst”, denotes encountering the crossing of the road with the railway line at the level with one track (I-34), i.e., with two or more tracks (I-34.1);

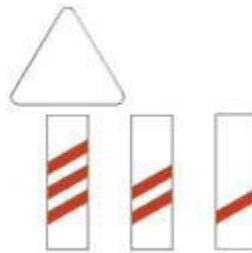


I-34



I-34.1

30) the sign “approaching the crossing of the road and the railway line” (I-35), denotes the distance to the crossing point of the road and the railway line at the level;



I-35

...

Placing the danger signs

...

Article 23.

Notwithstanding from the Article 22, paragraph 1 of this Rulebook:

...

5) signs I-34, I-34.1 are placed at the crossings of the road and railway, at a distance of 5 m from the nearest railway track, and if the circumstances require not less than 3 m, or not more than 10 m;

6) signs I-34, I-34.1 are placed on the common supporter above the traffic lights if the level crossing over the railway line is equipped with the traffic lights;

7) sign I-35 is placed with three oblique lanes at 240 m in front of the crossing of the road and the railway line at the level, then with two oblique lanes at 160 m, and the last with one oblique lane at 80 m in front of the crossing of the road and the railway at the level. The lower side of the oblique lanes is closer to the road. The sign I-32 or I-33 is placed above the sign with three oblique lanes.

...

Article 25. (excerpt)

Signs of explicit orders prescribing the priority of passage are:

...

2) sign "obligation of stopping" (II-2), denotes an order to the driver that he must stop the vehicle and give priority to the passage of vehicles moving along the road he encounters;



...

Placing the signs of explicit orders

...

Article 33. (excerpt)

Notwithstanding from the Article 32 of this Rulebook:

...

2) sign II-2 shall be placed in the immediate vicinity of the crossroad, preferably at the point of visibility, where the vehicle must stop in order to give way to other vehicles moving along the road it encounters;

...

1.4. Additional boards

Article 54.

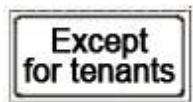
In addition to danger signs, signs of explicit orders and warning signs, it is allowed to place an additional board.

Article 55. (excerpt)

Additional boards are:

...

5) additional board (IV-5), determines the meaning of the sign in more detail in the text, i.e. provides additional information on the type and manner of use of the sign;



IV-5

The inscription on the additional board is an example.

...



Additional boards - general characteristics

Article 56.

The additional board has the same properties in terms of base color and retroreflection as the sign under which the additional board is placed, and the color of the inscriptions and symbols on the additional board corresponds to the color of the inscriptions and symbols on the sign under which the additional board is placed.

Notwithstanding from the paragraph 1 of this Article, it is allowed that additional boards IV-5 and IV-23 are not of the same color as the sign next to which they are placed.

Article 57.

The width of the additional board placed next to the sign must not exceed the width of the sign next to which the additional board is placed. The width of the additional board placed next to the circle shaped sign must not be larger than the diameter of the circle.

The height of the additional board must not exceed half of its length, except in the case of additional boards: IV-5, IV-6, IV-8.3, IV-8.4, IV-8.5 and IV-23.

...

3. Traffic lights

Article 71.

Traffic lights are used to regulate the traffic and to denote the works and obstacles on the road.

Traffic lights are used to regulate:

1. vehicle movements;
2. pedestrian movements;
3. tram movements;
4. bicycle movements;
5. level crossing over the railway line;
6. vehicle access.

Traffic lights emit light traffic signs, i.e. red, yellow, green or white lights.

Traffic lights can also be with a graphic symbol, which further explains its meaning, i.e. defines which category of users the term refers to.

...

3.5. Traffic lights for regulating the crossing of the road over the railway line at the same level

Article 81.

Traffic lights that regulate the crossing of the road over the railway at the same level (VI-9), are used to announce the approach of the train and the announcement of the lowering of the barriers, i.e. the semi-barriers.

It is placed at the crossings of the road over the railway at the level, with or without barriers, i.e. semi-barriers.

Light traffic signs are given by alternately turning on two red flashing lights in the shape of a circle, and sound devices can be added to inform traffic participants that a light traffic sign has been given, announcing the approach of a train.

The lights referred to in paragraph 3 of this Article are located next to each other on the horizontal axis, on a board that has the shape of an equilateral triangle with the top facing upwards, whose characteristics correspond to the danger signs.



3.3.5. Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic (“Official Gazette of RS” No. 89/2016)

III. Measures to secure the safe traffic on the level crossings

Article 10. (excerpt)

Measures to ensure safe traffic at level crossings depend on traffic density, visibility of the railway line, speed of driving on the railway and the road and local conditions in accordance with the law governing the safety and interoperability of the railway.

Traffic at level crossings referred to in paragraph 1 of this Article shall be provided with:

- 1) traffic signs on the road and the zone of necessary visibility;
- 2) light traffic signs and traffic signs on the road;
- 3) automatic semi-barriers with light traffic signs and traffic signs on the road;
- 4) barriers and traffic signs on the road;
- 5) direct regulation of traffic at the level crossing and special measures, and
- 6) protective fences and traffic signs or bypasses and traffic signs at level crossings for pedestrians and cyclists.

...

Article 34.

Direct regulation of traffic at the level crossing and special measures provide traffic at level crossings in the case of:

- 1) movements of railway vehicles on manipulative railways and industrial tracks;
- 2) failure or temporary unusability of a traffic light, automatic semi-barriers or barriers.

Article 35. (excerpt)

If there is a malfunction or temporary unusability of the signalling-safety device at the level crossing, the traffic at the level crossing shall be provided by applying one of the following special measures:

- 1) available technical means and signal equipment by on-site handling, i.e. as determined by the technical solution of the signalling-safety device for the state of failure, if there are conditions for that;
- 2) the authorized employee of the railway infrastructure manager secures the level crossing and directly regulates the traffic by giving manual traffic signs (flag) to the road vehicles, in accordance with the regulations which regulate the traffic safety on the roads;



3) the railway vehicle is stopped in front of the level crossing with giving the aspect of a signal prescribed in Article 17 of this Rulebook, and when it is assured that the road vehicles have stopped in front of the level crossing at the aspect of a signal indicating the place of crossing the road, the railway vehicle gently and carefully continues driving, and road vehicles continue driving after leaving the railway vehicle, i.e. the last vehicle in the train in the area of the level crossing.

Special measures referred to in item 1 of this Article shall be taken immediately after the occurrence of a malfunction or temporary unusability of the signalling-safety device at the level crossing.

...

Article 36

If the malfunction or temporary unusability of the signalling-safety device at the level crossing lasts longer than 84 hours, the traffic at the level crossing shall be ensured by one of the special measures referred to in Article 35, paragraph 1, item 1) and 2) of this Rulebook and are marked as faulty or temporarily unusable light signs, automatic semi- barriers and barriers.

In the cases referred to in paragraph 1 of this Article, the following measures shall be taken:

1) the manner of marking light signs, automatic semi-barriers and barriers that they are defective or temporarily unusable is defined in a timely manner;

2) temporary marking of barriers, automatic semi-barriers or light traffic signs on the road so that they are not valid for participants in road traffic (darkening, installation of black plastic foils, rotation of signalization, dismantling, etc.) is carried out;

3) it is requested that the temporary adjustment of traffic signs on the road in front of the level crossing equipped with light signs, automatic semi-barriers and barriers that are defective or temporarily unusable, as well as to re-install regular traffic signs on the road.

...

3.3.6. Rulebook 1, Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96, 5/96 and 1/97)

Important note: at the time of the occurrence of the respective serious accident, this rulebook was valid.

Section III: Permanent signals

...

Article 23. Signals for automatic devices at level crossings (excerpt)

A. Basic provisions

1. The correctness of automatic devices for providing traffic at level crossings at the same level that includes the oncoming train, is controlled in two ways:

...

6. control light signals installed at a certain distance in front of the level crossing.

...

3. When the traffic at the level crossings is provided in the manner from item 1, under b. of this Article, the following shall be installed on the line in front of the level crossing:

- a. control light signals;
- b. auxiliary control light signals (if necessary);
- b. switching point signals.

4. The poles of the control and auxiliary control light signals are painted on the front with oblique black and white stripes of equal width.

B. Control and auxiliary control light signals

Aspects of a signal. Purpose and use of aspects of a signal. Visibility distance.

5. Aspect of a signal 55: "Device at the level crossing defective"

day and night sign:

one yellow calm light towards the train (see Figure 81)

6. Aspect of a signal 56: "Device at the level crossing correct"

day and night sign:

one yellow calm and above it one white flashing light towards the train (see Figure 82).

The white flashing light turns on and off in the rhythm of the road traffic sign in front of the level crossing.

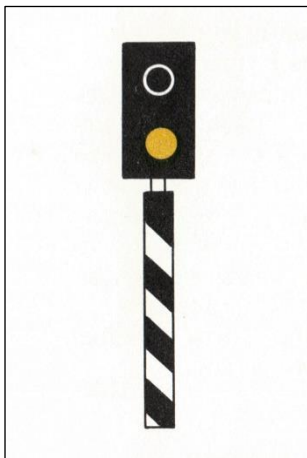


Figure 81.

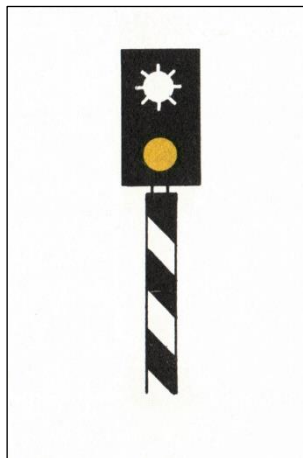


Figure 82

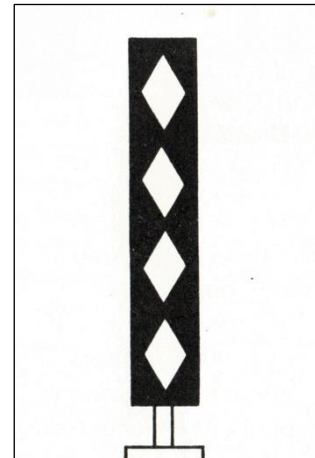


Figure 84.

7. Control light signals shall be installed in front of the level crossing at the distance of the stopping distance or at a greater distance, but not more than 1.5 times the length of the stopping distance.

...

8. The control light signal must be visible from the place where the signal is installed, the switching point in front of the control signal of the level crossing.

...



B. Switching point signals

10. Aspect of a signal 57: “Switching point, expect control signal”

day and night sign:

a rectangular black board with four white rhombuses placed one below the other (see Fig. 84).

...

D. Purpose and use of aspects of a signal. Visibility distance

13. Aspect of a signal 57: “Switch-on point, expect the control signal” commands that it must be observed whether the control light signal shows aspect of a signal 55: “Device at the level crossing defective” or an aspect of a signal 56: “Device at the level crossing correct”. When the first axle of the vehicle crosses the switch-on point, a white flashing light appears on the control light when the device is correct at the level crossing.

14. If immediately after passing the aspect of a signal 57: “Switch-on point, expect a control signal”, the aspect of a signal 56: “Device at the level crossing correct” does not appear on the control light signal, the driver must repeatedly give aspect of a signal 67: “Watch out” and stop the train in front of the level crossing. The procedure for further train driving, the manner of notifying stations about the failure of automatic devices at the level crossing by train staff, as well as the procedure of train dispatchers in such cases, are prescribed by the Traffic Rulebook.

