



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

No.: 340-00-8/2020-02-38

Date: 24.09.2020.

ANNUAL REPORT FOR 2019



Center for Investigation of Accidents in Transport (hereinafter referred to as 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 railways and to prevent accidents by issuing safety recommendations.

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), CINS drafted and published this Annual Report.

Annual report for 2019 consists of:

- Information on CINS
- Investigative procedure in the field of railway transport
- Investigations opened in 2019
- Investigations closed in 2019
- Issued safety recommendations
- Measures taken on the basis of the issued safety recommendations



Glossary:

RS	Republic of Serbia
CINS	Center for Investigation of Accidents in Transport
MGSI	Ministry of Construction, Transport and Infrastructure
IŽS	Serbian Railways Infrastructure
a.d.	Joint-stock company
d.o.o.	Ltd.
US	Constitutional Court
JŽ	Yugoslav Railways
ZJŽ	Community of Yugoslav Railways
EMV	Electro motor train
DMV	Diesel motor train
DMK	Diesel motor wagon
JP	Public Enterprise
EPS	Electrical Power Industry of Serbia
TENT	Thermo Power Plant “Nikola Tesla”
EU	European Union
MUP	Ministry of Interior
PP	Firefighting
DM	Diesel engine
BZR	Health and safety at work
ZOP	Fire protection
HTZ	Hygienic technical protection
PPZ	Firefighting protection
OJT	Basic public prosecutor
KM	Contact network
RDV	Radio - dispatch connection
SS	Safety signaling
TK	Telecommand



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1. CINS

1.1. Legal framework

Implementing the Directive 2004/49/EC of the European Parliament and of the Council of EU (Railway Safety Directive) of the Republic of Serbia is performed by bringing the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), Law on Interoperability of the Railway System (“Official Gazette of RS”, No.41/18) and the day of bringing into force of Law on Safety in Railway Traffic (“Official Gazette of RS”, No.41/18), that is on 08.06.2018. Law on Railway Safety and Interoperability (“Official Gazette of RS” No.104/13, 66/15 - other law, 92/15 and 113/17 - other law) ceases to apply, except for the Provision of Article 78, Paragraph 1, Item 5), Subpoint (1), which shall cease to be valid after three years from the date of entry into force of this Law, that is, on 08.06.2021.

CINS, comprising of the Sector for Investigation of Accidents in Railway Traffic, is a special organization which conducts investigation after serious accidents at the railway system. Apart from serious accidents, CINS can investigate other accidents and incidents, which could lead to serious accidents, including technical failure of the structural subsystems or of interoperability factors in accordance with the Law on Investigation of Accidents in of Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18).

According to the Law on Safety in Railway Traffic (“Official Gazette of RS”, No. 41/18), the infrastructure manager and railway undertaking, independently from CINS, must carry out tasks on investigation into the causes and consequences of accidents and incidents in rail transport as well as the circumstances in which they incurred.

According to the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), CINS, Sector for Investigation of Accidents in Rail Traffic conducts investigation independent of all the parties and organizations competent for railway traffic. CINS conducts investigation after serious accidents on the railway system with the aim of improving railway safety and prevention of accidents.

Professional activities relating to the investigation are independent from criminal investigations or other parallel investigations that determine liability or determine the degree of guilt.

Investigation and determining the causes of accidents is not aimed at establishing criminal, economic, misdemeanor, disciplinary, civil, or other responsibilities.



1.2. Role and goal

CINS has been established with the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), since July 2015, as a special organization whose task is to carry out professional activities relating to investigation of accidents and serious incidents in air traffic; serious accidents, other accidents and incidents in rail traffic; very serious maritime accidents, serious maritime accidents, maritime accidents, maritime incidents, serious inland navigation incidents and inland navigation incidents in waterborne traffic. CINS has the status of the legal entity, and the headquarters of CINS are in Belgrade.

Sector for Investigation of Accidents in Railway Traffic carries out tasks, which are in jurisdiction of CINS, regarding railway traffic with the aim of possible improvement of railway safety by issuing safety recommendations.

According to Article 35 of the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), CINS issues safety recommendations based on the analysis of data and the results of the conducted investigation. Recommendations are sent to Directorate for Railways, and in case it is needed, to other bodies and organisations in RS, as well as to interested bodies and organizations of other states and international organisations. Directorate for Railways is taking measures to take into account the safety recommendations, as well as to follow and act on them. Directorate for Railways and other bodies and organisations, except bodies and organisations of other states and international organizations, are obliged to take the necessary measures in order to take into account the CINS safety recommendations in an appropriate manner and, depending on the case, act on them. Directorate for Railways and other bodies and organisations to which safety recommendations have been addressed, apart from bodies and organisations of other states and international organisations, are obliged to submit at least once a year a report to CINS on measures taken or planned to be taken on the basis of safety recommendations issued in the previous year, and no later than July 31 of the current year.

Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), does not apply to underground railways (metros), trams and other types of light railway.

Basic tasks of CINS, Sector for Investigation of Accidents in Railway Traffic are:

- Investigation of serious accidents, other accidents and incidents occurring on the railways system
- Preparation of final reports on conducted specific investigations that may contain safety recommendations aiming to improve safety of railway traffic.

CINS performs other tasks stipulated by the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18).



1.3. CINS organization

Within CINS there are the following basic internal units: Sector for Investigation of Accidents in Air Traffic, Sector for Investigation of Accidents in Railway traffic and Sector for Investigation of Accidents in Waterborne traffic. Within CINS, a specific internal unit outside the Sectors, Group for Financial, Legal and Personnel Affairs, has been established.

CINS's structure has been presented in Fig. 1.3.1.

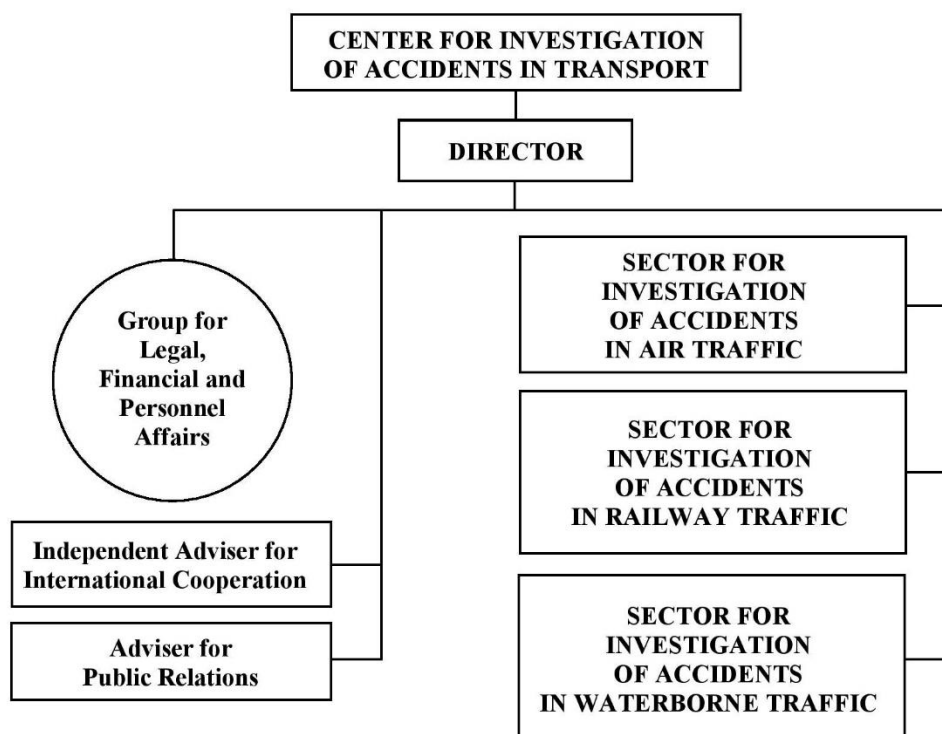


Figure 1.3.1: The structure of CINS

Sector for Investigations of Accidents in Railway Traffic has become operational since 26.06.2017. With the new Rulebook on internal organization and systematization of workplaces No. 110-00-1/2019-04 of 24.05.2019., which came into force on 12.06.2019., within the Sector for Investigation of Accidents in Railway Traffic the following four work positions have been systematized: Main Investigator for Railway Traffic, Senior Adviser for Coordination of Investigation and Railway Accidents Analysis, Independent Adviser for Investigation and Railway Accidents Analysis and Adviser for Investigation of Accidents in Railway Traffic.

Sector for Investigation of Accidents in Railway Traffic in 2019 employed:



1. Assistant to Main Investigator - Main Investigator for Railway Traffic and
2. Senior Adviser for Coordination of Investigation and Railway Accidents Analysis.

CINS, Sector for Investigations of Accidents in Railway Traffic is independent in its work and of all other bodies and organisations competent for railway traffic (MGSI, Directorate for Railways), as well as of all legal and natural persons whose interests may be in conflict with the tasks and entitlements of CINS.

1.4. Organisations competent for the railway system

Organisations competent for the railway system in the Republic of Serbia are MGSI, Directorate for Railways and CINS.

MGSI carries out state administration affairs related to the regulation and security of the transport system. MGSI is in charge of drafting laws passed by a legislative body. The legislative body in the RS is the National Assembly. MGSI sets the legal framework by developing the railway regulations and implementing of EU legislation. MGSI also carries out supervision of internal and international transport and intermodal transport, regulation and safety of the technical and technological traffic system.

Directorate for Railways carries out administration affairs in the field of railway determined by the Law on Railway (“Official Gazette of RS“ No. 41/18), Law on Railway Traffic Safety (“Official Gazette of RS” No. 41/18) and the Law on Interoperability of the Railway System (“Official Gazette of RS” No. 41/18). Directorate for Railways carries out tasks of regulating the railway services market and activities in the field of regulation of safety and interoperability of railway traffic. Directorate for Railways is competent to issue, suspend and withdraw the license for railway infrastructure management and the license for traffic, enact bylaws, participate in international cooperation in the field of railway traffic which is realized by MGSI.

CINS is a special organisation which performs state administration affairs in the field of investigation of accidents and incidents 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).



2. INVESTIGATIVE PROCEDURE IN THE FIELD OF RAILWAY TRAFFIC

2.1. Accidents and incidents being investigated

According to the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), CINS conducts investigation after serious accidents on the railway system with a view of possible improvement of railway safety and the prevention of new accidents caused by the same or similar causes.

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

CINS has discretion to decide whether to open investigation of other accidents and incidents. The scope of investigations and the procedure of conduction of these investigations is determined by CINS.

According to the Law on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18), accidents and incidents may be:

1. Serious accident in railway traffic is a collision or derailment of the train which results in the death of at least one person or serious injury to five or more persons or causing great material damage to the railway vehicles, railway infrastructure, or the environment, as well as other similar accident which has an obvious impact on railway safety or the safety management.
2. Accident in railway traffic is undesirable or unintended sudden event or a specific sequence of such events, which has detrimental effects (collisions, derailments, an overtaking of the train, level crossing accidents, accidents with the participation of individuals caused by railway vehicles in motion, fires, etc.).
3. Incident in the railway traffic is an event that is associated with the railway transportation or shunting composition and adversely affects the safety of the traffic.

