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FINAL REPORT

of

investigation of significant accident – front collision of shunting train № 30802 with direct freight train № 30595 along Kremikovtsi- Svetovrachane interstation on 15.01.2025



Sofia 2025

OBJECTIVE OF INVESTIGATION AND EXTENT OF RESPONSIBILITY

The National Air, Maritime and Railway Transport Accidents Investigation Board (NAMRTAIB), which is an independent investigation body on safety 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 as the priority is given to avoiding significant accidents.

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 11.04.2023 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 National Air, Maritime and Railway Transport Accidents Investigation Board.

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

ABS – Automatic block system
BDZ Cargo EOOD – Railway undertaking for freight services (state carrier)
ST – Shunting train
TOS – Train Operation Schedule
DFT – Direct Freight Train
DI – Dispatching Interlocking
SE NRIC – State enterprise „National railway Infrastructure Company “(railway infrastructure manager)
STOMC – Single Train Operation Management Center
EDU – Electrical Distribution Undertaking at SE NRIC
OU – Operation Undertaking
RS – Railway Section (division at the infrastructure manager)
RTA – Railway Transport Act
OOU – Operation Organization Unit at the Railway Infrastructure Manager
RAEA– Railway Administration Executive Agency, National Safety Authority in the rail transport of the Republic of Bulgaria
km – Kilometer of the rail track
OCL – Overhead contact line (catenary)
CDC – Coordination Dispatching Center at the infrastructure manager
MoI – Ministry of Interior
RRI – Route Relay Interlocking
ORDINANCE No 58 – on the rules for the technical operation, train traffic and signalling in the rail transport
Ordinance № 59 – Ordinance on the rail transport safety management
NAMRTAIB – National Air, Maritime, and Railway Transport Accidents Investigation Board (Safety Investigation Body of the Republic of Bulgaria)
NIS – National Investigation Service (pre-trial investigation body at the prosecutor's office)
TF – Task Force
RPO – Regional Prosecutor's Office
SE – Signalling equipment
PT – Passenger Train
RTOSART – Rules for the train operation and shunting activity in the rail transport
RRS – Rail Rolling Stock
PIMK RAIL EAD – Railway undertaking for freight services (private railway undertaking)
RTORI – Rules of technical operation of the railway infrastructure of SE NRIC
RRI – Regional Railway Inspection – Department at the National Safety Board
RITS – Regional Inspection, Transport Safety“at SE NRIC
RLHDI – Reserve local handling for dispatching interlocking
RPOS – Regional Prosecutor's Office Sofia
RPD – Regional Police Department at MoI
EMC – Emergency Medical Care
SMS – Safety Management System
TOMS – Train operation management system
TRS – Traction Rolling Stock
TOSAMD – Train operation and station activity management Division (division of SE NRIC)
DCCM – Device for communications, connections and messages in stations
UMHAT – University multi-disciplinary hospital for active treatment
CDMDI – Central Dispatching Management of the dispatching interlocking
PQC – Professional qualification centre at SE NRIC
PQC – Professional qualification centre at Holding BDZ EAD

1. Summary

1.1. Brief description of the event.

At 08:00 a.m., came at work the train chief, freight traffic, shunting switchman, wagon inspector technician, and employees of BDZ-Cargo EOOD at Iliyantsi station. The shift manager conducted a pre-shift briefing to the shunting crew.

The shift manager received an order from the senior dispatcher of BDZ-Cargo EOOD, diesel locomotive No. 98520055093-7 to leave for Kremikovtsi station to service ST No. 30802. The order was also transmitted to the shunting crew.

At 08:53 a.m. on 15.01.2025, an Application for a route request from BDZ-Cargo EOOD was submitted to TOMS for the preparation of a timetable and assignment for the movement of an insulated locomotive No. 98520055093-7 on the Voluyak - Iliyantsi - Kremikovtsi route.

From 09:00 a.m. to 09:57 a.m., the train dispatcher, through the TRIS CTC system, gave permission to perform shunting with a group of wagons from the railway undertaking "Rail Cargo Carrier-Bulgaria" EOOD at Kremikovtzi station, for the purpose of transporting them to an industrial branch of "SIEN 99" EOOD.

At around 09:40 a.m. the shunting crew headed to Kremikovtsi station, both traveling in their personal cars.

At 10:00 a.m., an insulated locomotive No. 98520055093-7 departed from Iliyantsi station, serviced by an engine driver, locomotive and assistant driver, and locomotive and wagon inspector technician traveling in the locomotive.

Given the objective control data downloaded from the TRIS CTC system, at 10:14 a.m. Kremikovtsi station switched to reserve local control (RLC), which was not mentioned in the written statements of the train dispatcher and duty traffic manager at Kremikovtsi station.

When the shunting crew arrived at Kremikovtsi station, around 10:15 a.m., the sales manager informed them that on the third track in the industrial branch of "SIEN 99" EOOD there were 15 wagons loaded with scrap, with which ST No. 30802 had to be composed.

A shift plan was prepared by the shunting crew, which went to the duty traffic manager, signed the daily briefing book at Kremikovtsi station, presented the shift plan to the duty traffic manager and discussed the upcoming shunting work on composing ST No. 30802. During the conversation, the duty traffic manager learned from the shunting crew that an auxiliary diesel locomotive for ST No. 30802 would also arrive.

At 10:43 a.m., Kremikovtsi station switched to CDI.

At 13:11 p.m., an insulated locomotive No. 98520055155-6 of BDZ-Cargo EOOD arrived at the fourth ADT.

During that time, in the industrial branch of "SIEN 99" EOOD with locomotive No. 98520055093-7, shunting works were carried out to collect the two groups of wagons, tighten the screw couplings, connect the air duct sleeves and perform a technical inspection of the wagons and a full test A of the automatic brakes.

During the preparation period of ST No. 30802, the train chief, freight traffic went to the office of the duty traffic manager and informed him that a shunting had to be carried out with two damaged wagons from the industrial branch of "SIEN 99" EOOD and they had to be parked on a third ramp track at Kremikovtsi station, with which the duty traffic manager agreed.

After the arrival of insulated locomotive No. 98520055155-6 at Kremikovtsi station, the duty traffic manager at 13:28 p.m. called the train dispatcher (the conversation was conducted on personal mobile phones) with a request to take the RLHDI station so that they would not make "unnecessary shunting." According to the written testimony of the duty traffic manager, the term "unnecessary shunting" was a tacit agreement to send directly ST No. 30802 from the industrial branch of "SIEN 99" EOOD to Svetovrachene station.