15. If, after passing the aspect of a signal 57: “Switch-on point, expect control signal”, the control signal is not illuminated, it should be considered as if the control signal shows the aspect of a signal 55: “Device at the level crossing defective”. In this case, paragraph 1, item 14 of this Article must be followed.

...

Section V: Aspects of a signals of the train and station staff

Aspects of a signals of the traction vehicle staff

Article 29. (excerpt):

A. Basic provisions. Aspects of a signal

1. With the aspects of a signals of the traction vehicle staff, the traction vehicle staff gives the necessary orders and warnings to the train, station and railway staff, and in certain cases to other persons.

...

2. The aspects of a signals of the traction vehicle staff are given by a train driver with a traction vehicle siren.

...

3. Aspect of a signal 67: “Watch out”, one long sound: —————

...

B. Purpose and use of aspects of a signal

11. Aspect of a signal 67: “Watch out”, given by a train driver

- at all trains:



a) in cases when it is necessary to warn of the arrival of a train or that it needs to be removed or removed from the track. This also applies to the driver of each propulsion vehicle when performing shunting drives;

...

v) in front of the aspect of a signal “track warning” and according to provisions of the item 5 of the Article 46 of this Rulebook;

...

k) in front of each level crossing, by larger cut, bridge and other larger objects that prevent the view;

...

lj) when necessary in the interests of general safety and the warning of others or the dispersal of animals from the tracks;

...

Aspects of a signal of the shunting staff

Article 32. (excerpt):

1. The aspects of a signal of the shunting staff are used to order with them to start in the required direction, regulate speed and stopping during shunting drives of all kinds.

2. The aspects of a signal of the shunting staff are given by the staff that executes the shunting drives or the switching staff that serves the switches upon shunting.

3. The aspects of a signal of the shunting staff are given simultaneously with a mouth whistle and a signal flag, i.e. a mouth whistle and a hand signal lamp. An aspect of a signal given exceptionally only by a mouth whistle or only by a signal flag, i.e. at night only by a hand signal lamp, has the same importance as if it was given simultaneously by a mouth whistle and a signal flag, i.e. at night by a mouth whistle and a hand signal lamp.

...

5. The aspects of a signal of the shunting staff are used at trains for drives which, according to provisions of the Traffic Rulebook, are considered shunting drives.

6. Aspect of a signal 85: “Forward”

day sign:

wave a developed signal flag vertically upwards and downwards in longer strokes, and in addition one long whistle with a mouth whistle: ————— (see Fig.131)

night sign:

wave a signal lamp with white light vertically upwards and downwards in longer strokes, and in addition one long whistle with a mouth whistle: ————— (see Fig. 132)

7. Aspect of a signal 86: “Back”

day sign:

wave the developed signal flag horizontally left and right in longer strokes, and in addition two long whistles with a mouth whistle: ————— ————— (see Fig.133)

night sign:

wave the developed signal flag horizontally left and right in longer strokes, and in addition two long whistles with a mouth whistle: ————— ————— (see Fig. 134)

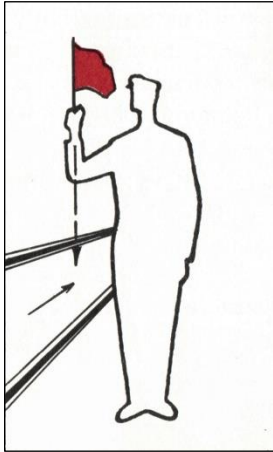


Figure 131.

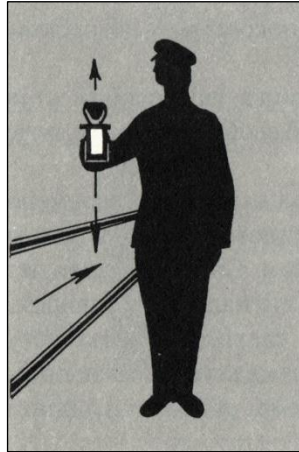


Figure 132.

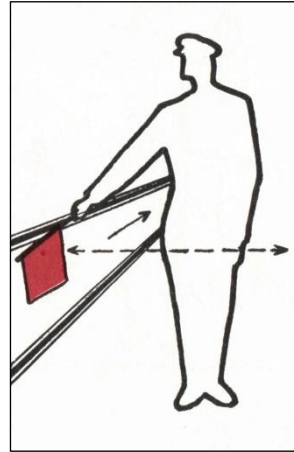


Figure 133.

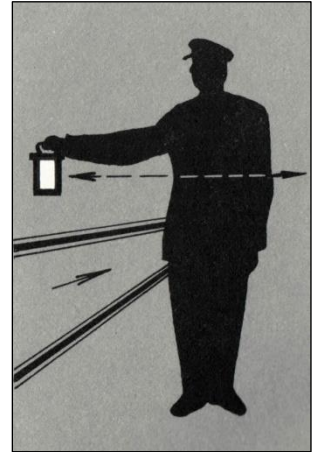


Figure 134.

8. Aspect of a signal 87: "A little further"

day sign:

wave the developed signal flag vertically up and down in short strokes, and in addition one short whistle with a mouth whistle: ● (see Fig. 135);

night sign:

wave a signal lamp with white light upright and down in short strokes, and in addition one short whistle with a mouth whistle: ● (see Fig. 136).

9. Aspect of a signal 87: "A little back"

day sign:

wave the developed signal flag horizontally left and right in short strokes, and in addition two short whistles with a mouth whistle: ● ● (see Figure 137);

night sign:

wave with a signal lamp with white light horizontally left and right in short strokes, and in addition two short whistles with a mouth whistle: ● ● (see Fig. 138).



Figure 135.

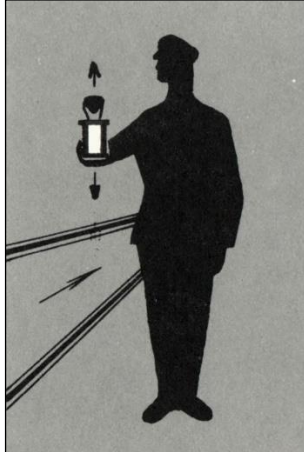


Figure 136

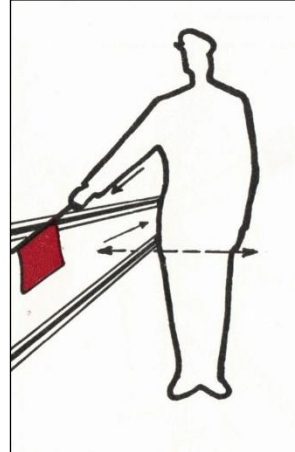


Figure 137

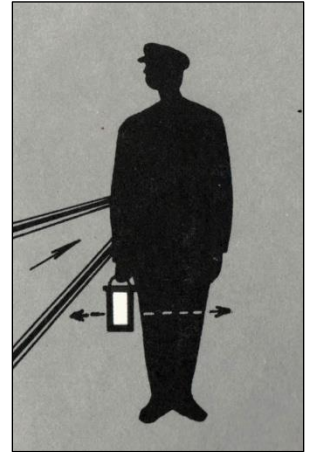


Figure 138.

Section VII: Signal markings

...

Track warnings

Article 46 (excerpt)



1. Signal mark 209: “Watch out, the level crossing”
a pillar painted alternately with red and white stripes
(see Fig. 181).

Figure 181

...

3. Track warning is installed at the right side of the track for the respective direction of travel.

...

Track warning is installed in front of the level crossing at a distance of 500 m on the main and other lines of the I rank, and at 200 m on the side lines.

...

5. Signal mark 209: “Watch out, the level crossing” warns the train driver that he must give aspect of a signal 67: “Watch out” and repeat it several times until the level crossing is encountered, in order to announce to the road traffic participants that the train is approaching the level crossing.

...



3.3.7. Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03)

Section VI: Organization of traffic

Article 34 (excerpt):

Informing train staff about train traffic and safety measures

...

29. By general order it is regularly informed and ordered that

...

the procedure when the barrier or automatic device at the level crossing is defective, i.e. when the level crossing is unsecured;

...

Section XI: Obligations of station and train staff

...

Article 58 (excerpt):

Obligations of the track keeper

...

6. A worker who secured a level crossing whose barriers are defective, for a certain time before the departure of each train stops the road traffic. The same procedure is followed in the case of securing a level crossing whose automatic device is not working. The light signals at these crossings that apply to the road vehicles are covered because due to a malfunction they cannot signal prohibited driving over the level crossing. The worker who secures the level crossing, stops the road vehicles and the pedestrians by day with a raised and extended hand with the palm directed towards the arriving vehicles, and by night by waving hand signal lamp with a red light conditionally on the longitudinal road axes.

...

Section XII: Obligations of the train staff

...

Article 61 (excerpt):

Obligations of the train staff during the drive and operations at the stations

...

12. If the train staff of an emergency or prematurely dispatched train is informed by a general order that the crossing keepers have not been informed about the traffic of their train, the speed in front of the level crossings is adjusted according to the visibility of the track and road and the train is stopped with giving the aspect of a signal 67: “Watch out”. After stopping, the train continues to drive with the utmost caution while the traction vehicle crosses the level crossing, and then at the prescribed speed. The procedure is the same when the train staff of any train is informed that the traffic at the level crossing is not provided.

...



Section XIII: Irregularities during the drive on the open track

Article 63 (excerpt):

Exceptional stopping of the train on the open track

...

5. In front of the level crossing the train driver must stop the train in the following cases:

...

- when the control light signal in front of the level crossing does not show the aspect of a signal 55: "Device at the level crossing correct"

...

In all these cases, the level crossing is considered unsecured.

...

If an unsecured level crossing is secured by a crossing keeper and there is a telephone at the crossing informing the crossing keeper about the departure of trains from neighboring stations, the train staff is informed that the device at the crossing is defective, that the crossing is secured and that the train operates over the road crossing at regular speed without stopping.

3.3.8. Shunting Instruction 42

("Official Gazette of ZJŽ" No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94)

V Shunting drive routes

Checking and monitoring the driving route

...

121.

If the shunting movement is performed with the locomotive that is in front, then the observation of the driving route in the first part belongs to the duty of the train driver. Workers on the locomotive are not exempted from the obligation to observe and are responsible for the driving route if they can see it from their place.

...

Article 122.

Before the shunting movement, the shunting operator and the shunter make sure that:

...

That the level crossing barriers are closed, i.e. that the traffic at the level crossing is secured in any way;

...

Article 124.

We are allowed to drive through unoccupied, open and all level crossings where traffic is not provided, if the participants in road traffic will certainly not be endangered. If necessary, give the aspect of a signal 67: "Watch out". When there are no devices for securing traffic at the level crossing, the shunting operator previously sends the shunter to stop the road traffic at the level



crossing. He does this with a raised hand or a lamp with a red light by giving aspects of a signal of road traffic: during the day and with an extended hand towards the vehicle, and at night by waving a red light across relative to the road.

...

3.3.9. Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave consent No. 340-1351/2019 of 03.10.2019.)

2. DESCRIPTION OF THE INDUSTRIAL TRACK

...

2.1.2. Consignments to/from the Pančevo Oil Refinery are transported by shunting compositions of the railway undertaking which are prepared at the Pančevo Glavna station and sent by regular train to Pančevo Varoš and then as specified by the shunting composition on the industrial track

...