Great damage in rail transport is the damage that CINS, upon accessing the accident site, assesses in the amount of at least two million euro.

Investigation refers to a process which includes the data collection and analysis, making conclusions, including the determination of causes and depending on the case, issuing safety recommendations with the aim of prevention of serious accidents in railway traffic.

Fatal injury is injury caused to a person in a serious accident in the railway traffic, resulting in the death of that person within 30 days from the injuries inflicted during serious accident in railway traffic.

Seriously injured person is any injured person who is hospitalized for more than 24 hours due to the consequences of an accident, excluding attempted suicides.



2.2. Organisations involved in investigation process

Investigations of serious accidents, other accidents and incidents on the railway system can be performed by different organizations in accordance with their legal obligations as follows:

- Infrastructure Manager and Railway Undertakings, pursuant to the Law on Safety in the Railway Traffic (“Official Gazette of RS”, No. 41/18) and with their safety management systems (SMS) deal with determining the causes and taking measures based on the results of investigation.
- CINS investigates serious accidents, other accidents and incidents with the aim of determining the causes and issuing safety recommendations in order to improve safety of the railway system.
- The Public Prosecutor's Office and Police investigate an accident or incident in order to determine liability for committed infringement or criminal offense.

2.3. CINS’s approach to an investigation

CINS, that is, the Sector for Investigation of Railway Traffic Accidents carries out an investigation to determine the causes in order to issue safety recommendations in terms of preventive actions aiming to reduce the number of accidents and incidents and improve the safety of the railway system. Investigations carried out by the CINS do not seek to determine liability.

CINS is on standby 24 hours, 7 days a week.

For the purpose of the investigation of any accident or incident Director of CINS forms by the Decision a Working Group led by the Main Investigator for Railway Traffic and for the members of the working group other employees of CINS i.e. the Sector for Investigation of Accidents in Railway Traffic are appointed, which participate in the affairs of the investigation of accidents and incidents, as well as other professionals outside CINS, in accordance with the Law on on Investigation of Accidents in Air, Railway and Waterborne Traffic (“Official Gazette of RS” No. 66/15 and 83/18).

Upon receiving notification of an accident or an incident on the railway system, CINS decides whether to go on the site of the accident or incident or not. At the site of the occurrence of the accident or incident, CINS will conduct an investigation and check the collected facts and procedures, undertaken by the Infrastructure Manager and Railway Undertaking (if in the investigation of the accident or incident one of them or both are involved).

The decision to launch an investigation can be made immediately after the reception of notification of accident or incident occurred or after all relevant facts necessary for making the decision to initiate the investigation of an accident or incident are collected.

After an investigation has been initiated, not later than seven days from the decision, CINS, Sector for Investigation of Railway Traffic Accidents shall inform the MGSI and The European Union Agency for Railways (ERA) on initiated investigation, 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).



Upon completion of the investigation, CINS publishes the final report and safety recommendation on its website www.cins.gov.rs. The report form is in accordance with the Rulebook on the Content of the Final Report on Investigations of Accidents and Incidents in Railway Traffic ("Official Gazette of RS" No. 89/15).

3. INVESTIGATIONS OPENED IN 2019

Sector for Investigation of Accidents in Railway Traffic has become operational on 26.06.2017. In 2019 2 (two) investigations have been initiated.

Basic data on investigations that Sector for Investigations of Accidents in Railway Traffic has initiated in 2019 are shown in Table 3.1.

Table 3.1: Review of investigations initiated in 2019

TYPE OF ACCIDENT OR INCIDENT	No.	[%]
Serious accidents	1	50,0
Accidents	1	50,0
Incidents	0	0,0
TOTAL:	2	100,0

Basic data about the fatally injured and injured persons for investigations that the Sector for investigation of accidents in railway traffic initiated in 2019, are shown in Table 3.2

Table 3.2: Review of fatally injured and injured persons for investigations initiated in 2019

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

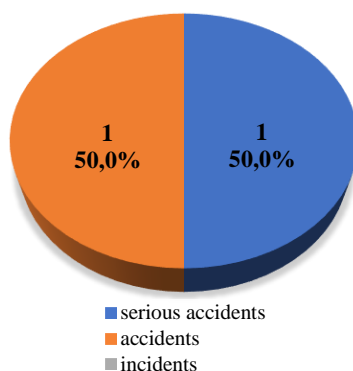


Figure 3.1: Investigations initiated in 2019

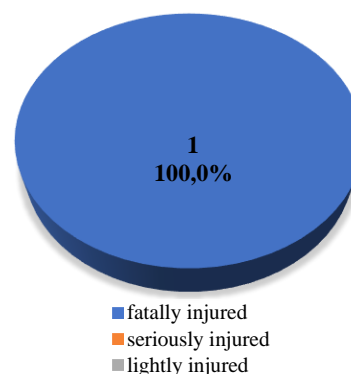


Figure 3.2: Fatally injured and injured in 2019

3.1. Derailment of the train No. 52770

On 14.02.2019. at 01:45 at km 55+252 of the regional track Crveni Krst - Zaječar - Prahovo Pristanište, between the station Svrljig and Knjaževac, on the open line on the concrete bridge above the river Svrljiški Timok, between the tunnel No.21 and the tunnel No.22, it came to derailment of the train No. 52770. From the train composition, viewed from the train locomotive 661-318, third wagon of the series Zags derailed, No. 33 87 7814 136-0 with two axles of the first bogie, fourth wagon of the series Zags No. 33 80 7818 085-2 with all the axles, fifth wagon of the series Zags No. 33 80 7818 094-4 with all the axles, sixth wagon of the series Zags No. 33 87 7813 564-4 with all the axles, seventh wagon of the series Zags No. 33 87 7816 547-6 derailed with one axle of the second bogie.



Figure 3.1.1: The appearance of the derailment site (concrete bridge between the tunnel 21 and the tunnel 22)



Figure 3.1.2: The appearance of the derailed wagon parts



Figure 3.1.3: The appearance of the derailed wagon parts



Figure 3.1.4: The appearance of the derailed wagon parts

After the derailment, the train passed 85 m more after which it stopped. The derailed wagon was found in the track zone, on their wheels. It did not come to tilting or overturning of the train and it did not come to the leakage of cargo.

The train No. 52770 operated on the route Crveni Krst - Prahovo. The train composition consisted of the train locomotive of the railway undertaking “NCL Neo Cargo Logistic“d.o.o. of the series 661-318 and 14 (fourteen) wagaon-tanks of the series Za (13 of the series Zags and 1 of the series Zagkk). All of the wagon-tanks, which were in the composition of the train No. 52770 were loaded with dehydrated ammonia (RID 268/1005, NHM code 2814.10). The net weight of the entire consignment of the dehydrated ammonia was 509 280 kg.

Due to this accident, the railway traffic between the stations Svrljig and Knjaževac was interrupted. By telegram No. 89 of the Executive Director for Railway Infrastructure Management dated of 14.02.2019., part of the regional railway line between the stations Crveni Krst and Zaječar was closed for train traffic. Until the conclusion of this annual report, the specified part of the railway line is not open for traffic.

Rehabilitation of the consequences of this accident (lifting of the derailed wagon-tanks and their removal from the site) was performed by engaging professional services and resources of “IŽS”a.d. in the presence of members of the Ministry of the Interior of RS, the Sector for Emergency Situations, the Department for Emergency Situations in Zaječar, and the regional Fire and Rescue Unit in Knjaževac.

Category: Accident

Fatally injured and injured: N/A

Material damage: On the infrastructure and the railway vehicles

3.2. Jumping of the railway worker from the train No. 432 in motion

On 25.06.2019. at 06:17 at km 14+169 of the main arterial route E70/E85: Belgrade - Mladenovac - Lapovo - Niš - Preševo - state border - (Tabanovce), during the passing of the train No. 432, of the railway undertaking "Srbija Voz" a.d., through the station Resnik, during the drive on the third station track at the covered part of the second station platform, which is located between the third and fourth station track, out of the train locomotive 441-604 of the train No. 432, it came to jumping of the railway worker the train driver, employed at railway undertaking "Srbija Kargo" a.d. The railway worker the train driver has, from the train locomotive 441-604, which was in motion, through the door of the machine compartment on the left side of the station platform (viewed from the direction of the train movement) jumped in direction of the second station platform and third station track, that is, in the space between the second station platform and the train in motion. On that occasion, he sustained serious injuries, from which he died on the spot.



Figure 3.2.1: The appearance of the point of jumping site
(view from the direction of station facility - the first station track)



Fig. 3.2.2: The appearance of the site where the train No. 432 stopped after the serious accident

The train No. 432 operated regularly on the route Bar - Topčider. The train composition consisted of the train locomotive of the railway undertaking “Srbija Voz” a.d. of series 441-604 and 10 (ten) wagons for the transport of passengers. The train was passing through the station Rakovica within its regular driving route.

The fatally injured railway worker, the train driver employed at the railway undertaking “Srbija Kargo” a.d. was found on the train locomotive 441-604 of the train No. 432 of the railway undertaking “Srbija Voz” a.d. for the reason of transport to work (coming to work).

The appearance of the site of the serious accident jumping of the railway worker from the train No. 432 is shown in Fig. 3.2.1.

Due to this serious accident, it did not come to the interruption of traffic.

Category: Serious accident

Fatally injured and injured: 1 fatally injured person (railway worker)

Material damage: N/A

4. REPORTS ON INVESTIGATIONS COMPLETED IN 2019

4.1. Fire on the train No. 2746

4.1.1. Short description of the accident

On 30.03.2018 at 17:50 on the regional track Crveni Krst - Zaječar - Prahovo Pristanište, between the station Matejevac and Svrlijig, on the part of the open track which is placed in the tunnel “Gramada“ (entrance portal - km 30+708.05 and exit portal - km 32+409.32), it came to the fire on the train No. 2746 (DMK 710-004). The fire occurred in the area of municipality Svrlijig, in the area of the village Grbavče, where the railway stop Hadžićevo is located. The area where the respective accident occurred is not populated.



Fig. 4.1.1.1: The appearance of DMK 710-004 on fire (middle part from the outside)



Fig.4.1.1.2: The appearance of passenger compartment DMK 710-004 on fire



The train No. 2746 operated, regularly, on the route Niš - Zaječar. The train composition consisted of DMK of inventory number 710-004. At the moment of occurrence of the fire, according to the conductor's judgement, about thirty passengers were in the train.

It came to the fire during the drive through the tunnel "Gramada". Taking into account that it did not come to interruption of the operation of the propulsion group at DMK and that the tunnel is not a suitable place for safe evacuation of passengers and extinguishing the fire, the train driver continued with driving and upon the tunnel he stopped the train at km 32+500 at an approximate distance of 100 m before the stop Hadzićevo, on the site suitable for evacuation of passengers and firefighting.