With the consent of the train dispatcher, without performing the necessary manipulations with the TRIS CTC system and without issuing a dispatch order, the traffic manager on duty used an irregular key (available at the station from the moment before the TRIS CTC system was put into regular operation along the section) and at 13:27 p.m. forcibly took over Kremikovtsi station from the RLHDI (according

to the data from the sample for objective control of events from the TRIS CTC system) and immediately after that allowed a shunting position at Post No. 2.

After assuming the shunting position, a shunting was performed with locomotive No. 98520055093-7 and the two damaged wagons from the industrial branch of "SIEN 99" EOOD were transferred to the third ramp track at Kremikovtsi station.

At 14:03 p.m., the shunting of re-routing locomotive No. 98520055093-7 from the third ramp track in the industrial branch of "SIEN 99" EOOD followed. At 14:07, locomotive No. 98520055155-6 was again re-routed from the fourth receiving-departing track in the industrial branch of "SIEN 99" EOOD, after which the station was returned to the CDU. The two locomotives were successively transferred to the third track in the industrial branch and were attached to the wagons of the ST No. 30802.

At around 14:30 p.m., the freight train manager went to the office of the duty traffic manager and informed him that he had "urgent work and must leave." In the conversation, the duty traffic manager asked whether ST No. 30802 would depart from the industrial branch of "SIEN 99" EOOD, to which he received a positive answer from the freight train manager, who also mentioned that the wagon documents were being wait from the customs. The duty traffic managers agreed loudly with "yes" to ST No. 30802 leaving the industrial branch for Svetovrachene station, after which the shunting crew left Kremikovtsi station, each in their own car.

At around 15:00 p.m., the shipper provided the commercial manager with the customs-processed documents for the wagons of ST No. 30802, and he prepared the physical list (form DP-1), handing over a copy of the wagon bills to TMRV.

At 15:01 p.m., the train dispatcher on duty of BDZ-Cargo EOOD held a conversation with the train dispatcher (on the landline office phones), during which he expressed his desire for ST No. 30802 to depart from Kremikovtsi station before the scheduled departure time, according to the TOS. At 15:07 p.m., such a conversation was held again, in which the train dispatcher on duty replied that he had no objection, but the train had not yet been composed on the station track and a request had to be submitted by BDZ-Cargo EOOD. Such a request was sent to an office e-mail.

Despite the received request, the train dispatcher on duty did not issue a movement order ahead of time for ST No. 30802, which he should transmit to the traffic manager on duty at Kremikovtsi station. At Voluyak station, DFT No. 30595 of the railway enterprise "Pimk Rail" EAD was composed.

At 15:12 p.m., the same departed with 32 wagons, 96 axles, 497 meters, 686 tons, locomotive No. 92520007063-7 in working condition, using the route to Tulovo station and led by locomotive No. 91521080013-1. The train passed through Sectional post 4 without stopping and at 15:25 p.m. arrived at Iliyantsi station at 15:30 p.m., where it stayed for 5 minutes to meet with ICPT No. 20245.

Around 15:30 p.m., the shunting crew arrived at Iliyantsi station with their personal cars.

The train dispatcher on duty called the traffic manager on duty at Kremikovtsi station (the conversation was conducted again on personal mobile phones) and said: "FT No. 4610 comes from Yana station and passes without stopping at Kremikovtsi station". In response, the traffic manager on duty at Kremikovtsi station said okay informed that ST No. 30802 was ready to depart, and dictated its composition, then asked when to send it to Svetovrachene station. The train dispatcher on duty answered: "after the fast train". After the conversation and after signing the brake mass certificate of ST No. 30802, the duty traffic manager informed the TMRV that he would release the train after passing FT No. 4610.

At 15:31 p.m., the duty traffic manager at Iliyantsi station called the duty train dispatcher on the official landline phone with a request for consent to send DFT No. 30595 and received consent.

At 15:33 p.m., FT No. 4610 passed without stopping along the first receiving-departing track (main) of Kremikovtsi station towards Svetovrachene station.

At 15:35 p.m., DFT No. 30595 departed towards Svetovrachene station. The train stopped for 16 seconds in front of the entrance semaphore of Svetovrachene station on the Iliyantsi side due to an ordered route for the transit passage of FT No. 4610 from Kremikovtsi through Svetovrachene station to Kurilo station.

Shortly after 15:40 p.m., the train dispatcher on duty went to the office of the head of the Sofia Railway Station, with a request to give him a permission to visit the toilet. The two went to the workplace

to familiarize him with the operational situation. The information provided about the movement of trains in the section was incomplete.

Meanwhile, the head of the Sofia Railway Traffic Department, observing the movement of FT No. 4610 through Svetovrachene station and its departure to Kurilo station, arranged a transit route for passing through Svetovrachene station on DFT No. 30595 to Kremikovtsi station.

After accepting the local shunting, the switchman/crossing guard at Post No. 2 at Kremikovtsi station arranged a route for exiting the industrial branch of "SIEN 99" EOOD through the shunting console, which led to the current track in the direction of Svetovrachene station, and exiting in front of the shunting post building, gives a manual signal for the shunting "Ready!". At 15:48 p.m., ST No. 30802 illegally departed from the industrial branch of "SIEN 99" EOOD to Svetovrachene station.

After seeing that the shunting train departed illegally, the traffic controller on duty went to the sanitary unit.

At 15:49 p.m., DFT No. 30595 passed through Svetovrachene station without stopping and took the interstation route to Kremikovtsi station.

At that time, the shift manager at OOU Sofia noticed on the station visualization monitor in the section that a local shunting was allowed at Post No. 2 at Kremikovtsi station and a shunting was performed in the station entrance towards Svetovrachene station. For this reason, he repeatedly tried to contact the direct dispatching connection with the traffic manager on duty at Kremikovtsi station, and after failing, decides to call his work mobile phone.

While the unsuccessful attempts to connect continued, ST No. 30802, consisting of 15 full wagons with scrap, 60 axes, 210 meters, 1089 tons, train locomotive 98520055093-7 and leading locomotive 98520055155-6, travelled to Svetovrachene station.

At 15:52 p.m., the head of the Sofia OOU managed to contact the traffic controller on duty at Kremikovtsi station on his official mobile phone, asking if he was manoeuvring with many wagons because he had ordered a transit from Svetovrachene on DFT No. 30595 of Pimk Rail EAD. In response, the connection was disconnected.

Entering his office, the traffic controller on duty saw that the direction of the automatic blocking was in the direction of reception and was busy.

The head of the Kremikovtsi station on duty called the direct dispatching line and had a conversation with the head of the Sofia OOU, during which it was established that the two trains were traveling towards each other. An attempt was made to turn off the voltage in the overhead contact line, but the actions were delayed.