2.1.5. The monitoring station for transport and commercial affairs is the station Pančevo Varoš, which forms and initiates shunting compositions for the RNP.

...

2.3.13. Devices and facilities on the industrial track

2.3.13.1 Level crossings

...

2.3.13.1.2. All level crossings (a total of 15) were constructed properly, i.e. according to the standard and are in function and they are properly marked. Marked on the regional road Pančevo - Kovin are installed automatic level crossing barriers (km 2+231), which are equipped with a signal bell and a calm red light in the middle of the barrier and which are occupied by the shunter of the Marshalling Yard upon passing of the shunting composition. For the use of the automatic level crossing, the Instructions for operation of that device (Annex 14) is used.

...

6. ORGANIZATION AND REGULATION OF THE SHUNTING OPERATION ON THE INDUSTRIAL TRACK

...

6.2. Means of communication with the place of separation of the industrial track

The means for communication between RNP and the stations Pančevo Varoš and Pančevo Glavna are the PTT lines and mobile telephony "NIS" a.d. Novi Sad, "Serbian Railways Infrastructure" a.d. as well as the telephones of the undertakings in both railway stations.

6.3. Shunting movements

6.3.1. Shunting movements on RNP manipulative tracks are performed for the purpose of setting (pulling) the vehicles for loading/unloading (from loading/unloading) and preparation for dispatch.

...



6.3.2. Shunting is performed by the shunting staff (in full compliance with the provisions of the Shunting Instruction (UP 42) and all regulations related to the work of railway staff arising on the basis of the Law governing railway traffic in the Republic of Serbia).

6.4. Shunting performed by the staff of the Undertaking upon dragging/pulling

6.4.1. Shunting movements upon dragging, i.e. pulling of the shunting composition of/on the track RNP is regularly performed by the “undertaking” with its locomotive and its staff.

...

6.4.2. The shunting compositions of the undertakings regularly move along the connecting track, towards the RNP with the approval of the RNP Marshalling Yard head, and on weekends the shunting operator, employed at the RNP, and towards the Pančevo Varoš station with the approval of the train dispatcher and providing the route by the undertaking staff.

6.4.3. In the direction of driving the station “Pančevo Varoš” - RNP, the shunting staff of the undertaking provides the driving route of the shunting composition over the slide, whose regular position is “forbidden shunting”. At the level crossing with the regional road Pančevo-Kovin, at km 2+231, which is secured with automatic level crossing barriers, the driver is obliged to fully comply with the provisions of the Instructions for operation of devices for securing the automatic traffic at the level crossing.

...

6.4.19. In the opposite direction, in the 1st shift, the head of the Marshalling Yard, and the shunting operator in the 2nd shift and on weekends, announces the departure of the train to the train dispatcher of the Pančevo Varoš station. At the same time, the train driver accompanying the train announces to the train dispatcher of the Pančevo Varoš station the train composition (train weight, train length, number of axles and gross loaded/empty).

...

6.6.10. Shunting on the level crossings

6.6.10.1. We may shunt over level crossings after the shunting movement of the shunting composition over them has been previously ensured, by aspects of signal, safety devices or manual aspects of signals by occupying the level crossing.

6.6.10.2. The provision of manual aspects of signals during the day is done by a hand raised with an open fist towards the oncoming road vehicles, and at night by waving a red light upright on the longitudinal axis of the road.

6.6.10.3. The service of the industrial track with the locomotive and the staff of the undertaking from the station Pančevo Varoš is organized by hiring the undertaking by the representatives of the Serbian Railways Infrastructure, and at the level crossing the organization of the level crossing operation is done according to Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the Pančevo Oil Refinery industrial track from 01.01.2018.

...



3.3.10. Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the Pančevo Oil Refinery industrial track from 01.01. 2018. (Registration No. 1/2018)

1. INTRODUCTORY PROVISIONS

1.1. Introductory remarks

...

1.1.2. The device for securing traffic at the level crossing is of the ELC type - Electronic Level Crossing, Signalling & Control d.o.o. and functions automatically when the train arrives which turns it on or off, whereby the train staff is informed about the condition of the level crossing by control signals.

...

1.1.4. As the mentioned level crossing is located at 2,231 m from the separate switch of S1 station Pančevo Varoš, from where the own stationing of the industrial track of the Pančevo Oil Refinery begins, km 0+000, all works related to this level crossing are performed in the Marshalling Yard RNP, which is responsible for it.

...

1.3. General provisions

1.3.1. All those tasks and procedures that are not specifically prescribed by the provisions of this Instruction must be organized and executed in the manner described by the provisions of general traffic and technical regulations that are valid and in application for the level crossings, and other Instructions and orders that apply to in the area of the Railway Infrastructure Manager, "Serbian Railways Infrastructure" a.d. "Serbian Railways".

1.3.2. All the interested employees, who perform activities related to the organization and execution of train traffic in the field of infrastructure and the field of railway transport, must be acquainted in a proven manner with the provisions of this Instruction.

...

1.3.4. Independent handling of this level crossing, in terms of the provision of item 5.1.1. of this Instruction, is allowed only to those employees who are, in a proven manner, familiar with the provisions of this Instruction, and who have given a written consent that they feel capable of performing the service independently regarding the handling of the crossing device.

2. TECHNICAL - OPERATING CHARACTERISTICS OF THE DEVICE

2.1. Basic information about the crossing device

...

2.1.2. The automatic level crossing device is with control signals of the type "ELC - Electronic Level Crossing" produced by the company "Signalling & Control d.o.o.".

Switching on and off of the level crossing device is done automatically, by crossing the train or rail vehicle via on or off devices - sensors, and there is also the possibility of direct operation of the control device on the spot - level crossing house at km 2+231.



2.1.3. The level crossing device is equipped with control signals, and for the direction of travel Pančevo Varoš - Pančevo Oil Refinery and vice versa. In the neighboring official positions, there is no control of certain elements regarding the functioning of the level crossing device. *The staff participating in the regulation of train traffic does not operate or supervise this device, but securing of traffic is provided automatically by the train.*

...

3. HANDLING THE LEVEL CROSSING DEVICE

3.1. Regular operation of the device

3.1.1. This level crossing device is not handled regularly, but the level crossing device is switched on and off automatically when the train or rail vehicle encounters the appropriate on and off sensors.

...

3.1.5. In the event that the crossing point device is not switched on after crossing the switch-on point due to a fault or any other reason, the control signals or auxiliary control signal shall still show aspect of a signal 55: "Device at the crossing point defective". In these cases, the train driver or the driver of the railway vehicle is obliged to act in the manner prescribed for the case when the level crossing is unsecured, i.e. to act in accordance with the provisions of Art. 61 item 12 or Art. 63 points 5 of the Rulebook 2. When encountering a level crossing, the driver is obliged to give several times the aspect of a signal 67: "Watch out".

...

4.2. Procedures in case of failures

4.2.1. In the event that there is an operational disturbance that endangers traffic safety, the level crossing device goes into a state of "failure" and in that state, the level crossing device does not provide traffic at the level crossing.

4.2.2. In these cases, upon crossing of a train or rail vehicle over the switching sensors, the crossing device will not be switched on and traffic will not be secured at the crossing, i.e. the control signal will still show the aspect of a signal 55: "Device at the crossing defective" so that the train staff is obliged to act as if the traffic at the level crossing is not provided, i.e. to act in accordance with the provisions of Art. 61 item 12 and Art. 63 item 5 of the Regulation 2.

This operation must be recorded by the train staff in the travel document or pass in accordance with the provisions of Instruction 58.

4.2.3. After the train staff at the level crossing acted in accordance with the provisions of Art. 61 item 12 and Art. 63 item 5. of Rulebook 2, the train continues further drive depending on the direction of the train to the Marshalling Yard RNP or to the station Pančevo Varoš. Only after the train arrives at the RNP Marshalling Yard station, the train driver is obliged to inform the shunting operator, i.e. the train dispatcher of the Pančevo Varoš station, about the malfunction at the level crossing. This is done by entering the data on section IV "Remarks" of the travel document, and the receipt of the notification must be confirmed by the train dispatcher with his signature in the travel document below the entered text on the malfunction of the level crossing.

4.2.4. The shunting operator of the RNP Marshalling Yard, i.e. the train dispatcher of the Pančevo Varoš station, who received a notification from the train driver about the malfunction of the level crossing device, is obliged to immediately record this notification in the Telegraph-Telephone Log Book (S-43).

...



4.2.6. In cases when there is a fault on the level crossing device, the train staff is not informed about the failure of the level crossing device, i.e. that the traffic at the level crossing is not provided, but the driving staff is informed about it via a control signal.

...

5. SPECIAL PROVISIONS

5.1. A manner of providing traffic in exceptional conditions

5.1.1. In cases when there is a malfunction or damage to the level crossing device so that it will not be used or if it is excluded from use, traffic over the level crossing can be organized so that traffic is provided directly at the level crossing on site using a local installer by engaging on-duty shunter. This must be done by the sent shunter by order of the shunting operator. If it is not possible to handle through the local installer, then the sent shunter by order of the shunting operator must provide traffic in the sense of Article 58 item 6 of the Rulebook 2.

5.1.2. In these cases when traffic is provided at the level crossing on the spot, through a local installer or through a sent worker-on-duty shunter, the train staff of all trains must be informed by a general order that traffic at the level crossing is provided (*including the manner of providing traffic*) and that the control signal is exceptionally not valid.

Pančevo Varoš station informs the train staff from the previous paragraph only after the train dispatcher determined that the traffic was provided at the level crossing, i.e. after receiving a written report on sending a shunter to the level crossing by the shunting operator of the RNP Marshalling Yard (a written document is delivered via e-mail to the official e-mail: specified e-mail of the official in the station Pančevo Varoš).

5.1.3. This manner of providing traffic at the level crossing is not allowed unless a communication is provided between the shunting operator and the sent worker - the shunter at the site of the level crossing.

3.3.11. Rulebook on types of signals, signal markings and markings on the railway track ("Official Gazette of RS" No. 51/20)

Important note: this Rulebook entered into force on 14.4.2020., and is in application from 01.07.2020.

III. PERMANENT SIGNALS

...

10. Signals for automatic devices at level crossings

...

Procedures for railway workers regarding the display of aspects of signals of signals for automatic devices at level crossings.

Article 143 (excerpt)

Aspect of a signal 57: "Switch-on point, expect control signal" commands to observe whether the control light signal shows aspect of a signal 55: "Device at the level crossing defective" or aspect of a signal 56: "Device at the level crossing correct".



If, after passing the aspect of a signal 57: “Switch-on point, expect a control signal”, aspect of a signal 55: “Device at the level crossing defective” appears on the control light signal, the train driver reduces the train speed, gives aspect of a signal 67: “Watch out” repeatedly and the train stops in front of the level crossing. The procedure for further train driving is prescribed by the Traffic Rulebook.

If, after passing the aspect of a signal 57: “Switch-on point, expect a control signal”, the aspect of a signal 56: “Device at the level crossing correct” appears on the control light signal, there are no obstacles for the train to continue driving over the level crossing.

If, after passing the aspect of a signal 57: “Switch-on point, expect a control signal”, it is noticed that the control signal is not illuminated, it is acted as if the control signal is showing the aspect of a signal 55: “Device at the level crossing defective”.

...

