



**R E P U B L I C O F B U L G A R I A**  
**NATIONAL AIR, MARITIME AND RAILWAY TRANSPORT**  
**ACCIDENTS INVESTIGATION BOARD (NAMRTAIB)**

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**FINAL REPORT**

**from**

**investigation of serious railway accident – collision of fast train № 7623 in loaded truck at  
railway level-crossing between the stations Dimovo and Oreshets on 07.06.2022**



**2022**

## **OBJECTIVE OF INVESTIGATION AND EXTENT OF RESPONSIBILITY**

The National Air, Maritime and Railway Transport Accidents Investigation Board (NAMRTAIB), which is an independent body performs the investigation of significant accidents, accidents and incidents. The National Board is within the Council of Ministers (CM) of the Republic of Bulgaria, and aims to find the circumstances and causes that led to the accidents and incidents occurrence in order to improve the safety and to avoid such in future.

**The investigation, which the NAMRTAIB performed is independent from any judicial investigation, and does not include the determination of fault or responsibility.**

The investigation is performed in accordance with the requirements of DIRECTIVE (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway transport safety, the Railway Transport Act (RTA), Ordinance No59 dated 5.12.2006 on the rail transport safety management, as well as per Agreement dated 17.04.2018 on the interaction during investigation of accidents and incidents in the air, maritime and railway transport between the Prosecutor's Office of the Republic of Bulgaria, Ministry of Interior, and the Ministry of Transport, Information Technology and Communications.

The Investigation reports follow the requirements of REGULATION (EU) 2020/572 of the Commission dated 24 April 2020 on the reporting structure for railway accident and incident investigation reports.

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## **ABBREVIATIONS, USED IN THE REPORT**

ASB – Automatic semi-barriers  
ALCS – Automatic level crossing signalling (without barriers)  
ALCD – Automatic level crossing device  
FT – Fast train  
BDZ PS EOOD –, BDZ-Passenger Services“ EOOD – state railway undertaking for passengers  
RLCOB – Remote level crossing opening button  
GBS – Glavbulgarstroy (Construction Company)  
SE NRIC – State enterprise „National railway Infrastructure Company “(railway infrastructure manager)  
RS – Railway section  
RTA – Railway Transport Act  
TOU – Traffic organization unit  
SETC – Short electronic track circuit  
km – Kilometre along the rail track  
OCL – Overhead contact line (catenary)  
ECM – Entity in Charge of Maintenance  
MV- Motor vehicles  
Ordinance № 59 – Ordinance on the rail transport safety management  
NAMRTAIB – National Air, Maritime, and Railway Transport Accidents Investigation Board  
(Independent Specialized National Investigation Body)  
RAEA/NSA – Railway Administration Executive Agency, National Safety Authority  
BLCSIOD – Before level crossing semaphore in odd direction  
NIS – National Investigation Service  
TF – Task Force  
DID – District Investigation Department  
SE – Signalling equipment  
SABS – Semi-automatic Block System  
RRS – Rail Rolling Stock  
RIRTA – Regulations for the implementation of the Road Traffic Act  
RTV – Road traffic vehicles  
TOMR – Train operation management and reporting  
SP – Sectioning post  
RD MoI – Regional department within the Ministry of Interior  
RHKD – Relay handling with key dependence  
TLLCH – Traffic light level crossing highway  
SMS – Safety Management System  
RIP – Remote information panel  
TMWI – Technician-mechanic wagon inspector  
TOSAMD – Train operation and station activity management Division  
DCCM – Device for communications, connections and messages in stations

## 1. Summary

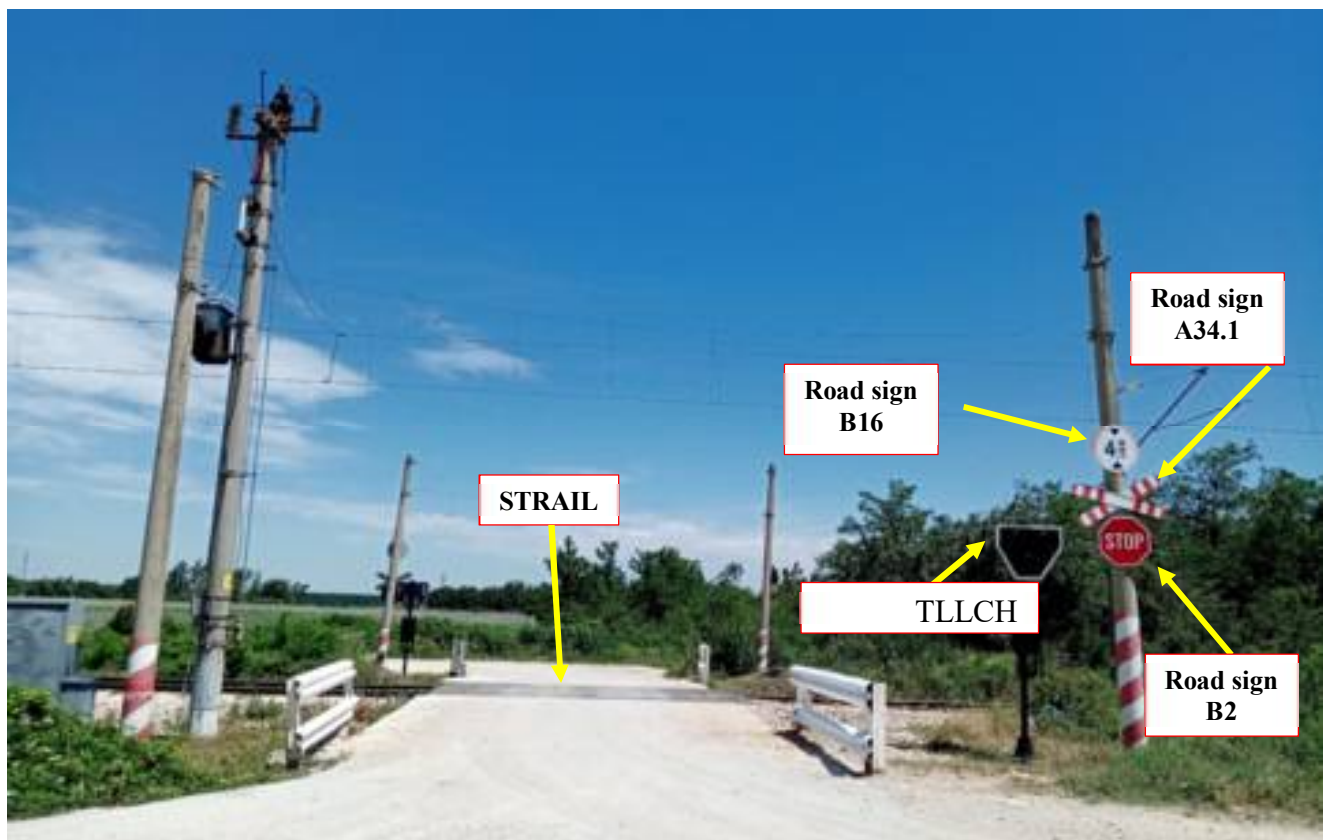
### 1.1. Brief Description of the Event.

On 07.06.2022 at 12:25 p.m., FT No. 7623 departed from Vidin station, consisting of 4 passenger coaches, 175 tons, hauled by locomotive No. 91520044158-1, operated by a first-person locomotive driver and a second-person locomotive driver, train crew with head of train and conductor. The train runs daily on the TOS in the Vidin - Sofia direction. The railway undertaking for passenger transport BDZ PS EOOD operated the train. About 60 passengers travelled on the train from Vidin origin station.

FT No. 7623 moved on time and arrived at Dimovo station at 13:14 p.m. and after a 1-minute stay, departed at 13:15 p.m. for Oreshets station, with a regular exit signal and an order given by the traffic manager on duty.

The traffic manager on duty at the Oreshets station, around 13:18 p.m., ordered the post switchman at Post No. 2 to prepare a route for receiving FT No. 7623 on the second main track and to open the entrance signal.

During the movement of the train at the Dimovo - Oreshets interstation, a remote sensor for controlling the ALCD at km 127+123 was activated, which, after being activated, turned on the pre-crossing traffic light, which began to glow with a flashing moon-white light. That indicated to the locomotive driver that the ALCD was activated and operating normally. The train approached the level crossing and with the locomotive whistle gave signal "Attention" (fig. 1.1).



**Fig. 1.1. Railway level crossing with ALCD at km 127+123 between the stations Oreshets and Dimovo.**

At that time, on the road, to the right of the rail track in the direction of the train, a loaded Iveco dump truck was approaching parallel to it. The driver of the car turned left and did not stop at the regularly activated traffic light, entered the danger zone of the level crossing and at around 13:30 p.m., the train hit the heavy goods vehicle passing through the railway level crossing.

Because of the collision, the driver of the truck died and fell from the cab of the vehicle, and the heavy goods vehicle was thrown from the locomotive to the right in the direction of the movement of the train into the ditch 20 meters after the level crossing with a destroyed cab (fig. 1.2).



**Fig. 1.2. The heavy-goods vehicle after the collision with the locomotive of FT № 7623.**



**Fig. 1.3. Locomotive № 91520044158-1 after the collision with the heavy-goods vehicle.**



Because of the subsequent collision, the cabin of the locomotive was severely deformed and the two locomotive drivers died (Fig. 1.3). Three passengers from the train were slightly injured. Two were given medical aid at the Vidin General Hospital and were released; the third passenger was given medical aid on the spot and was also released. The injured passengers were traveling in the first passenger coach next to the locomotive with number 51522563027-3 (fig. 1.4), which derailed with both wheel-sets of the first bogie and one wheel-set on the second bogie (third wheel-set).

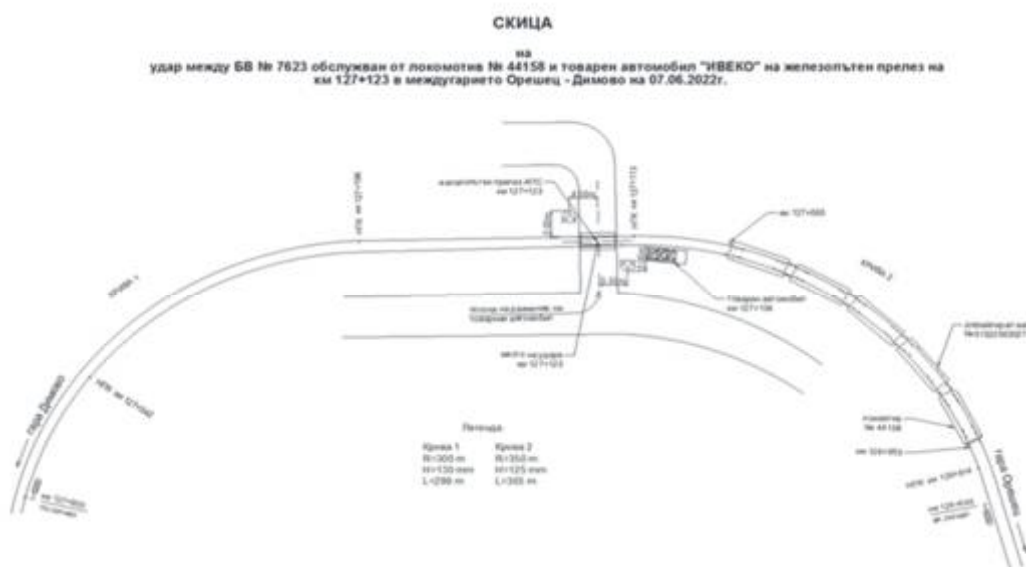


**Fig. 1.4. The derailed first coach from the composition of FT № 7623 with № 51522563027-3**

The train movement between Dimovo and Oreshets stations was interrupted from 13:30 p.m. on 07/06/2022 and was restored according to the schedule at 03:42 a.m. on 08/06/2022.

### ***1.2. Location and time of the event occurrence.***

The place of the accident is at a railway level crossing between the Oreshets and Dimovo stations at km 127+123, equipped with an ALCD. The event occurred at 13:28 p.m. on 07.06.2022, with the ALCD being regularly activated by the passing FT No. 7623, which resulted in a collision on a loaded IVECO brand heavy truck. The level crossing is a fourth category. The level crossing is located on the seventh main railway line Mezdra - Vidin, single-track line, electrified (Fig. 1.5).



**Fig. 1.5. Scheme of the railway level crossing location – km 127+123.**

### **1.3. Factors determining and contributing the event.**

A determining factor for the occurrence of the accident was the illegal passage of the heavy goods vehicle through the railway level crossing without stopping at the prohibitory indication of the road traffic sign with two flashing red lights with a sound signal and road sign No. B2 (Stop! Let pass the road users with priority!).

A contributing factor to the accident is that, when the heavy goods vehicle was traveling on the road parallel to the rail track, the driver of the vehicle turned left and entered the level crossing area, without heeding the indication of the signals of the traffic light located on the right, announcing the approach of FT No. 7623.

### **1.4. Direct causes and consequences of the event.**

The accident was caused by the illegal passage of the loaded heavy goods vehicle "Iveco" with per. No. BH 1602 AM through the railway level crossing at km 127+123 in the Dimovo - Oreshets interstation in front of the approaching FT No. 7623, when the ALCD was activated, a prohibitive indication of the traffic light (the traffic light emitted a light signal consisting of two red lights flashing one after the other and a sound signal, which meant "Passing is prohibited") and failure to comply with traffic sign B2 - "Stop! Let pass those moving on the road with priority!" from RIRTA.

Consequences from the event:

- The driver of the heavy-loaded vehicle Iveco died;
- Significant material damages was caused to the heavy-loaded truck Iveco;
- The two locomotive drivers of locomotive № 91520044158-1 died;
- Slightly injured were three passengers of FT № 7623;
- Significant material damages were caused to locomotive № 91520044158-1;
- Material damages were caused to passenger coach B4 № 51522563027-3;
- Damages were caused to the rail track after the rail level crossing.

### **1.5. Safety recommendations and addressees to which they are addressed.**

In order to prevent other similar accidents, the Investigation Commission proposes to the National Safety Authority RAEA safety recommendations related to the railway undertaking "BDZ-Passenger Services" EOOD, SE NRIC and Dimovo municipality.

- Recommendation 1, proposes that SE NRIC and "BDZ-Passenger Services" EOOD familiarize the interested personnel with the contents of the report.

- Recommendation 2, suggests that the National Safety Authority RAEA organizes and proposes amendments and additions to Ordinance No. 4 of 27.03.1997 on the railway level crossings, that a representative of the State Agency be included in the commission under chapter five of the Ordinance "Road traffic safety".

- Recommendation 3, suggests that the National Safety Authority RAEA organizes and proposes an amendment and supplement to Ordinance No. 4 of 27.03.1997 on the railway level crossings, regarding updating the categorization of level crossings, on the main railway lines railway crossings equipped with ALCD, to re-equip with automatic semi-barriers (ASB).

- Recommendation 4, proposes that the SE NRIC develop a program for the phased re-equipment of the level crossings equipped with ALCD in the interstation of the main railway lines with automatic semi-barriers (APB), after amendment and supplement to Ordinance No. 4 for updating the categorization of the railway level crossings.

- Recommendation 5, proposes that SE NRIC gradually builds 24-hour video surveillance covering the passing flow of road vehicles and rolling stock through the level crossings located on the main railway lines.

- Recommendation 6, proposes that the Municipality of Dimovo restores and maintains the missing road signs A33 (railway level crossing without barriers) and A35 (balises) from the two road approaches to the railway level crossing at km 127+123 in the Dimovo - Oreshets interstation in accordance with the requirements of RIRTA and Ordinance No. 4/27.03.1997 on the railway level crossings



## **2. Investigation**

### ***2.1. Decision for starting the investigation.***

The decision to initiate the safety investigation was taken by the member of the Management Board of the NAMRTAIB in the Republic of Bulgaria, leading the investigation of railway accidents and incidents given the severity of the accident and its impact on railway transport safety. The investigation is mainly focused on the analysis and organization, which aims to prevent other serious accidents of similar nature.