After stopping the train and conducted safe evacuation of passenger at a safe distance, the train driver first noted the fire from the outside on the roof of the vehicle, after which he took the manual PP devices and he climbed on the roof to extinguish the fire. Trying to localize the fire, he noted that the access to the center of fire was unavailable because the fire was under the sheath of the vehicle and that he could not localize the fire himself.

For remediation of the accident (fire), it was necessary to engage the fire-rescue department from Svrljig. There was no need to engage the emergency medical service, because there were no injured nor fatally injured in this accident. Remediating the consequences occurred in this accident was made by hiring the expert services and resources of "Srbija Voz" a.d.

Due to this accident, it came to rail traffic interruption between the stations Crveni Krst and Svrljig. The traffic interruption lasted until 30.03.2018 at 21:00.

Category: Accident

Fatally injured and injured: N/A

Material damage:

On DMK 710-004	1 000 000.00	RSD
Total damage on the infrastructure:	0.00	RSD
Total direct material damage:	1 000 000.00	RSD

The damage is stated in the official nomination of the RS (Dinar - RSD).

According to the official middle exchange rate of the National Bank of Serbia on the day 30.03.2018., which amounts to 1 EUR (Euro) = 118.3853 RSD (Dinars), overall material damage occurred in the respective accident amounts to 8 446.99 Eur (EUR).

4.1.2. The causes of accident determined by investigation

Due to the major load of DM "A" because DM "B" could not be connected to a joint traction due to a failure, during the overcoming of the rise, there happened an increase in the temperature and flow of a higher amount of exhaust gases through the exhaust pipe - exhaust, passing through the vertical protective channel and goes to the roof of DMK. As a consequence of the heating of the exhaust gases of the exhaust pipe to the temperatures above the temperature of the work-warmed operating engines, and due to the lack of seal on the flange connection at the extension of the exhaust pipe, the hot products directly act on the protective



tube which is then heated and due to its heating comes to inflammation of the upholstery, plastic and wooden parts in that part where the channel touches. The fire started in the upper part of the channel, and then it continued to the lower part when the parts of the burning lining fall to the bottom of the channel and melt the aluminum parts of the air intake.

Based on the submitted EV-63 Request by “Srbija Voz” a.d. it can be stated that they are recorded and treated accordingly, but the measures that are implemented on the database from the Request can not be observed. Namely, it is noted that works/repairs are being carried out to eliminate the consequences without determining the causes of failures in order to eliminate the causes of failure, so that they would not be not repeated in a short time interval.

4.1.3. Issued safety recommendations

SR_01/19 “Srbija Voz” a.d. to review the constructive design of the end of the exhaust manifold on the DMK series 710, and to perform the modification of solution (installment of the convenient seal), with the aim to prevent breakthrough of hot exhaust gasses, which could lead to occurrence of new fires on this segment.

SR_02/19 “Srbija Voz” a.d. that on the basis of quality control in the course of repair and final review of the DMK series 710, determine whether repairs were made in the required quality and scope of work, with the aim of adequate execution of the repairs in accordance with Article 8 of the Rulebook on the Maintenance of railway vehicles.

SR_03/19 “Srbija Voz” a.d. to perform the checks and tests, not only of the parts on the DMK series 710 that are relevant to safety, but also those parts of the fault frequency higher than the ones that are defined by the manufacturer that can affect the availability of the vehicle.

SR_04/19 “Srbija Voz” a.d. that, given the long exploitation period of DMK series 710, carry out technological research related to the joint work of the diesel engine - hydrodynamic transmitter - the cooling system in order to identify lacks and on the basis of them implement appropriate improvements of the drive system (replacement of the kind of coolant, check the capacity of the heat exchanger - cooler, etc.) in order to prevent failures that could lead to occurrence of the new accidents.

SR_05/19 “Srbija Voz” a.d. that due to the frequency of failures in the operating system DMK series 710 and accidents occurred - fires, conduct analysis and consider the possibility of shortening the period up to the execution of regular repairs.

SR_06/19 “Srbija Voz” a.d. that at the next regular repair DMK Series 710, during the reconstruction of the interior applies materials in accordance with EN 45545-1 and EN 45545-2:2013+A1, that is SRPS EN 45545-1:2013 and SRPS EN 45545-2:2017.

SR_07/19 Directorate for Railways to check the license for use of DMK series 710 in terms of improvement of technical solutions of the drive system and the application of appropriate materials in terms of controlling the fulfillment of conditions for issuing safety certificates for transport.

4.2. Overtaking of the locomotive CEM-7 on the worker - contractor

4.2.1. Short description of the serious accident

On 13.04.2018. at 13:30 in the area of the industrial railway JP “EPS“, branch TENT, at the station Obrenovac at the track depot 10d, it came to overtaking of the locomotive CEM-7, owned by JP “EPS“, branch TENT from Obrenovac, on the worker of “Inter-Mehanika“d.o.o. from Skorenovac, which on this occasion, had been heavily injured and had, on the same day, succumbed to injuries at the hospital.

It came to this serious accident in the area of the city of Belgrade, municipality Obrenovac, in the area of TENT, at the railway station Obrenovac, on the track depots. The area where the respective serious accident occurred is located in the industrial zone of the municipality Obrenovac.



Fig. 4.2.1.1: The appearance of the site where it came to overtaking of the locomotive CEM-7 on the worker

Workers of “Inter-Mehanika“d.o.o from Skorenovac at the time of occurrence of the respective serious accident had carried out the installation of derailment detectors on the wagons of series Faboo and tasks of handover of completed works. The wagons of series Faboo on which the detectors have been installed were located on the track depots 11d and 12d. The CEM-7 locomotive was located on the paved part of the track 10d, where on the same part of the track, closer to the depot hall, right next to the CEM-7 locomotive, there was also the locomotive 443-10. Locomotive CEM-7 and locomotive 443-10 were not coupled together. The CEM-7 locomotive was driven for the purpose of maneuvering in the area of the depot, pulling two functional locomotives off the track of depot 8d.



On track 11d, the performed works were checked on 6 (six) wagons of the Faboo series, on which derailment detectors were previously installed. The performed works were checked: in front of JP "EPS" Belgrade, branch TENT from Obrenovac - supervisor of wagon examiner and I locksmith for air brakes and in front of "Inter Mehanika"d.o.o. from Skorenovac - locksmith of the II group (deputy manager - injured worker), and in parallel with that activity, workers of "Inter-Mehanika"d.o.o. from Skorenovac: a locksmith of group II and a welder completed the installation of pipes for connecting derailment detectors.

Works on the installation of derailment detectors on Faboo series wagons have been performed since 26.03.2018. Until 13.04.2018., until the moment of the serious accident in question, the installation was performed on a total of 20 wagons.

Due to this serious accident, where there came to a severe bodily injury to the worker of "Inter-Mehanika"d.o.o. from Skorenovac, who died on the same day in a hospital in Belgrade as a result of injuries sustained in a serious accident, the team of the Obrenovac Health Center in the TENT circle, the Obrenovac Emergency Medical Service, the Obrenovac Police Station were engaged.

Due to this serious accident, it did not come to interruption of the railway traffic.

Category: Serious accident

Fatally injured and injured: 1 fatally injured person (worker of the contractor)

Material damage:

Total material damage on the railway vehicles:	0.00	RSD
Total material damage on the infrastructure:	0.00	RSD
Total direct material damage:	0.00	RSD

No material damage was caused to the railway vehicles, infrastructure and property of third parties in the respective serious accident.

4.2.2. Causes of the serious accident determined by investigation

The direct and immediate cause of a serious accident is that the deceased worker found himself on the track 10d just before the locomotive CEM-7 approached, which created a dangerous situation related to the occurrence of this serious accident.

The deceased worker from the area where the works were performed (the space between the tracks 10d and 11d) had the opportunity to hear the work of the locomotive and notice that it started, and was familiar with the working conditions of the temporary construction site.

On the occurrence of the respective serious accident the following had the influence: 1) lack of notification that shunting drive is in preparation in the vicinity of the construction works 2) non existence of the coordinator for executions of works, 3) the fact that prior to the accident there was a certain and permanent amount of noise from the locomotive CEM-7 that for a certain period of time had been operating without moving in the vicinity of the construction works, 4) the noise of the locomotive at the moment of overtaking due to which the worker could not hear the warnings from the group of workers and 5) weather situation, that is, the influence of the Sun.



The main cause of this serious accident is noncompliance with the Provisions from the part B, Point 9 Paragraph 4 of the Business order of the station Obrenovac No. 32063/1 from 21.10.2010. The train driver had started the locomotive without giving the aspect of a signal "Forward" by the shunter. Before starting the locomotive, the train driver did not give with a siren an aspect of a signal "Watch out" and did not repeat the aspect of a signal during the shunting drive, which is in collision with the provisions of the Article 29, B, Point 11, under a) and l) of the Rulebook 1 of the Signalling Rulebook ("Official Gazette of ZJŽ" No. 4/96, 5/96 and 1/97). During the shunting drive, the train driver had exceeded the maximum speed limit for the paved and unpaved part of the track 10d determined by provisions from the part B, Point 15 of the Paragraph 4 of the Business order of the station Obrenovac No. 32063/1 from 21.10.2010.

The deceased worker who conducted the field work did not fully comply with the measure BZR, HTZ and PPZ, although according to Form 6: Record of employees qualified for safe and healthy work (issued by "Inter-Mehanika"d.o.o. from Skorenovac) he was qualified for safe and healthy work from theoretical and practical work.

According to the Article 9 of Regulation on health and safety at work on temporary and mobile construction sites ("Official Gazette of RS" бр. 14/2009 and 95/2010), investor was obliged to conduct the registration of construction site on the form in Annex 3 "Construction site registration". In the form "Construction site registration" there is a column "coordinator for execution of works". JP "EPS" branch TENT from Obrenovac did not deliver the form "Construction site registration" so the coordinator for works has not been appointed. Also, the Project report on arrangement of construction site on derailment detectors installment from 088/18 of 13.03.2018. "Inter-Mehanika"d.o.o. from Skorenovac in Part II Description of works is stated that TENT will determine the person for coordinator, supervision and handing over the executed works. The absence of appointing the coordinator for works by JP "EPS" branch TENT from Obrenovac had a consequence in this case that the executors of works "Inter-Mehanika"d.o.o. from Skorenovac (among them the deceased worker) were not timely informed on the planned maneuvering drive with CEM-7 locomotive.

Before the commencement of works, on this construction site "Inter-Mehanika"d.o.o. from Skorenovac and JP "EPS" branch TENT from Obrenovac were not the subject of regular supervision of the competent inspectorates for the last two years.