3.4. Industrial Track Act

“NIS”a.d. Novi Sad, as the owner of the industrial track of the Pančevo Oil Refinery, in accordance with the Law on Railways (“Official Gazette of RS” No. 41/2018), has adopted the Act on the industrial track of Marshalling Yard in Pančevo Oil Refinery on 11.10.2019., for which the Directorate for Railways gave its consent No. 340-1351/2019 from 03.10.2019. (hereinafter: The Industrial Track Act). Industrial Track Act consist of the organization and all processes and procedures established in “NIS”a.d. Novi Sad for safe shunting on the industrial track of the Pančevo Oil Refinery.

Through the Industrial Track Act, “NIS”a.d. Novi Sad ensures that all employees who directly participate in the performance of railway traffic are trained and competent in order to enable efficient, effective and safe execution of the set work goals.

Regarding the respective serious accident, in which the on-duty shunter was involved, employed at the Pančevo Oil Refinery (“NIS”a.d. Novi Sad), all activities related to professional training, competence and working time planning were carried out in accordance with applicable regulations.

Through the Industrial Track Act, it is defined that the risk control related to the maintenance of the railway infrastructure of the industrial track (subsystems infrastructure, energy, control, management and signalling - track part) and railway vehicles used by “NIS”a.d. Novi Sad for operations in the Pančevo Oil Refinery, is based on the implementation of defined activities of regular and corrective maintenance by authorized companies with which the owner has concluded contracts, monitoring the implementation of the contract and control. Regular and corrective maintenance includes constant supervision, checks, inspections, fixings and repairs. Requirements, standards and maintenance procedures in “NIS”a.d. Novi Sad were determined on the basis of the legal regulations, general and individual acts of the company, manufacturer's instructions and standards.

Regarding the respective serious accident, regular and corrective maintenance of the level crossing at km 2+231 was performed in accordance with the procedures defined in the Industrial Track Act and applicable regulations in the part related to the track maintenance. Taking measures in order to set the prescribed traffic signalization on the road and harmonize it with the current state of correctness of the device at the level crossing at km 2+231 was not performed in accordance with the valid and applicable regulations.



In the part related to railway signalization, regular and corrective maintenance of the level crossing was performed in accordance with the valid regulations, and all necessary signals and aspects of signals at the time of the on-site investigation by the CINS' investigative team were located in places determined by valid railway regulations.

The owner of the industrial track, Pančevo Oil Refinery "NIS" a.d. Novi Sad has, in accordance with the Law on Railway Traffic Safety ("Official Gazette of RS" No. 41/2018) and the procedures defined in the Industrial Track Act, with the railway undertaking "Srbija Kargo" a.d. formed a joint investigative committee to investigate the respective accident. Upon completion of the investigation, on 31.01.2020. the Investigation Report was drafted and signed by all members of the joint investigative committee, but it was not registered (there is no official reference No.).

3.5. Functioning of the railway vehicles and technical installations

3.5.1. Control, command and signalling

On the industrial track of the Pančevo Oil Refinery, the SS device at the level crossing at km 2+231 was not working. According to the data submitted in the attachment to the letter from "NIS" a.d. Novi Sad No. DWN 121300/iz-do/2394/2020 of 28.02.2020., the failure of the device at the level crossing was registered on 02.01.2020. around 23:00 and was removed on 09.01.2020. during the day, after the occurrence of the respective serious accident.

In accordance with the procedure defined in the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery, which is an integral part of the Industrial Track Act (Annex 14 of the Industrial Track Act), at the level crossing there was a sent worker - on-duty shunter of the Pančevo Oil Refinery with the task of providing traffic at the level crossing in accordance with point 5.1.1. of the aforementioned Instruction.

The sent worker - on-duty shunter of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) was at the level crossing at km 2+231. According to his own statement (see Point 3.1.1.), he was dressed in a fluorescent suit and equipped with a hand-held flashlight and with a hand-held flashlight he was showing aspects of a signal to participants in road traffic by using a white flashing light.

According to the allegations from Paragraph 1, item 5.1.2. of the aforementioned Instruction, the staff of the MS-4 shunting composition were not informed by a general order because the train dispatcher of the Pančevo Varoš station ("IŽS" a.d.) was not able to enter such information in the general order because they were not informed by the representative of the Pančevo Oil Refinery on the failure of the SS device at the level crossing in the manner defined in paragraph 2, item 5.1.2. (see point 3.3.10.).

According to the provisions of item 2.3.13.1.2. Industrial Track Act (see point 3.3.9.), the level crossing at km 2+231, upon passing of the shunting compositions, is always occupied by the shunter of the Pančevo Oil Refinery, regardless of whether the SS device at the level crossing is faulty or not.



3.5.2. Infrastructure

The condition of the infrastructure (in terms of the condition of the tracks and plants) on the connecting track of the industrial track of the Pančevo Oil Refinery was in order and in that sense there were no irregularities that could adversely affect the occurrence of the serious accident.

Based on the information obtained on 02.06. 2019. at 13:30 from the Pančevo Oil Refinery ("NIS" a.d. Novi Sad), which was recorded in the Telegraph Telephone Log Book (S-15) of the Pančevo Varoš station, by General Order I (S-20) No. 44 of 09.01.2020 issued for shunting compositions MS-3/MS-4, an order was issued for restricted speed running from km 1+500 to km 1+700 with 10 km/h. As a reason for the introduction of temporary restricted speed running in the Telegraph Telephone Log Book (S-15) of the Pančevo Varoš station, it was written: "due to track deformation". CINS from "NIS" a.d. Novi Sad did not receive data on introduced restricted speed running on the industrial track of the Pančevo Oil Refinery.

According to item 2.3.13.1.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (for which the Directorate for Railways gave consent No. 340-1351/2019 of 03.10.2019), at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery automatic level crossing barriers are installed, which are equipped with a signal bell and a calm red light in the middle of the barriers. At the same point in the table under No. 4 it is stated that the manner of providing transport is automatic.

According to the data obtained from "NIS" a.d. Novi Sad (item 12 of the letter No. DWN 121300/iz-do/2394/2020 of 28.02.2020. and e-mail of the manufacturer of SS devices at the level crossing, delivered as an attachment to the e-mail of "NIS" a.d. Novi Sad of 24.03.2020), commissioning of the device for automatic traffic provision at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) was performed on 26.03.2018. at 10:00 and since then, the device is in operation.

At the time of occurrence of this serious accident, the SS device was not working at this level crossing. The failure of the SS device of the level crossing was recorded on 02.01.2020. at 23:00. CINS did not receive information that the owner of the industrial track of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) informed the manager of the public railway infrastructure "IŽS" a.d. about the failure of the SS device at the level crossing.

Signals and signaling marks are installed before the respective level crossing, in accordance with the provisions of Rulebook 1, Signalling Rulebook ("Official Gazette of ZJŽ" No. 4/96 and 5/96) relating to the level crossing with automatic device and for level crossing for cyclists and pedestrians (see point 2.2.3).

An on-site inspection carried out by the CINS' investigative team established that the control light signals KS 1 (installed at km 1+820) and KS 2 (installed at km 2+620) had been showing the aspect of a signal 55: "Device at the level crossing defective" (See point 2.2.3).

Between "NIS" a.d. Novi Sad, in the capacity of the Manager of Railway Infrastructure and JP "Putevi Srbije", in the capacity of the Manager of Road Infrastructure, no Agreement has been concluded which regulates the relations regarding the level crossing in question, as prescribed by Articles 67 and 70 of the Law on Railways ("Official Gazette of RS" No. 41/2018). "NIS" a.d. Novi Sad submitted data (letter No. NM_046000/iz-do/17140 of 30.11.2017) that in the period from 26.04. to 30.11.2017. took the initiative in order to sign the Agreement with the manager of the state road which regulates in more detail the relations regarding the level crossing in question, but without a response from JP "Putevi Srbije".



An on-site investigation conducted by the CINS' investigative team determined that the traffic signalization at the level crossing at km 2+231 was not set in accordance with the Rulebook on traffic signalization ("Official Gazette of RS" No. 85/17). Traffic sign I-34: "Andrejin krst" is not placed on a common supporter above the traffic lights: IV-9 which regulates the crossing of the road over the railway line at the same level as defined in Article 23, paragraph 1, under 6) of the Rulebook on Traffic signalization ("Official Gazette of RS" No. 85/17), i.e. at a distance of not less than 3 m and not more than 10 m from the nearest railway line, as defined in Article 23, Paragraph 1, under 5) of the Rulebook on Traffic Signalization ("Official Gazette of RS" No. 85/17), but is placed on a common supporter with traffic sign II-2: "Obligation of stopping" at a distance of 15.6 m from the level crossing seen in the direction towards Kovin, i.e. at a distance of 14.0 m from the level crossing, seen in the direction towards the center of Pančevo (see point 2.2.3.) The provisions of Article 33, Paragraph 1, under 2) of the Rulebook on Traffic Signalization ("Official Gazette of RS" No. 85/17), the installation of traffic sign II-2: "Obligation of stopping" is predicted for the immediate vicinity of the crossroad, preferably at the point of visibility, on which the vehicle must stop in order to give way to other vehicles moving along the road it encounters, and not at the crossings of the road and the railway.

Traffic lights IV-9 which regulate the crossing of the road over the railway at the same level (light signs) and semi-barriers were not marked as defective or temporarily unusable, which, given the fact that the automatic device at the crossing was faulty longer than 84 hours, according to the provisions of Article 36 of the Rulebook on the manner of crossing of the railway line and road, pedestrian or bicycle path, the place where the crossing can be made and measures to ensure safe traffic ("Official Gazette of RS" No. 89/2016) and provisions from Article 58, under 6 of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96, 6/03) had to be done.

3.5.3. Means of communication

At the time of occurrence of the respective serious accident, on the industrial track of the Pančevo Oil Refinery and at a station Pančevo Varoš, communication tools were operational and in function. No disturbances or malfunctions were recorded on the means of communication.

3.5.4. Railway vehicles

At the time of the occurrence of the respective serious accident, the shunting composition of the MS-4 was moving in the direction from the marshalling yard of the Pančevo Oil Refinery to the Pančevo Varoš station (in the direction of declining stationing).

The shunting composition consisted of a locomotive of the series 661-155 and 21 (twenty-one) wagon-tanks of the Za series loaded with oil derivatives (motor gasoline and eurodiesel).

The locomotive of the 661-155 series is a six-axle diesel electric locomotive made for traffic on normal gauge lines with a width of 1435 mm, intended for traction of all types of passenger and freight trains on all categories of lines. The locomotive box is divided into a shorter and a longer part by the driver's cab.

At the time of the occurrence of the respective serious accident, the locomotive 661-155 was used as a shunting one for traction of the shunting composition and was moving so that the shorter part of the locomotive box was in front.



The 661-155 series locomotive manufactured by General Motors- EMD from the United States of America was produced in 1961. For the locomotive series 661-155, the owner of “Srbija Kargo” a.d. has a use permit No. 376/91-124 from 26.09.1991. The last investment repair of the rank SO, on the locomotive 661-155 was performed in the period from 01.04.2009. to 27.06.2009. In the period from the last investment repair to 31.12.2019., the locomotive ran 597,995 km.

In accordance with the Article 51 of the Law on Railway Traffic Safety (“Official Gazette of RS” No. 41/2018), the locomotive of series 661-155 is equipped with a device for giving sound signals (siren).

Inspection of the locomotive 661-155 performed after the serious accident in the service of the ZOVS Belgrade Section (Commission minutes of the inspection were submitted in the attachment to the letter of ZOVS Sector, “Srbija Kargo” a.d. it was determined that there were no irregularities or malfunctions on the locomotive and that there was no damage to the locomotive.