### ***2.2. Motives for the decision to initiate the investigation.***

The member of the Management Board of the NAMRTAIB, leading the railway unit takes the decision to initiate the investigation based on art. 20, paragraph 1 of Directive (EU) 2016/798, art. 115к, paragraph 1, item 1 of RTA, and art. 76, par. 1, item 1 of Ordinance No 59 dated 5.12.2006.

### ***2.3. Scope and restrictions of the investigation.***

Within the scope of the investigation, the organizational and human factors, the railway system related to the safety of railway level crossings and the relevant normative acts were examined and analysed.

The investigation is undertaken taking into account the circumstances and causes that led to the occurrence of the serious accident - collision of high-speed train No. 7623 into a heavy loaded vehicle at a railway crossing with an activated TLLCR, which resulted in three human fatalities, injured passengers and significant material damage caused to the RRS and the heavy loaded vehicle.

### ***2.4. Competences of the persons, involved in the investigation.***

The member of the Management Board of the NAMRTAIB, head of railway transport field headed the Investigation Commission. The composition of the commission includes external independent experts - habilitated persons from the scientific circles and experts with qualification and professional orientation in fields of activity – human factor, railway infrastructure, and rail rolling stock.

### ***2.5. Communication and consultations with the persons and entities, involved in the event.***

The Commission determined the parameters of the investigation and coordinated its actions with the Task Force, which includes representatives of the two entities (BDZ PS EOOD and SE NRIC). The Task Force collected all the documents and samples, written statements of the personnel of the entities, the records from the recording devices of the locomotive No. 91520044158-1, hauling FT No. 7623. The materials and documents were handed over to the Chairperson of the Investigation Commission at the NAMRTAIB. The chairperson of the Investigation Commission conducted the first on-site interview with the train staff (head of train and conductor), the traffic manager on-duty from Oreshets station, involved in the accident. Information regarding the maintenance and facilities of the signalling equipment, related to the ALCD at the railway level crossing and at the Oreshets station, was requested and provided by the SE NRIC. BDZ PS EOOD were requested and provided information about the personnel who serviced FT No. 7623, the repair and maintenance of the locomotive and train coaches. Interviews were conducted with the safety authorities of the two entities and with the management of the railway enterprise BDZ PS EOOD and representatives of SE NRIC.

### ***2.6. Degree of cooperation from the participating entities.***

During the investigation by the Commission at the NAMRTAIB, the managers of the railway undertaking BDZ PS EOOD and the representatives of SE NRIC provided full assistance and a complete set of all necessary materials and documents. Full access to the rolling stock (locomotive and coaches) and the elements of the railway infrastructure (SE, ALCD and rail track) was provided for carrying out inspections, measurements and expertise.

### ***2.7. Methods and techniques of investigation and analysis.***

On 07/06/2022 at 13:50 p.m., the member of the Management Board of the NAMRTAIB with the competence to investigate railway accidents received a verbal notification on the mobile phone from the dispatcher on duty of BDZ PS EOOD. At 14:09 p.m., there was also a written notification by SMS from the officials on duty of the railway infrastructure manager SE NRIC about a realized accident

at the railway level crossing between the Dimovo and Oreshets stations. The member of the Management Board of the NAMRATIB analysed the received information and immediately went to the place of the accident. He notified the two entities (SE NRIC and BDZ PS EOOD) until his arrival on the spot to take no other actions and to maintain the situation of the accident.

At 17:00 p.m., the member of the Management Board of the NAMRATIB arrived at the place of the accident at the railway level crossing between Dimovo and Oreshets stations. He undertook primary inspections of the two dead locomotive drivers in the locomotive and the dead driver of the heavy loaded vehicle outside it, photographic material of the current technical condition of the level crossing and the operation of the ALCD at that moment, of the heavy loaded vehicle, the rolling stock and the railway infrastructure (rail track, SE, ALCD and KM).

At the place of the accident, new joint inspections were organized and conducted with representatives of the pre-trial proceedings from DID - Vidin and RD MoI Belogradchik. A protocol for the performed inspections was drawn up.

At Oreshets station, inspections were carried out of the RHKD-type station interlocking with a dispatching apparatus (RA) in the station and an executive apparatus (IA) installed in Post No. 2. It was found that the route was prepared for a second main track to receive FT No. 7623 in the station with a stop. The operation of the ALCD is carried out by means of the "Instructions for the operation of the ALCD at the railway level crossing at km 127+123 of the Oreshets - Dimovo interstation", approved on 30.11.2020. The level crossing is located between the warning signal and the entrance signal of Oreshets station and is crossed by a road connecting the village of Oreshets station with agricultural properties. The crossing angle is 90° the fence is of light metal construction 90 cm from the road level. The pavement of the crossing is elastic STRAIL. The level crossing is located in an electrified section, fenced on both sides with gauge frames and signalized. The level crossing is unlighted. The remote information panel (RIP) was found to have a green steady light indication. The status of the RIP counter is No. 99530 and the shift manager on duty placed temporary seal at 12:53 p.m. on 07/06/2022. The telephone messages with receipt numbers exchanged between the duty shift supervisors at the Dimovo and Oreshets stations with the duty dispatcher at TOU - Sofia were established and recorded, which confirms the manipulations of the TOU counter when giving and returning the windows for the prevention of KM in the interstation and the last recorded number corresponds to the above counter. The traffic manager described the information in Book VII-51 on duty at Oreshets station about the current state of RIP.

It was established that the traffic manager on duty at the Oreshets station correctly manipulated the RIP and the SE in the station was working normally at the time of the accident. The availability of the keys in the IA locks in Post 2 and the integrity of all RA and IA seals were established.

During the inspection of the railway level crossing at km 127+123 between the Oreshets and Dimovo stations, it was established that there was no damage to the railway level crossing and the ALCD traffic light. At the time of the inspection, the TLLCR was working with an indication of a slowly flashing moon-white light. The STRAIL level crossing was not deformed and damaged; there was about 2 m<sup>3</sup> of scattered aggregates from the truck as a result of the collision from the train.

Inspections were carried out for the visibility of the readings of the TLLCR, located diagonally on both sides of the rail track at 5.50 and 4.50 m respectively from the axis of the highway and at 5 m from the nearby rail.

Inspections were carried out and the visibility of passing traffic in both directions to an approaching RRS in the danger zone and the level crossing overview area was established (a total of 8 meters from the nearest rail).

The serviceability of the equipment (the position of the relays) at the time of the accident in the two equipment cabinets was established, as well as the integrity of the seals preventing their manipulation. The two cabinets serving the operation of the ALCD are located near the railway level crossing (5 m from the nearest rail and 4.50 m from the axis of the highway).

Catenary inspections were carried out and no damage was found.

During the inspection of the passenger coaches of FT No. 7623, which consists of four coaches, the first one next to the locomotive had derailed with the first three wheel-sets of the ballast prism and visible damage to the draft gear the other three coaches were on the rails without visible damage.

From the performed inspection of locomotive No. 91520044158-1, which served FT No. 7623, it is clear that the locomotive did not derail the locomotive crew operated the locomotive from the second cabin (first in the travel direction). The control panel after the collision was severely deformed and penetrated deep into the cab, which most likely caused the death of the two locomotive drivers. There was a large amount of inert material spilled in the cabin because of the collision on the vehicle body. The second cabin of the locomotive (first in the travel direction) was completely destroyed. The first cabin of the locomotive, which is next to the train coaches, was fully preserved, it houses the locomotive recorder (speedometer) type "Hasler RT9".

Around 19:00 p.m., pre-trial proceedings bodies from the National Criminal Court - Sofia, investigating investigators, arrived at the place of the accident. According to the report of the investigating investigators, the District Prosecutor's Office - Vidin has initiated pre-trial proceedings to establish the causes that led to the occurrence of the accident and to identify the guilty officials who caused the accident. An organization was created for follow-up actions and exchange of information between the bodies of the pre-trial proceedings from the National Court of Justice - Sofia and the Investigation Commission from the NAMRATIB.

On the spot, the investigating investigators from the NIS conducted an interview with the transport staff from the train (head of train and conductor) and carried out a re-inspection of the accident scene.

At 20:15 p.m., after the completion of the procedural and investigative actions, the employees of the NIS gave written permission to carry out emergency recovery activities.

At 21:30 p.m. after the on-site inspections were completed, written permission was given by the member of the Management Board of the NAMRATIB (Chairperson of the Investigation Commission) to carry out emergency recovery activities by SE NRIC and BDZ PS EOOD.

After the written permissions were given, actions were taken to move the heavy-loaded truck and open the gauge for the RRS.

Employees of the railway infrastructure manager undertook the clearing of the level crossing from the fallen aggregates and the replacement of the sleeper grid of the rail track after the level crossing, which was compromised by the accident.

Under the order of the chairperson of the Investigation Commission at the NAMRATIB, with the arriving from Dimovo station locomotive No. 91520044098-9 for taking away the passenger cars from the train, tests were carried out for the serviceability of the ALCD when the locomotive left and returned to the station.

From Dimovo station at 22:37 p.m., locomotive No. 91520044098-9 departed to the place of the accident to pull the non-derailed three coaches from FT No. 7623. Until the moment when the distant sensor overlapped, the TLLCR was unlighted with a slowly flashing moon-white light, allowing the passage of RRS through the railway level crossing and indicating the serviceability of the ALCD. After the oncoming locomotive overlapped the distant sensor, the pre-crossing traffic light switched to the mode of flashing moon-white light, the slow-flashing moon-white light of the crossing went out and it switched to the mode of two sequentially flashing red lights, accompanied by a sound signal, prohibiting the passage of traffic through the railway level crossing. Locomotive No. 91520044098-9 arrived at the railway level crossing at 22:53 p.m., at 23:00 p.m. it was attached to the passenger coaches and departed; at 23:50 p.m. it arrived at Dimovo station.

After lifting the derailed passenger coach onto the tracks, at 00:10 a.m., locomotive No. 91520044098-9 left Dimovo station again to pull the coach and locomotive No. 91520044158-1 on FT No. 7623 to Oreshets station. During the movement of locomotive No. 91520044098-9 to the railway level crossing, a second test was made for the operation of the ALCD, which established its serviceability.

On 14.06.2022, the Investigation Commission at the NAMRATIB went to the place of the accident, where additional interviews were held with the staff at the Oreshets station. An interview was also held at the station with the signalling equipment mechanic, an employee of SE NRIC, regarding the dependencies between the RHKD in Oreshets station and the operation of the ALCD at the railway level crossing at km 127+123. The Commission was acquainted with the Instruction for the operation of the ALCD at the railway level crossing at km 127+123 of the Oreshets - Dimovo interstation.

An inspection was carried out of the temporarily opened railway level crossing at km 130+284 in the Oreshets - Dimovo interstation, equipped with manual barriers with electric drive by a crossing guard on shift, for the passage of vehicles transporting inert materials for the construction of a high-speed highway. An interview was conducted with the crossing guard on shift at the temporarily opened railway level crossing at km 130+284. Legally qualified personnel (crossing guards) of the railway infrastructure manager SE NRIC serve the railway level crossing at km 130+284. In order to directly and quickly transport the inert materials from the quarry to the newly constructed site (highway), the temporary railway level crossing was opened for the needs of the company GBS - "Infrastructural construction" JSC, which serves the passing heavy goods vehicles and construction machinery of the company. To ensure the safe operation of the crossing when trains and railway vehicles pass, the crossing guard on shift keeps diaries for the exchange of telephone messages with the traffic managers on duty at the Dimovo and Oreshets stations. A schedule for 12-hour working hours in the daylight part of the day for crossing guards has been approved. The rest of the time, the level crossing is locked in the closed position with the barrier beams down. At the level crossing, there are additionally installed barrier beams, blocking the entire roadway, when they are lowered, which are locked by the crossing guard on duty. The traffic manager on duty at the Oreshets station keeps the keys for the level crossing. At the level crossing and at the Oreshets station, there is an "Instruction for the operation of a temporary railway crossing at km 130+284 with manual barriers with electric drive" approved on 05.05.2021.

On 16.06.2022, the chairperson of the Investigation Commission at the NAMRATIB received from the head of the Task Force in the TOSAMD - Sofia the collected materials, documents and physical evidence (including photographic material) regarding the railway accident that occurred at the railway level crossing in the Oreshets - Dimovo interstation on 07/06/2022.

### ***2.8. Difficulties faced during the investigation.***

During the investigation, the Investigation Commission of the NAMRATIB did not encounter any difficulties. The representatives of the Task Force and the safety authorities of the Railway Infrastructure Manager and the Railway Undertaking provided full cooperation to the safety Investigation Commission.

### ***2.9. Interaction with the judicial authorities.***

In accordance with the Agreement on Interaction between the bodies of the pre-trial proceedings of SDoI, the supervising prosecutor from DPO – Vidin, and the Investigation Commission of the NAMRATIB in force from 17.04.2018, information, documents and materials were exchanged between the parties during the investigation. The pre-trial authorities from SDoI assigned the preparation of expertise that refer the accident.

### ***2.10. Other important information for the investigation context.***

In the process of the conducted investigation in connection with the requirement of Art. 23 of the Agreement on interaction between the bodies of the pre-trial proceedings from DIS - Vidin to Vidin District Prosecutor's Office in the presence of bodies from RD MoI - Belogradchik and the head of the safety investigation from the recording device of locomotive No. 91520044158-1, serving FT No. 7623, was removed the speedometer tape and it was found that the speed of the train at the time of the collision was about 69 km/h. The speed limit for the section is 70 km/h. The speedometer tape was forwarded with an entry in the protocol to the head of the safety investigation for decryption in order to use the information for the needs of the investigation by the pre-trial and safety authorities.

### 3. Description of the event

#### 3.1. Information on the event and the context.

##### 3.1.1. Description of the event type.

It has been established that with Telegram No. 17 of 01.06.2022 of the director of TOSAMD - Sofia for work on the catenary - inspection, regulation of zigzag and cleaning of the gauge in stations and between stations, three train and electric windows were permitted of Energy Section - Sofia by dates and times as follows:

- On 06,07,08, 09 and 10.06.2022, the Oreshets - Dimovo interstation and Dimovo station from 10:00 a.m. after FT No. 70101 to 11:00 a.m. before FT no. 7620. Inspection, zigzag regulation and cleaning of the gauge will be carried out with DM No. 99529436035-0.
- On 06,07,08, 09 and 10.06.2022, the Oreshets - Dimovo interstation and Dimovo station from 11:50 a.m. after FT No. 7620 to 12:50 p.m. before FT No. 7623. Inspection, zigzag regulation and cleaning of the gauge will be carried out with DM No. 99529436035-0.
- On 06,07,08, 09 and 10.06.2022, the Oreshets - Dimovo interstation and Dimovo station from 13:35 p.m., after FT No. 7623 until 14:40 p.m. before FT No. 7622. Check, zigzag rule and cleaning of the gauge will be carried out with DM No. 99529436035-0.

For the mentioned dates was assigned DM № 99529436035-0 Vidin freight – Dimovo – Vidin freight under schedule as follows:

70967 NRIC 30% veh.99.99 6-10.06

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VIDIN FREIGHT - : - - 08:18  
VIDBOL MY 11 : - - :29  
STRATSIMIR 24 08:53 09:08 70590  
DIMOVO 27 09:35 - : -

70968 NRIC 30% veh.99.99 6-10.06

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DIMOVO - : - - 13:20  
STRATSIMIR 18 13:38 - :43  
Synag. gorkovo 28 : - - 14:11  
VIDBOL MY 6 : - - :17  
VIDIN FREIGHT 14:28 - : -

Before occupying the interstation (turning off and turning on the voltage in the OHCL), permission shall be requested from the train and energy dispatchers, observing the requirements of Ordinance No. 58.

##### First window:

On 07.06.2022 at 09:10 a.m. in the dispatcher's orders log No. II-76 at Dimovo station, a written request was made by a catenary technician/mechanic for permission for a train and electric window to work on the catenary from 09:20 a.m. until 11:00 a.m., with DM No. 99529436035-0 at the Dimovo - Oreshets interstation with pick-up at the Oreshets station, for which telephone messages with receipt numbers were exchanged.