4.2.3. Issued safety recommendations

SR_08/19 JP "EPS" branch TENT from Obrenovac to conduct the amendment of the procedure, QP.0.14.05 edition 11 from 25.04.2018., in the part 3.1. General, Paragraph 7 (which in this part is identical to the procedure QP.0.14.05 edition 10 from 22.01.2018., and that was valid at the time of occurrence of the respective serious accident), with detailed content of the description of the procedure regarding the dangers and damages in railway traffic that the instructor for BZR and ZOP from Training Department or the Person for Health and Safety at TENT or surveillance body uses when he introduces the employees of the contractor of works and predicts the manner of check of the employees of the contractor of works or to create a special procedure that defines this.



- SR_09/19** JP “EPS“ branch TENT from Obrenovac to align the procedure QP.0.14.05 edition 11 from 25.04.2018. Annex 1 in the part Safety regulations at work in TENT, Paragraph 6, 7 and 8 (which is in that part identical to procedure QP.0.14.05 edition 10 from 22.01.2018., and that was valid at the time of occurrence of the respective serious accident), with the Article 6 of the Regulation on Health and Safety at work on temporary or mobile construction sites (“Official Gazette of RS” 14/2009 and 95/2010) with the aim of appointing the coordinator for execution of works.
- SR_10/19** JP “EPS“ branch TENT from Obrenovac to conduct additional training of high quality of the staff that participates in carrying out the shunting drives with the purpose of appropriate application of the railway regulations aiming to prevent occurrence of new similar accidents and improve safety in the railway traffic.
- SR_11/19** “Inter-Mehanika“d.o.o. from Skorenovac that in Form 6 of the Records on employees trained for healthy and safe work, for the persons at work position of increased risk (worker-locksmith/II locksmith and manager) in the part of description of the works at that position, beside the anticipated obligations, anticipates the training and check for safe work during execution of works on temporary and mobile construction sites at other employer where in the vicinity of the place of execution of works shunting movements are being carried out.
- SR_12/19** Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labor Inspectorate to carry out additional inspection within its competences in terms of fulfillment of conditions under Article 9 of the Regulation on Safety and Health on Temporary or Mobile Construction Sites (“Official Gazette of RS” 14/2009 and 95/2010), where the investor (JP “EPS” branch TENT from Obrenovac) was obliged to carry out application of the construction site on the form in Annex 3 “Construction site registration” and appoints the coordinator for execution of works.
- SR_13/19** Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labor Inspectorate that upon application of future works by the employer-investor (JP “EPS“ branch TENT from Obrenovac) to carry out the inspection within its authorities, and with the aim of reducing the possible similar accidents.

4.3. Collision of trains No. 2990 and 70922

4.3.1. Short description of the accident

On 01.08.2018. at 05:35 at km 27+369 on the main arterial route E70/E85: Belgrade - Mladenovac - Lapovo - Niš - Preševo - state border - (Tabanovce), between the stations Klenje and Ripanj Tunnel, upon driving in the direction from the station Ripanj Tunnel to Klenje station, on the open track at the km 27+369 there came to gaining close to and collision of trains No. 2990 (EMV 413/417-033/034) and 70922 (mere locomotive 661-162). The collision

occurred when the head of the train No. 2990 (EMV 413/417-033/034), which was moving, hit the end of the train No. 70922 (mere locomotive 661-162), which was standing. Upon collision, due to kinetic energy of the train No. 2990, which was moving, it came to moving of the train at the length of 19 m, after which they stopped. On that occasion, the EMV 413/417-033/034 from the train No. 2990 derailed with a single bogie (the first bogie in the direction of movement).



Fig. 4.3.1.1: The appearance of damages on the railway vehicles after the collision of trains

The site of respective accident is located in the area of the city of Belgrade, municipality Voždovac, settlement Ripanj. The area in which the respective accident occurred is not populated.

The train No. 70922 operated regularly on the route Rajka - Belgrade Marshalling Yard. The locomotive 661-162 was part of the train composition. At the time of the occurrence of the respective accident, the train No. 70922 was standing on the open line.

The train No. 2990 operated regularly on the route Stalać - Belgrade. EMV 413/417-033/034 was in the train composition. At the time of the respective accident, train No. 2990 was moving in the direction from the station Ripanj Tunnel to the station Klenje. At the time of the collision, according to the conductor's estimate, there were between sixty and seventy passengers on the train.

No one was fatally injured in this accident. Light bodily injuries were sustained by 23 (twenty-three) passengers from train No. 2990.

Members of the City Institute for Emergency Medical Aid and members of the police came to the site to provide assistance to the injured.

Remediation of the consequences of this accident was performed by engaging professional services and resources of "IŽS" a.d., "Srbija Voz" a.d. and "Srbija Kargo" a.d.

Due to this accident, the railway traffic between Klenje and Ripanj Tunnel stations was interrupted. The traffic interruption lasted until 01.08. 2018. at 19:49.



Category: Accident

Fatally injured and injured: No fatally injured, 23 lightly injured
(the mentioned persons were in the train No. 2990)

Material damage:

Damage on EMV 413/417-033/034:	35 000 000.00	RSD
Damage on locomotive 661-162:	394 400.00	RSD
Total costs of lifting the derailed EMV:	247 533.52	RSD
Costs of engaging the team of KM:	112 300.00	RSD
Total direct material damage:	35 754 233.52	RSD

The damage is stated in the official currency of RS (Dinar - RSD).

According to the official middle exchange rate of the National Bank of Serbia on 01.08.2018., which is 1 EUR (Euro) = 118.0618 RSD (Dinars), the total material damage caused in the respective accident amounts 302 843.37 EUR.

4.3.2. The causes of accident determined by investigation

The immediate cause of the accident was that the two trains were found simultaneously in one spatial section, with one train standing (train No. 70922) while the second train was moving (train No. 2990), which is contrary to the provision in Article 37, Item 7 of Rule 2, Traffic Rules ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03).

The occurrence of the accident was also influenced by the following:

- 1) failure to comply with the railway regulations on passing along the signal that prohibits further driving by the train driver of the train No. 2990,
- 2) faults and failures of SS devices that are repeated over a longer period of time,
- 3) unsecured minimum prescribed distance of visibility of the main signals,
- 4) untimely detection of the obstacle on the track (of the stopped locomotives) due to the vegetation near the railway track,
- 5) incomplete notification of train driver No. 2990 on train traffic situation by TK dispatcher,
- 6) frequent alienation of railway property - of certain parts of the SS devices by third parties,
- 7) weather conditions - extensive rainfall from 30.07.2018. on the mentioned railway section which contributed to the deterioration of the state of functioning of the SS devices.

Considering that the train driver's of the train No. 2990 had no order to pass the spatial signal that prohibited further driving, issued by the General Order I and by a phonogram by the traffic regulator (TK Dispatcher), was obliged, pursuant to the provisions of Article 6, item Đ, item 20, paragraph 2 of Regulation 1, the Signal Regulations ("Official Gazette of ZJŽ" No. 4/96, 5/96 and 1/97), to stop the train. In the event that it is unable to establish a connection with the TK Dispatcher, in accordance with the provisions of Article 79, item 5, a) of Rulebook 2, Traffic Rulebook ("Official Gazette of ZJŽ" No. 3/94, 4/94, 5/94, 4/96 and 6/03), after standing for a period of from 3 minutes, he had the opportunity to pass a spatial signal that



prohibits further driving and careful driving according to the transparency of the track, but at most 30 km/h, continues driving to the first next spatial signal. The reasons for such a train driver's work can be the simultaneous influence of a technical factor (long distance driving in conditions of interference on SS devices resulting in a lot of information and instructions to the train driver via General Order I or via RDV; this drive deviates from the usual driving mode when devices for signaling and traffic control function properly) and psychological nature (in conditions when he continuously for a certain period of time, repeatedly performed a one-way action, or repeatedly used the "drive-by-order" button, it can not be ruled out that the train driver of the train No. 2990 routinely, mechanically thought and reacted, what is the expected motor action in the recurring movement scheme).

It was found that they performed all required periodic measurements on SS devices prescribed by the Rulebook on maintenance of the SS devices ("Official Gazette" No. 80/15). In addition, an increasing number of disorders in which due to technical failure or otherwise caused damage to external devices SS requires replacement of individual components is noted. For these disorders are characterized by their long duration of which is directly due to the deviation from the designed sheet, reduces the safety of the railway traffic. The documentation submitted by "IŽS" a.d. there are no reliable data on whether it is carried out periodic checks orientation and visibility of main light signal and distant signal repeaters of pre signalling. For spatial signal E 51 is no minimum sighting distance prescribed by the provisions of Article 6 of the Rulebook 1, Signalling Rulebook ("Official Gazette of ZJŽ" No. 4/96, 5/96 и 1/97).

The Rulebook on maintenance of the SS device ("Official Gazette of RS" No. 80/15) does not define the maximum permissible interference time on SS devices. Only the maximum deadline in which the workers who work on maintenance approach the elimination of a fault or malfunction on the SS device from the receipt of the notification of a fault or malfunction.

The Rulebook on maintenance of SS devices ("Official Gazette of RS" No. 80/15) does not define that monitoring the condition of SS devices is performed by workers who maintain SS devices in order to determine their usability and correctness. It is defined that only workers who handle SS devices do that.

The Rulebook on Technical Requirements for SS Devices ("Official Gazette of RS" No. 18/2016 and 89/2016) do not define electrical parameters to describe the technical condition of the track balises, similar to the provisions that were defined in the currently unapplicable Instruction 427, Instructions for the application, installation, testing and maintenance of track autostop devices on the railway tracks of JŽ ("Official Gazette of ZJŽ" No. 1158/75).

4.3.3. Issued safety recommendations

SR_14/19 Directorate for Railways to define in the Rulebook on Technical Requirements for SS Devices ("Official Gazette of RS" No. 18/2016 and 89/2016) electrical parameters describing the technical condition of the track balises.

SR_15/19 Directorate for Railways, in the Rulebook on maintenance of SS devices ("Official Gazette of RS", No. 80/2015), in addition to the defined maximum period in which maintenance workers approach elimination of fault or malfunction on SS device, define the maximum allowed time of duration of fault or malfunction on SS devices, after which it is necessary to take special measures in order to return the



device to the designed condition. Taking into account the specifics of each individual case, Directorate for Railways prescribes special measures to be taken.

- SR_16/19** Directorate for Railways in the Rulebook on maintenance of SS devices (“Official Gazette of RS”, No. 80/2015), to define that monitoring of the condition of SS devices in order to determine their usability and correctness is performed in addition to workers handling signaling and safety devices also by maintenance workers. of the signaling and safety devices.
- SR_17/19** “IŽS”a.d. to perform the procurement and installation of the missing and due to technical malfunctioning of the off track auto-stop devices on the railway section Resnik - Velika Plana, as well as to see the possibility of the installation of the track balises and on other exit signals that are not on the main transit station tracks.
- SR_18/19** “IŽS”a.d. to regularly check and continuously maintain the prescribed distance of the visibility of light signals in accordance with the provisions of Article 15 of the Rulebook on maintenance of the SS devices (“Official Gazette of RS”, No. 80/2015).
- SR_19/19** “IŽS”a.d. when, due to weather conditions or some other reason, an interruption in the operation of the TK device occurs, it shall dispose stations by the train dispatchers whose signals are considered unusable after the interruption in the operation of the TK device.
- SR_20/19** “IŽS”a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crises situations in order to reduce the impact on the occurrence of new accidents and incidents.
- SR_21/19** “Srbija Voz”a.d. to perform the quality additional training of the train drivers with the aim of proper handling of traffic regulation in the cases of interferences on SS devices and interferences on communication means.
- SR_22/19** “Srbija Voz”a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crisis situations in order to reduce the impact on the emergence of new accidents and incidents.