The locomotive 661-155 is equipped with Hasler speedometer devices, as follows: register speeding device type RT9i, serial No. 8.145 and indicating speedometer type A16, serial No. 14269 (according to the document Notice of replacement on speeding device No. 35-2/2019-548/1 of 03.07.2019. submitted by “Srbija Kargo” a.d. For the mentioned speeding devices, from “Srbija Kargo” a.d. Certificate No. 32/19 on the correctness of the Hasler speed measuring and registration device of 05.03.2019 was submitted, which confirms that the registering speedometer type RT9i, serial No. 8.145 and indicating speedometer type A16, serial No. 14269 are correct and in accordance with Instruction 230, with the validity of the certificate until 05.03.2020.

By processing the data registered on the speedometer tape taken from the register speeding device of locomotive 661-155 (according to the Analysis of speeding tapes of locomotive 661-155 for shunting composition MS-3 and for shunting composition MS-4 of 09.01.2020., submitted by electronic mail on 05.05.2020 and 07.05.2020. from “Srbija Kargo” a.d.), it was determined that the shunting composition MS-3 starts from the stations Pančevo Varoš at 00:47. The speed increases and after 500 m it is 18 km/h. The shunting composition MS-3 moves at a constant speed of 18 km/h for the next 1000 m, after which the speed decreases to 13 km/h and after 50 m it increases to 18 km/h. After 500 m, the speed is reduced to 12 km/h, and after 50 m it is increased to 18 km/h. In the next 4000 m, the MS-3 shunting composition moves at a speed of approximately 18 km/h, after which it stops in front of the gate of the Pančevo Oil Refinery at 01:12. The MS-4 shunting train starts from the Pančevo Oil Refinery at 02:12. The speed increases so that in the first 600 m it is between 5 and 6 km/h. In the next 1600 m the speed increases to 22 km/h, and in the next 1000 m it decreases to 18 km/h. After 2000 m covered at a constant speed of 18 km/h, there is a sudden drop in speed and the shunting composition MS-4 stops at 02:39. Until the removal of the speedometer tape from the speedometer device of the locomotive 661-155 (at 04:24), no locomotive starts were registered. The times are given by the clock of the speedometer.

3.6. Traffic management and regulation

3.6.1. Actions taken by the staff that manages traffic regulation, control and signalling

The traffic of the shunting compositions MS-3/MS-4 on the industrial track of the Pančevo Oil Refinery took place in accordance with the provisions of the Industrial Track Act and the Business order of the Pančevo Varoš station.



Prior to the dispatch of the MS-3 composition to the industrial track of the Pančevo Oil Refinery, the train dispatcher of the Pančevo Varoš station received consent from the on-duty shunting operator of the Pančevo Oil Refinery for the traffic of the MS-3 shunting composition.

Shunting staff has through General Order I (S-20) No. 44 of 09.01.2020., issued by the train dispatcher of the station Pančevo Varoš for shunting compositions MS-3/MS-4, received information on maximum speeds and restricted speed runnings on the industrial track of the Pančevo Oil Refinery, as well as on the procedure when entering the circle of the Pančevo Oil Refinery (Pančevo Oil Refinery Marshalling Yard station) and the procedure upon return to the station Pančevo Varoš. The issued general order did not provide notifications on the failure of the SS device of the level crossing at km 2+231. The train dispatcher of the Pančevo Varoš station was informed about restricted speed runnings on the industrial track of the Pančevo Oil Refinery (entry in the Telegraph-Telephone Log Book (S-15) of the Pančevo Varoš station; see point 3.5.2.), while he had no knowledge of the device failure at the level crossing.

The shunting composition MS-4 had, after the formation, commercial and technical inspection and brake testing, after obtaining the permission of the train dispatcher of the Pančevo Varoš station, with the approval of the duty shunting operator of the Pančevo Oil Refinery, been sent from the Marshalling Yard station to the connecting track of the industrial track of the Pančevo oil refinery, in the direction of Pančevo Varoš station.

At the time of the occurrence of the serious accident, the shunting composition MS-4 was moving along the connecting track of the industrial track of the Pančevo Oil Refinery, “NIS” a.d. in the direction from the Pančevo Oil Refinery towards the Pančevo Varoš station.

3.6.2. Exchange of voice messages in relation to the serious accident

Immediately before and during the occurrence of the respective serious accident, there was verbal communication between the staff at the Marshalling Yard of the Pančevo Oil Refinery and the staff of “Srbija Kargo” a.d. which was at the shunting composition MS-4. From dispatch of the shunting composition MS-4 from the Marshalling Yard of the Pančevo Oil Refinery to the occurrence of the respective serious accident, there was no communication between the shunting staff at the shunting composition MS-4 and the staff that regulates the traffic.

During the dispatch of the MS-4 shunting composition from the Marshalling Yard of the Pančevo Oil Refinery, with official mobile phones via the network of mobile telephony operators, communication was established between the duty shunting operator of the Pančevo Oil Refinery and the shunter of the Pančevo Oil Refinery located at km 2+231 with a task to secure a level crossing. The communication was realized for the purpose of informing about the departure of the shunting train MS-4 from the Marshalling Yard of the Pančevo Oil Refinery.

Communication between the staff that regulates the traffic and the staff on the MS-4 shunting composition was established after the occurrence of the respective serious accident for the purpose of informing about the serious accident by the conductor on the MS-4 shunting composition by mobile phone, by calling through the network of mobile telephony operators, who informed the train dispatcher of the Pančevo Varoš station (“IŽS” a.d.) and the wagon dispatcher of the Regional Traffic Operational Department of the Section for ST Pančevo, with a place of work in Zrenjanin (“Srbija Kargo” a.d.), while the train driver of a shunting composition MS-4 has, by mobile phone, by calling through the network of mobile telephony operators, informed the head of Section for Traction of trains Pančevo (“Srbija Kargo” a.d.) about the serious accident occurred. The train dispatcher of the Pančevo Varoš station further informed the Department for Operational Affairs



of Pančevo and the on-duty shunting operator in the Marshalling Yard of the Pančevo Oil Refinery about the serious accident.

3.6.3. Measures taken to protect and secure the place of the serious accident

After the occurrence of a serious accident, the locomotive 661-155 of the MS-4 shunting composition remained at the level crossing, as a result of which the traffic on the state road was interrupted (road traffic on the state road over the level crossing was not possible) and the work on the industrial track of the Pančevo Oil Refinery was suspended (“NIS” a.d. Novi Sad).

Protecting and securing of the place of the serious accident (providing conditions for the work of emergency and rescue services that provided assistance to the injured and securing and protecting of evidence) was performed by members of the PU in Pančevo, who were in the immediate vicinity of the level crossing at the time of occurrence of the serious accident.

No other measures have been taken to secure the site of the serious accident.

3.7. Interface between men, machine and organisation

3.7.1. Working hours of the staff involved

From the railway undertaking “Srbija Kargo” a.d. the data was submitted that show that the train driver, train driver assistant, conductor and shunter of the shunting composition MS-4 had the stipulated rest before coming to work and did not spend more hours at work than the maximum hours stipulated by the Law.

For the staff of the owner of the industrial track of Pančevo Oil Refinery (“NIS” a.d. Novi Sad) the data was submitted that the shunter who was securing the level crossing had the stipulated rest before coming to work and did not spend more hours at work than the maximum hours stipulated by the Law.

3.7.2. Health-related and personal circumstances that have effects on the serious accident, including the presence of physical or mental stress

For the staff employed at the railway undertaking “Srbija Kargo” a.d., data were submitted that show that the train driver, train driver assistant, conductor and shunter of the shunting composition MS-4 are professionally trained and medically fit to perform the work. The train driver of the shunting composition MS-4 owns the License to operate the traction vehicle No. RS 71-2017 1263, issued by the Directorate for Railways on 30.08.2017., with validity date until 30.08.2027.

From “NIS” a.d. Novi Sad data were submitted (letter No. DWN 121300/iz-do/2394/2020 of 28.02.2020.) that show that upon entering MS-3 in the Pančevo Oil Refinery, on 09.01.2020. at 01:15 (1h and 20m before the occurrence of the respective serious accident), Alcotesting of the train driver, train driver assistant, conductor and shunter of the MS-3 shunting composition was performed by the staff of the Function for Corporate Protection “NIS” a.d. Novi Sad. On that occasion, the presence of alcohol was not determined in the tested persons. From “NIS” a.d. Novi Sad, no data were obtained on the breathalyzer (model, type, correctness) with which the alcotesting was performed.



After the occurrence of a serious accident, a blood sample was taken from the train driver, on the order of the Deputy Public Prosecutor from the OJT Pančevo for analysis for the presence of alcohol. Based on the data obtained from OJT Pančevo (letter KT No. 274/20 of 09.03.2020), in the blood sample taken from the driver, the analysis did not prove the presence of alcohol.

On the order of the Deputy Public Prosecutor from the OJT Pančevo, blood samples were taken for analysis for the presence of alcohol also from the driver of the road passenger vehicle and the person who was in the road passenger vehicle at the passenger seat. According to the submitted data (letter from OJT Pančevo KT No. 274/20 of 09.03.2020), the presence of 1.67‰ alcohol was determined in the blood sample of the co-driver at the passenger seat, in the blood sample of the driver of the road passenger vehicle taken on 09.01.2020. at 03:30, the presence of 0.96‰ alcohol was determined, while in the blood sample of the driver of the road passenger vehicle taken on 09.01.2020. at 04:30 the presence of 0.74‰ alcohol was determined.

3.7.3. Design of the equipment that has influence on the interface between user and machine

The industrial track of the Pančevo Oil Refinery is designed so that in all parameters it meets the criteria for safe traffic of shunting compositions at speeds prescribed by the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (approved by the Directorate for Railways No. 340-1359/2019 of 03.10.2019).

For the purpose of traffic regulation, control light signals for automatic devices at level crossings have been installed on the industrial track of the Pančevo Oil Refinery.

On the industrial track of the Pančevo Oil Refinery, communication between the staff that regulates the traffic on the industrial track and the staff of the traction vehicle is possible via mobile telephony.

The locomotive of the 661-155 series is controlled by the driver through commands from the driver's cab, designed during the production of the diesel locomotive. With the 661 series locomotives, no objections or irregularities were noticed on the control systems and devices.

3.8. Previous accidents of the similar character

Based on the data submitted by "NIS"a.d. Novi Sad (letter No. DWN 121300/iz-do/2394/2020 of 28.02.2020.) and "IŽS"a.d. (letter No. 2/2020-494 of 25.02.2020) for the period from 01.01.2009. to 09.01.2020. at the level crossing at km 2+231 of the industrial track of the Pančevo Oil Refinery, there were no accidents.

4. Analysis and conclusions

4.1. Final review of the course of events and adoption of conclusions about the occurrence based on facts determined during the investigation and interviews

On 09.01.2020. at 02:35 at the level crossing at the level at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery (“NIS”a.d. Novi Sad), there occurred an overtaking of the MS-4 shunting composition on a road passenger vehicle of the Renault type Kangoo license plates PA 086-LS.

A serious accident occurred at the level crossing located on the part of the industrial track (owned by “NIS”a.d. Novi Sad) which is located in the area of the city of Pančevo, the city settlement Stara Misa. The industrial track is single-track, of normal gauge, non-electrified.