On 07.06.2022 at 09:10 a.m. by order No. 172 of the traffic manager/train dispatcher on the seventh line, to the traffic managers on duty at Dimovo and Oreshets stations for work on the catenary, the interstation was closed for all vehicles except DM no. 99529436035-0 with collection at Oreshets station and permission given to Oreshets station to break regular seal of remote opening button (ROB) of railway level crossing at km 127+123 with counter No. 99528 to insulate the operation of the railway level crossing due to operation of DM No. 99529436035 -0 in area of activity.

At 09:10 a.m., the traffic manager on duty at the Oreshets station entered in the book on the condition of the signalling equipment – sample operation of the railway level crossing at km 127+123, equipped with ALCD.

At 09:15 a.m., the traffic manager on duty at Dimovo station ordered by telephone to the level crossing guard on duty at the railway crossing at km 130+284 the DM No. 99529436035-0 to depart from Dimovo station at 09:18 a.m.

At 09:20 a.m., the traffic manager on duty at Dimovo station exchanged a telephone message with the traffic manager on duty at Oreshets station that DM No. 99529436035-0 left at 09:18 a.m.

After completing work, DM No. 99529436035-0 returned to Oreshets station at 10:46 a.m., for which a telephone message was exchanged between the two stations.

At 10:50 a.m. a technician/mechanic catenary wrote in the dispatcher's order log No. II-76 at the Oreshets station that the work was completed, the gauge was opened, the trains were moving at the speed according to the book schedule.

After completion of work and collection of DM No. 99529436035-0 at Oreshets station, the traffic manager on duty at Oreshets station at 10:51 a.m. wrote in the book on the condition of the signalling equipment, rev.VII-51, that he normalized the ROB and placed a temporary seal on the button with counter number 99529.

At 10:52 a.m. with order No. 177, the traffic manager/train dispatcher cancelled order No. 172 due to the completion of the repair of the catenary and opened the Dimovo - Oreshets interstation for the movement of regular trains.

#### Second window:

After passing of FT No. 7620 at 11:45 a.m., a catenary technician/mechanic entered in the dispatcher's order log No. II-76 at Oreshets station a request for permission for a train and electric window to work on the catenary from 11:46 a.m. to 12 :50 p.m. with DM No. 99529436035-0 to km 128+000 in the interstation Oreshets - Dimovo with pickup at Oreshets station, for which a telephone message with receipt numbers was exchanged.

At 11:46 a.m., by order No. 181 of the traffic manager/train dispatcher for work on the contact network up to km 128+000, the Oreshets - Dimovo interstation is closed for the movement of all vehicles except DM No. 99529436035-0 until 12:50 p.m.

At 11:46 a.m., the traffic manager on duty at the Oreshets station entered in the book on the state of the signalling equipment, no. ALCD at the railway level crossing at km 127+123.

At 11:48 a.m. by telephone, the traffic manager on duty at Oreshets station requested the consent of the traffic manager on duty at Dimovo station to send DM No. 99529436035-0 to km 128+000 with return to Oreshets station.

At 11:49 a.m. by telephone, the traffic manager on duty at Dimovo station gave consent to the traffic manager on duty at Oreshets station to send DM No. 99529436035-0 to km 128+000 with return to Oreshets station.

DM No. 99529436035-0 departed from Oreshets station to km 128+000 at 11:55 a.m. after being served with a movement order under special conditions Rev. II-A No. 4 for work to km 128+000 with return to Oreshets station.

After completing the work on the catenary, DM No. 99529436035-0 returned to Oreshets station at 12:47 p.m.

At 12:48 p.m. a catenary technician/mechanic entered in the dispatcher's order log No. II-76 at the Oreshets station that the work was completed, the gauge was opened, the trains were moving at the speed according to the book schedule.

With Order No. 184 at 12:52 p.m., the traffic manager/train dispatcher cancelled Order No. 181 and opened the interstation for regular train traffic.

At 12:53 p.m., the traffic manager on duty at Oreshets station normalized the ROB and placed a temporary seal on the button with counter No. 99530, for which he wrote in the book about the status of SE sample VII-51 at Oreshets station.

From the diaries and books in the two stations Oreshets and Dimovo, it was established that during the windows used for repair, regulation and gauge of the catenary, all the officials kept correctly the

records of the authorized windows used by hours for leaving and returning from the interstation in the station.

On 07.06.2022, FT No. 7623 with locomotive No. 91520044158-1 and a set of four second-class passenger coaches departed from Vidin passenger station at 12:25 p.m. according to the train schedule.

From the diaries kept by the traffic managers on duty at the stations, it is clear that the train passed without stopping at 12:30 p.m. at the Vidin freight station. In MY - Vidbol arrived at 12:39 p.m., and after a stay of 0.5 minutes departed at 12:39 p.m. It arrived at Sratsimir station at 12:58 p.m., stayed for 1 minute and departed at 12:59 p.m. It arrived at Dimovo station at 13:14 p.m. and after a 1-minute stay, the train departed at 13:15 p.m. for Oreshets station.

The traffic manager on duty at the Oreshets station ordered by telephone the switchman on duty at Post No. 2 to prepare the route for receiving FT No. 7623 on the second main track and through the Dispensing Device (RA) of the relay system for key dependence (RHDKD) to prepare the opening of an entrance train signal.

After preparing the route, the switchman on-duty at Post No. 2 opened the entrance signal for the train by means of the Executive Apparatus (IA) of the Key Dependency Relay (RHDKD).

During the movement of the train in the Dimovo - Oreshets interstation, the remote sensor was activated, and at km 128+430 KERV for activating the ALCD at km 127+123, the headlights with a white flashing light turned off at the two TLLCR and the two headlights with an alternating red flashing light started to light up light accompanied by an audible signal. After the TLLCR was activated, the pre-crossing traffic light began to glow with a flashing moon-white light, indicating to the locomotive driver that the ALCD was activated and was operating normally. After exiting a right curve with radius  $R=300$  m and length  $L=299$  m, the train entered a straight line with length  $L=73$  meters, approaching the level crossing at km 127+123.

On the road parallel to the rail track on the right, from the quarry, a heavy-loaded "Iveco" truck with registration plate No. BH 1602 AM was approaching parallel to the train. In the extension between the rail track and the road, there was tall dense vegetation that impaired the visibility of the two vehicles moving parallel. The driver of the heavy goods vehicle did not stop in front of the regularly activated TLLCR, entered the dangerous zone of the level crossing and at around 13:30 p.m. the train hit the passing heavy goods vehicle.

As a result of the subsequent collision, the driver of the car died and fell from the cabin to the left in the direction of the train, and the heavy goods vehicle was dragged by the train and thrown to the right in the ditch, parallel to the rail track about 20 meters after the level crossing.

The locomotive with the coaches of FT No. 7623 stopped 170 m after the level crossing.

Before the train arrived at Oreshets station, the switchman at Post No. 2 heard an "Attention" signal from the locomotive whistle and a rumble of a loud collision. He immediately informed the traffic manager on duty at the Oreshets station.

The head of the Oreshets station headed to the scene of the accident, where at around 13:42 p.m. authorities of the Ministry of Interior - Belogradchik also arrived.

From the written explanation of the traffic manager on duty at the Oreshets station, it is clear that a resident of the Oreshets station village notified that the train had hit a cargo truck. About the accident, the traffic manager on duty at the Oreshets station notified telephone number 112 and all services in accordance with the established procedure.

At around 13:50 p.m., emergency services and FSaCPS from the city of Vidin arrived at the place of the accident to carry out rescue operations, and found that the driver of the heavy goods vehicle and the two locomotive drivers had died.

At around 14:00 p.m., authorities of DIS - Vidin also arrived, and began inspecting the accident and carried out procedural and investigative actions.

The voltage in the catenary was switched off from 13:41 p.m. to 22:08 p.m.

At 15:00 p.m., the head of the safety investigation from the NAMRATIB arrived at the site and, together with the authorities of DIS - Vidin and RD MoI Belogradchik, inspections were carried out and a report on the accident was drawn up. After removing the speedometer tape from the locomotive recorder, it was determined that the locomotive hit the HGV at a speed of approximately 69 km/h.



At 19:00 p.m., the authorities of the pre-trial proceedings from the NIS - Sofia also arrived, and began inspections of the accident and carried out procedural and investigative actions.

At 20:00 p.m., the authorities of the pre-trial proceedings gave a written permission from the NIS - Sofia for restorative actions to the head of the Task Force in the SE NRIC.

At 21:30 p.m., a written permission was given by the head of the safety investigation at the NAMRATIB to the manager of the railway infrastructure and the railway undertaking to start emergency restoration activities of the railway infrastructure and rolling stock.

### *3.1.2. Date, punctual time and location of the event.*

On 07/06/2022 at 13:30 p.m. during the movement of FT No. 7623 in the Dimovo - Oreshets interstation at a regularly activated ALCD at a railway crossing at km 127+123, the locomotive of the train hit a passing loaded heavy goods vehicle. The railway crossing is located on a straight line section of the rail track with an inclination of 1.5 ‰ in the direction of the mileage of the main railway line No. 7 (Fig. 3.1).



**Fig. 3.1. Route of movement of FT № 7623 and the place of the accident.**

- - Origin station of movement of FT № 7623;
- - Major stations along the train alignment;
- - Final destination station of movement of FT № 7623;
- ☀ - Place of the accident;
- - Track that FT № 7623 passed;
- - Track that FT № 7623 was about to pass;

FT № 7623 moved in direction Vidin-Sofia, as the movement route is along main line № 7 and main line № 2 (fig. 3.2).

### *3.1.3. Description of the event location:*



**Fig. 3.2. Map of the movement route of FT № 7623.**

*3.1.3.1. Location of the place of the accident (fig. 3.3).*

*Geographic width: 43°39'50.35"N*

*Geographic length: 22°43'58.14"E*



**Fig. 3.3. GPS location of the railway level crossing – km 127+123.**

*3.1.3.2. Meteorological and geographical condition at the time of the event.*

- In the light part of the day – 13:30 p.m. (under locomotive recording device data);
- Air temperature: +29°C;
- Wind speed and direction around 17 km/h, West;
- Weather – sunny, clear with normal visibility of the signals;

*3.1.3.3. Performance of construction activities on the site or in vicinity.*

From 20.05. ÷ 03.06.2022 in the area of the railway level crossing at km 127+123 in the Oreshets - Dimovo interstation from the railway station - Vratsa to the manager of the railway infrastructure, cleaning and felling of branches and tall vegetation was carried out in order to establish a gauge and overview of visibility to the rail track from the approaches to the level crossing.

On 07.06.2022, at the Oreshets - the Sofia Energy Section to the manager of the railway infrastructure carried out Dimovo interstation, a zigzag regulation of the catenary and cleaning of the gauge.

#### *3.1.4. Fatalities, injuries and material damages:*

##### *3.1.4.1. Employees of the railway infrastructure manager or railway undertaking.*

Two locomotive drivers, employees of the BDZ PS EOOD railway undertaking, had died.

##### *3.1.4.2. Other persons officially connected with the location of the event.*

None.

##### *3.1.4.3. Passengers.*

Minor injuries to three passengers on the train, no consequences.

##### *3.1.4.4. External persons.*

The driver of the heavy goods vehicle of the company "VIDASTROY" Ltd. had died.

##### *3.1.4.5. Cargo, luggage or other property.*

None.

##### *3.1.4.6. Rolling stock, infrastructure and environment.*

- Material damage of the locomotive № 91520044158-1 – completely destroyed second cabin;
- Material damage of passenger coach № 51522563027-3 – derailed with three wheel-sets, damages caused to the draft gear;
- Finance account for caused damages, presented by BDZ PS EOOD, for locomotive № 91520044158-1 amounting to 88 434,44 BGN;
- Finance account for caused damages, presented by BDZ PS EOOD, for coach № 51522563027-3 amounting to 26 473,73 BGN;
- Account for caused damages to the rail track in the level crossing area from km 127+000 to km 127+123 amounting to 3607,00 BGN;
- Total costs for damages: 118 515,17 BGN.

##### *3.1.4.7. Heavy-loaded truck of Vidastroy Ltd.*

- Material damages caused to dump truck Iveco with reg. № BH1602AM, property of the company has not been presented.

#### *3.1.5. Description of other consequences, including the event impact on the usual activity of the participants.*

In the period 07.06÷08.06.2022, the railway infrastructure manager and the railway undertakings have generated additional costs for changing the train schedule along the section.

- Deviated trains of the railway undertakings – none;
- Cancelled trains of the railway undertakings – 2 398,00 BGN;
- Assigned trains of the railway undertakings – none;
- Delayed trains of the railway undertakings – none;
- Costs for rehabilitation means – 1 762,00 BGN;
- Total other costs: 4 160,00 BGN.

#### *3.1.6. Identity of the participants and their functions.*

##### *Railway infrastructure:*

- SE National railway infrastructure company has Safety Authorization № BG 21/2018/0001 valid from 01.07.2018 until 30.06.2023.

SE NRIC personnel, involved in the accident:

- Traffic manager on-duty in Oreshets station;
- Post switchman in post № 2 at Oreshets station;

- Traffic manager on-duty in Dimovo station;

*Railway undertaking:*

BDZ PS EOOD has:

- License for performing railway transport services;
- Safety Certificate part A BG 11 2017 0009, valid until 30.12.2022;
- Safety Certificate part B BG 12 2017 0009, valid until 30.12.2022;

Personnel of BDZ PS EOOD involved in the accident:

- Locomotive driver, first person of locomotive № 91520044158-1 of FT № :7623;
- Locomotive driver, second person of locomotive № 91520044158-1 of FT № 7623;
- Head of FT № 7623;
- Conductor of FT № 7623.

*Automobile company Vidastroy Ltd. – owner of the vehicle:*

- Driver of freight dump truck Iveco with reg. № BH1602AM.
- Certificate of registration with the parameters of freight truck make Iveco type AD 410T45.

*3.1.7. Description of the respective parts of the railway infrastructure and signalling system:*

*3.1.7.1. Type of the track, railway switch, rail crossing etc..*

The railway level-crossing is equipped with Automatic level-crossing device (ALCD) type APS 73M, in dependence with RHKDD at Oreshets station.

The crossing is a fourth category without a crossing guard in accordance with Ordinance No. 4/27.03.1997, it is located between the warning and entrance signal of the Oreshets station. In the Oreshets - Dimovo interstation, traffic is carried out by ALCD.

The crossing pavement is elastic, "STRAIL" type, width - 6.00 m, height above railhead - 5 mm.

Crossing angle (road/rail track) - degrees - 90°.

Visibility of the driver to the crossing along the odometer/mileage – 220 m, back to the odometer/mileage – 250 m.

Characteristics of the road for public transport - profile on the left 0% on the right - 2%, type of pavement of the approaches to the crossing - concrete, width of the shoulder - 0.50 m.

Railway profile – straight line– 73 m - 1.5 ‰.

Distance from the end of the vertical curve of the highway

- To the left of the railway line horizontal
- To the right of the railway line horizontal

Pavement 20 meters from the end rail - concrete/asphalt on the left, concrete/gravel on the right.

Pre-crossing signs: distance to the crossing - 400 m, visibility from the driver - 300 m.

The pre-crossing traffic light is 1007 meters from the crossing with a visibility of 300 meters.

The location of the TLLCR from the nearest rail (m) left - 5.00 m, right - 5.00 m.

The location of the TLLCR from the axis of the highway – left - 5.50 m, right – 4.50 m.

Signalling with road signs and their distance from the crossing - B16 -2X6.00m.

On the rail track, the crossing is signalled with pre-crossing signs located 457 m from the crossing.

*3.1.7.2. Interstation block system, station installation, type of signalling.*

The interstation Oreshets - Dimovo is equipped with ALCD - working;

The Oreshets station is equipped with a relay system with key dependence (RHKDD) - serviceable;

Dimovo station is equipped with a relay system with key dependence (RHKDD) - working;

Type of signalling:

Oreshets station and Dimovo station - entrance and exit traffic lights according to the ordinary signaling - functional;

Automatic crossing signalling ALCD at the railway crossing at km 127+123 – serviceable.