SR_23/19 “Srbija Kargo” a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crisis situations in order to reduce the impact on the emergence of new accidents and incidents.

4.4. On the level crossing, overtaking of the train No. 7821 on the bus

4.4.1. Short description of the serious accident

On 21.12.2018. at 07:30 on the main arterial route E70/E85: Belgrade - Mladenovac - Lapovo - Niš - Preševo - state border - (Tabanovce), on the level crossing secured with traffic signs on the road and the zone of necessary visibility located in the area of the station Međurovo at km 250+065, overtaking of the train No. 7821 on the road vehicle bus occurred. It came to the accident in the area of the populated settlement Donje Međurovo, on the section located in direction on the plain terrain.



Fig. 4.4.1.1.: The appearance of the vehicle after the serious accident (view in direction to the end of the train)



Fig. 4.4.1.2: The appearance of the vehicle after the serious accident (view in direction to the front of the train)



Fig. 4.4.1.3: The appearance of the head of the train



Fig. 4.4.1.4: The appearance of the part of the side part of the train and back part of the bus

The road vehicle bus of the brand Mercedes Benz type O 530 of license plate NI 152-ŠJ, owned by “Niš ekspres” a.d. from Niš, operated regularly on the regular bus line Novo Selo - Niš. The bus was moving by the local road in the direction of the settlement Donje Međurovo to Niš. By approaching the level crossing at km 250+065, the bus did not stop in front of the level crossing but continued its drive and in the area of the level crossing has entered the profile of the track just before the arrival of the train.

The train No. 7821 of the undertaking “Srbija Voz” a.d. operated regularly on the route Niš - Kuršumlija - Merdare stop. The train consisted of DMV series 711-075/076. After being at the Međurovo station due to passengers’ needs, the train No. 7821 was started from the station towards the Belotince crossing. At the moment of the serious accident in the train there were 10 (ten) passengers. Driving on the station part of the track, upon entering the level crossing at km 250+065, it came to overtaking of the train on the road vehicle bus, which has just before the train arrival, entered the profile of the track. The overtaking occurred in such a manner that the forehead of the DMV 711-075/076 has hit the left port side of the road vehicle bus (looking in the direction of the train drive, that is the road vehicle bus). After the overtaking, the train continued its movement in length of 60 m, and derailed with two bogies. Due to the force of the impact, the road vehicle bus physically split into two approximately similar parts, with each part of the road vehicle bus being discarded out of the track, with one part at each side of the track.

In this serious accident, 7 (seven) persons were fatally injured, 19 (nineteen) persons were seriously injured and 17 (seventeen) persons were lightly injured. All the fatally injured and injured people were in the road vehicle bus, except for one lightly injured person - the driver of train No. 7821.

Members of the MUP RS, Police Directorate in Niš, the Traffic Police Department in Niš, members of the MUP RS, Sector for Emergency Situations, Emergency Management Directorate in Niš, members of OJT Niš and members of the Institute for Emergency Medical Services Niš came on the site of this serious accident.

Due to mentioned serious accident, the interruption of traffic between the station Međurovo and the Belotince crossing lasted until 17:30, when the railway line was opened for the traffic of trains.



Category: Serious accident

Fatally injured and injured: 7 fatally injured, 19 seriously and 17 lightly injured
(All the fatally injured and injured people were in the road vehicle bus, except for one lightly injured person - the driver of train No. 7821)

Material damage:

On DMV 711-075/076:	3 500 000.00	RSD
Total costs of lifting the derailed EMV:	45 663.90	RSD
On the track:	489 040.00	RSD
On KM network:	85 709.04	RSD
Total direct material damage:	4 120 412.94	RSD

The damage is stated in the official currency of RS (Dinar - RSD).

According to the official middle exchange rate of the National Bank of Serbia on 21.12.2018., which was 1 EUR (Euro) = 118.2709 RSD (Dinars), the total material damage occurred in the respective serious accident amounts to 34 838.77 EUR.

4.4.2. The causes of the serious accident determined by investigation

The direct and immediate cause of the serious accident is that the road vehicle bus was found on the track immediately before the train arrival, thus, creating a dangerous situation related to the occurrence of this serious accident.

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

The fact that the prescribed zone of necessary visibility was not provided (but there was a necessary visibility) does not in any way diminish the obligation of the driver of the road vehicle bus, as he was obliged to obey the traffic signs I-33: "Crossing the road with the railway line without barrier or half-barrier", I-35: "Approaching the point of crossing of the road and the railway line", I-34: "Andrejin krst" and II-2: "Obligation of stopping", to stop and make sure that whether the train was approaching, and what the necessary visibility existence allowed to him.

On the line, before approaching the respective level crossing from the direction of the station Niš to the station Međurovo, that is, to the Belotince crossing, in front of the first entrance switch on the entering side of the station Međurovo, in the direction of the train movement, signalling mark 209: "Watch out, level crossing" is not set in accordance with provisions of the Article 46 of the Signalling Rulebook ("Official Gazette of ZJŽ" No. 4/96 and 5/96). Not setting of this signalling mark in the manner prescribed by provisions of the Signalling Rulebook ("Official Gazette of ZJŽ" No. 4/96 and 5/96) could have contribute to the situation that the train driver, in front of the respective level crossing, not give an aspect of a signal 67 "Watch out", as determined by the provisions of the Article 29 under B, Point 11



under v) and Article 46, Point 5 of the Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96 and 5/96).

As the speedometer equipped with the DMV 711-075/076 records the use of the locomotive siren, it can be reliably established that the train driver did not give the aspect of a signal 67: “Watch out” in the manner prescribed by the Article 29 under B, Point 11 under a), k) and lj) of the Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96 and 5/96). Bearing in mind the fact that the train driver was familiar with the line on which he had driven the train, he had the possibility that, nevertheless that the signalling mark 209: “Watch out, level crossing” was not set, by giving the aspect of a signal 67: “Watch out” warn on the arrival of the train. Not giving this aspect of a signal in the manner prescribed by the provisions of the Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96 and 5/96) may have contributed to the occurrence of this serious accident.

4.4.3. Issued safety recommendations

SR_24/19 Ministry of Construction, Transport and Infrastructure, that in 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), defines methodology (the manner) of determining (calculating) the elements of the zone of necessary visibility given in Annex 9 (dpz - the length of stopping of the road vehicle and Spžv- the length of approaching of the railway vehicle).

SR_25/19 Ministry of Construction, Transport and Infrastructure, that in 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), defines the procedure when there exists a necessary visibility according to the definition from the Article 2 Paragraph 1 under 12) of this Rulebook and it is not possible to determine the zone of necessary visibility. In particular, it should be borne in mind that by setting the traffic sign II-2: “Obligation of stopping”, while providing the necessary visibility, enables the safe passage of road vehicles over the crossing.

SR_26/19 Ministry of Construction, Transport and Infrastructure that in the Article 14 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), makes corrections in the expression:

$$t_v = \frac{m + n + d + s}{V_p} \cdot 3,6 \quad [s]$$

so that in front of s there is a sign “-”, and not the sign “+”



- SR_27/19** Ministry of Construction, Transport and Infrastructure that in the Article 14 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), harmonize the description of the position of point B given in Article 14, Article 15 and Annex 6.
- SR_28/19** Ministry of Construction, Transport and Infrastructure that makes amendments to the Rulebook on traffic signalling (“Official Gazette of RS”, No. 85/17) which would allow the instalment of traffic sign II-2: “Obligation of stopping”, and in front of the crossing of the road over the track in the level, with the purpose of stopping the occurrence of the new similar accidents and improvement of traffic safety.
- SR_29/19** Ministry of Construction, Transport and Infrastructure to consider the possibility that in the Law on traffic safety on the roads (“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) Article 153 Paragraph 2 to harmonize with the Article 97 Paragraph 1 of the Law on safety of railway traffic (“Official Gazette of RS”, No.41/2018) in terms of more precise provisions for the installation of traffic lights.
- SR_30/19** “IŽS” a.d. to conduct expertly based risk assessment on level crossings. Given that the accidents on the level crossings (by reviewing every crossing individually) are rare events, it is not possible to assess risk solely on the number of accidents which occurred on the individual level crossings. Risk assessment, as a precautionary measure, should be made jointly for all level crossings in accordance with all relevant parameters, whether the accidents occurred or not.
- SR_31/19** “IŽS” a.d. to make the act “Level Crossing Program” according to the previously done risk assessment on the level crossings with a view to undertake appropriate activities in order to raise the level of traffic safety.
- SR_32/19** “Srbija Voz” a.d. to carry out part-time training of traction vehicle staff in the proper implementation of the aspect of a signal 67: “Watch out”, in accordance with provisions of the Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96 and 5/96), with the purpose of the proper application of railway regulations, which has an aim of preventive actions for preventing the circumstances that could contribute to the occurrence of the new similar accidents and improvement of safety in the railway traffic.



5. SAFETY RECOMMENDATIONS AND MEASURES TAKEN

With the aim to possibly improve railway safety and prevent the occurrence of new accidents, CINS, the Sector for Investigation of Accidents in Railway Traffic, issued 32 (thirty-two) safety recommendations in 2019. In 2018, 33 (thirty-three) security recommendations were issued, and in 2017, 7 (seven) safety recommendations were issued. Out of a total of 72 (seventy-two) safety recommendations issued by CINS in 2017, 2018 and 2019, 58 (fifty-eight) safety recommendations (80.56%) were issued to Directorate for Railways, and to the other bodies and organizations were issued 14 (fourteen) safety recommendations (19.44%).

The table 5.1. shows issued safety recommendations by years.

Table 5.1: Issued safety recommendations

Year	Directorate for Railways		Other bodies and organisations		Total	
	[No.]	[%]	[No.]	[%]	[No.]	[%]
2017.	6	85.71	1	14.29	7	100.00
2018.	28	84.85	5	15.15	33	100.00
2019.	24	75.00	8	25.00	32	100.00
Total	58	80.56	14	19.44	72	100.00

The table 5.2. shows the status of issued safety recommendations by years.