According to the described events in the time range from 15:49 p.m. to 15:55 p.m., according to a written testimony of the locomotive crew of DFT No. 30595 in locomotive No. 91521080013-1, leaving the area of the Svetovrachene station, they continued their movement along the inter-station area. "After passing the Lokorsko stop and exiting the right curve" the driver, locomotive 2nd person in locomotive No. 91521080013-1, saw that a train was moving towards them no more than 300-400 meters away, managed to shout to his colleague "A train is coming!" and ran to the second cabin of the locomotive. The reaction of the locomotive driver 1st person was to immediately undertake a "quick stop" and also ran to the other cabin of the locomotive.

At 15:57 p.m. at km 11+949 in the Svetovrachene - Kremikovtsi interstation, a collision occurred between DFT No. 30595 of Pimk Rail EAD and ST No. 30802 of BDZ-Cargo EOOD.

At 15:56 p.m., the train dispatcher on duty entered the ECUDV and learned about the occurred situation.

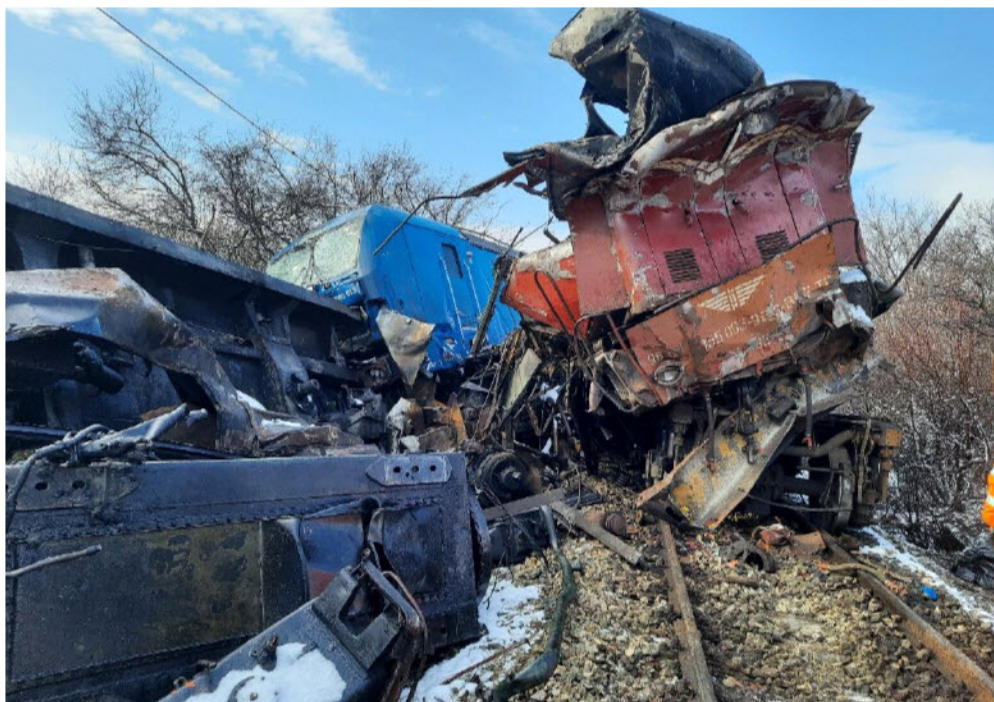


Fig. 1.1. Place of the accident.

Immediately after the accident, in the first minutes after 16:00 p.m., emergency medical teams from the FSaCP and MoI arrived.

The injured were transported by ambulance to the Military Medical Academy, the St. Anna University Hospital, the Ts. Yoanna - ISUL University Hospital and the N.I. Pirogov University Hospital for examination and treatment.

The bodies of the locomotive driver and the assistant locomotive driver were found in locomotive No. 98520055093-7.

At around 16:30 p.m., the first inspections of the scene by the pre-trial investigation bodies of the NIS and the safety investigation body of the NAMRTAIB.

Damage was caused to the railway track, the signalling equipment, the catenary and, the rolling stock-locomotives and wagons.

1.2. Location and time of the event occurrence.

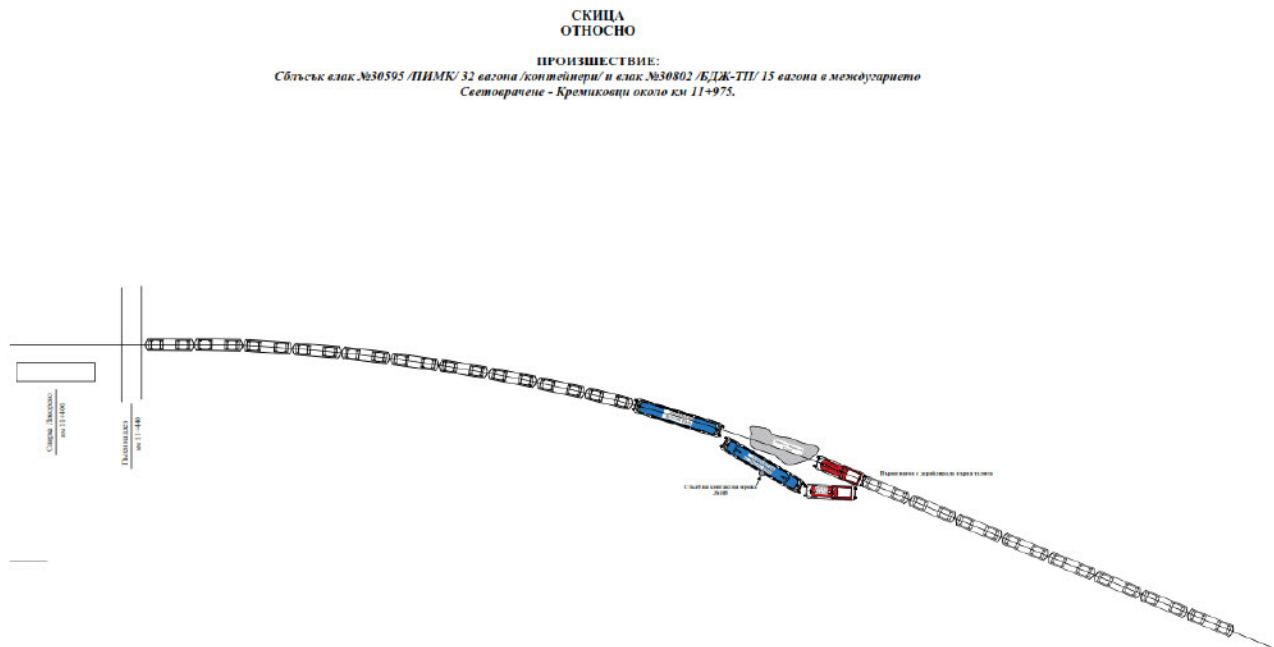


Fig. 1.2. Scheme of the place of the accident.