*3.1.7.3. Train protection systems.*

Oreshets and Dimovo stations do not have a train protection system. The stations and interstations are equipped with a train dispatching radio connection (TDRC), with the help of which radio





USEPNCTHO HA BALOHME OT TAPA HA KOMOSCHPANE																
№	Name	Pa opas										Name		I	I	
		Height	Weight	Age	Sex	Occupation	Education	Marital status	Religion	Political views	Other					
1	Agina	1.70	65	35	Male	Farmer	High school	Married	Orthodox	Conservative	Other	1.70	65	35	100	
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
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18																
19																
20																

Signature: [Signature] Date: [Date] Signature: [Signature] Date: [Date] Signature: [Signature] Date: [Date]

Fig. 3.7. Nature sheet of FT № 7623 – rear part.

Informational data		Personal data	
Name	Agina	Height	1.70
Weight	65	Age	35
Sex	Male	Occupation	Farmer
Education	High school	Marital status	Married
Religion	Orthodox	Political views	Conservative
Other			

Signature: [Signature] Date: [Date]

Fig. 3.8. Brake mass certificate of FT № 7623 – front part.

Informational data		Personal data	
Name	Agina	Height	1.70
Weight	65	Age	35
Sex	Male	Occupation	Farmer
Education	High school	Marital status	Married
Religion	Orthodox	Political views	Conservative
Other			

Signature: [Signature] Date: [Date]

Fig. 3.9. Brake mass certificate of FT № 7623 – rear part.



2004



Year	Case	Age (yr)	Incidence	Sex
1990	1	10	1.0	M
1991	2	12	1.5	F
1992	3	15	2.0	M
1993	4	18	2.5	F
1994	5	20	3.0	M
1995	6	22	3.5	F
1996	7	25	4.0	M
1997	8	28	4.5	F
1998	9	30	5.0	M
1999	10	32	5.5	F
2000	11	35	6.0	M
2001	12	38	6.5	F
2002	13	40	7.0	M
2003	14	42	7.5	F
2004	15	45	8.0	M
2005	16	48	8.5	F
2006	17	50	9.0	M
2007	18	52	9.5	F
2008	19	55	10.0	M
2009	20	58	10.5	F
2010	21	60	11.0	M
2011	22	62	11.5	F
2012	23	65	12.0	M
2013	24	68	12.5	F
2014	25	70	13.0	M
2015	26	72	13.5	F
2016	27	75	14.0	M
2017	28	78	14.5	F
2018	29	80	15.0	M
2019	30	82	15.5	F
2020	31	85	16.0	M
2021	32	88	16.5	F
2022	33	90	17.0	M
2023	34	92	17.5	F
2024	35	95	18.0	M
2025	36	98	18.5	F
2026	37	100	19.0	M
2027	38	102	19.5	F
2028	39	105	20.0	M
2029	40	108	20.5	F
2030	41	110	21.0	M
2031	42	112	21.5	F
2032	43	115	22.0	M
2033	44	118	22.5	F
2034	45	120	23.0	M
2035	46	122	23.5	F
2036	47	125	24.0	M
2037	48	128	24.5	F
2038	49	130	25.0	M
2039	50	132	25.5	F
2040	51	135	26.0	M
2041	52	138	26.5	F
2042	53	140	27.0	M
2043	54	142	27.5	F
2044	55	145	28.0	M
2045	56	148	28.5	F
2046	57	150	29.0	M
2047	58	152	29.5	F
2048	59	155	30.0	M
2049	60	158	30.5	F
2050	61	160	31.0	M
2051	62	162	31.5	F
2052	63	165	32.0	M
2053	64	168	32.5	F
2054	65	170	33.0	M
2055	66	172	33.5	F
2056	67	175	34.0	M
2057	68	178	34.5	F
2058	69	180	35.0	M
2059	70	182	35.5	F
2060	71	185	36.0	M
2061	72	188	36.5	F
2062	73	190	37.0	M
2063	74	192	37.5	F
2064	75	195	38.0	M
2065	76	198	38.5	F
2066	77	200	39.0	M
2067	78	202	39.5	F
2068	79	205	40.0	M
2069	80	208	40.5	F
2070	81	210	41.0	M
2071	82	212	41.5	F

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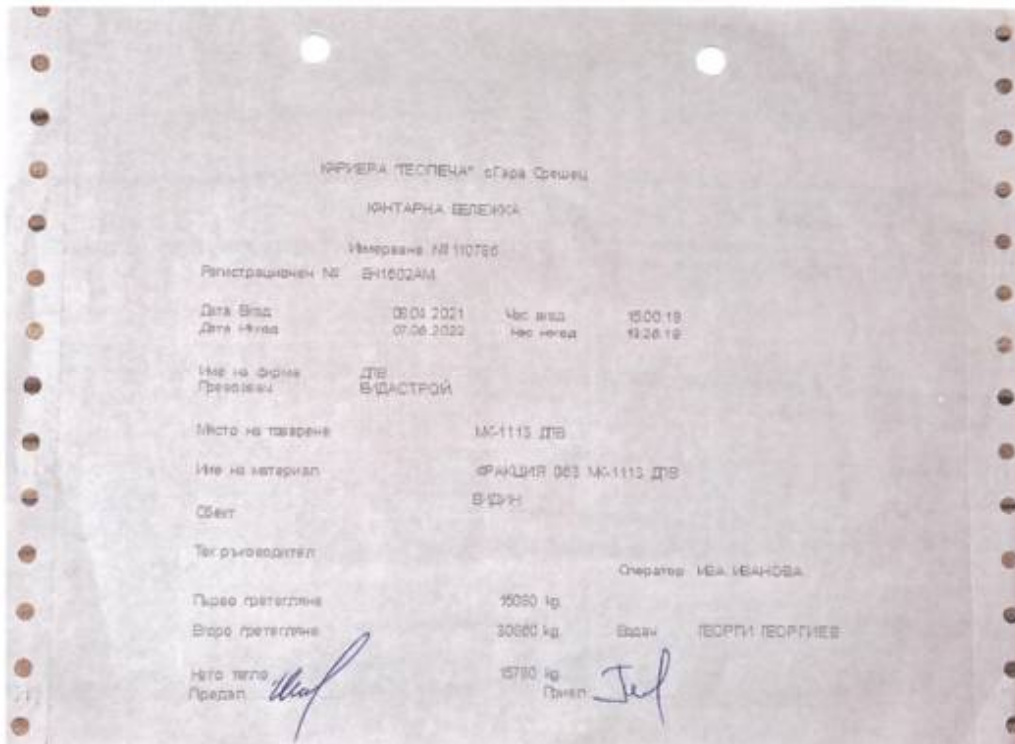
### 3.1.8.2. Documents of automobile company Vidastroy Ltd.



**Fig. 3.12a. Document of valid technical inspection of freight vehicle BH1602AM.**



**Fig. 3.12b. Document of valid technical inspection of freight vehicle BH1602AM.**



**Fig. 3.13. Weighed receipt, registering the transported mass cargo and the mass of the freight vehicle, reg. № BH1602AM.**

### ***3.2. Factual description of the occurred.***

#### ***3.2.1. Immediate sequence of events that led to the accident, including:***

##### ***3.2.1.1. Actions that the involved in the event persons undertook.***

During the movement of the train to Oreshets station, the switchman at Post No. 2 heard the "Attention" signal from the locomotive whistle and rumble from a strong collision, and he informs the traffic manager on duty at Oreshets station. The head of the station headed to the scene of the accident, where around 13:45 p.m. authorities of the Ministry of Interior - Belogradchik also arrived.

In his written explanation, the traffic manager on duty at Oreshets station reflected that a resident of Oreshets station informed him that the train collided a cargo truck and he called 112. The traffic manager on duty at Oreshets station notified all services about the accident in the specified order.

##### ***3.2.1.2. Rolling stock and technical facilities functioning.***

Until the time of the accident, the rolling stock of FT No. 7623 (locomotive and four coaches) were technically sound.

Locomotive No. 91520044158-1 is also regularly registered in the European Register of Railway Vehicles (ERV).

Coaches No. 51522563027-3, 51521563011-9, 5122563028-1 and 51522563029-9 are serviceable and regularly registered in the European Register of Railway Vehicles (ERV).

The ALCD at the railway level crossing at km 127+123 was functional and operated normally, the ALCD was illuminated with two red consecutively flashing lights, accompanied by an audible signal, as can be seen from the presented Protocol of Findings of the Task Force.

##### ***3.2.1.3. Operational system functioning.***

At the time of the accident, the operational system for managing the train traffic along the main railway line No. 7 and between Oreshets and Dimovo stations was functional and functioning normally.

#### ***3.2.2. Sequence of the events from the beginning of the occurrence until the end of the rescue services actions:***

##### ***3.2.2.1. Undertaken measures for protecting and guarding the event location.***

After the arrival of the authorities from the RD MoI - Belogradchik at 13:45 p.m. and clarification of the situation, the area was restricted to outsiders. The authorities of the pre-trial proceedings from DIS - Vidin, the Investigation Commission from NAMRATIB, FSaCPS, NIS - Sofia and the interested officials of the entities were allowed to enter on the place. Media access was restricted.

##### ***3.2.2.2. Actions of the emergency rescue services.***

Around 13:50 p.m., the authorities of the EMA and FSaCPS from the town of Vidin arrived at the scene of the accident, and found that the driver of the heavy truck had died.

At 13:55 p.m. it was established that the two locomotive drivers had also died. Three passengers in the first coach of the train were slightly injured, and two of them were taken to the Vidin General Hospital, and the third passenger received medical assistance on the spot. After providing medical assistance to the two passengers in the hospital, they were released on the same day.

At 21:00 p.m., the body of the dead truck driver was transported.

At 21:10 p.m., the bodies of the dead locomotive drivers were transported.

##### ***3.2.2.3. Actions of the emergency rehabilitation services.***

On 07.06.2022 at 17:00 p.m., a specialized UNIMOG recovery vehicle from the Mezdra recovery service arrived at the scene of the accident.

At 20:15 p.m. after completion of the procedural-investigative actions, written permission was given by the NIS to carry out emergency restoration activities.

At 21:30 p.m., after the inspections were completed, written permission was given by the head of the safety investigation from the NAMRATIB to carry out emergency recovery activities.

At 21:30 p.m., employees of the railway station - Vratsa began to clear the floor of the crossing from the scattered ballast from the truck.

At 21:40 p.m. the heavy goods truck was moved and the rail track gauge was opened.

At 22:00 p.m., employees from the railway station - Vratsa were restoring the compromised rail track in the area after the railway level crossing.

At 22:40 p.m., the remains of the heavy goods vehicle were pulled onto the highway and taken away in another vehicle.

At 22:37 p.m., locomotive No. 91520044098-9 departed from Dimovo station to the scene of the accident to collect the three train coaches that had not derailed.

At 22:53 p.m., locomotive No. 91520044098-9 arrived at the level crossing.

At 23:17 p.m., the locomotive with the three coaches left the place and arrived at Dimovo station at 23:50 p.m.

At 23:25 p.m., the specialized UNIMOG vehicle at the level crossing was brought onto the rail track to approach and lift the derailed coach from the train.

At 23:40 p.m., the first track wheel-set of the coach was raised.

At 23:55 p.m., the specialized UNIMOG vehicle was removed from the rail track at the crossing and settled parallel to the derailed coach.

At 00:10 a.m. from Dimovo station, locomotive No. 91520044098-9 left to pick up the derailed coach and locomotive No. 91520044158-1 at Oreshets station.

At 00:28 a.m., locomotive No. 91520044098-9 again arrived at the scene of the accident.

From 00:45 a.m. to 01:23 a.m., the voltage in the catenary for attaching the damaged pantograph to the damaged locomotive No. 91520044158-1 was disconnected.

At 01:25 a.m., coach No. 51522563027-3 was lifted onto the rail track.

At 01:40 a.m., locomotive No. 91520044098-9 with coach No. 51522563027-3 attached to it and the damaged locomotive No. 91520044158-1, pushing the train, left for Oreshets station;

At 01:53 a.m. the train arrived at the Oreshets station on the fourth free track and the Oreshets - Dimovo interstation was free;

At 02:42 a.m., DM No. 99529436520-1 and tamping machine No. 99529424002-4 departed from Oreshets station to carry out repairs to the rail track along the axis and level and check the catenary;

At 03:30 a.m. after completion of work, the machines returned to Oreshets station;

On 08/06/2022 at 03:42 a.m., the movement of all trains and vehicles in the Oreshets - Dimovo interstation was permitted at the speed according to the schedule.

## **4. Analysis of the event**

### ***4.1. Participation and responsibilities of the entities, involved in the event***

#### ***4.1.1. Railway undertaking.***

##### ***Analysis of the movement of FT № 7623.***

The decryption was made based on the data recorded on the speedometer tape of locomotive No. 91520044158-1, at the head of FT No. 7623 on 07.06.2022.

The registration of the main and most important parameters of the movement of the locomotive, respectively of the train, in speedometer installations "Hasler" system is done by recording on the speedometer control tape of:

- Track speed (V-S);
  - Astronomic time through a graphic and print on the tape as during the travelling time as well as during the stay time (diagram T);
  - Passed track for the separate track sections (through perforations on the tape – 2,5 mm = 0,5 km);
- On the speedometer tape for apparatuses type RT (those of locomotive № 91520044158-1) also

the following additional parameters could be registered:

- Pressure in the main air duct;
  - Movement direction;
  - Rheostat brake switching;
  - Activation of automatic brake (pneumatic registration);
- The speedometer tape is controlled for establishing:
- Whether the prescribed maximum train movement speed is observed;
  - Whether such speed is restricted to the prescribed one while passing along section, which requires a speed restriction;
  - Whether the duration of reduced speed movement is respected, i.e. to travel a distance equal to the length of the reduction plus the length of the entire train;
  - Are there any unplanned stops on the interstation;
  - Are there any skids noted on the locomotive;
  - Is there a pressure drop in the main air duct of the air brake when performing the various tests;
  - The way of use of the automatic air brake of the train and the way of use of the rheostat brake;
  - Presence of additional registrations as per the envisaged for each series of TRRS (traction rolling stock);
  - Availability of all the records for the respective TRRS.

The speedometer control tapes can also be used for other clarifications in the movement of trains, namely:

- Delays in departure and arrival;
- Stopping before closed signals and in the stations;
- During calculation of the energy cost etc.

Speedometer control tapes are considered a valuable objective document in the investigation of safety accidents.

Any falsification of the speedometer tape, wilful destruction or tampering with the clock or recording mechanism shall be considered as safety violations.

Locomotive No. 91520044158-1 is equipped with a "Hasler" type speedometer installation, which consists of a three-phase AC collector converter (geber) driven by one of the locomotive's wheel-sets. The resulting three-phase voltage with a variable frequency depending on the speed of movement drives the mechanical speedometer synchronous electric motors mounted on it (Fig. 4.12). One speed measuring device is installed in the locomotive cabins: the recording device (tape tachograph) RT9 in cabin No. 1 (fig. 4.1) and the non-recording device (tachometer) A16 in cabin No. 2 (fig. 4.2). The two speedometers have a range of 0÷150 km/h.

The tape tachograph measures and shows on a proper dial the following data during the movement



**Fig. 4.1.** Tape tachograph  
RT9



**Fig. 4.2.** Tachometer A16

of the locomotive:

- Track speed in km/h;
- The time in hours and minutes;
- The whole passed section in km (kilometer counter);

The tachometer measures and displays on a clear dial the same data that the tape tachograph displays, without the distance travelled and without recording the information. It is electrically connected to the tachograph, and if the power cable is interrupted, the two devices stop recording the speed of movement.

The recording equipment of the RT9 tachograph records the following basic parameters:

- Track speed in km/h;
- Astronomic time during the travelling time as well as during the stay time;
- Passed track for the separate track sections;
- Other parameters of the locomotive movement.