Table 5.2: Issued safety recommendations - status

Year	Accepted		Executed		Not accepted, no response has been submitted or it is not possible to determine the status from the submitted response		Total	
	[No.]	[%]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2017.	3	42.86	1	14.28	3	42.86	7	100.00
2018.	17	51.52	9	27.27	7	21.21	33	100.00
2019.	19	59.38	3	9.37	10	31.25	32	100.00
Total	39	54.17	13	18.06	20	27.77	72	100.00



The table 5.2.1. shows the status of safety recommendations issued to Directorate for Railways by years.

Table 5.2.1: Safety recommendations issued to Directorate for Railways - status

Year	Accepted		Executed		Not accepted, no response has been submitted or it is not possible to determine the status from the submitted response		Total	
	[No.]	[%]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2017.	3	50.00	1	16.67	2	33.33	6	100.00
2018.	17	60.71	8	28.58	3	10.71	28	100.00
2019.	12	50.00	3	12.50	9	37.50	24	100.00
Total	32	55.17	12	20.69	14	24.14	58	100.00

The tables 5.2.2. и 5.2.3. show the status of safety recommendations issued to other bodies and organisations by years, and the Table 5.2.2. shows the status of safety recommendations issued to MGSI, while the Table 5.2.3. shows the status of issued safety recommendations to other bodies and organisations.

Table 5.2.2: Safety recommendations issued to MGSI - status

Year	Accepted		Executed		Not accepted, no response has been submitted or it is not possible to determine the status from the submitted response		Total	
	[No.]	[%]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2017.	-	-	-	-	1	100.00	1	100.00
2018.	-	-	-	-	4	100.00	4	100.00
2019.	6	100.00	-	-	-	-	6	100.00
Total	6	54.55	-	-	5	45.45	11	100.00



Table 5.2.3: Safety recommendations issued to other bodies and organisations - status

Year	Accepted		Executed		Not accepted, no response has been submitted or it is not possible to determine the status from the submitted response		Total	
	[No.]	[%]	[No.]	[%]	[No.]	[%]	[No.]	[%]
2017.	-		-		-		-	-
2018.	-		1	100.00	-		1	100.00
2019.	1	50.00	-		1	50.00	2	100.00
Total	1	33.33	1	33.33	1	33.33	3	100.00

Due to the series of accidents on the level crossings in 2017 and 2018 and due to importance of the issue, CINS has, with the aim of possible improvement of safety on the railway and prevention of occurrence of the new accidents issued to Directorate for Railways identical safety recommendations SR_11/18 and SR_30/19 as well as SR_13/18 and SR_31/19 (that relate to "IŽS"a.d.) and MGSJ (SR_09/18, SR_24/19, SR_25/19, SR_26/19, SR_27/19, SR_28/19 and SR_29/19). All the aforementioned safety recommendations have not yet been executed.

5.1. The status of safety recommendations from 2017

5.1.1. Investigation Report (ŽS-02/17) 33 No.: 340-8059/2017-16 of 05.01.2018. (accident, derailment of the train No. 62946 from 16.08.2017. at 15:30 on the main arterial route: Belgrade Marshalling Yard "A" - Junction "B" - Junction "K" - Resnik, between Junction "B" and "K")

SR_03/17 "IŽS"a.d. shall amend the Guidelines on the Unique Criteria for the Control of the Condition of Railway Lines on the Network of Yugoslav Railways, Guidelines 339 ("Official Gazette of ZJŽ" No. 2/2001 and 4/2004), which is, by the Decision of "IŽS"a.d., No. 4/2015-51-17 from 29.12.2015. still into force in "IŽS"a.d., in accordance with provisions from the Guidelines 339 from 1989, mentioned in point 3.3.5. For future measuring wagons, recommended parameters are in accordance with the Standards: SRPS EN 13848-1, SRPS EN 13848-2, SRPS EN 13848-6.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and Report - Letter I-01 No.340-804/2020 of 30.07.2020., safety recommendation SR_03/17 is in realisation.

SR_04/17 "IŽS"a.d. shall prescribe in its internal documents that, if during the measurement using the measuring wagon, there is a disorder in the continuity of the



measurement, the control of the superstructure parameters must necessarily be carried out at the site of the resulting disturbance and in the zone for which data are missing. The control aims to eliminate the cause of the measurement disorder and to check the condition of the superstructure, visual control and measurement of the superstructure parameters with alternative measuring devices. After removing the cause of the disorder, it is necessary to repeat the measurement with measuring wagon on that kilometre.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No.340-383/2020 of 13.03.2020. and a Report- Letter I-01 No. 340-804/2020 od 30.07.2020., safety recommendation SR_04/17 is in realisation.

SR_05/17 “IŽS” a.d. shall, having in mind inadequate maintenance and condition of the tracks, sleepers and fastening devices, to assess the risk of train traffic on the main arterial route Belgrade marshalling yard “A” - Junction “B” - Junction “K” - Resnik, between junctions “B” and “K”.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020. safety recommendation SR_05/17 is in realisation.

5.2. The status of safety recommendations from 2018

5.2.1. Investigation Report (ŽS-01/17) 33 No.: 340-07684/2017-006 of 01.03.2018. (accident, decoupling of the train No. 8011 of 03.08.2017. at 07:55 on the main arterial route E 66: Belgrade Center - Pančevo Main Station - Vršac - state border - (Stamora Moravita) in the area of junction and stop Pančevački most)

SR_02/18 “Srbija Voz” a.d. should consider the possibility to make structural changes on the couplings between vehicles during regular repairs of EMV 412/416 in order to provide for a back-up alternative force transmission in case that the threaded connection is separated, or to apply other measures to reduce the risk of separation of the threaded joint.

Status of the recommendation: Directorate for Railways did not submit a reply for the Final Report for 2019.

The status of safety recommendation SR_02/18 has not been changed relative to the Final Report for 2018. Safety recommendation SR_02/18 is accepted and is in realisation.

SR_03/18 “Srbija Voz” a.d. should, in the submitted Instructions for the Repair of Couplings between Vehicles, which was produced within the Project for the preparation of the technical and overhaul documentation for the electric multiple unit of the series 412/416 by the Institute “Kirilo Savic” from Belgrade in 2004, align item 7 with the Working Instructions for the Control and Receiving Bodies of JŽ (“Official Gazette of ZJŽ”, no 1/03).

Status of the recommendation: Directorate for Railways did not submit a reply for the Final report for 2019.



The status of safety recommendation SR_03/18 has not been changed relative to the Final Report for 2018. Safety recommendation SR_03/18 is accepted and is in realisation.

SR_05/18 “Srbija Voz” a.d. should harmonize its Instructions for the Maintenance of Traction Vehicles No. 4/2016-16-4, dated 23.02.2016., with Article 34, paragraph 2 and Article 36 of the Rulebook on Rolling Stock Maintenance No. 340-382-7/2015 dated 04.12.2015. (“Official Gazette of RS”, No. 101/15), or to thoroughly reexamine the deadlines for regular repairs by taking the original technical documentation as a basis and to change them only after performing a risk evaluation and risk assessment based on information about the determined condition (especially measurement limits) during previous regular repairs, as well as perform analyses of extraordinary repairs and unplanned works.

Status of the recommendation: Directorate for Railways did not submit a reply for the Final report for 2019.

The status of safety recommendation SR_05/18 has not been changed relative to the Final Report for 2018. Safety recommendation SR_05/18 is accepted and is in realisation.

SR_06/18 “Srbija Voz” a.d. should perform a risk assessment for passenger transport in EMV of the series 412/416 where the extension of the deadlines for regular repairs was done before a previously performed risk evaluation and risk assessment based on the extension of these deadlines, as specified in paragraph 1, under 2) in Article 36 of the Rulebook on Rolling Stock Maintenance No. 340-382-7/2015 dated 04.12.2015. (“Official Gazette of RS”, No. 101/15) and in paragraph 2, item 4.13. of the Rules of Procedure of the Safety Management System of “Srbija Voz” a.d. (due to the incident that occurred).

Status of the recommendation: Directorate for Railways did not submit a reply for the Final report for 2019.

The status of safety recommendation SR_06/18 has not been changed relative to the Final Report for 2018. Safety recommendation SR_06/18 is accepted and is in realisation.

SR_07/18 Directorate for Railways should reexamine the content of the Maintenance File for EMV 412/416 and take measures from its area of competence, as the changes of the maintenance conditions specified by the manufacturer were not performed in accordance with Article 36 of the Rulebook on Rolling Stock Maintenance No. 340-382-7/2015 dated 04.12.2015. (“Official Gazette of RS”, No. 101/15).

Status of the recommendation: Directorate for Railways did not submit a reply for the Final report for 2019.

The status of safety recommendation SR_07/18 has not been changed relative to the Final Report for 2018. Safety recommendation SR_07/18 is accepted and is in realisation.



5.2.2. Investigation Report (ŽS-05/17) 33 No.: 340-00-10144/2017-20 of 18.05.2018. (serious accident, overtaking of the train No. 4905 on the road passenger vehicle from 09.10.2017. at 20:26 on the main arterial route E 70/E 85: Belgrade - Mladenovac - Lapovo - Niš-Preševo – state border - (Tabanovce), on the level crossing, secured with the traffic signs and the zone of necessary visibility, which is located on the open track between the station Grdelica and Predejane)

SR_09/18 Ministry of Construction, Transport and Infrastructure should adjust the Rulebook on the mode of crossing the railway line and the road, pedestrian or bicycle path, a place where you can carry out the intersection and measures for ensuring safe traffic (“Official Gazette of RS” No. 89/2016) with actual performances of the road vehicles (in the manner of adjustment by some countries in the region) and the actual state of the railway infrastructure.

It is necessary to determine whether the speed of the road vehicle over the crossing which is used in these calculations by this Rulebook, and which amounts to 4 km/h is suitable for the actual performances of the rolling stock, or if this speed should be enlarged (for example, in the Republic of Slovenia the speed is 7 km/h). With the speed of 4 km/h, the large number of crossings cannot satisfy the minimal required zone of visibility that the Rulebook predicts.

Explanation for the Article 11 of the Rulebook, which is given in the Article 12, and which states:

“By securing the necessary zone of visibility from the Article 11 of this Rulebook, the participants in the road traffic are enabled with uninterrupted visibility on the railway track with both sides of the road, pedestrian or bicycle path, for noticing on time of the upcoming railway vehicles on the track so that they could stop the vehicle and stop the moving of the pedestrians or bicycles before they come to the railway, that is, in front of the traffic sign that indicates the point where the road comes over the railway track at the railway level” would make sense only in the case that in front of the crossing there is no traffic sign II-2: “The obligation of stopping”. Situation on site confirms that the traffic sign II-2: “Obligation of stopping”, exists on all the crossings with passive signalization, which we consider absolutely necessary.

In the expression:

$$t_a = \frac{m + n + d + s}{V_p} \cdot 3,6 \quad [s]$$

In front of s should stand a sign ”-“, and not the sign ”+“ (see Fig. 3.4.2).

Status of the recommendation: MGSI did not submit a reply for the Annual Report for 2019.

The status of safety recommendation SR_09/18 has not been changed relative to the Final Report for 2018. SR_09/18 is partially accepted (the part of the recommendation which relates to the speed of crossing of the road vehicle over the level crossing).