The event occurred at km 11+949 in the Svetovrachene - Kremikovtsi interstation on 15.01.2025 at 15:57 p.m. The railway track in the area of the accident is straight with a slope of 4 ‰ in the direction of the kilometre mileage (Fig. 1.2)

1.3. Factors determining and contributing the event.

Determining factors: the actions in the organization of work of the train dispatcher, the duty traffic manager at Kremikovtsi station, locomotive and transport crews led to the unregulated departure of ST No. 30802 from Kremikovtsi station to Svetovrachene station. If the regulations for the train traffic and shunting work for the departure of ST No. 30802 from the receiving-departing track at Kremikovtsi station had been observed, the accident could have been prevented.

Contributing factors: the absence of the train dispatcher from the workplace, accompanied by incomplete communication with the deputy head of the unit of the Sofia Regional Office and the duty manager at Kremikovtsi station, which led to the prerequisites for the event. If he had transmitted the complete operational situation to the deputy head of the unit of the Sofia Regional Office, the accident could have been prevented.

Systemic factors: the organization of work at Kremikovtsi station, the systematic violation of train traffic rules by the employees of the railway undertaking BDZ Cargo EOOD and the infrastructure manager SE NRIC, the absence of the train dispatcher from the workplace and the incomplete communication between the individual participants led to unregulated train traffic management.

1.4. Direct causes and consequences of the event.

The direct causes of the accident are a complex of violations of the regulations governing the train traffic:

- Unregulated departure of ST No. 30802 from the shunting track of the industrial branch at Kremikovtsi station;
- Unregulated communication between the train dispatcher and the duty manager at Kremikovtsi station;
- Unregulated verbal agreements between the train master, freight traffic of ST No. 30802 and the duty manager at Kremikovtsi station.
- The consequences of the event are:

- Two employees of the railway undertaking BDZ Cargo EOOD died - the locomotive crew of locomotive No. 98520055093-9 of ST No. 30802;
- Six employees seriously injured;
- Three locomotive drivers of the railway undertaking "Pink Rail" EAD;
- Two locomotive drivers and a TMRV of the railway undertaking BDZ Cargo EOOD;
- Material damage caused to locomotive No. 91521080013-1 and locomotive No. 92520007063-7 of "Pink Rail" EAD;
- Material damage caused to locomotive No. 98520055155-6 and locomotive No. 98520055093-9 of BDZ Cargo EOOD;
- Interruption of traffic from 15.01.2025 to 18.01.2025.

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 SE NRIC and "Pink Rail" EAD.

- Recommendation 1 proposes that SE NRIC, "BDZ-Cargo" EOOD and "Pink Rail" EAD familiarize interested personnel with the content of the report;
- Recommendation 2 proposes that SE NRIC request a risk assessment of the "Control, Command and Signalling" subsystems in the Ilyantsi/Kurilo – Karlovo section in accordance with Commission Implementing Regulation (EU) No. 402/2013 and Art. 7, item 16 of the Railways Act;
- Recommendation 3 proposes that SE NRIC restore the operation of the TDRC in sections where there is no GSM-R communication, including the Ilyantsi/Kurilo – Karlovo section;
- Recommendation 4 proposes that SE NRIC should carry out constant control over the implementation of Order No. ŽI-43705/05.12.2024 of the Director General of SE NRIC determining the procedure and manner for the movement of rolling stock not equipped with TDRC and GSM-R in sections equipped with TDRC and GSM-R;
- Recommendation 5 proposes that the personnel of "Pink Rail" EAD, related to the safety of transport, should be trained in licensed educational institutions according to the register of NAVET;
- Recommendation 6 proposes that "Pink Rail" EAD should ensure reliable communications between the personnel engaged in train control and train movement management in SE NRIC;
- Recommendation 7 proposes that BDZ Cargo EOOD shall install TDRC in diesel locomotives (mainline and shunting).

2. Investigation

2.1. Decision for starting the investigation.

Decision to initiate a safety investigation was made by the member of Management Board of the NAMRTAIB in the Republic of Bulgaria, leading the investigation of railway accidents and incidents as per art. 22, paragraph 3 of Directive (EU) 2016/798 of the European Parliament and the Council. Given the severity of the accident and its impact on the railway safety, the investigation was focused on establishing the causes and the analysis, aimed at preventing other accidents of a similar nature in the railway transport.

2.2. Motives for the decision to initiate the investigation.

The member of the Management Board of the NAMRTAIB, leading the railway investigation section, took the decision to initiate the investigation based on art. 20, paragraph 1 (a) and (c) of Directive (EU) 2016/798, art. 115к, paragraph 1, item 1 of RTA, and art. 76, par. 1, item 1, and art. 78, par. 1 and par. 2 of Ordinance No 59 dated 5.12.2006.

The investigation was initiated in view of the circumstances that led to fatal outcome of the locomotive crew of locomotive No. 98520055093-7 and six other employees of the locomotives of the two railway companies with serious traumas and injuries sustained because of the head-on collision of the two trains.

2.3. Scope and restrictions of the investigation.

The scope of the investigation includes and analyses the organizational and human factors, since all employees involved in the accident are from the State Enterprise NRIC, BDZ-Cargo EOOD and "Pink Rail" EAD. The safety management system relevant to the operation and management of the railway infrastructure in the implementation of the TOS, as well as the RRS. The activities to ensure the movement of trains in sections with AB. This includes the risk assessment with the registered hazards, listed in the regulatory acts, instructions and rules of the railway infrastructure manager for ensuring movement, as well as the management of TPRS.

Limitations and delays in the investigation have been allowed by Forensic Medicine - regarding the preparation of forensic medical examinations.

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

The member of the Management Board of the NAMRATIB, head of railway transport field heads the Investigation Commission as per art. 22, paragraph 1 of Directive 2016/798. The members of the Commission are external independent experts - habilitated persons from the higher transport institutions and experts with qualification and professional orientation in fields of activity – operation and management of the railway transport, human and organizational factor, rail rolling stock, signaling equipment, railway infrastructure.

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

The member of the Board of the NAMRATIB, arriving at the scene of the accident, determined the parameters of the investigation and coordinated his actions with the Task Force, which includes the heads of divisions and transport safety bodies of the railway infrastructure manager (SE NRIC of the railway enterprises BDZ-Cargo EOOD and "Pink Rail" EAD). The Task Force in accordance with the requirements of Ordinance No. 59, collected all documents, samples, materials and written statements of the personnel involved in the accident. At the scene of the accident, the member of the Board of the NAMRATIB conducted an interview with the heads of the enterprises involved in the accident, as well as with the representatives of safety and traffic management. The shift personnel at the Svetovrachene and Kremikovtsi stations, the shift train dispatcher on duty, the senior train dispatcher, as well as the head of the Sofia Railway Safety Department, who replaced the train dispatcher in the ECUDV of SE NRIC, were questioned. In the course during the investigation conducted by SE NRIC, BDZ Cargo EOOD and "Pink Rail" EAD, additional documents and materials on the investigation were requested and provided.