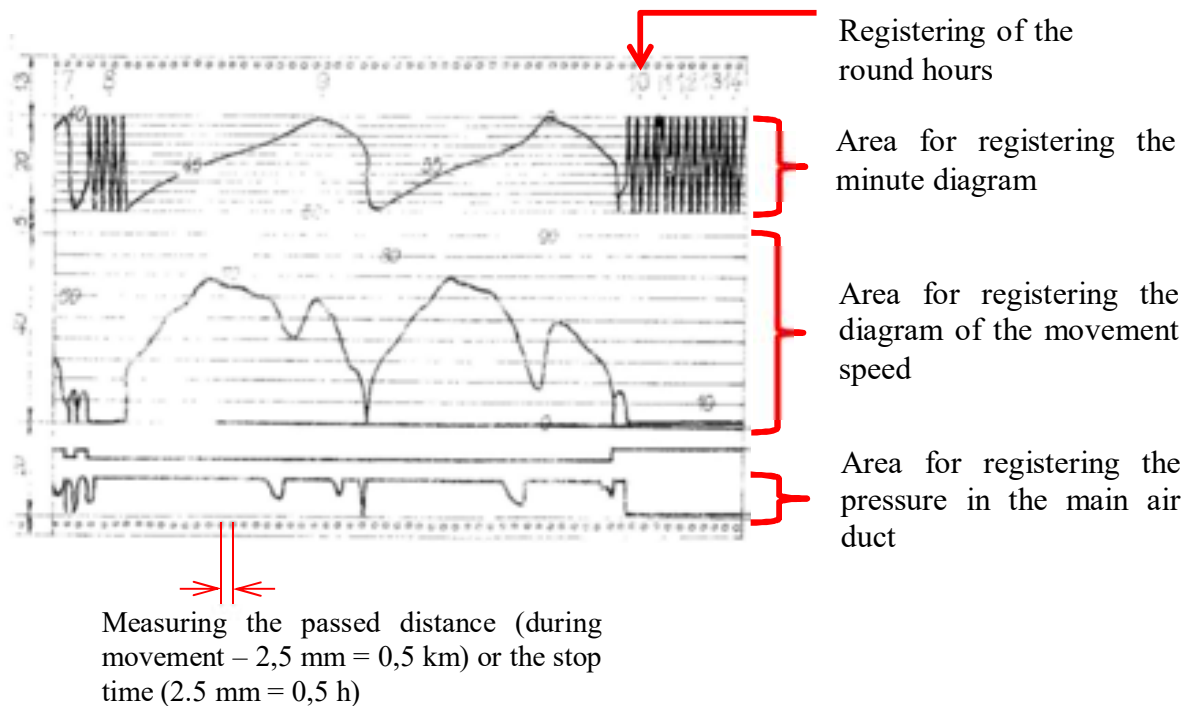
The recording (speedometer) tape is made of waxed paper. It has lined fields for recording the information transmitted by the tape tachograph (Fig. 4.3). The speedometer tape is a valuable objective data source for accurately determining the beginning, course and end of movement-related processes.

On the speedometer tape are registered:

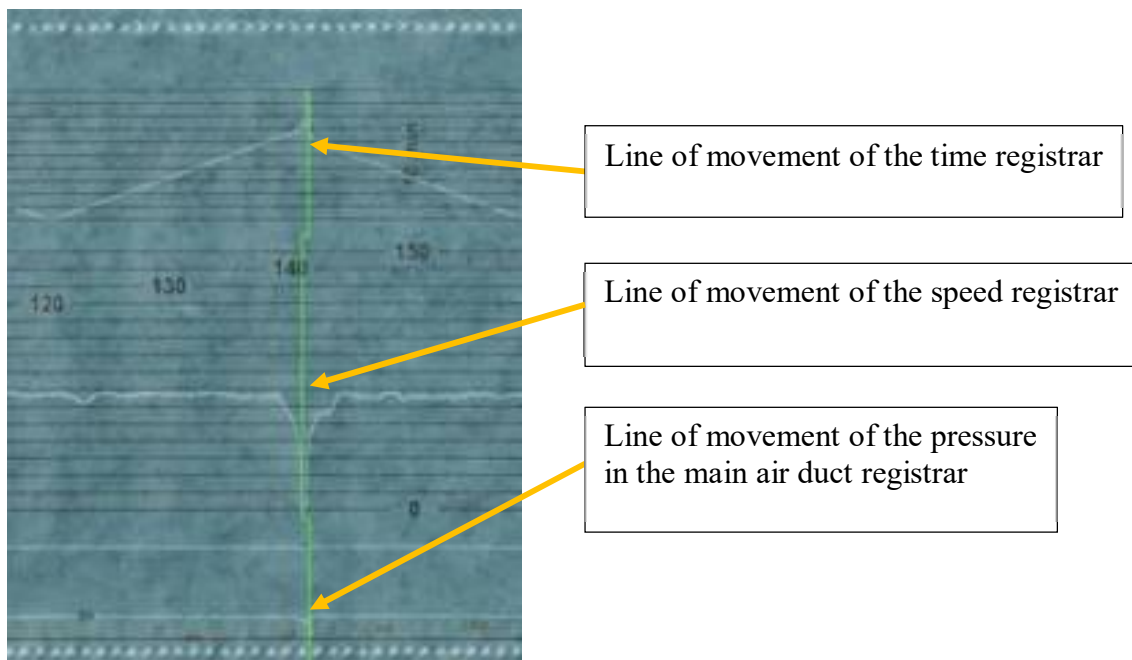
- Track speed in km/h;
- Astronomic time;
- Travelling time;



- Stay time;
  - The passed track for separate track sections;
  - The air pressure in the main air duct (MAD);
- Other data (non-obligatory which is not always implemented).



**Fig. 4.3.**



**Fig. 4.4.**

When examining the speedometer tape, it was found that the recorders recording the time and pressure in the main air duct were about 1 mm ahead of the recorder recording the speed of movement (Fig. 4.4). This was taken into account in the analysis of the train movement.

FT No. 7623 departed from Vidin passenger station at 12:26 p.m., increased the speed to 23 km/h, whereupon the engine driver made a partial arrest, reducing the pressure in the main air duct by 0.7 bar to 4.3 bar, thereby performed an effective test of the train's automatic braking (trial hold). The train

slowed down to 10 km/h, then for about 150 meters accelerated to 26-27 km/h, again slowed down to 10 km/h (Fig. 4.5, item 1), then began to accelerate to 70 km/h and so throughout the interstation it maintained a speed of movement between 60 and 70 km/h (fig. 4.5, item 2).

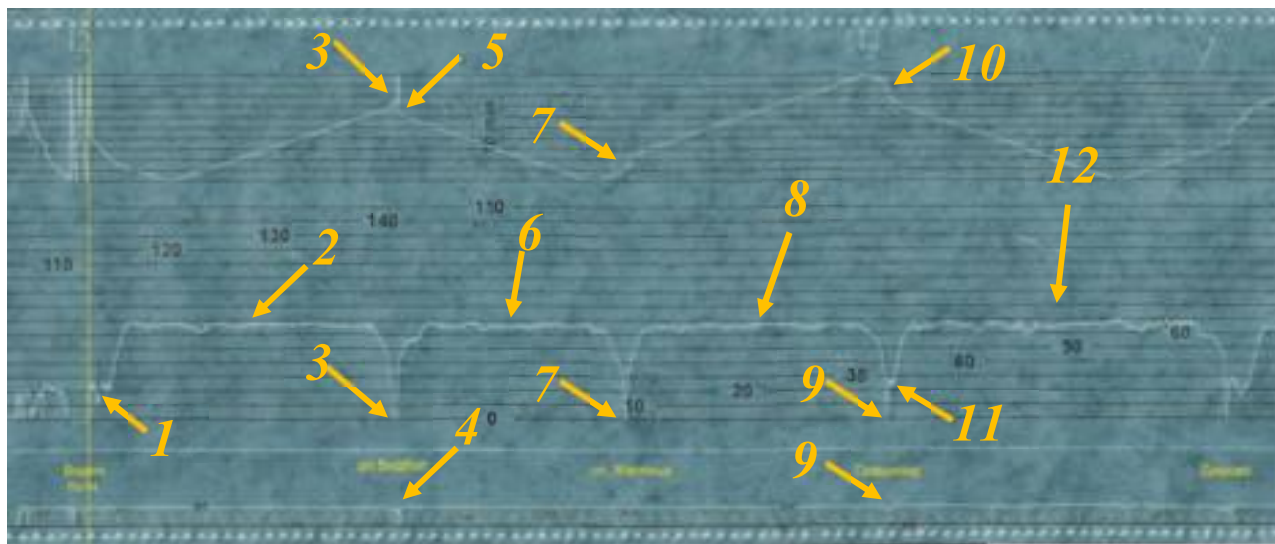
At 12:37 p.m., the train arrived at MY Vidbol station (fig. 4.5, item 3). It was observed that the driver initially performed a partial duty hold, reducing the main air pressure to 3.75 bar, until a speed of 30 km/h was reached, and then increased the main air pressure to 4.0 bar, performing a partial release of the automatic brake, and immediately after that, he performed an emergency stop (fig. 4.5, pos. 4). The train stayed at MY Vidbol for 5.5 minutes and departed at 12:43 p.m. (fig. 4.5, item 5).

After its departure from MY Vidbol, FT No. 7623 accelerated, reached a speed of 70 km/h and maintained a speed of movement from MY Vidbol to Zheglitsia halt from 64 to 70 km/h, which was the maximum permissible for the section (fig. 4.5, pos. 6).

At the Zheglita halt, the train arrived at 12:51 p.m., stayed for 1 minute and departed at 12:52 p.m. (fig. 4.5, item 7). Between the Žeglitsa halt and the Sratsimir station, the train again observed the speed of movement, maintaining a speed between 64 and 70 km/h (Fig. 4.5, item 8).

At Sratsimir station, the train stopped, and the locomotive driver made an official hold by reducing the pressure in the main air duct to 4.0 bar (Fig. 4.5, item 9). After a stop of 1 minute at 13:02 p.m. (Fig. 4.5, item 10), the train departed from Sratsimir station, accelerated to a speed of 25 km/h, then travelled about 200 meters at a speed between 23 and 26 km/h ( fig. 4.5, pos. 11) and accelerated again to 66 km/h, passing the interstation from Sratsimir station to Dimovo station at a speed between 60 and 70 km/h, a greater part of which was in braking mode of movement (fig. 4.5, item 12).

On fig. 4.6 and 4.9 the bar is stretched for better visibility due to the saturation of events.

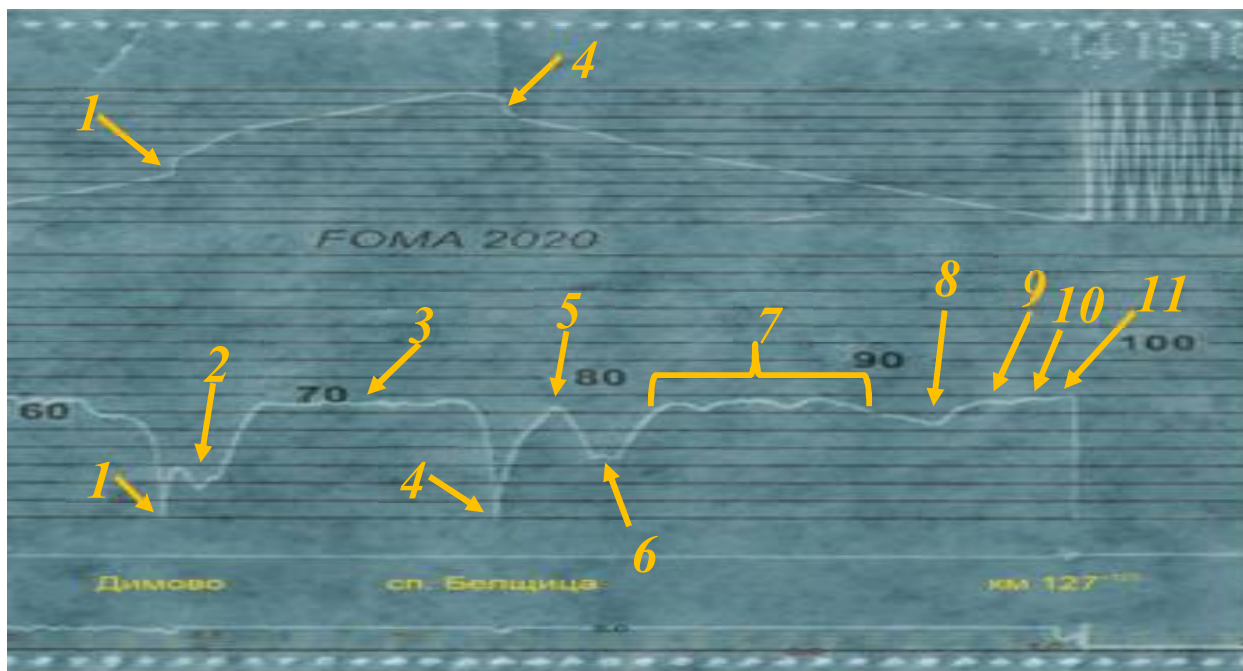


**Fig. 4.5.**

FT No. 7623 arrived at Dimovo station at 13:13 p.m. and after a stay of 1 minute and 20 seconds departed at 13:15 p.m. (fig. 4.6, item 1). It accelerated to 30 km/h, traveling 200 meters, then the speed decreased to 17 km/h without using the automatic train brake, i.e. from the natural resistance to the movement of the train, which can be explained by the fact that immediately after the Dimovo station, an uphill with a value of 15 ‰ began (fig. 4.6, item 2). In that way, the train travelled 300 meters, then accelerated and after another 900 meters, it reached a speed of 65 km/h, and at that speed was travelled along the section to the Belshitsa halt (Fig. 4.6, item 3).

The train arrived at the Belštitsa halt at 13:21 p.m. and after a 1-minute stop, it set off (Fig. 4.6, item 4), accelerating to 65 km/h after 850 meters (Fig. 4.6, item 5). This was followed by a decrease in speed to 34 km/h for 300 meters in about 1 minute with a peak to 36 km/h (Fig. 4.6, pos. 6). Further, the train accelerated to 65 km/h and continued its movement, the speed was varying in the range from 60 to 68 km/h, thereby traveling 3.5 km (Fig. 4.6, item 7). About 2000 meters before the railway level crossing at km 127+123 (the place of the accident), the speed decreased to 54 km/h (Fig. 4.6, item 8), after which it accelerated to 67 km/h for 800 meters (Fig. 4.6, item 9) and then followed a new acceleration in stages: once to 69 (fig. 4.6, item 10) and a second time to 70 km/h (fig. 4.6, item 11).

At 13:30 p.m. FT № 7623 approached the level-crossing at km 127+123. The level crossing is



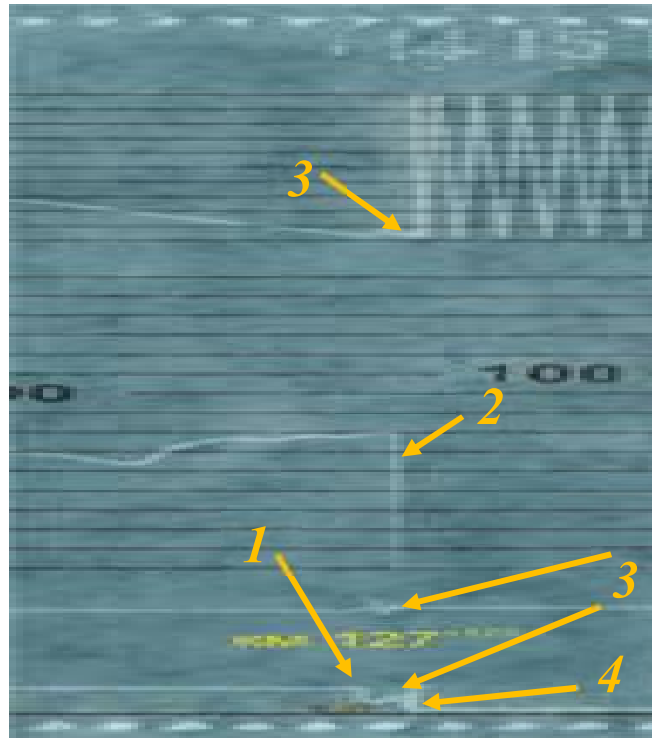
**Fig. 4.6.**



**Fig. 4.7.**

located on a straight line section with length 73 meters, 63 of which before the railway level crossing axis (fig. 1.5).