The shunting composition MS-4 consisted of shunting locomotives 661-155 and 21 (twenty-one) wagon-tanks of the series Za loaded with oil derivatives (motor gasoline and eurodiesel). The shunting locomotive 661-155 was at the head of the shunting composition MS-4 (traced shunting composition). No shortcomings or malfunctions were observed on the shunting locomotive 661-155 that could have affected the occurrence of this serious accident (see Points 3.2.3, 3.5.4 and 3.7.3).

In accordance with Article 51 of the Law on Railway Traffic Safety (“Official Gazette of RS” No. 41/2018), the locomotive 661-155 is equipped with a device for giving sound signals (siren).

Shunting staff has through General Order I (S-20) No. 44 of 09.01.2020., issued by the train dispatcher of Pančevo Varoš station for shunting compositions MS-3/MS-4, received notifications on maximum speeds and restricted speed runnings on the industrial track of the Pančevo Oil Refinery, as well as on the procedure when entering the circle of the Pančevo Oil Refinery (Marshalling Yard of Pančevo Oil Refinery) and the procedure upon return to the Pančevo Varoš station. The issued general order did not provide notifications on the failure of the level crossing device in km 2+231.

The train dispatcher of the Pančevo Varoš station was informed about restricted speed runnings on the industrial track of the Pančevo Oil Refinery (see point 3.5.2), while he had no information about the failure of the device at the level crossing.

The shunting composition MS-4, after obtaining the permission of the train dispatcher of the Pančevo Varoš station, with the approval of the duty shunting operator of the Pančevo Oil Refinery, was dispatched from the Marshalling Yard of the Pančevo Oil Refinery to the connecting track of the industrial track of the Pančevo Oil Refinery, in the direction of Pančevo station.

The road is the state road 1B rank, of line No. 14: Pančevo - Kovin - Rajla - connection with the state road 33. The level crossing is located on the part of the mentioned state road that passes through the settlement of Stara Misa (St. Bavaništanski put in Pančevo). The state road is made of asphalt pavement. The drive ramps on both sides of the road are covered with asphalt. The roadway at the crossing itself is made of rubber panels for heavy traffic load. In the vicinity of the level crossing, seen from the direction of the center of Pančevo to the direction of Kovin, the width of the road is 7.2 m on the part of the road in front of the level crossing and 7.8 m on the part of the road behind the level crossing. The total width of the installed rubber panels is 11.5 m, and the length is 4.0 m, seen in the direction of the road. The condition of the asphalt pavement near the



level crossing is in order, without any noticeable damage. The railway line and the road cross at an angle of 51°.

At the time of occurrence of the serious accident, the road was dry. No ice was observed on the roadway. Night visibility conditions applied. The road in the area of the level crossing was illuminated by the street lighting.

According to the data obtained from the Republic Hydrometeorological Institute, based on data from meteorological stations relevant for the area of Pančevo, at the time of occurrence of this serious accident it was completely cloudy, the air temperature was -1.9°C, the ground was frozen, and weak haze and light salt were observed. Visibility was 8 km.

At the respective level crossing traffic at the level, traffic is provided with automatic semi-barriers with light traffic signs to which sound signals and traffic signs on the road are added. An SS device for level crossings was built on the industrial track.

On the industrial track, before encountering the respective level crossing from the direction of the Marshalling Yard of the Pančevo Oil Refinery to the Pančevo Varoš station, on the right side of the track there are properly placed: switching point signal, an aspect of a signal 57: "Switching point, expect control signal" (at km 2+680, 449 m in front of the level crossing), control light signal KS 2 (at km 2+620, 389 m in front of the level crossing) and an signalling mark 209: "Watch out, the level crossing" (at km 2+521, 290 m in front of the level crossing).

On the respective state road, before encountering the level crossing from the direction of the center of Pančevo to Kovin, on the supporters, which are located on the right side of the road next to the roadway traffic signs are set: I-32: "Crossing of a railway line with barriers or semi-barriers" (at a distance of approximately 240m in front of the level crossing) and I-35: "Approaching the point of crossing of the road and the railway line" (at distances of approximately 240m, 160m and 80m in front of the level crossing.). On the supporter, which is located on the right side of the road next to the roadway and is 15.6 m away from the level crossing (the beginning of the rubber panel), traffic signs are set: I-34: "Andrejin krst" and II-2: "Obligation of stopping", on the supporter, which is located on the right side of the road next to the roadway and is 6.2 m away from the level crossing (the beginning of the rubber panel), a traffic light is set: IV-9 which regulates the crossing of the road over the railway at the same level (used for announcement of approaching train and announcing the lowering of the barrier) and on the right side of the road next to the roadway and 5.2 m away from the level crossing (the beginning of the rubber panel) a semi-barrier supporter has been set at the level crossing.

At the time of the occurrence of the respective serious accident, the SS device at the level crossing in question was out of order for more than 84 hours. Traffic lights IV-9 regulating the crossing of the road over the railway at the same level (light signs) and semi-barriers were not marked to be faulty or temporarily unusable, which, according to provisions of the Article 36 Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic ("Official Gazette of RS" No. 89/2016), and provisions of the Article 58, under 6 of the Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), had to be done. The traffic at the respective level crossing was provided by a shunter employed at the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) directly at the level crossing, so that, dressed in a light-reflecting suit and equipped with a hand flashlight, he was standing in the middle of the road on the side of the track closer to the center of Pančevo and according to his own statement, waved a horizontal movements with flashing white light (left-right) towards the road users, which is not in accordance with the



provision of Article 58 under 6 of Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03).

The road passenger vehicle was moving along the part of the state road that passes through the settlement of Stara Misa (St.Bavaništanski put in Pančevo), from the direction of the center of Pančevo towards Kovin and approached the shunting composition from the left side. The MS-4 shunting composition was moving along the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), from the direction of the Pančevo Oil Refinery Marshalling Yard in the direction of the Pančevo Varoš station and was approaching the road passenger vehicle on the right side.

In the documents Analysis of the speedometer tape of the locomotive 661-155 for the shunting composition MS-3 and for the shunting composition MS-4 from 09.01.2020. delivered by e-mail on 05.05.2020. and 07.05.2020. from “Srbija Kargo” a.d., it can be stated that before the occurrence of the respective serious accident, the shunting composition MS-4 was moving at a constant speed of 18 km/h in the length of 2000 m. From the departure of the MS-4 shunting composition from the Pančevo Oil Refinery until the occurrence of a serious accident, no stopping of the MS-4 shunting composition was registered. According to his own statement and the statements of other participants in this serious accident, the driver of the shunting locomotive 661-155 of the shunting composition MS-4 was giving the aspect of a signal 67 when approaching the level crossing: “Watch out” with the locomotive siren.

Upon encountering the level crossing at the level of km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), the road passenger vehicle did not stop in front of the level crossing (the driver of the road vehicle did not respect traffic signs I-32: “Crossing the road with the railway with barriers or semi-barriers”, I-35: “Approaching the place of crossing of the road and the railway”, and I-34: “Andrejin krst” and adjusted the speed so that he could stop the vehicle before entering the railway, did not respect the traffic sign II-2: “Obligation of stopping” and stopped the vehicle and did not act according to the order of the authorized worker - shunter that was standing at the level crossing and was stopping the traffic), but continued driving and entered the track profile in the area of the level crossing just before the MS-4 shunting composition arrived. On that occasion, it came to overtaking of the shunting composition MS-4 with a road passenger vehicle. Overtaking occurred when the right part of the front of the shunting locomotive 661-155 (front right bumper) hit the front right part of the side of the road passenger vehicle (seen in the direction of driving the shunting composition MS-4, i.e. road passenger vehicle).

In this serious accident, one person was fatally injured, one person was seriously injured and one person was lightly injured. The fatally injured and injured person were in a road passenger vehicle. The interruption of road traffic and the suspension of work on the industrial track lasted from 02:35 to 04:27. There was no damage to the railway vehicles, infrastructure and goods in the MS-4 shunting compositions. There is significant damage to the road passenger vehicle. CINS does not have data on the assessment of damage to a road passenger vehicle.



4.2. Discussion - Analyses of facts determined during the investigation and interviews with the view to drawing conclusions regarding the causes of the serious accident and effect of rescue services

4.2.1. General data

For the traffic of shunting compositions MS-3/MS-4, General Order I (S-20) No. 44 of 09.01.2020 was issued by the train dispatcher of the station Pančevo Varoš ("IŽS" a.d.) in which the data on restricted speed running on the industrial track and the procedure for entering the circle of the Pančevo Oil Refinery and for returning to the Pančevo Varoš station are stated, but no notification is given on the failure of the level crossing device at km 2+231. The Pančevo Oil Refinery ("NIS" a.d. Novi Sad) did not inform "IŽS" a.d. about the failure of the SS device at the level crossing at km 2+231.

The device at the level crossing at the level at km 2+231 was out of order from 02.01.2020. at 23:00. At the time of this serious accident, traffic lights on the road and semi-barriers were not covered or otherwise marked as invalid.

At the time of the on-site investigation, the CINS investigative team found that the control light signals KS 1 and KS 2 installed on the industrial track showed aspect of a signal 55: "Device at the level crossing defective" (see Points 2.2.3 and 3.5.2).

At the time of the failure of the device in the respective accident, the control light signal KS 2 installed on the industrial track showed aspect of a signal 55: "Device at the level crossing defective" and upon encountering the switching points it did not change, but continued to show "Device at the level crossing is defective", which was confirmed in his statement by the driver of the shunting composition MS-4 (see point 3.1.1.).

The sent worker- on-duty shunter of the Pančevo Oil Refinery ("NIS" a.d. Novi Sad) was at the level crossing at the level of km 2+231, dressed in a fluorescent suit and equipped with a hand-held flashlight and showed aspect of a signal to the participants in the road traffic with white flashing light.

4.2.2. Analysis of shunting composition's movement

The data duly registered on the speedometer record on the locomotive 661-155 (see item 3.5.4.) show:

- that the shunting composition MS-3 was moving at a speed between 12 km/h and 18 km/h from the departure from the Pančevo Varoš station until the stopping in front of the gate of the Pančevo Oil Refinery,
- from departure of the MS-3 shunting composition from the Pančevo Varoš station to the stop in front of the gate of the Pančevo Oil Refinery, no stops of the MS-3 shunting composition were registered,
- that the shunting composition MS-4 was moving at a speed between 5 km/h and 22 km/h from the departure from the Pančevo Oil Refinery until the occurrence of a serious accident,
- the maximum speed of the shunting composition MS-4 was registered at 3000 m from the place of occurrence of the respective serious accident,



- prior to the occurrence of the respective serious accident, the MS-4 shunting composition was moving at a constant speed of 18 km/h for a length of 2000 m, and
- from the departure of the MS-4 shunting composition from the Pančevo Oil Refinery until the occurrence of a serious accident, no stops of the MS-4 shunting composition were registered.