SR_10/18 “IŽS” a.d. that given the existence of construction facilities, not even from the limit of dangerous area it is not possible to provide the necessary visibility in all directions, to consider introduction of active signaling, or to solve the problem in another way.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_10/18 is in realisation.

SR_11/18 “IŽS” a.d. to perform the expert-based risk assessment on the crossing. Having in mind that the accidents on the crossing (viewing them individually) are rare events, the risk evaluation cannot be done solely on the number of accidents that had happened on some crossings. The risk assessment should be done, as a measure of precaution, for all the crossing according to all the relevant parameters, whether there were accidents on them or not.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_11/18 is in realisation.

SR_12/18 “IŽS” a.d. that during the conduction of investigation of traffic accidents on the crossings, research committees should pay more attention to collecting relevant data, so that all the possible causes of the accident could be established, and with the goal of applying suitable measures.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_12/18 is executed.

SR_13/18 “IŽS” a.d. to do the act of “Programme for resolution of the level crossings” according to previously finished risk assessment, with the goal of taking certain actions to raise the level of safety in traffic.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_13/18 is accepted (realisation of safety recommendation SR_13/18 is possible upon execution of the safety recommendation SR_11/18).

SR_14/18 “Srbija Voz” a.d. that during the conduction of investigation of traffic accidents on the crossings, research committees should pay more attention to collecting relevant data, so that all the possible causes of the accident could be established, and with the goal of applying suitable measures.

Status of the recommendation: Directorate for Railways did not submit a reply for the Annual Report for 2019.

The status of the safety recommendation SR_14/18 has not been changed relative to the Annual Report for 2018. Safety recommendation SR_14/18 is accepted and in realisation.



5.2.3. Investigation Report (ŽS-04/17) 33 No.: 340-00-9180/2017-18 of 22.06.2018. (accident, derailment of the pushed shunting composition of 17.09.2017. at 08:45 on the main arterial route E70/E85: (Belgrade) - Rakovica - Jajinci - Mala Krsna - Velika Plana between the Junction “K1“ and the station Rakovica)

SR_16/18 When issuing license for the use of new vehicles which are made by already issued license for the type, Directorate for Railways to act strictly in accordance with Article 22. of Law on Railway System Interoperability (“Official Gazette of RS“ No. 41/2018), to avoid the new vehicles getting licenses for use even when they are not in accordance with valid technical legislation (delivery and issuing of licenses for wagon series Faboo 2007/2008).

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-803/2020 of 30.07.2020., safety recommendation SR_16/18 is executed.

SR_17/18 Directorate for Railways to to conduct a review of the safety certificate for infrastructure management “IŽS”a.d. for not taking measures to urgently eliminate defects such as type “C” as established by measurements with track examination coach according to the Instruction 339 and to take measures within its jurisdiction in accordance with Article 15. of Law on Safety in Railway Transport (“Official Gazette of RS“ No. 41/2018).

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-803/2020 of 30.07.2020., safety recommendation SR_17/18 is executed.

SR_18/18 Directorate for Railways to review the Rulebook on technical conditions and maintenance of the superstructure of railway lines (“Official Gazette of RS” No. 39/16, and 74/16) and to include in it the limit of the geometric parameters of railway condition, including twist, on the basis of standards SRPS EN 13848-5 and SRPS EN 13848-6 and to define, complied with these limits, the obligation of measuring the condition of track with track examination coach and action based on measurement results.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-803/2020 of 30.07.2020., safety recommendation SR_18/18 is accepted and in realisation.

Note: Directorate for Railways had a change of opinion relative to the submitted Report - Letter I-01 No. 340-897-2/2019 of 10.07.2019., when the safety recommendation SR_18/18 had not been accepted.



SR_20/18 “IŽS” a.d. to conduct examination of the reasons why the measures have not been taken for urgent elimination of defects type “C” that were determined during the measurement with track examination coach under the Instruction on unique criteria for control of the condition of railways on the network JŽ, Instruction 339 (“Official Gazette of ZJŽ” No.2/2001 and 4/2004) and to develop coordination between sectors that determined the defect and sectors that should eliminate this defect, and under review of management in order to follow and analyze these cases. According to the evaluation of safety risks which due to this occurred, to take efficient measures for elimination of the safety flaws, and in accordance with the Article 5 of Law on safety in Railway Transport (“Official Gazette of RS” No. 41/2018) and its Safety Management Manual.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-383/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-803/2020 of 30.07.2020., safety recommendation SR_20/18 is in realisation.

SR_21/18 JP “EPS” branch TENT that in future purchases of new vehicles for their fleets require the vendor delivering vehicles compliant with the current technical regulations, in order to avoid the risk of obtaining the decision to deny a license for the vehicle type.

Status of the recommendation: Directorate for Railways did not submit a reply for the Annual Report for 2019.

The status of the safety recommendation SR_21/18 has not been changed relative to the Annual Report for 2018. Safety recommendation SR_21/18 is accepted.

5.2.4. Investigation Report (ŽS-06/17) 33 No.: 340-00-10982/2017-16 of 14.08.2018. (accident, derailment of the train No. 56990 of 03.11.2017. at 15:25 on the railway line Markovac - Resavica, between the stations Svilajnac and Despotovac)

SR_24/18 “IŽS” a.d. to make amendments to the Instruction on common criteria for control of the condition of railway track on the network JŽ, Instruction 339 (“Official Gazette of ZJŽ” No.2/ 2001 and 4/2004), which with the decision of the “IŽS” a.d. No.4/2015-51-17 from 29.12.2015. is still applicable in “IŽS” a.d., in accordance with the provisions of Instruction 339 of 1989 which are listed in paragraph 3.3.4. For future track examination coaches parameters in accordance with standards: EN 13848-1, EN 13848-2, EN 13848-6 are recommended.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-383/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_24/18 is in realisation.



SR_25/18 “IŽS” a.d. that, given the extremely poor condition of the track, makes an assessment of risk of train traffic on the local railway track Markovac - Resavica and take measures to reduce risks to an acceptable level. Based on this, to make a technical assessment of the minimum required resources (materials, machinery, labor) for track maintenance.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-383/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_25/18 is in realisation.

5.2.5. Investigation Report (ŽS-07/17) No.: 340-00-13136/2017-19 of 26.11.2018. (accident, derailment of the train No. 53527 of 23.12.2017. at 13:15 on the regional track Pančevo Main Station - Zrenjanin - Kikinda - state border - (Jimbolia), in the area of the station Novi Bečej)

SR_28/18 “IŽS” a.d. to conduct amendments to the Instruction on unique criteria for control of the condition of railway tracks on the network JŽ, Instruction 339 (“Official Gazette of RS”, No.2/2001 and 4/2004), which is by the decision of the “IŽS” a.d. No. 4/2015-51-17 from 29.12.2015. is still applicable in “IŽS” a.d., pursuant to the provisions of Instruction 339 of 1989 which are listed in clause 3.3.5. For future track inspection coaches the parameters are recommended in accordance with standards: SRPS EN 13848-1, SRPS EN 13848-2, SRPS EN 13848-6.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-383/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_28/18 is in realisation.

SR_29/18 “IŽS” a.d. that, due to inadequate maintenance and condition of the track, sleepers and fastening systems, conducts an assessment of risk of train traffic on the regional railway line Pančevo Main Station - Zrenjanin - Kikinda - (Jimbolia) and take measures to reduce risk to an acceptable level. Based on this, to conduct a technical assessment of the minimum required resources (material, machinery, work force) for track maintenance.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020. safety recommendation SR_29/18 is in realisation.

SR_30/18 “IŽS” a.d. to review the procedures and criteria for the approval of the traffic of trains with an overload and that this process is confined to the extreme and rare individual occasions, and not as a daily practice.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-804/2020 of 30.07.2020., safety recommendation SR_30/18 is in realisation.



5.3. Status of the safety recommendations from 2019

5.3.1. Investigation Report (ŽS-01/18) 33 No.: 340-00-3336/2018-10 of 06.03.2019. (accident, fire on the train No. 2746 of 30.03.2018. at 17:50 on the regional track Crveni Krst- Zaječar- Prahovo Pristanište, between the stations Matejevac and Svrlijig)

SR_01/19 “Srbija Voz” a.d. to review the constructive design of the end of the exhaust manifold on the DMK series 710, and to perform the modification of solution (installment of the convenient seal), with the aim to prevent breakthrough of hot exhaust gasses, which could lead to occurrence of new fires on this segment.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_01/19 is not accepted.

SR_02/19 “Srbija Voz” a.d. that on the basis of quality control in the course of repair and final review of the DMK series 710, determine whether repairs were made in the required quality and scope of work, with the aim of adequate execution of the repairs in accordance with Article 8 of the Rulebook on the Maintenance of railway vehicles.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_02/19 is accepted.

SR_03/19 “Srbija Voz” a.d. to perform the checks and tests, not only of the parts on the DMK series 710 that are relevant to safety, but also those parts of the fault frequency higher than the ones that are defined by the manufacturer that can affect the availability of the vehicle.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. From the submitted reports it is not possible to determine whether the safety recommendation SR_03/19 is accepted.

SR_04/19 “Srbija Voz” a.d. that, given the long exploitation period of DMK series 710, carry out technological research related to the joint work of the diesel engine - hydrodynamic transmitter - the cooling system in order to identify lacks and on the basis of them implement appropriate improvements of the drive system (replacement of the kind of coolant, check the capacity of the heat exchanger - cooler, etc.) in order to prevent failures that could lead to occurrence of the new accidents.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. From the submitted reports it is not possible to determine whether the safety recommendation SR_04/19 is accepted.



SR_05/19 “Srbija Voz” a.d. that due to the frequency of failures in the operating system DMK series 710 and accidents occurred - fires, conduct analysis and consider the possibility of shortening the period up to the execution of regular repairs.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_05/19 is not accepted.

SR_06/19 “Srbija Voz” a.d. that at the next regular repair DMK Series 710, during the reconstruction of the interior applies materials in accordance with EN 45545-1 and EN 45545-2:2013+A1, that is SRPS EN 45545-1:2013 and SRPS EN 45545-2:2017.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_06/19 is accepted.

SR_07/19 Directorate for Railways to check the license for use of DMK series 710 in terms of improvement of technical solutions of the drive system and the application of appropriate materials in terms of controlling the fulfillment of conditions for issuing safety certificates for transport.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_07/19 is accepted.