Coming out of the right curve (in the direction of travel), the locomotive driver, whose workplace is to the right of the command cabin, saw the crossing only when he was about 150 meters ahead of it (Fig. 4.7).



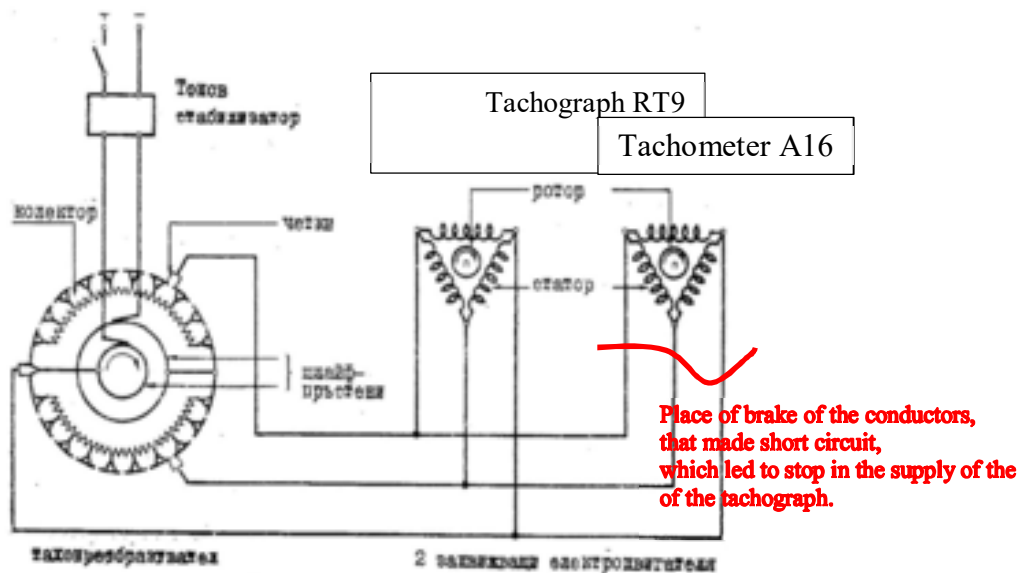
**Fig. 4.8.**



**Fig. 4.9.**

About 150 meters before the collision (i.e. from the time of visibility to the crossing) the locomotive driver applied the automatic train brake, reducing the pressure in the main air duct from 5.0 to 3.85 bar (Fig. 4.8, item). Since it took a certain amount of time to apply the brake (in that case about 10 seconds), at a speed of 70 km/h from the moment the brake was applied to the moment of collision, 9 seconds have passed (the time during which the train travelled the specified distance), i.e. the train brake was in the process of increasing the braking force, but there was no real braking effect at that moment. For that reason, no speed reduction was reflected on the speedometer bar. The speed recorder drew a vertical line and from 70 km/h dropped directly to 0 km/h (Fig. 4.8, pos. 2).

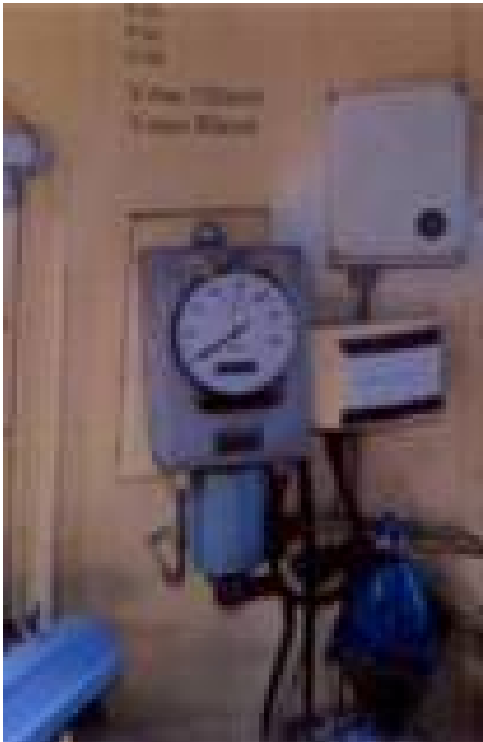
That was explained by the fact that at the time of the collision of the locomotive with the passing truck, the collision hit the right part of the cabin (Fig. 4.9) where the speedometer was located, causing the speed measurement power cable to break, which caused the speed recording circuit to break and the recorder instantly dropped to its zero position (Figs. 4.10 and 4.11)



speedometer RT 9, located in the first command cabin, which was rearward in the direction of movement of the locomotive (Fig. 4.12) unaffected.



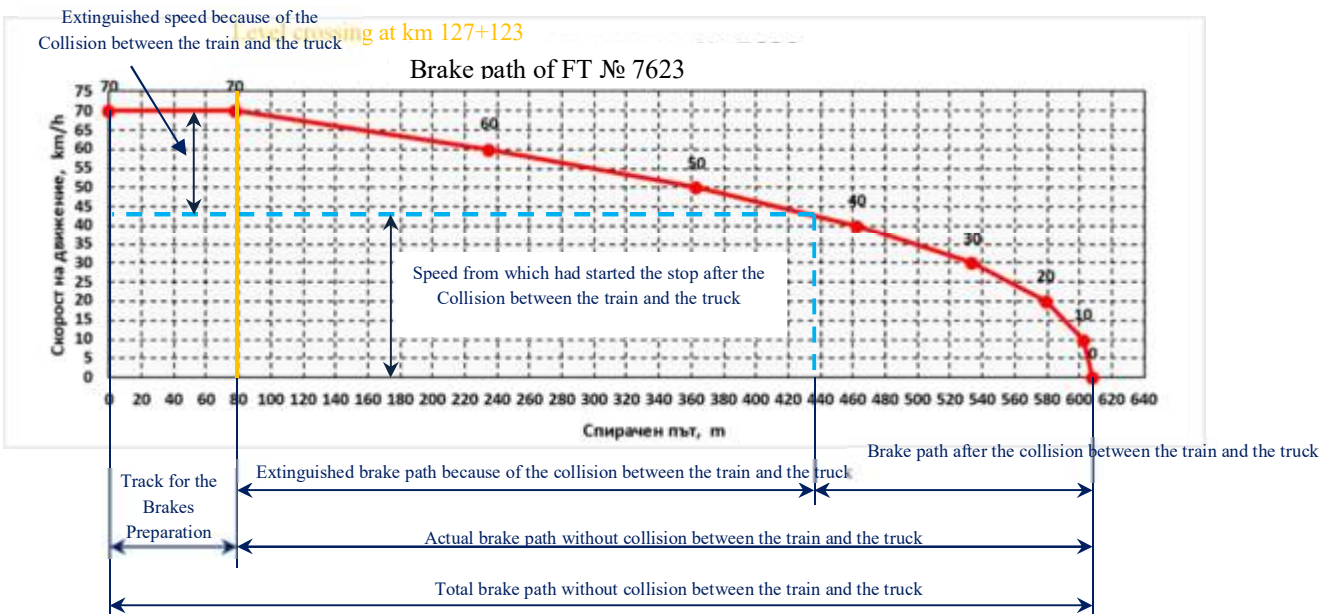
After the collision, the locomotive dragged 20 m and threw the freight vehicle to the right outside the railway track and the train continued its movement for another 170 meters (Fig. 1.5). Thus, the remains of the front buffers of the locomotive were found at km 126+953.



**Fig. 4.12.**



**Fig. 4.13.**



**Fig. 4.14.**

After a detailed and thorough analysis of the movement of the train in the last meters of its movement, it was found that the braking distance of the train should have continued as described in fig. 4.14 curve and that it stopped 608 meters after the moment of arrest with the automatic train brake, at km 126+587. In fact, the train's braking distance was shortened by the collision with the truck, which resulted in a significant dissipation of the train's kinetic energy, followed by a sharp deceleration, and it stopped at km 126+953 (where the front buffers of the locomotive were after the suspension), i.e. 366 meters shorter braking distance was realized.

Fig. 4.15 shows the graph of the change in the braking distance of FT No. 7623, taking into account the collision with the freight vehicle and the actual change in the speed of the train

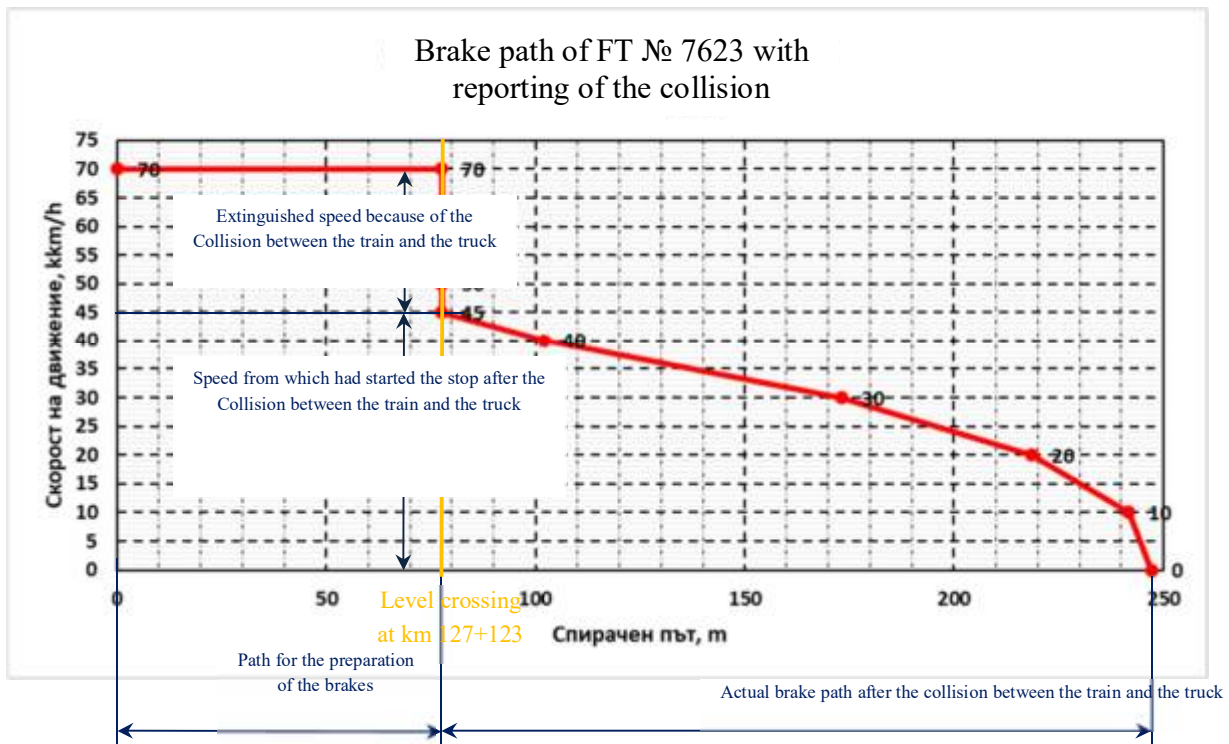


Fig. 4.15.

#### 4.1.2. Infrastructure manager.

##### Analysis of the rail track condition.

The level crossing has a technical passport and Instructions for the operation of the ALCD at the crossing, located at km 127+123, on the seventh main railway line Mezdra - Vidin. The area of operation of the ALCD is from km 125+823 to km 128+423. It is located between the entrance and warning semaphores of Oreshets station on the side of Dimovo station, and the distance from Oreshets station is 1168 m and 12606 m from Dimovo station. It crosses at a level with the railway line. According to the categorization of railway level crossings under Ordinance No. 4/27.03.1997, it is the fourth category for general use. It connects the village of Oreshets station with agricultural lands, with a crossing angle of 90° to the rail track, which is in a straight line section.

The survey must be completed at any point along the centre line of the highway at least 6 m in front of the danger zone or 8 m from the nearest rail. The danger zone covers the railway track gauge and 2 m on both sides of the rails or a total of 5.50 m.

The overview for each level crossing is determined by the following formula:

$$S_{neb} = \frac{V}{5} \left( L + \frac{5.50+F}{\sin \alpha} \right) (m), \text{ where:}$$

S = the necessary overview in m;

V = maximum speed of the fastest train under schedule in km/h;

L = the length of the RRS in meters (it is accepted maximum length of 24 m);

F = distance between the axis of the end tracks.

Within single-track railway line F = 0, as in that case.

$\alpha$  = crossing angle of the highway with the rail track. In the formula is used maximum speed of 5 km/h for RRS, within which is ensured safety passing of the railway level crossing.

In that case the necessary overview is:

$$S_{neb} = \frac{V}{5} \left( L + \frac{5.50+F}{\sin \alpha} \right) (m); F = 0 \text{ (single track line);}$$

$$S_{neb} = \frac{70}{5} \left( 24 + \frac{5.50+0}{1} \right) (m) \Rightarrow S_{neb} = 14(24 + 5.50) = 413 \text{ m;}$$



At about 200 m, the highway is almost parallel to the railway line, with a distance of 20 to 30 m between them. There is very lush vegetation in this area, limiting visibility to both roads. During the inspections, it was found that from the level crossing to the left along the odometer/mileage, for about 250 m, the vegetation near the rail track was cut.

The railway approaches and level crossing are technically sound.

*Analysis of the work of the automatic level-crossing signalling (ALCD) located at km 127+123.*

The automatic level crossing signalling is a relay, type APS 73M, implemented with first-class relays - to ensure safe behaviour after failures. It consists of the following nodes:

1. Track sensors (sensors) - serve to detect the passage of a railway vehicle through a certain point on the rail track. They are implemented by means of short electronic rail circuits (ERCs):
  - 1.1. A distant one - at km 128+430 (1307 meters from the axis of the crossing, towards Dimovo station). It serves to close the ALCD (activation of the red lights of the traffic lights) when a railway vehicle arrives from Dimovo station to Oreshets station;

- 1.2. Two close ones - on both sides of the highway. They serve to open the ALCD (turning off the red lights of the traffic lights) when the railway vehicle passes through the two sensors and releases them.

2. Pre-crossing semaphores (NPPS) - at km 128+130 (1007 meters from the axis of the level crossing, direction Dimovo station - pre-signal braking distance from the crossing). It serves to notify the driver of the railway vehicle that the crossing is closed and the automatic crossing signalling is operational. Traffic light visibility is 300 meters. At 100, 200 and 300 meters before the NPPS, three pre-traffic indicators have been installed, according to Article 456 of Ordinance No. 58. The automatic crossing signalling at this crossing does not have a second pre-crossing smaphore (even), because the ALCD is tied to the signalling installation at Oreshets station;

3. Road crossing traffic lights (TLLCR) - two pieces. They serve to signal to road vehicles about the upcoming passage of a railway vehicle through the crossing, as well as to signal a serviceable ALCD in the absence of a railway vehicle in the notification area (no railway vehicle is about to pass). They are located on both sides of the rail track - 5 meters from the corresponding nearby rail. TLLCR have three headlights each:

- 3.1. Two headlamps, located horizontally next to each other, giving consecutive flashing red light signals one after the other;

- 3.2. One slow-flashing light (about 30 flashes per minute) of moon-white color - to indicate to road users that the ALCD is in working order during the time when the traffic light at the level crossing is not giving a red flashing signal. This balises is located below the two red balises.

The lamps of all headlights are twin-filament.