2.6. Extent of cooperation from the participating entities.

During the investigation conducted by the Investigation Commission at the NAMRATIB, the management of the railway infrastructure manager, SE NRIC, BDZ-Cargo EOOD and "Pimk Rail" EAD provided full cooperation and provided the necessary set of materials and documents required for the investigation. Access was provided for multiple technical inspections of the rolling stock - the four locomotives of the two trains, the signalling equipment at the Svetovrachene and Kremikovtsi stations, as well as the train dispatcher's control panel at the ECUDV and CDR of SE NRIC, the railway track and the overhead contact line in the area of the accident along the inter-station.

2.7. Methods and techniques of investigation and analysis.

On 15.01.2025 at 16:39 p.m., the member of the Board of the NAMRATIB with competence to investigate railway accidents received a written notification by SMS on the official mobile phone of the central senior dispatcher on duty at NRIC with the following text:

"At 15:48 p.m., train 3595/PIMK/ and train 30802 /BDZ Cargo/ collided at the Svetovrachene - Kremikovtsi interstation. Train traffic has been suspended."

On the same day at around 17:15 p.m., the member of the Board of the NAMRATIB with competence to investigate railway accidents left for the scene of the accident at the Svetovrachene - Kremikovtsi interstation and arrived around 18:30 p.m.

Until the arrival of the pre-trial investigation bodies from the National Investigative Service, everything was preserved without changes to the situation and the ambient, as well as the location of the two trains on the railway infrastructure, the location of the bodies of the deceased locomotive drivers in the cabin of the second locomotive of ST No. 30802.

After the arrival at the scene of the accident, the pre-trial investigation bodies from the National Investigative Service (Nils), together with the member of the Board, head of the railway accident department at the NAMRATIB, jointly organized and conducted inspections of the site of the collision of the two trains. Inspections of the four derailed locomotives were carried out. Inspections of the railway track, the signalling equipment facilities and the overhead contact line, which was interrupted and fell onto the railway track due to a broken pole, were carried out.

The bodies of the FSaCP removed the charred bodies of the deceased drivers from the second burning locomotive of ST No. 30802. The bodies of the pre-trial proceedings of the NIS drew up a report after the inspections of the scene.

At around 23:00 p.m., after the completion of the on-site inspections, the pre-trial investigation authorities from the NIS, together with the member of the Board, head of the railway accident department at the NAMRATIB, left for Svetovrachene station. Interrogations and interviews were conducted with the shift personnel (duty traffic controller and station switchman). The station control panel, station logs and train traffic books were inspected, as well as an inspection of the relay room for controlling the security and signaling equipment.

From Svetovrachene station, the investigative authorities of both structures headed for Kremikovtsi station, where an interrogation and interview was conducted with the shift personnel (duty traffic controller, station switchman/crossing guard at Post No. 2 and the station manager). The pre-trial investigation authorities detained the duty traffic controller for 24 hours. The station logs and books were inspected, and the pre-trial investigation authorities seized them. Inspections were carried out of the control panel and the relay room in the station. Inspections were carried out of the receiving and transmitting platform located in the industrial branch of "SIEN 99" EOOD in the rear part of the reception building, from where ST No. 30802 departed.

After completing the inspections at Kremikovtsi station, the investigative bodies of both structures headed to Sofia Central Station. The structures for the train traffic management (ECUDV and CDR) of SE NRIC are located in the reception building of the station. The train dispatcher on shift, the head of TOU Sofia (who replaced the train dispatcher) and the senior train dispatcher were questioned on site. The CDR staff on shift were also questioned. Inspections were carried out of the train traffic management control panel, by visualizing the monitors in the Sofia - Karlovo section. Demonstrations were made of taking individual stations under local control and returning them to central dispatch control.

Inspections were carried out of the control panel for supplying the section with voltage from the traction substations in the overhead contact network. Switching off and on the catenary voltage on a specific section was demonstrated.

The Investigation Commission at the NAMRATIB held several working meetings with interviews with the personnel involved in the accident, with the managers and safety services of the enterprises SE NRIC, BDZ Cargo EOOD and "Pink Rail" EAD.

The Chairman of the Investigation Commission at the NAMRATIB held several working meetings with the members of the commission to accept their written opinions on the tasks set by the investigation.

The Chairman of the Investigation Commission at the NAMRATIB held a working meeting with the members of the commission and proposed a structure for a draft final report that would present the shortcomings in the signalling equipment on the Iliyantsi - Karlovo section and the regulatory acts not complied with by the staff of the railway infrastructure manager at the National Railway Infrastructure and the railway enterprises BDZ Cargo EOOD and "Pink Rail" EAD.

On 05.02.2025, the Chairman of the Investigation Commission at the NAMRATIB received the collected documents and materials from the head of the Task Force, with which he introduced the members of the investigation commission and continued the investigation until the preparation of a draft final report.

In the period from 12.08 to 15.08.2025, the Investigation Commission conducted inspections and meetings with the management and safety authorities and requested additional materials in connection with the accident at the office of the railway enterprise "Pink Rail".

2.8. Difficulties faced during the investigation.

During the investigation, representatives of the railway infrastructure manager SE NRIC, BDZ Cargo EOOD, "Pink Rail" EAD and the Task Force assisted the Commission for Investigation at the NAMRATIB.

2.9. Interaction with the judicial authorities.

At around 16:20 p.m., the first to arrive at the scene of the accident after receiving a notification by phone 112 were the patrol bodies of the Ministry of Interior. By order of the Ministry of Interior, the area of the accident was fenced off and access to railway employees and outsiders was restricted. All traces of the vehicles and railway infrastructure were preserved until the arrival of the pre-trial investigation bodies from the NIS and the safety investigation body at the NAMRATIB under the Council of Ministers.

The investigation bodies from the NAMRATIB, the National Investigative Service, teams from the Fire Safety and Civil Protection Service and the Emergency Medical Care were allowed to the protected area to provide first aid to the injured personnel and transport them to medical facilities. The train traffic on the Kremikovtsi - Svetovrachene interstation was stopped.

In accordance with the current Agreement on Cooperation between the investigative bodies of the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Interior and the NAMRATIB, effective from 11.04.2023, the investigation actions were coordinated. After the arrival of the pre-trial investigation bodies from the NIS, together with the head of the investigation in relation to safety at the NAMRATIB, they coordinated the boundaries of the scene of the incident and the sequence of investigation actions in order to safely handle and preserve the identified material evidence.