Analysis of the data registered by the speedometer device on the locomotive 661-155 shows the following:

- the maximum speed of the MS-4 shunting composition was 22 km/h, which is for 2 km/h, i.e. 10% more than the maximum allowed by the order from General Order I (S-20) No. 44 of 09.01.2020. and was realized on the part of the industrial track which is 3000 m away from the level crossing in question. This speeding did not affect the occurrence of this serious accident,
- during the drive of the shunting composition MS-3 in the direction from the station Pančevo Varoš to the Pančevo Oil Refinery, the driver did not follow the restricted speed running from 10 km/h from km 1+500 to km 1+700 for which he received the order by General Order I (S- 20) No. 44 of 09.01.2020. (the minimum speed of the shunting composition MS-3, according to the data registered by the registering speed measuring device on the locomotive 661-155 was 12 km/h; see point 3.5.4.).
- during the drive of the MS-3/MS-4 shunting compositions, no stop was registered in front of the level crossing at km 2+231. The shunting composition MS-3 approached the mentioned level crossing and crossed it at a speed of 18 km/h, while the shunting composition MS-4 approached the mentioned level crossing at a speed of 18 km/h, when, after a serious accident, it stopped.

The speedometer device on locomotive 661-155 does not register data on pressures in the main air line and brake cylinders, data regarding train traction and braking and data on the use of the locomotive siren. The analysis of the registered data shows that after moving at a constant speed of 18 km/h there was a sudden drop in speed and stopping of the shunting composition MS-4 (see point 3.5.4.), which indicates that the shunting composition was stopped by the introduction of fast braking by the driver. This speed record does not contradict the statements of the shunting staff in the locomotive 661-155 that, after seeing a road passenger vehicle moving at high speed towards the level crossing, the train driver assistant started fast braking. According to the statements of the shunting staff on the locomotive 661-155 and the shunter of the Pančevo Oil Refinery at the level crossing, the driver was giving an aspect of a signal 67 when approaching the shunting composition MS-4 to the level crossing at km 2+231: “Watch out” with the locomotive siren.

4.2.3. Analysis of the road passenger vehicle’s movement

The road passenger vehicle of the Renault brand Kangoo type with license plates PA 086-LŠ was moving along the road, on the state road 1 B rank, No. 14, from the direction of the center of Pančevo towards Kovin.

Upon encountering the level crossing at the level at km 2+231 of the own stationing of the industrial track of Pančevo Oil Refinery (“NIS” a.d. Novi Sad), the driver of the road passenger vehicle did not act in accordance with the traffic signs I-32: “Crossing of a railway line with

barriers or semi-barriers”, I-35: “Approaching the point of crossing of the road and the railway line” and: I-34: “Andrejin krst” and adjusted the speed of movement so that he can stop the vehicle before stepping on the railway line. Also, he did not respect the traffic sign II-2: “Obligation of stopping” and stopped the vehicle and did not act according to the order of the licensed worker-shunter who was standing on the level crossing and was stopping the traffic, but he continued his drive and in the area of the level crossing he entered the track profile just before encountering of the shunting composition MS-4.

The exact speed of the road passenger vehicle is not known to CINS (road passenger vehicle does not have a speedometer registering device). The statements of the participants in the respective serious accident and the damage caused to the road vehicle (see Figure 2.1.2.2), indicate that the speed of the road passenger vehicle was probably significant (high). According to the statements of the participants in this serious accident, the road vehicle was approaching the level crossing at high speed and did not slow down. The shunter, who was standing at the level crossing and was stopping the traffic, was forced to lean to the side so that the road passenger vehicle would not hit him.

4.2.4. Analysis of the level crossing device’s operation

At the level crossing at the level at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), traffic is provided with automatic semi-barriers with light traffic signs to which sound signals and traffic signs are added on the road. An SS device for level crossings (device for securing the traffic at the level crossing) of the type “ELC - Electronic Level Crossing”, manufactured by the company “Signalling & Control d.o.o.”, was built on the industrial track. The device functions automatically when the train arrives over the turn on or off devices-sensors, and there is a possibility of the direct handling of the control device on the spot, in the level crossing house. The train staff is informed about the condition of the level crossing by control signals (see Point 2.2.3.).

According to the data obtained from “NIS” a.d. Novi Sad (item 12 of the letter No. DWN 121300/iz-do /2394/2020 of 28.02.2020 and e-mail of the manufacturer of SS devices at the level crossing, delivered as an attachment to the e-mail of “NIS” a.d. Novi Sad of 24.03.2020), commissioning of the device for automatic traffic provision at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) was performed on 26.03.2018. at 10:00 and since then, the device is in operation.

From 26.03.2018. when the automatic device for providing traffic at the respective level crossing was put into operation, until the moment of the respective serious accident on 09.01.2020., there were 17 (seventeen) interventions at this level crossing. An overview of the performed interventions is given in Table 4.2.4.1.



Table 4.2.4.1: Overview of interventions executed at the level crossing at km 2+231

Serial No.	Date	Intervention
1	16.05.2018.	Replacement of barrier pole insert for mounting device 2
2	17.09.2018.	Replacement of the broken semi- barrier insert of the pole 2, continuation of the connecting cable and replacement of the bulbs in the pole 2
3	02.10.2018.	Replacement of the broken semi- barrier insert of the pole 1, continuation of the connecting cable and replacement of the bulbs in the pole 1
4	16.01.2019.	Replacement of blown bulb on control signal KS 2
5	26.02.2019.	Replacement of blown bulb on control signal KS 2
6	25.04.2019.	Batteries are deeply discharged due to power failure and rectifier failure. PP left in a state of failure; 04/30/2019 returned batteries and PP returned to normal condition
7	22.05.2019.	Replacement of blown bulb on control signal KS 2 and replacement of defective bulb on S3 on travel signal RS2
8	03.06.2019.	Mechanical adjustment of the upper position of the installation device of the semi- barrier RB2 which has been distributed due to vibrations
9	11.06.2019.	UT1 switching point fault repair
10	27.06.2019.	Replacing a blown bulb on the control signal KS 2 and dismantling the SIM card to reprogram the numbers
11	01.07.2019.	SIM card installation; the failure of the feed switch and fuse OA1 was established, as a result of which the batteries were deeply discharged
12	08.07.2019.	Changed the insert for the pole of the installation device 2, corrected the pole that was distorted due to trampling and replaced the bulb on the pole
13	15.07.2019.	Replaced pole insert on mounting device 1 and replaced pole bulb
14	03.09.2019.	A malfunction has been established: weakened batteries that need to be replaced, wear of the brushes on the motor of the installation devices, as a result of which the poles are difficult to lengthen and lower quickly, occasional mechanical jamming was noticed at one bell; device left in a fault condition
15	16.09.2019.	Inspection and repair of PP performed: two 12V 55Ah batteries replaced, brushes on RV2 motor replaced, rod inserts on RV1 and RV2 replaced, bells inspected and repaired and PP returned to normal condition
16	20.09.2019.	Replacing the cartridge on the PS2, correcting the pole that was distorted due to the impact, returning the disconnected fuse OA1 and the feed switch
17	20.12.2019.	Regular six-month inspection, defecting and repair of PP was performed

According to the data obtained from “NIS” a.d. Novi Sad (e-mail of the manufacturer of SS devices at the level crossing, submitted as an attachment to the e-mail of “NIS” a.d. Novi Sad of 24.03.2020.) malfunction which was present at the time of occurrence of the respective serious accident dates from 02.01.2020. at 23:00 and was removed on 09.01.2020. during the day, after the occurrence of the respective serious accident.

4.2.5. Analysis of the rescue service’s performance

Members of the Pančevo Health Center, the Pančevo Emergency Medical Service and members of the MUP RS, the Sector for Emergency Situations, and the Pančevo Fire and Rescue Unit went to the site to provide assistance to the injured in this serious accident.



Two emergency teams arrived at the site of the accident from the emergency medical service in Pančevo. After securing the access point to the injured, they performed a quick medical triage according to the degree of urgency. Two persons who were lightly injured at that moment were pulled out of the passenger car, given professional medical assistance and transferred to the General Hospital in Pančevo with surgical and orthopedic injuries. The third person, who was most seriously injured, was released from the wrecked road vehicle with the help of the fire brigade and members of the police, and transported to the General Hospital in Pančevo.

From the Pančevo Fire and Rescue Unit 2 (two) vehicles with 6 (six) firefighters-rescuers arrived at the site. With an intervention on the site, members of the Pančevo Fire and Rescue Unit performed releasing of one injured person who was in the passenger seat of the damaged road vehicle.

4.3. Conclusions on the serious accident causes

4.3.1. Direct and immediate cause of the serious accident

Direct and immediate cause of the occurrence of this serious accident is that before the occurrence of the respective serious accident the road passenger vehicle was found on the track, just before the arrival of the shunting composition MS-4, by which the dangerous situation, related to the occurrence of this serious accident, was created.

The direct cause of a serious accident is non-compliance with the provisions of Articles 100, 132 and 187 of the Law on Road Traffic Safety ("Official Gazette of RS" No. 41/2009, 53/2010, 101/2011, 32/2013 - decision US, 55/2014, 96/2015 - other law, 9/2016 - decision US, 24/2018, 41/2018, 41/2018 - other law and 87/2018) by the road passenger vehicle driver.

4.3.2. Basic causes deriving from skills, procedures and maintenance

Considering that it was determined that the failure of the SS device at the level crossing lasted longer than 84 hours, according to the Article 36 of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic ("Official Gazette of RS" No. 89/2016), the owner of the industrial track and the road infrastructure manager were obliged to take all the necessary measures to indicate that the semi-barriers and traffic lights were not valid for participants in road traffic. It should be borne in mind that the road infrastructure manager of the JP "Putevi Srbije" was not informed about the failure of the SS device at the level crossing by the owner of the industrial track of the Pančevo Oil Refinery "NIS" a.d. Novi Sad. The obligation to cover light signals that apply to road vehicles that due to failure can not signal prohibited driving over the level crossing also exists according to the provisions of Article 58 under 6 of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), and which, in accordance with the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery, to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10. 2019.), is in use in the Pančevo Oil Refinery ("NIS" a.d. Novi Sad). Failure to act in this manner could have contributed to the occurrence of this serious accident.

General Order I (S-20) No. 44 of 9.01.2020., issued by the train dispatcher of the station Pančevo Varoš for shunting compositions MS-3/MS-4, the driver of the shunting locomotive 661-155 of shunting composition MS-4 was not given notice of failure of the SS level crossing device



at km 2+231 of own stationing of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) and no order or instruction was given on the procedure when crossing this level crossing because the Pančevo Varoš station was not informed about the failure of the level crossing device by the Pančevo Oil Refinery (“NIS” a.d. Novi Sad), as well as by the train drivers of the shunting composition of the railway undertaking “Srbija Kargo” a.d. who served the industrial track from 02.01.2020. when SS level crossing device failed (CINS has no evidence that the train drivers of the shunting compositions of the railway undertaking “Srbija Kargo” a.d. informed the Pančevo Varoš station and the Marshalling Yard of the Pančevo Oil Refinery about the failure of the device at the level crossing in a proven manner). Pursuant to the Provisions of Article 63 of Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03), the train driver was obliged to respect the aspect of a signal that showed the control signal KS 2 and to stop the shunting composition MS-4 in front of the level crossing. Failure to act in this manner could have contributed to the occurrence of this serious accident.

The sent worker - the on-duty shunter of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) was at the level crossing at the level of km 2+231, dressed in a fluorescent suit and equipped with a hand-held flashlight and stopped the participants in road traffic by showing manual traffic signs with a hand-held flashlight with a white flashing light. Pursuant to Article 58 of Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03), Article 124 of the Shunting Instruction 42 (“Official Gazette of ZJŽ” No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94) and item 6.6.10.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery, the procedure or manner of giving aspects of a signal for vehicles in road traffic in case of device failure at the level crossing is defined (see items 3.3.7, 3.3.8, and 3.3.9). Giving manual traffic signs with white instead of red light could have contributed to the occurrence of the respective accident. Also, giving manual traffic signs with a hand-held flashlight with a white flashing light by a sent worker - on-duty shunter of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) could have caused confusion among the train driver and train driver assistant.