4. Remote information panel (RIP). It is installed in the office of the traffic manager on duty at the Oreshets station and is intended to inform him about the state and operation of the ALCD. The RIP also has a button for remote opening of the crossing (ROB), sealable, with a counter. Consists of:

- 4.1. Indications:

- 4.1.1. Steady green light – ALCD is not activated and is working;

- 4.1.2. Steady red light – ALCD is activated;

- 4.1.3. Flashing green light - Malfunction: one to three filaments of the four red traffic light lamps burned out or a lamp of the pre-crossing traffic light burned out

- 4.1.4. Flashing red light - ALCD failure: signalling of the crossing from all sides is not guaranteed. The pre-crossing traffic light is unlit or with a constantly shining white light;

- 4.1.5. Steady white light - the ALCD action is disabled via ROB;

- 4.1.6. Flashing white light – ALCD operation is disabled by ROB and at the same time there is a malfunction or failure.

- 4.2. Buttons:

4.2.1. Remote opening button (ROB) - red, with fixation, sealable with actuation counter. In normal condition, the ROB is sealed in an unpressurized position.

4.2.2. Button for turning off the sound signalling of TDI - white, non-sealable with fixation. Any malfunction or failure is signaled by a light and sound signal, which is turned off using this button. After the fault/failure has been rectified, the buzzer is switched on again to notify the traffic manager on duty that the fault/failure has been rectified. The sound signal is turned off after the button is returned to the normal position.

5. Relay cabinet in which the ALCD equipment is located. It is mounted 5 meters from the nearest railway track, left in the direction of the odometer, and 4.50 meters from the axis of the highway, left in the direction of the odometer.

6. Buttons for controlling the ALCD from the Oreshets station. They are installed on the control apparatus (CA) of the relay system for key dependence (RHKDD) at the Oreshets station.

6.1. Closing ALCD button ZB- ALCD. Through it, ALCD is activated when sending a train from Oreshets station to Dimovo station. After the crossing is closed and the red light is permanently on at the TDI, the traffic controller on duty can open an exit signal;

6.2. Isolating push-button switching device (IPPU) - with fixation, sealable with actuation counter. It is used in the event of a failure in the connection with the ALCD, which does not allow the crossing to close when the ZB- ALCD is activated. Before sending the train to the Dimovo station, the traffic manager on duty at the Oreshets station handed the train staff an order, sample II-A, for the train to pass through the level crossing, giving a frequent and repeated "Attention" signal and reducing the speed in front of the level crossing to 15 km/h with readiness to stop at a visible obstacle.

#### *4.1.3. Entities in charge of the technical maintenance.*

SE NRIC is a certified ECM and is responsible for the repair and maintenance of the railway network and facilities, including the level crossings located on the rail network for their normal work and equipment.

"BDZ-Passenger Services" EOOD owns an ECM Certificate with EIN No. BG/31/00 21/ 0001, valid until 18.04.2026 and is responsible for the technical maintenance of the public transport system that it operates (the locomotive and coaches of FT No. 7623);

#### *4.1.4. Manufacturers or providers of rolling stock and railway products.*

Not applicable.

#### *4.1.5. National Safety Authority.*

Railway Administration Executive Agency is the National Safety Authority of the Republic of Bulgaria.

#### *4.1.6. Notified bodies or Risk assessment authorities.*

Not applicable.

#### *4.1.7. Certifying bodies of the entities in charge of maintenance.*

The Railway Administration Executive Agency as the National Safety Authority for railway transport performs certification of the entities in charge of the vehicles maintenance (ECM) in accordance with Directive 2004/49/EC and Regulation (EU) 445/2011, as per Ordinance No 59 on the railway transport safety management and on the maintenance functions in accordance with Directive 2004/49/EC and Regulation (EU) 445/2011.

From June 16, 2020 the RAEA performs certification of the ECM as per the Commission Implementing Regulation (EU) 2019/779 of 16 May 2019 laying down detailed provisions on a system of certification of entities in charge of maintenance of vehicles pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulation (EU) No 445/2011.

#### *4.1.8. Persons or entities involved in the event, documented or not in the respective safety management systems or indicated in register.*

- SE NRIC implements Safety Procedure PB 2.09 "Methodology for determining, assessing and managing of the risk" version 05 effective from 01.03.2019, part of the SMS
- BDZ PS EOOD implements Quality Procedure PK-2-15 "Safety Management of Passenger Transportation. Monitoring and information" from 13.12.2018 and Methodology for assessing the safety risk in BDZ PS EOOD from 23.02.2012.

*Rolling stock and technical facilities:*

*4.2.1. Factors, deriving from the design of the rolling stock, railway infrastructure or technical facilities.*

Not applicable.

*4.2.2. Factors deriving from the installation and placing into service of the rolling stock, railway infrastructure and technical facilities.*

Not applicable.

*4.2.3. Factors deriving from manufacturers or other supplier of railway products.*

Not applicable.

*4.2.4. Factors, deriving from the technical maintenance and/or modification of the rolling stock or the technical facilities.*

Not applicable.

*4.2.5. Factors due to the entity in charge of the technical maintenance, workshops for technical maintenance and other technical maintenance service providers.*

Not applicable.

*4.2.6. Other factors or consequences considered as involved within the investigation objectives.*

Not applicable.

**4.3. Human factor:**

*4.3.1. Individual human characteristics:*

*4.3.1.1. Training and development, including skills and experience.*

*Railway undertaking:*

• Locomotive driver first person of a locomotive No. 91520044158-1 - Certificate of qualification No. 11648 acquired qualification for "Locomotive driver of electric locomotives", training conducted in the period 06.11.2009÷04.03.2010, training institution PQC at BDZ - Sofia, issued from RAEA;

Locomotive driving license BG 7120220065, issued by RAEA;

Certificate No. III-1058 for holding the position of "Locomotive driver" in BDZ PS EOOD dated 29/04/2022.

Additional certificate No. 000008045217 from BDZ PS EOOD for rolling stock for which the locomotive driver is allowed to drive - series 43, 44, 45,000 from 13.05.2022 on the national railway infrastructure of the Republic of Bulgaria until 12.05.2025.

• Locomotive driver second person on a locomotive No. 91520044158-1 - Certificate of qualification No. 867 acquired qualification for "Locomotive driver of electric locomotives", training conducted in the period 29.01.÷18.04.1990, training institution Company BDZ - Sofia;

Locomotive driving license BG 71 2016 0081 issued by RAEA;

Certificate No. III-1000 for holding the position of Locomotive driver in BDZ PS EOOD from 29/04/2022.

Additional certificate No. 000006257636 from BDZ PS EOOD for rolling stock for which the locomotive driver is allowed to drive - series 43, 44, 45, 52 and 55.00 from 18.04.2019 to 18.04.2022 on the national railway infrastructure of the Republic of Bulgaria .

• Head of train, passenger traffic of FT No. 7623 – Certificate of qualification No. 21222 acquired qualification for "Head of train", training conducted in the period 02.04.÷29.06.2018, training institution PQC at BDZ, issued by RAEA;

Certificate No. II-1690 for occupying the position of Head of train, passenger traffic in BDZ PS EOOD from 07/09/2019.

- Conductor of FT No. 7623 – Vocational Training Certificate No. 102-102/ 20.04.2016-acquired qualification for "Conductor", conducted training in the period 05.01.-06.04.2016 training institution CPO at BDZ;

Certificate No. II-1649 for holding the position of Conductor in BDZ PS EOOD from 03.07.2019.

*Railway infrastructure:*

- Traffic manager at Oreshets station - Certificate of professional qualification No. 000156, specialty "Technology and transport management", conducted training in the period 2001 ÷ 2005, issued by VTU "Todor Kableshkov" - Sofia;

Certificate No. 5077 for occupying the position of Traffic Manager in TOSAMD - Sofia from 06.12.2019.

- Level crossing guard/switchman at the Oreshets station - Certificate of qualification No. 257 acquired qualification for "Level-crossing guard/switchman", training conducted in the period 08.05.-09.07.2000, training institution Company BDZ - Sofia;

Certificate No. 3997 for occupying the position of Level crossing guard/switchman in TOSAMD - Sofia from 08/04/2015.

- Traffic manager at Dimovo station - Diploma No. 20214, recognized qualification "Traffic manager and commercial operation", training held in the period 1980÷1983, issued by SHRI, Todor Kableshkov - Sofia;

Certificate No. 6164 for occupying the position of Traffic Manager in TOSAMD - Sofia from 01.03.2022.

*Automobile company Vidastroy Ltd.*

- Truck driver: Vehicle driving license No. 283811968 for categories AM, B1, B, C1, C, Tkt, valid until 22.11.2023, issued by the Ministry of Interior-Vidin.

*4.3.1.2. Medical and personal circumstances, which influence the event, including the presence of physical and psychological stress.*

*Railway undertaking:*

- Locomotive driver first person on locomotive No. 91520044158-1:

Single health information file No. 1771 of 28.09.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion: fit for a locomotive driver.

Psychological certificate No. 1285/29.11.2021, issued by the Psychological Laboratory at the National Multidisciplinary Transport Hospital Sofia for a locomotive driver.

Conclusion: allowed for a period of 5 years.

- Locomotive driver second person on locomotive No. 91520044158-1:

Single health information file No. 1770 of 28.09.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion: fit for a locomotive driver.

Psychological certificate No. 1396/30.10.2019, issued by the Psychological Laboratory at the Sofia National Multidisciplinary Transport Hospital for a locomotive driver.

Conclusion: admitted for a period of 3 years.

- Head of train, passenger traffic of FT No. 7623:

Single health information file No. 2921 of 12.10.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion: suitable for Head of train, passenger traffic.

Psychological certificate No. 1077/31.08.2020, issued by the Psychological Laboratory at the Sofia National Multidisciplinary Transport Hospital for a locomotive driver.

Conclusion: admitted for a period of 3 years.

- Conductor of FT No. 7623:

Single health information file No. 1958 of 19.10.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion: suitable for Conductor.

*Railway infrastructure:*

- Traffic manager at Oreshets station:

Single health information file No. 2023 of 25.10.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion - suitable for traffic manager.

Psychological certificate No. 798/11.06.2019, issued by the Psychological Laboratory - Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: allowed for a period of 5 years.

- Switchman/level crossing guard at Oreshets station:

Single health information file No. 4302 of 16.12.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion: suitable for switchman/level-crossing guard.

Psychological certificate No. 1382/14.10.2020, issued by the Psychological Laboratory - Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: admitted for a period of 3 years.

- Traffic manager at Dimovo station:

Single health information file No. 4336 of 21.12.2021, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion - suitable for traffic manager.

Psychological certificate No. 1326/06.20.2020, issued by the Psychological Laboratory - Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: admitted for a period of 3 years.

*Automobile company Vidastroy Ltd.:*

- Freight vehicle driver:

Card for preliminary medical examination, issued by General Hospital Vidin on 29.10.2012.

Conclusion: suitable for a truck driver

*4.3.1.3.Fatigue.*

*Railway undertaking:*

- Locomotive driver I-st person of locomotive № 91520044158-1:

Break/rest: from 06.06.2022 hour and 22 minutes 30 until 07.06.2022 hour and 11 minutes 00

Started work: 07.06.2022 hour and 11 minutes 00 – (12 hours and 30 min.)

- Locomotive driver second person of locomotive № 91520044158-1:

Break/rest: from 06.06.2022 hour and 22 minutes 30 until 07.06.2022 hour and 11 minutes 00

Started work: 07.06.2022 hour and 11 minutes 00– (12h. and 30 min.)

- Head of train, passenger transport of FT № 7623:

Break/rest: from 05.06.2022 hour and 21 minutes 15 until 07.06.2022 hour and 11 minutes 45

Started work: 07.06.2022 hour and 11 minutes 45 – ( 38 hours and 30 min.)

- Conductor of FT № 7623:

Break/rest: from 06.06.2022 hour 21 minutes 15 until 07.06.2022 hour and 11 minutes 45

Started work: 07.06.2022 hour and 11 minutes 45 - ( 14 hours and 30 min.)

*Railway infrastructure:*

- Traffic manager Oreshets station:

Break/rest: from 04.06.2022 hour and 07 minutes 00 until 07.06.2022 hour and 07 minutes 00

Started work: 07.06.2022 hour and 06 minutes 20 – ( 71 hours and 20 min.)

- Switchman/level-crossing guard at Oreshets station:

Break/rest: from 05.06.2022 hour and 07 minutes 00 until 07.06.2022 hours and 07 minutes 00

Started work: 07.06.2022 hour and 06 minutes 21 (47 hours and 21 min.)

- Traffic manager at Dimovo station:

Break/rest: from 17.01.2022 hour and 07 minutes 00 until 20.01.2022 hours and 18 minutes 50

Started work: 20.01.2022 hour and 18 minutes 50 – (47 hours and 10 min.)

*Automobile company Vidastroy Ltd.:*

Presented data on rest and work of the driver - none.

#### *4.3.1.4. Motivation and attitudes related to the human factor*

Not applicable

#### *4.3.2. Work related factors:*

##### *4.3.2.1. Tasks planning.*

- SE NRIC carries out maintenance, repair and operation of the railway infrastructure. Prepares schedules and timetables based on requests submitted by the railway undertakings for the movement of trains and vehicles on all the main and secondary railway lines.

- "BDZ-Passenger Services" EOOD carries out railway transport of passengers according to the approved Plan for composing the trains, according to the contract for the carriage of passengers with the state, stated and assigned in the Schedule for the movement of trains.

##### *4.3.2.2. Constructive particularities of the facilities that influence the connection human-machine.*

Not applicable.

##### *4.3.2.3. Communication means.*

The communication connections at Oreshets station and Oreshets-Dimovo interstation are carried out with DCCM - 8, as well as at the station with the corresponding switch posts.

In the locomotives are installed VDRV devices for establishing a connection between the locomotive driver and the traffic manager on duty at the respective station. The staff on shift at SE NRIC and BDZ PS EOOD are provided with official mobile phones.

##### *4.3.2.4. Practices and processes.*

Not applicable.

##### *4.3.2.5. Operation rules, local instructions, staff requirements, prescriptions for technical maintenance and applicable standards.*

- BDZ PS EOOD and SE NRIC implement national and departmental normative acts.
- Automobile company "Vidastroy" Ltd. implements a Risk Assessment System and Instructions for safe work with a truck.

##### *4.3.2.6. Working time of the involved personnel.*

- The staff involved in the accident of BDZ PS EOOD and SE NRIC works in shifts regime of 12-hour working shift. In accordance with the requirements of the normative acts - Labour Code and Ordinance № 50 of 28.12.2001 for the working hours of the managerial and executive staff, engaged in providing the transportation of passengers and freights in the railway transport.

- The driver of the truck in the company "Vidastroy" Ltd. works full-time 8 hours.

##### *4.3.2.7. Risk treatment practices.*

- SE NRIC implements a safety procedure PB 2.09 "Methodology for determining, assessing and managing risk" version 05 effective from 01.03.2019, part of the SMS.
- "BDZ-Passenger Services" EOOD implements the following procedures:
  - Methodology for safety risk assessment in BDZ PS EOOD;

- Quality procedure PK-2-15 "Safety management of passenger transport. Monitoring and exchange of information";
- Register of hazards in the operation, repair and maintenance of RRS in BDZ PS EOOD.
- Automobile company "Vidastroy" OOD implements a Risk Assessment System (Hazard Identification Card and Risk Assessment) and Instructions for safe work with a truck.

*4.3.2.8.Context, machinery, equipment and indications for shaping the working practices*  
Not applicable.

*4.3.3. Organizational factors and tasks:*

*4.3.3.1.Planning of the working force and the working load.*

In the two entities SE NRIC, and "BDZ-Passenger Services" EOOD, in accordance with the requirements of national regulations, developed methodologies and good European practices, the work and workload of personnel directly related to the safety of rail transport is planned.

*4.3.3.2.Communications, information and teamwork.*  
Not applicable.

*4.3.3.3.Recruitment, staffing requirements, resources.*

- In BDZ PS EOOD, the selection of personnel is carried out according to an approved "Human Resources Management System", which includes:
  - o Recruitment and selection rules;
  - o Rules for appointment and changes in employment relationships;
  - o Rules for staff training and development;
  - o Rules for ensuring HSLC, Ecology, and organization of the activity of STM.