At 18:15 p.m. on 15.01.2025, in the dark, parallel inspections began by the head of the investigation in relation to safety at the NIS and the pre-trial investigation bodies from the NAMRATIB. The inspections were carried out under electric lighting.

The investigation into the pre-trial proceedings is carried out by competent investigative bodies of the National Police, under the supervision of a supervising prosecutor from the Sofia District Prosecutor's Office. Media access to the scene is limited. The inspections ended at 22:30 p.m.

On 16.01.2025 at 09:15 a.m. at the scene of the accident, joint inspections by the pre-trial proceedings bodies of the NIS and the member of the NAMRATIB.

2.10. Other important information for the investigation context.

2.10.1. Materials provided by the pre-trial authorities – NIS:

The chair of the Investigation Commission in relation to the safety at NAMRATIB has required and received the following materials from the pre-trial judicial authorities at the NIS:

1. Technical expertise for the movement of locomotive No. 91521080013-1, servicing DFT No. 30595 of "Pimk Rail" EAD in the Svetovrachene - Kremikovtsi interstation on 15.01.2025;
2. Technical expertise for the movement of locomotive No. 98520055155-6, first servicing ST No. 30802 of BDZ Cargo EOOD in the Svetovrachene - Kremikovtsi interstation on 15.01.2025;
3. Report of interrogation of locomotive driver 1st person of locomotive No. 91521080013-1;
4. Report of interrogation of locomotive driver 2nd person of locomotive No. 91521080013-1;
5. Report of interrogation of locomotive driver of locomotive No. 98520055155-6;
6. Report of interrogation of assistant locomotive driver of locomotive No. 98520055155-6;
7. Report of interrogation of duty traffic controller at Kremikovtsi station on 15.01.2025;
8. Report of interrogation of switchman/crossing guard at Kremikovtsi station on 15.01.2025;
9. Report of interrogation of head of Operational Dispatch Unit on 15.01.2025;
10. Report of interrogation of train dispatcher on shift on 15.01.2025;
11. Report of interrogation of commercial manager at Kremikovtsi station on 15.01.2025;
12. Report of interrogation of freight train traffic manager of MV No. 30802 on 15.01.2025;
13. Report of interrogation of the technician-mechanic inspector of wagons of ST No. 30802 on 15.01.2025;
14. Forensic medical examination No. 39/2025 of the locomotive driver of locomotive No. 98520055155-6;
15. Forensic medical examination No. 40/2025 of the assistant locomotive driver of locomotive No. 98520055155-6;

2.10.2. Materials provided by „PIMK RAIL“ EAD

1. Protocol No. 71/08.09.2021 for acquiring additional qualification for a series of locomotives of a locomotive driver first person of an electric locomotive No. 91521080013-1, issued by a Commission of "PIMK RAIL" EAD;

2. Protocol No. 69/08.08.2021 for acquiring additional qualification for a series of locomotives of a locomotive driver second person of No. 91521080013-1, issued by a commission of "PIMK RAIL" EAD;

The investigation commission does not accept the submitted protocols, as they do not meet the requirements of Art. 8, para. 1 of Ordinance No. 56/14.02.2003 on the requirements, conditions and procedure for training candidates for acquiring the qualification required by the personnel responsible for the safety of railway transport, or recognition of such qualification and the procedure for conducting the verification exams of the personnel responsible for the safety of transport;

3. Card for preliminary medical examination of a locomotive driver of a diesel locomotive No. 92520007063-7, issued on 08.04.2024 by a general practitioner, the city of Lovech.

The investigation commission does not accept the provided card for preliminary medical examination. It does not meet the requirements of Art. 4 of Ordinance No. 54 of 2.06.2003 on the medical and psychological requirements for personnel performing railway transport of passengers and freight and related activities, and on conducting pre-trip (pre-shift) medical examinations;

The investigation commission received from PIMK Rail EAD:

1. Certificate of professional training reg. No. 3083-310/13.06.2025 of a first-person driver of an electric locomotive No. 91521080013-1 for a locomotive driver of electric locomotives series SIEMENS SMARTRON (X4-E/FAMILY D/ VARIANT D02) – X4ELFHB – SOFTWARE VERSION E1.03 “BDZ SERIES 80”, issued by the PQC at “BDZ Cargo” EOOD;
2. Certificate of professional training reg. No. 3080-307/13.06.2025 of a second person driver of an electric locomotive No. 91521080013-1 for a locomotive driver of electric locomotives series SIEMENS SMARTRON (X4-E/FAMILY D/ VARIANT D02) – X4ELFHB – SOFTWARE VERSION E1.03 “BDZ SERIES 80”, issued by the CVT at “BDZ Cargo” EOOD;
3. Card for preliminary medical examination dated 01.09.2025, issued by the Multi-profile Transport Hospital – Plovdiv to a locomotive driver of a diesel locomotive No. 92520007063-7.

3. Description of the event

3.1. Information on the event and the context.

3.1.1. Description of the event type.

The Svetovrachene and Kremikovtsi stations are located on the main line No. 3 with the route Ilyantsi – Karlovo – Karnobat – Varna ferry. They are adjacent and are located in a section equipped with a dispatching interlocking TRIS CTC (Ilyantsi – Kuriko – Svetovrachene – Karlovo), which is managed by a train dispatcher. The workplace is in the Single Train Traffic Management Center (STMC), located in the Sofia Station building. Both stations are equipped with route-relay interlocking and automatic blocking without passing signals with axle counters.

In connection with the "Request for a train path" submitted by the railway enterprise "Pimk Rail" EAD No. 027/14.01.2025, with telegram No. 372/14.01.2025 of the Director General of SE NRIC, direct freight train (DFT) No. 30595 was assigned for operation on 15.01.2025 with a schedule on the route Bozhurishte - Voluyak - Ilyantsi - Karlovo - Karnobat - Burgas and the parameters of the train (Fig. 3.1).