4.3.3. Main causes of the serious accident deriving from legal framework and safety management system application

In the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10. 2019) in Point 2.3.13.1.2. it is stated that the level crossing at km 2+231 is equipped with road barrier and a red calm light in the middle of the barrier (which does not correspond to the situation on the ground, semi- barriers are installed, see point 2.2.3.) and that the mentioned level crossing permanently occupied by the shunter of the Marshalling Yard station upon passing of the shunting composition. In the same point, it is stated that for the use of this level crossing, the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018 is being used. (Registration No. 1/2018) - Annex 14 of the Industrial Track Act (hereinafter: The Instruction). Also, in Item 6.6.10.3. of the Industrial Track Act, it is stated that the organization of the work of the level crossing is performed according to the Instruction. In point 5.1.1. of the instructions it is stated that this level crossing is possessed by a sent worker only in case of failure of the SS device at the level crossing. The inconsistency of the above provisions could have caused confusion to the train driver and train driver assistant of the MS-4 shunting composition in terms of proper conduct.



4.3.4. Additional observations on deficiencies and shortcomings established during the investigation, but without relevance for conclusions about the causes

The provisions of Article 33, Paragraph 1, under 2) of the Rulebook on Traffic Signalization (“Official Gazette of RS” No. 85/17) define the installation of traffic sign II-2: “Obligation of stopping” that it is predicted for the immediate vicinity of the crossroad, preferably at the point of visibility, on which the vehicle must stop in order to give way to other vehicles moving along the road it encounters, and not at the crossings of the road and the railway. According to Article 25, paragraph 1 under 2) of the same Rulebook, traffic sign II-2: “Obligation of stopping”, means an order to the driver that he must stop the vehicle and give priority to the passage of vehicles moving along the road he encounters.

At the respective level crossing, traffic sign II-2: “Obligation of stopping” is placed in front of the level crossing at the level with the traffic sign I-34: “Andrejin krst” (at the place behind which there is no crossroad in the immediate vicinity). This placement of the mentioned traffic sign is not in accordance with the provision of Article 33, paragraph 1 under 2) of the Rulebook on Traffic Signalization (“Official Gazette of RS”, No. 85/17). Pursuant to the provisions of Article 213, paragraph 1 under 6) of the Rulebook on Traffic Signalization (“Official Gazette of RS”, No. 85/17), the installation of traffic sign I-34: “Andrejin krst” is provided on the same supporter with traffic light VI-9, above traffic lights.

Article 35 of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the place where the crossing can be made and measures to secure safe traffic (“Official Gazette of RS” No. 89/2016) states that if a failure or temporary unusability of SS devices at the level crossing, traffic at the level crossing is provided by the authorized worker of the railway infrastructure manager securing the level crossing and directly regulating the traffic by giving manual traffic signs (flag) to road vehicles, in accordance with regulations governing road safety (see point 3.3.5.).

Article 166 of the Law on Road Traffic Safety (“Official Gazette of RS” No. 41/2009, 53/2010, 101/2011, 32/2013 - decision US, 55/2014, 96/2015 - other law, 9/2016 - decision US, 24/2018, 41/2018, 41/2018 - other law and 87/2018 and 23/2019), the regulation regulating traffic safety on roads, states that on the part of the road on which works are performed and where an obstacle has arisen that cannot be removed immediately, traffic regulation can be performed by at least two, designated workers of the contractor, i.e. road manager, and traffic regulation can be done with red and green flags (in the same article the meaning of the flags is also described, see point 3.3.1.). There are no other provisions related to the direct regulation of traffic at level crossings at the level by giving manual traffic signs (flags) in the regulations governing road safety.

According to the above, the provisions listed in Article 35 of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the place where the crossing can be made and measures to secure safe traffic (“Official Gazette of RS” No. 89/2016) are not clear and complete (they are incomplete) and are in conflict with the provisions of Article 58 under 6 of the Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) and Article 124 of the Shunting Instruction 42 (“Official Gazette of the ZJŽ” No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94) (see Points 3.3.5, 3.3.7, and 3.3.8).

The terms “train” and “train staff” are listed in several points of the Instruction (points 3.1.5, 4.2.2, 4.2.6, 5.1.2). In the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (which was approved by the Directorate for Railways No. 340-1351/2019 of 03.10.2019) in Points 2.1.2. and 2.1.5. it is stated that on the industrial track, the consignments are transported



exclusively by the shunting compositions. Therefore, only shunting compositions and shunting staff can be found on the connecting track of the industrial track of the Pančevo Oil Refinery. This is important because in some of the mentioned points it is stated that the provisions of certain regulations that otherwise apply to trains and train staff, are also applied on the industrial track where there are no trains and train staff, but only shunting compositions and shunting staff.

In point 4.2.3. of the Instruction it is stated that the train driver is obliged to inform the shunting operator of the Marshalling Yard of the Pančevo Oil Refinery ("NIS"a.d. Novi Sad) or the train dispatcher of the Pančevo Varoš station about the irregularities at the level crossing. This is done by entering the data in section IV "Remarks" of the Travel Document, and the receipt of the notification must be confirmed by the train dispatcher with his signature in the travel document below the entered text on the irregularity of the level crossing. There are no such entries in the Travel Document issued for MS-3/MS-4 shunting composition.

5. Measures taken

JP "Putevi Srbije", as the state road manager of the state road 1B rank, No.14: Pančevo - Kovin - Ralja - connection with the state road 33 has, in accordance with Article 91 of the Law on Roads ("Official Gazette of RS" No. 41/18 and 95/18 - other law), after the occurrence of a traffic incident with at least one fatally injured person, provided an independent assessment of the contribution of the public road to the occurrence, i.e. consequences of the traffic incident with fatally injured persons on the industrial track of the Pančevo Oil Refinery (attached to the letter of the JP "Putevi Srbije" No. 953-22149/20-1 of 04.11.2020., the Project of independent assessments of the impact of the road on the occurrence of traffic incident with fatalities on state roads in the Republic of Serbia No. 04-11/2020 of 14.10.2020 by MHM-Projekt d.o.o.). The independent assessment is of the opinion that the road did not have an impact on the consequences and the occurrence of this traffic incident.

6. Safety recommendations

With the aim of possible improvement of safety on the railway and prevention of occurrence of the new accidents, CINS has issued the following safety recommendations:

To the Directorate for Railways:

SR_01/20 Pančevo Oil Refinery ("NIS"a.d. Novi Sad) to harmonize item 2.3.13.1.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019) with item 5.1.1. of the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018), in terms of the manner of securing the traffic at the level crossing, pursuant to Article 58, item 6 of the Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.3.3).



- SR_02/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to train the staff of the Marshalling Yard of the Pančevo Oil Refinery in terms of consistent compliance with the established procedure in item 5.1.2. Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018), and notifying the Manager of Public Railway Infrastructure “IŽS” a.d., in this case the monitoring station in which the industrial track is connected, i.e. the station Pančevo Varoš, about the malfunction of the level crossing device, that is, on the exceptional invalidity of the control signal and securing the level crossing by the level crossing keeper, all in order to timely inform the train staff (issuance of the General Order by the train dispatcher of the station Pančevo Varoš “IŽS” a.d.) on the procedure in front of the level crossing, pursuant to Article 34, item 29. Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.2.1.).
- SR_03/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to train the staff of the Marshalling Yard of the Pančevo Oil Refinery regarding compliance with the provisions of Article 58, item 6 of Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03), as well as the provisions of item 6.6.10.2. of the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019), which refer to manual aspects of a signal given to participants in road traffic by the level crossing keeper (see point 4.2.1.).
- SR_04/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) to, in the capacity of railway infrastructure manager, establish cooperation with the road manager of JP “Putevi Srbije” and conclude an Agreement which regulates more closely the relations regarding the respective level crossing in accordance with the provisions of Articles 67 and 70 of the Law on Railways (“Official Gazette of RS” No. 41/2018) (see point 3.5.2.).
- SR_05/20** Pančevo Oil Refinery (“NIS” a.d. Novi Sad) that in the Act on the industrial track of the Marshalling Yard in the Pančevo Oil Refinery (to which the Directorate for Railways gave its consent No. 340-1351/2019 of 03.10.2019) and the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018) to make corrections in terms of harmonizing the terminology “train” and “train staff” with the actual situation on the industrial track - “shunting composition” and “shunting staff” (see point 4.3.4.).
- SR_06/20** “Srbija Kargo” a.d. to conduct the training of the traction vehicle staff regarding the procedure in front of the level crossing equipped with control signals, pursuant to Article 143, Paragraph 2 of the Rulebook on types of signals, signal markings and markings on the railway track (“Official Gazette of RS” No. 51/20), and Article 61, Item 12 and Article 63, Item 5 of the Rulebook 2, Traffic Rulebook (“Official Gazette of the ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) (see point 4.1.).



SR_07/20 “Srbija Kargo” a.d. to conduct the training of the train staff, that is, the train drivers and conductors, except train driver assistants and train shunters, regarding the procedure upon entering the station in case of crossing of the level crossing secured with control signals whose device is defective, pursuant to Article 4.2.3. of the Instruction for operation of devices for automatic securing the traffic at the level crossing at km 2+231 of the own stationing of the industrial track of the Pančevo Oil Refinery from 01.01.2018. (Registration No. 1/2018) (see Point 4.3.4.).

Ministry of Construction, Traffic and Infrastructure:

SR_08/20 JP “Putevi Srbije” to, in the capacity of the road infrastructure manager, establish cooperation with the railway infrastructure manager of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) and conclude an Agreement which regulates more closely the relations regarding the respective level crossing, in accordance with the provisions of Articles 67 and 70 of the Law on Railways (“Official Gazette of RS” No. 41/2018) (see point 3.5.2.).

SR_09/20 JP “Putevi Srbije” to, in the capacity of the road infrastructure manager, on the level crossing at km 2+231 of the industrial track of the Pančevo Oil Refinery (“NIS” a.d. Novi Sad) harmonize the installed road signalization with the valid regulations on road signalization (see Point 4.3.4.).

SR_10/20 Ministry of Construction, Transport and Infrastructure to harmonize the provisions of Article 35, paragraph 1 under 2) of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic (“Official Gazette of RS” No. 89/2016) with Article 58. under 6. of the Rulebook 2, Traffic Rulebook (“Official Gazette of ZJŽ” No. 3/94, 4/94, 5/94, 4/96 and 6/03) and Article 124 of the Shunting Instruction 42 (“Official Gazette of ZJŽ” No. 3/80, 6/83, 3/87, 4/88, 6/91 and 2/94) regarding the manner in which the sent railway worker at the level crossing directly regulates the traffic by giving manual traffic signs to road vehicles (see point 4.3.4.).

Note: Article 35 Paragraph 1 under 2) of the Rulebook on the manner of crossing of the railway line and the road, pedestrian or bicycle path, the point where the crossing can be made and measures to secure the safe traffic (“Official Gazette of RS” No. 89/2016) refers to the regulations that regulate traffic safety on roads, and in these regulations the stated issue is not defined (it is defined only in cases of performing works).