The entity's personnel is selected and appointed with the relevant legal capacity, professional qualification and skills for working in the management and executive staff.

- SE NRIC has an approved "Strategy for the management of human resources 2021÷2025".

In the SE NRIC, the selection of personnel is carried out according to the established "Rules for recruitment, selection and appointment of personnel in the central administration of the SE NRIC" in force from 01.12.2020.

The recruitment, selection and appointment of personnel is carried out by the "Human Resources Management" department, which is responsible for:

- Recruitment;
- Maintaining a personnel database;
- Creating a system of selection techniques;
- Carrying out the selection together with the head of the unit;
- Documenting the process and communicating with staff;
- Appointment.

- Automobile company "Vidastroy" OOD has concluded an employment contract - a single and permanent one - with the driver of the motor vehicle, driving a dump truck with registration number BH1602AM.

*4.3.3.4.Implementation management and supervision*  
Not applicable

*4.3.3.5.Compensation (remuneration).*

- BDZ PS EOOD has approved "Internal rules for wages" effective from 01.07.2013, which regulate the general conditions for the organization of wages:
  - Formation and distribution of funds for salary in the company;
  - Determining and changing the basic salaries by position;
  - Determination of the types and amounts of additional and other remunerations;
  - Regulation of the order and manner of payment of staff salaries.
- SE NRIC has approved "Internal rules for wages" in force since 01.09.2014, which regulate issues related to the wages of the company's personnel:

- General provisions for the organization of the salary in the enterprise;
- Determining and distributing the funds for wages - sources, order and way of forming the remuneration;
- Determination and amendment of wages and additional remuneration;
- Regulation, order and method of payment of wages.
- Automobile company "Vidastroy" Ltd. has drawn up internal rules for the organization of wages.

*4.3.3.6. Leadership, powers related issues.*

Not applicable.

*4.3.3.7. Organizational culture.*

Not applicable.

*4.3.3.8. Legal issues (including the respective European and national rules and provisions).*

Not applicable.

*4.3.3.9. Regulatory framework conditions and safety management system application..*

*Railway undertaking.*

- Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety;
- Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010;
- COMMISSION IMPLEMENTING REGULATION (EU) 2019/779 of 16 May 2019 laying down detailed provisions on a system of certification of entities in charge of maintenance of vehicles pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulation (EU) No 445/2011;
- COMMISSION IMPLEMENTING REGULATION (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009;
- Railway Transport Act;
- ORDINANCE No 59 dated 5.12.2006 on the railway transport safety management.

*Railway infrastructure.*

- Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety;
- Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010;
- COMMISSION IMPLEMENTING REGULATION (EU) 2019/779 of 16 May 2019 laying down detailed provisions on a system of certification of entities in charge of maintenance of vehicles pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulation (EU) No 445/2011;
- COMMISSION IMPLEMENTING REGULATION (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009;
- Railway Transport Act;
- ORDINANCE No 59 dated 5.12.2006 on the railway transport safety management.

*Automobile company "Vidastroy" Ltd.*



No regulatory frameworks dealing with SMS are presented.

#### *4.3.4. Environmental factors:*

##### *4.3.4.1. Labour conditions (noise, illumination, vibrations).*

Not applicable for SE NRIC and BDZ PS EOOD.

Automobile company "Vidastroy" Ltd.:

According to the approved Risk Identification and Assessment Card, noise and vibration factors are of acceptable risk to truck drivers.

##### *4.3.4.2. Meteorological and geographic conditions.*

- Oreshets and Dimovo stations are located in the north-western part of the railway network;
- The accident occurred in daylight at 13:30 p.m.;
- Air temperature +29°C;
- Wind speed and direction about 17 km/h, west;
- Weather – clear, sunny with normal visibility of the signals;

##### *4.3.4.3. Construction works, performed on the spot or in very proximity.*

By telegram, train and electric windows were allowed between Oreshets and Dimovo stations in the period 06.04. ÷ 10.04.2022 in the daylight for prevention and detection of the catenary gauge. Due to work being carried out in the area of the railway level crossing during the allowed windows, the operation of the ALCDD was switched off and on according to the regulatory documents.

An expressway was under construction near the railway line, which necessitates the crossing of the railway line by trucks carrying aggregates for the construction of the road. For this purpose, a direct temporary railway crossing equipped with electric barriers and a level crossing guard was opened at km 130+284 in the Dimovo - Oreshets interstation to ensure the safety of crossing the level crossing, with the aim of limiting the passage through the railway crossing at km 127+123 in the same interstation where the accident occurred.

##### *4.3.5. Any other factors for the investigation objective.*

Not applicable.

#### **4.4. Feedback and control mechanisms, including risk and safety management, as well as monitoring processes:**

##### *4.4.1. Regulatory framework conditions.*

Commission Delegated Regulation (EU) 2018/761 of 16 February 2018 establishing common safety methods for supervision by national safety authorities after the issue of a single safety certificate or a safety authorisation pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulation (EU) No 1077/2012.

Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on safety management system requirements pursuant to Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulations (EU) No 1158/2010 and (EU) No 1169/2010.

ORDINANCE No 59 dated 5.12.2006 on the railway transport safety management.

##### *4.4.2. Processes, methods and results from the activities on the risk assessment and monitoring that the involved entities performed:*

###### *4.4.2.1. Railway undertakings.*

• "BDZ-Passenger Services" EOOD implements the Quality Management System PK 2-15 "Passenger Transportation Safety Management. Monitoring and exchange of information". In section 6.7. "SMS implementation control, item 6.7.2. "Periodic control of the implementation of the SMS is carried out through internal audits: monthly and complex. Complex audits are conducted once a year on all safety-related structures."

• In accordance with the requirements of the "Methodology for safety risk analysis and assessment in force from 23.02.2012", the railway undertaking BDZ PS EOOD has not prepared and submitted

monthly reports for the current year, as well as a complex (annual) audit previous year's risk monitoring report.

#### *4.4.2.2. Infrastructure Manager.*

- SE NRIC implements safety procedure PB 2.09 "Methodology for determining, assessing and managing risk" version 05 effective from 01.03.2019, which is part of the SMS.

#### *4.4.2.3. Entities in charge of the technical maintenance..*

##### *Railway undertaking*

- "BDZ-Passenger Services" EOOD is a certified ECM with Certificate No. BG/31/0021/0001 valid until April 18, 2026;

##### *Infrastructure Manager*

- SE NRIC is a certified ECM with Certificate No. BG/31/0020/0003 valid until 30.06.2025

#### *4.4.2.4. Manufacturers and all other participants.*

Not applicable.

#### *4.4.2.5. Reports for independent risk assessment.*

No assessment has been made by an Independent Assessor (AsBo) of any changes in operating conditions or factors relevant to the occurred accident.

#### *4.4.3. Safety management system of the involved:*

##### *4.4.3.1. Railway undertakings.*

"BDZ-Passenger Services" EOOD implements the "Methodology for Analysis and Assessment of Safety Risk", which is part of the SMS.

##### *4.4.3.2. Railway Infrastructure.*

SE NRIC implements safety procedure PB 2.09 "Methodology for determining, evaluating and managing risk version 05" effective from 01.03.2019, which is part of the SMS.

#### *4.4.4. Safety Management System of the entities in charge of the technical maintenance.*

"BDZ-Passenger Services" EOOD implements an approved "Safety Management System" effective from 30.07.2017, which also regulates the technical maintenance of traction and non-traction rolling stock.

SE NRIC implements Safety Procedure PB 7.01 "Regulations for maintaining the signalling system (Signalling equipment)", which is part of the SMS;

SE NRIC implements approved "Rules for current maintenance of a railway" in force from 2021, which include a section for maintaining the elements of the substructure of railway crossings.

#### *4.4.5. Results from the supervision, performed by the National Safety Authority*

The results of the performed audits and inspections regarding the functioning of the Safety Management System of SE NRIC and "BDZ-Passenger Services" EOOD in accordance with the requirements of Regulation (EU) 2018/761, Regulation (EU) No. 1169/2010, Regulation No. 56 and Ordinance No. 59 to satisfy the specific requirements of European legislation and national rules for the design, maintenance and operation of the managed railway infrastructure, show that the companies maintain the SMS and can fulfil the requirements provided for in the relevant legal acts.

In the period from 19.10.2020 to 30.10.2020, the National Safety Authority (RAEA) carried out an annual planned supervision of the SMS of SE NRIC.

In the period from 08.02.2021 to 19.02.2021, the National Safety Authority (RAEA) carried out an annual planned supervision of the SMS of "BDZ-Passenger Services" EOOD.

#### *4.4.6. Permits, certificates and assessment reports, provided by the National Safety Authority or other Conformity Assessment Bodies:*

##### *4.4.6.1. Safety certificates of the involved railway infrastructure manager*

SE NRIC holds Safety Authorization No BG 21/2018/0001 valid from 01.07.2018 to 30.06.2023.

*4.4.6.2. Safety certificates of the involved railway undertaking*

"BDZ-Passenger Services" EOOD owns Safety Certificate part A BG 11 2017 0009, valid until 30.12.2022;

"BDZ-Passenger Services " EOOD owns Safety Certificate Part B No. BG 12 2017 0009, valid until 30.12.2022;

*4.4.6.3. Authorizations for placing in service of permanently fixed facilities and authorizations for placing vehicles on the market.*

Not applicable.

*4.4.6.4. Entities in charge of the technical maintenance.*

"BDZ-Passenger Services" EOOD holds a Certificate of ECM for railway vehicles No. BG 12 2017 0009, valid until 30.12.2022;

SE NRIC is responsible for the repair, maintenance and operation of the national railway infrastructure.

*4.4.7. Other system factors.*

Not applicable.

**4.5. Previous similar cases.**

An accident of a similar nature was investigated by the NAMRTAIB in 2019 – a collision of passenger train No. 19205 with an automobile at a railway crossing with manual barriers and a crossing guard between Krumovo and Asenovgrad stations. Four people were traveling in the car with the driver. Because of the collision, one of the passengers next to the driver died after four days in the hospital. The other two, after a five-day stay in the hospital, were released healthy. Light damage was done to EMU series 31-005/006 with four coaches and heavy damage to the car.

## 5. Conclusions

### 5.1. *Summary of the analysis for the event causes.*

The Investigation commission visited the place of the accident several times, got acquainted with the collected and provided documentation about the maintenance and operation of the ALCD at km 127+123. Performed inspections of the temporary railway crossing at km 130+284, equipped with manual barriers with electric drive by a crossing guard, opened at the request of the GBS company for the movement of trucks carrying aggregates from the quarry to the site.

The Investigation commission got acquainted with the provided documentation on the technical condition of locomotive No. 91520044158-1.

The Investigation commission carried out several detailed inspections of the approaches of the railway to the level crossing and of the road to the level crossing. Conducted tests on the operation of the ALCD. It carried out inspections of the rolling stock (locomotive and coaches), conducted an interview with the station staff on shift at the time of the accident. Analyzed all the circumstances related to the collision of the locomotive into the freight vehicle.

It established that until the accident occurred, the rolling stock (locomotive and coaches) was standing, the signalling systems at the level crossing was working and was in good working order, the rail track was in good technical condition, the train was moving on time, observing the section speed for traffic and safety regulations.

The bodies of the pre-trial proceedings - NIS Sofia provided the head of the safety investigation at the NAMRTAIB with documents and materials of the company "Vidastroy" Ltd., from which it is clear that the truck "Iveco" was technically correct, with regular registration and technical inspection. the driver who drove the vehicle had the necessary professional qualifications, has been briefed, and was provided with the necessary documents for carrying out the transport.

The accident was caused by the passage of the heavy goods vehicle through the railway crossing at km 127+123 in the Dimovo - Oreshets interstation, without complying with the prohibitive light and sound indications of the traffic light.

#### *Violated regulations:*

There were violated the requirements of RIRTA:

- Art. 36, paragraph 2:

"The traffic light gives a signal consisting of one or two red lights flashing one after the other, which means 'Passing is prohibited';

- Art. 106:

"When approaching a railway crossing, road users are obliged to move with caution, and drivers of road vehicles - and at such a speed that allows them to stop in front of the crossing if necessary.";

- Art. 107:

"When crossing a railway crossing, road users are guided by the instructions of the crossing guard, the position of the barriers, the light and sound signalling and the road signs.";

- art. 109, item 3:

"Stopping of road vehicles in front of a railway crossing is mandatory when:

item 3. flashing red light of the traffic light and/or activated sound signalling, regardless of the position of the barriers";

- Art. 111:

"Before setting off to cross the railway, the driver must again make sure that no railway vehicle is approaching the crossing".

### 5.2. *Undertaken measures after the event occurrence.*

The Railway Infrastructure Manager undertook the restoration of the damaged section of the rail track in the area after the level crossing.

The derailed passenger coach No. 51522563027-3 of BV No. 7623 was raised on the rail track and taken for repair to WRD - Nadezhda to determine the damages.

The damaged locomotive No. 91520044158-1, serving FT No. 7623, was moved to the Oreshets station and subsequently to the Mezdra Locomotive Depot to determine the damage caused.

The commission of investigation from the NAMRTAIB carried out an inspection to establish the operation of the ALCD at the railway crossing in real operation.

With a letter to the general director of the NRIC "Automagistrali" EAD was requested to reduce the speed of the trains in the Oreshets - Dimovo interstation, given the heavy traffic of trucks passing through the railway crossing at km 127+123. As of 07.12.2022, a temporary reduction in the speed of all trains and vehicles has been introduced in the Oreshets - Dimovo interstation from km 127+100 to km 127+150 with a length of 50 meters to 25 km/h, covering the area of the railway level crossing.

### ***5.3. Additional findings.***

Not applicable.

## 6. Safety recommendations

In order to improve the safety in the rail transport, the Chairperson of the Investigation Commission at the NAMRTAIB proposes the following safety recommendations to the National Safety Authority (RAEA), related to SE NRIC and "BDZ-Passenger Services" EOOD and Dimovo municipality.

- Recommendation 1, proposes that SE NRIC and "BDZ-Passenger Services" EOOD familiarize the interested personnel with the contents of the report.

- Recommendation 2, suggests that the National Safety Authority RAEA organizes and proposes amendments and additions to Ordinance No. 4 of 27.03.1997 on the railway level crossings, that a representative of the State Agency be included in the commission under chapter five of the Ordinance "Road traffic safety".

- Recommendation 3, suggests that the National Safety Authority RAEA organizes and proposes an amendment and supplement to Ordinance No. 4 of 27.03.1997 on the railway level crossings, regarding updating the categorization of level crossings, on the main railway lines railway crossings equipped with ALCD, to re-equip with automatic semi-barriers (ASB).

- Recommendation 4, proposes that the SE NRIC develop a program for the phased re-equipment of the level crossings equipped with ALCD in the interstation of the main railway lines with automatic semi-barriers (APB), after amendment and supplement to Ordinance No. 4 for updating the categorization of the railway level crossings.

- Recommendation 5, proposes that SE NRIC gradually builds 24-hour video surveillance covering the passing flow of road vehicles and rolling stock through the level crossings located on the main railway lines.

- Recommendation 6, proposes that the Municipality of Dimovo restores and maintains the missing road signs A33 (railway level crossing without barriers) and A35 (balises) from the two road approaches to the railway level crossing at km 127+123 in the Dimovo - Oreshets interstation in accordance with the requirements of RIRTA and Ordinance No. 4/27.03.1997 on the railway level crossings.

In accordance with the requirements of Art. 24 (2) of Directive (EU) 798/2016 and Art. 91, para. 3 and para. 94, (1) and (4) of Ordinance № 59 of 5.12.2006, the Chairperson of the Investigation Commission in NAMRTAIB, provides a final report containing information on the circumstances and causes that led to the accident with formulated safety recommendations.

The Member of the Managing Board at NAMRTAIB, presents a final report with safety recommendations on 15.12.2022.

### Chairperson:

**Dr. Eng. Boycho Skrobanski**

*Deputy President of the NAMRTAIB AB*

### Members:

1. ....(s)..... (External expert)
2. ....(s)..... (External expert)
3. ....(s)..... (External expert)