ДТВ 30595 "Пимк Рейл" ЕАД 45% лок07/1080 / 15.01.2025					
божурище	-	:	-	- 14:29	-36
60 ВОЛУЯК	10	14:39	-36	33 15:12	-63 10208
40 РП 4	13	:	-	-63 - :25	-63
ИЛИЯНЦИ	5	15:30	-63	5 :35	-63 20245
60 СВЕТОВРАЧЕНЕ	14	:	-	-59 - :49	-59
КРЕМИКОВЦИ	4	15:53	-67	- : -	
СВЕТОВРАЧЕНЕ	-	:	-	- 12:54	X
60 КРЕМИКОВЦИ	15	:	-	- 13:09	X
40 ЯНА	12	:	-	- :21	X
70 СТОЛНИК	10	:	-	- :31	X
65 САРАНЦИ	16	:	-	- :47	X
МАКОЦЕВО	6	:	-	- :53	X
70 ДОЛНО КАМАРЦИ	9	:	-	- 14:02	X
буново	8	:	-	- :10	X
65 МИРКОВО	9	:	-	- :19	X
челопеч	9	:	-	- :28	X
70 ЗЛАТИЦА	4	:	-	- :32	X
ПИРДОП	6	:	-	- :38	X
80 АНТОН	6	:	-	- :44	X
65 КОПРИВЩИЦА	10	:	-	- :54	X
75 СТЯМА	7	:	-	- 15:01	X
65 КЛИСУРА	13	:	-	- :14	X
ХРИСТО ДАНОВО	18	:	-	- :32	X
иганово	9	:	-	- :41	X
70 СОПОТ	8	:	-	- :49	X
КАРЛОВО	6	:	-	- :55	X
БОТЕВ	8	:	-	- 16:03	X
80 свежен	8	:	-	- :11	X
60 КАЛОФЕР	7	:	-	- :18	X
ТЪЖА	11	:	-	- :29	X
САХРАНЕ	13	:	-	- :42	X
ДУНАВЦИ	8	:	-	- :50	X
70 КАЗАНЛЪК	10	:	-	- 17:00	X
60 ЧЕРГАНОВО	9	:	-	- :09	X
75 ТУЛОВО	8	:	-	- :17	X
ДЪБОВО	9	:	-	- :26	X
65 ветрен	8	:	-	- :34	X
70 николаево	9	:	-	- :43	X
80 ГУРКОВО	5	:	-	- :48	X
ТВЪРДИЦА	8	:	-	- :56	X
60 ШИВАЧЕВО	15	:	-	- 18:11	X
70 чумерна	6	:	-	- :17	X
60 орешак	7	:	-	- :24	X
65 ГАВРАИЛОВО	6	:	-	- :30	X
70 СЛИВЕН	17	:	-	- :47	X
65 ЖЕЛЮ ВОЙВОДА	17	:	-	- 19:04	X
75 ЗИМНИЦА	11	19:15	1	:16	път 2 X
СТРАЛДЖА	10	:	-	- :26	X
80 ЦЕРКОВСКИ	13	:	-	- :39	X
КАРНОБАТ	11	:	-	- :50	X

Fig. 3.1. Schedule of DFT № 30595.

ST № 30802 run under TOS with route from Kremikovtsi station to Ilyantsi (fig. 3.2).

=====									
МВ 30802 "БДЖ - Товарни превози" ЕООД 40% лок06 / 15.01.2025									

КРЕМИКОВЦИ	-	:	-	-	15:57	-19			
60 СВЕТОВРАЧЕНЕ	1	15:58	-29	-	:	-			
КРЕМИКОВЦИ	-	:	-	-	12:41				X
60 СВЕТОВРАЧЕНЕ	11	:	-	-	:	52			X
ИЛИЯНЦИ	9	13:01		60	14:01				X
40 РП 4	6	:	-	-	:	07			X
ВОЛУЯК	11	14:18		-	:	-			X
Разписание по график:									
КРЕМИКОВЦИ	5	:	-	-	16:16				
60 СВЕТОВРАЧЕНЕ	11	:	-	-	:	27			
ИЛИЯНЦИ	9	16:36	60	17:36	20104 20206 20225 20591 2641 30595 7623 7624				
40 РП 4	6	:	-	-	:	42			
ВОЛУЯК	11	17:53	-	:	-				

Fig. 3.2. Schedule of ST № 30802.

Employees on shift of SE NRIC on 15.01.2025:

- Head of Unit/Service in Sofia Regional Office in ECUDV;
- Traffic Manager/Senior Train Dispatcher, Daily;
- Traffic Manager/Senior Train Dispatcher, Shifted;
- Traffic Manager/Train Dispatcher at the Sofia - Karlovo Dispatch Section;
- Energy Dispatcher at the ED Division;
- Duty Traffic Manager at Svetovrachene Station;
- Station Master at Kremikovtsi Station;
- Duty Traffic Manager at Kremikovtsi Station;
- Switchman/Level Crossing Guard at Post No. 2 at Kremikovtsi Station;

Employees on shift of BDZ Cargo EOOD on 15.01.2025:

- shift manager at Iliyantsi station;
- commercial manager at Kremikovtsi station;
- train manager, freight traffic on ST No. 30802;
- shunting switchman on ST No. 30802;
- technician mechanic inspector of wagons on ST No. 30802;
- locomotive driver on locomotive No. 98520055093-7;
- assistant locomotive driver on locomotive No. 98520055093-7;
- locomotive driver on locomotive No. 98520055155-6;
- assistant locomotive driver on locomotive No. 98520055155-6;

Employees on shift from „Pimk Rail“ EAD on 15.01.2025:

- engine, locomotive I-st person of locomotive No. 91521080013-1;
- driver, locomotive II person locomotive No. 91521080013-1;
- engine driver, locomotive - on locomotive No. 92520007063-7;

At 06:20 a.m. the traffic controller on duty reported to work at Kremikovtsi station and upon arrival at 06:30 a.m. he received the station at the central dispatching office (CDM), the first and second receiving and sending tracks – free and the fourth track – occupied by a group of wagons;

Around 07:30 a.m., the station manager arrived at Kremikovtsi station to participate in a commission to carry out a monthly inspection of the railway infrastructure facilities. The commission carried out its activities in the range of 09:30 a.m. ÷ 12:00 p.m., during which time the station was at the CDM.

Between 09:00 a.m. and 09:30 a.m., the shunter of the railway enterprise "Rail Cargo Carrier - Bulgaria" EOOD appeared at the traffic controller on duty at Kremikovtsi station with a request for permission to shunt a group of wagons from the fourth track, to be submitted to the receiving and transmitting platform in the industrial branch of "SIEN 99" EOOD. In that regard, the traffic controller on duty at Kremikovtsi station at 09:34 a.m. called the train dispatcher from his official mobile phone with a request to authorize a shunting position in the switch neck of Post No. 1 and a subsequent call again to authorize a shunting position in Post No. 2. The train dispatcher, in turn, authorized the requested shunting positions through the TRIS CTC system and after their acceptance by the shunting desks at Post

No. 1 and Post No. 2, the necessary shunting activity was carried out, with the wagons from the fourth track being submitted to the industrial branch of "SIEN 99" EOOD, thereby freeing the fourth track at the station from the rolling stock. The shunting position was returned to the train dispatcher at 09:57 a.m.

At 08:00 a.m., the train chief, freight traffic, shunting switchman and wagon inspector technician at BDZ-Cargo EOOD reported to work at Iliyantsi station, at the same time the shift leader conducted a pre-shift briefing for them.