5.3.2. Investigation Report (ŽS-02/18) No.: 340-00-1/2018-02-1-31 of 26.03.2019. (serious accident, overtaking of the locomotive CEM-7, owned by JP “EPS” branch TENT from Obrenovac, on the worker of “Inter-Mehanika” d.o.o. from Skorenovac on 13.04.2018. at 13:30 in the area of the industrial railway JP “EPS” branch TENT, at the station Obrenovac on the track depot No. 10d

SR_08/19 JP “EPS” branch TENT from Obrenovac to conduct the amendment of the procedure, QP.0.14.05 edition 11 from 25.04.2018., in the part 3.1. General, Paragraph 7 (which in this part is identical to the procedure QP.0.14.05 edition 10 from 22.01.2018., and that was valid at the time of occurrence of the respective serious accident), with detailed content of the description of the procedure regarding the dangers and damages in railway traffic that the instructor for BZR and ZOP from Training Department or the Person for Health and Safety at TENT or surveillance body uses when he introduces the employees of the contractor of works and predicts the manner of check of the employees of the contractor of works or to create a special procedure that defines this.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_08/19 is accepted and in realisation.



SR_09/19 JP “EPS“ branch TENT from Obrenovac to align the procedure QP.0.14.05 edition 11 from 25.04.2018. Annex 1 in the part Safety regulations at work in TENT, Paragraph 6, 7 and 8 (which is in that part identical to procedure QP.0.14.05 edition 10 from 22.01.2018., and that was valid at the time of occurrence of the respective serious accident), with the Article 6 of the Regulation on Health and Safety at work on temporary or mobile construction sites (“Official Gazette of RS” 14/2009 and 95/2010) with the aim of appointing the coordinator for execution of works.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_09/19 is not accepted.

SR_10/19 JP “EPS“ branch TENT from Obrenovac to conduct additional training of high quality of the staff that participates in carrying out the shunting drives with the purpose of appropriate application of the railway regulations aiming to prevent occurrence of new similar accidents and improve safety in the railway traffic.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_10/19 is executed.

SR_11/19 “Inter-Mehanika“d.o.o. from Skorenovac that in Form 6 of the Records on employees trained for healthy and safe work, for the persons at work position of increased risk (worker-locksmith/II locksmith and manager) in the part of description of the works at that position, beside the anticipated obligations, anticipates the training and check for safe work during execution of works on temporary and mobile construction sites at other employer where in the vicinity of the place of execution of works shunting movements are being carried out.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_11/19 is executed.

SR_12/19 Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labor Inspectorate to carry out additional inspection within its competences in terms of fulfillment of conditions under Article 9 of the Regulation on Safety and Health on Temporary or Mobile Construction Sites (“Official Gazette of RS” 14/2009 and 95/2010), where the investor (JP “EPS” branch TENT from Obrenovac) was obliged to carry out application of the construction site on the form in Annex 3 “Construction site registration” and appoints the coordinator for execution of works.

Status of the recommendation: Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labour Inspectorate submitted a Report - Letter, No. 021-01-00002/2020-01 of 21.07.2020. from which it cannot be determined whether the measures have been undertaken based on the safety recommendation SR_12/19.

SR_13/19 Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labor Inspectorate that upon application of future works by the employer-investor



(JP “EPS“ branch TENT from Obrenovac) to carry out the inspection within its authorities, and with the aim of reducing the possible similar accidents.

Status of the recommendation: Ministry of Labor, Employment, Veteran and Social Affairs of RS, Labour Inspectorate submitted a Report - Letter, No. 021-01-00002/2020-01 of 21.07.2020., safety recommendation SR_13/19 is accepted.

5.3.3. Investigation Report (ŽS-03/18) No. 340-00-2/2018-02-3-51 of 27.06.2019. (accident, collision of successive trains No. 2990 and 70922 of 01.08.2018. at 05:35 on the main arterial route E70/E85: Belgrade - Mladenovac - Lapovo - Niš - Preševo - state border - (Tabanovce), between the official positions Klenje and Ripanj Tunnel)

SR_14/19 Directorate for Railways to define in the Rulebook on Technical Requirements for SS Devices (“Official Gazette of RS” No. 18/2016 and 89/2016) electrical parameters describing the technical condition of the track balises.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_14/19 is not accepted.

SR_15/19 Directorate for Railways, in the Rulebook on maintenance of SS devices (“Official Gazette of RS”, No. 80/2015), in addition to the defined maximum period in which maintenance workers approach elimination of fault or malfunction on SS device, define the maximum allowed time of duration of fault or malfunction on SS devices, after which it is necessary to take special measures in order to return the device to the designed condition. Taking into account the specifics of each individual case, Directorate for Railways prescribes special measures to be taken.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_15/19 is not accepted.

SR_16/19 Directorate for Railways in the Rulebook on maintenance of SS devices (“Official Gazette of RS”, No. 80/2015), to define that monitoring of the condition of SS devices in order to determine their usability and correctness is performed in addition to workers handling signaling and safety devices also by maintenance workers. of the signaling and safety devices.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_16/19 is not accepted.

SR_17/19 “IŽS” a.d. to perform the procurement and installation of the missing and due to technical malfunctioning of the off track auto-stop devices on the railway section Resnik - Velika Plana, as well as to see the possibility of the installation of the track balises and on other exit signals that are not on the main transit station tracks.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No.340-805/2020 of 30.07.2020., safety recommendation SR_17/19 is accepted and in realisation.



SR_18/19 “IŽS” a.d. to regularly check and continuously maintain the prescribed distance of the visibility of light signals in accordance with the provisions of Article 15 of the Rulebook on maintenance of the SS devices (“Official Gazette of RS”, No. 80/2015).

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_18/19 is accepted.

SR_19/19 “IŽS” a.d. when, due to weather conditions or some other reason, an interruption in the operation of the TK device occurs, it shall dispose stations by the train dispatchers whose signals are considered unusable after the interruption in the operation of the TK device.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No.340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_19/19 is accepted.

SR_20/19 “IŽS” a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crises situations in order to reduce the impact on the occurrence of new accidents and incidents.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_20/19 is not accepted.

SR_21/19 “Srbija Voz” a.d. to perform the quality additional training of the train drivers with the aim of proper handling of traffic regulation in the cases of interferences on SS devices and interferences on communication means.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_21/19 is accepted and in realisation.

SR_22/19 “Srbija Voz” a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crisis situations in order to reduce the impact on the emergence of new accidents and incidents.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-1164/2019 of 21.08.2019. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020. safety recommendation SR_22/19 is accepted.



SR_23/19 “Srbija Kargo” a.d. to form a Human Factor Assessment Team for Occurrence of Accidents and Incidents in order to Develop Critical Elements Models by classifying them according to the importance and ranking list of representation (identification of all risks) in order to work on the prudent structuring of preventive measures and anticipation of human behavior in crisis situations in order to reduce the impact on the emergence of new accidents and incidents.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_23/19 is accepted.

5.3.4. Investigation Report (ŽS-04/18) No. 340-00-1/2018-2-2-45 of 29.11.2019. (serious accident, overtaking of the train No. 7821 on the road vehicle bus of 21.12.2018. at 07:30 on the main arterial route E 70/E 85: Belgrade - Mladenovac - Lapovo - Niš - Preševo - state border - (Tabanovce), on the level crossing, secured with traffic signs on the road and the zone of necessary visibility, located in the area of the station Međurovo)

SR_24/19 Ministry of Construction, Transport and Infrastructure, that in 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), defines methodology (the manner) of determining (calculating) the elements of the zone of necessary visibility given in Annex 9 (dpz - the length of stopping of the road vehicle and Spžv- the length of approaching of the railway vehicle).

Status of the recommendation: MGSI submitted a Report - Letter No. 340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_24/19 is accepted.

SR_25/19 Ministry of Construction, Transport and Infrastructure, that in 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), defines the procedure when there exists a necessary visibility according to the definition from the Article 2 Paragraph 1 under 12) of this Rulebook and it is not possible to determine the zone of necessary visibility. In particular, it should be borne in mind that by setting the traffic sign II-2: “Obligation of stopping”, while providing the necessary visibility, enables the safe passage of road vehicles over the crossing.

Status of the recommendation: MGSI submitted a Report - Letter No. 340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_25/19 is accepted.



SR_26/19 Ministry of Construction, Transport and Infrastructure that in the Article 14 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), makes corrections in the expression:

$$t_v = \frac{m + n + d + s}{V_p} \cdot 3,6 \text{ [s]}$$

so that in front of s there is a sign “-”, and not the sign “+”

Status of the recommendation: MGSI submitted a Report - Letter No.340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_26/19 is accepted.

SR_27/19 Ministry of Construction, Transport and Infrastructure that in the Article 14 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), harmonize the description of the position of point B given in Article 14, Article 15 and Annex 6.

Status of the recommendation: MGSI submitted a Report - Letter No.340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_27/19 is accepted.

SR_28/19 Ministry of Construction, Transport and Infrastructure that makes amendments to the Rulebook on traffic signalling (“Official Gazette of RS”, No. 85/17) which would allow the instalment of traffic sign II-2: “Obligation of stopping”, and in front of the crossing of the road over the track in the level, with the purpose of stopping the occurrence of the new similar accidents and improvement of traffic safety.

Status of the recommendation: MGSI submitted a Report - Letter No.340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_28/19 is accepted.

SR_29/19 Ministry of Construction, Transport and Infrastructure to consider the possibility that in the Law on traffic safety on the roads (“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) Article 153 Paragraph 2 to harmonize with the Article 97 Paragraph 1 of the Law on safety of railway traffic (“Official Gazette of RS”, No.41/2018) in terms of more precise provisions for the installation of traffic lights.

Status of the recommendation: MGSI submitted a Report - Letter No.340-01-00517/2019-04 of 28.02.2020. and a Report - Letter No. 340-01-00517/2019-04 of 21.07.2020., safety recommendation SR_29/19 is accepted.



SR_30/19 “IŽS” a.d. to conduct expertly based risk assessment on level crossings. Given that the accidents on the level crossings (by reviewing every crossing individually) are rare events, it is not possible to assess risk solely on the number of accidents which occurred on the individual level crossings. Risk assessment, as a precautionary measure, should be made jointly for all level crossings in accordance with all relevant parameters, whether the accidents occurred or not.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-387/2020 of 13.03.2020. and a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_30/19 is accepted and in realisation.

SR_31/19 “IŽS” a.d. to make the act “Level Crossing Program” according to the previously done risk assessment on the level crossings with a view to undertake appropriate activities in order to raise the level of traffic safety.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-380/2020 of 13.03.2020., a Report - Letter I-01 No. 340-387/2020 of 13.03.2020. and a Report-Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_31/19 is accepted (realisation of safety recommendation SR_31/19 is possible upon realisation of SR_30/19).

SR_32/19 “Srbija Voz” a.d. to carry out part-time training of traction vehicle staff in the proper implementation of the aspect of a signal 67: “Watch out”, in accordance with provisions of the Signalling Rulebook (“Official Gazette of ZJŽ” No. 4/96 and 5/96), with the purpose of the proper application of railway regulations, which has an aim of preventive actions for preventing the circumstances that could contribute to the occurrence of the new similar accidents and improvement of safety in the railway traffic.

Status of the recommendation: Directorate for Railways submitted a Report - Letter I-01 No. 340-805/2020 of 30.07.2020., safety recommendation SR_32/19 is executed.