According to the written testimony of the shift leader, locomotive No. 98520055093-7 received an order from the senior dispatcher of BDZ-Cargo EOOD to leave for Kremikovtsi station to service ST No. 30802. The order was passed to the shunting crew and the TMRV.

At 09:40 a.m., the shunting crew left for Kremikovtsi station, each traveling in their own car.

At 10:00 a.m., locomotive No. 98520055093-7 departed from Iliyantsi station, accompanied by the TMRV, to perform a brake test of the train.

Given the data from the TRIS CTC event sample, at 10:14 a.m. Kremikovtsi station switched to reserve local control (RLC), which was not mentioned in the written statements of the train dispatcher and the duty traffic manager.

At 10:15 a.m., the commercial manager informed the arriving shunting crew at Kremikovtsi station that on the third track in the industrial branch of "SIEN 99" EOOD there were 15 "E" series wagons loaded with scrap for Macedonia, which should be used to compose a train for ST No. 30802, currently the documents were being prepared by the customs.

After the conversation, the train chief, freight traffic, prepared a shift plan, with which he went to the duty traffic manager at Kremikovtsi station, with a registered time of 09:30 a.m., signed the daily briefing book, presented the shift plan for signature to the duty traffic manager and the two discussed the upcoming shunting work for composing ST No. 30802. In the conversation, the duty traffic manager understood from the train chief, freight traffic, that an auxiliary locomotive for ST No. 30802 would also arrive at the station. At 10:22 a.m., the shunting locomotive No. 98520055093-7 of BDZ-Cargo EOOD arrived on the second track at Kremikovtsi station and immediately after the route was cleared, a shunting position was allowed at Post No. 2 and at Post No. 1 for the locomotive to be shunted on the tenth ramp track. After the completion of the shunting, the shunting positions were sequentially returned, respectively from Post No. 1 at 10:25 a.m. and from Post No. 2 at 10:29 a.m.

At 10:35 a.m., DFT No. 30990 passed without stopping on the first main track of Kremikovtsi station.

At 10:37 a.m., the shunting position was again allowed at Post No. 1 and at 10:42 a.m., the shunting locomotive No. 98520055093-7 from the tenth ramp track was directed to the second track in the direction of the industrial branch of "SIEN 99" EOOD.

At 10:43 a.m., Kremikovtsi station passed to the CDM, and at 11:25 a.m., DFT No. 48085 passed without stopping on the first main track. At 12:01 p.m., FT No. 7623 passed without stopping on the first main track. At 13:11 p.m., locomotive No. 98520055155-6 of BDZ-Cargo EOOD arrived on the fourth track.

During that time, shunting was carried out in the industrial branch of "SIEN 99" EOOD with locomotive No. 98520055093-7 to collect and couple the two groups of wagons and connect the Knorr sleeves, carried out by the shunting crew, and subsequently, TMRV has carried out a technical inspection of the wagons and a full sample A of the automatic train brakes.

At 12:30 p.m., the commercial manager handed over to the shipper the processed documents of these wagons for declaring the shipments to customs.

A shift manager at Iliyantsi station of BDZ-Cargo EOOD called the train manager, freight traffic, on his mobile phone and informed him "it may be necessary to retrain ST No. 30802 after its arrival at Iliyantsi station."

During the preparation period of ST No. 30802, the train manager, freight traffic, went to the office of the duty traffic manager and informed him that a shunting had to be performed with two damaged wagons that had to be removed from the industrial branch of "SIEN 99" EOOD and parked on a third ramp track at Kremikovtsi station, to which the duty traffic manager agreed.

After the arrival of locomotive No. 98520055155-6 of BDZ-Cargo EOOD at Kremikovtsi station, the duty traffic manager called the train dispatcher at 13:28 p.m. (the conversation was conducted on personal mobile phones) with a request to take the RLHDI station so that "unnecessary shunting" would not be made. According to the written testimony of the traffic controller on duty, the term "excessive shunting" was a tacit agreement to send directly ST No. 30802 from the industrial branch of "SIEN 99" EOOD to Svetovrachene station.

The train dispatcher agreed, without performing the necessary manipulations with the TRIS CTC system and without issuing a dispatch order.

The traffic controller on duty used an unauthorized key for the interlocking at the station (available at the station before the TRIS CTC system was put into regular operation), at 13:27 p.m. he forcibly "took over" the Kremikovtsi station of the RLHDI (according to the data from the sample of events from the TRIS CTC system) and immediately afterwards authorized a shunting position at Post No. 2.

After accepting the shunting position and arranging the relevant route, at 13:34 p.m. a shunting was performed with shunting locomotive No. 98520055093-7, which moved the two damaged wagons from the industrial branch of "SIEN 99" EOOD to the third ramp track at Kremikovtsi station, where they were left.

At 14:03 p.m., a shunting followed for the shunting of shunting locomotive No. 98520055093-7 from the third ramp track and locomotive No. 98520055155-6 from the fourth track in the industrial branch of "SIEN 99" EOOD, after which the shunting position was returned. The two locomotives were transferred to the third track in the industrial branch and were attached to the head of the wagons for the composition of ST No. 30802.

The train dispatcher agreed, without performing the necessary manipulations with the TRIS CTC system and without issuing a dispatch order.

The traffic controller on duty used an unregulated key for the interlocking in the station (available at the station before the TRIS CTC system was put into regular operation), at 13:27 p.m. he forcibly "took over" the Kremikovtsi station of the RLHDI (according to the data from the sample of events from the TRIS CTC system) and immediately after that allowed a shunting position at Post No. 2.

After accepting the shunting position and arranging the relevant route, at 13:34 p.m. a shunting was performed with shunting locomotive No. 98520055093-7, which moved the two damaged wagons from the industrial branch of "SIEN 99" EOOD to the third ramp track at Kremikovtsi station, where they were left.

At 14:03 p.m., a shunting followed to overrun shunting locomotive No. 98520055093-7 from the third ramp track and locomotive No. 98520055155-6 from the fourth track in the industrial branch of "SIEN 99" EOOD, after which the shunting position was returned. The two locomotives were transferred to the third track in the industrial branch and were attached to the head of the wagons for the composition of ST No. 30802.

Around 14:30 p.m., the train chief, freight traffic again went to the office to the duty traffic manager and informed him that he had "urgent work and had to leave" and that the duty traffic manager should call him when he sent ST No. 30802 to Iliyantsi station to wait for him there. In the conversation, the traffic controller asked whether the specified train would depart for Svetovrachene station from the industrial branch of "SIEN 99" EOOD, to which he received a positive answer from the train manager, freight traffic, adding in addition that the documents for the wagons from customs are awaited. The traffic controller on duty loudly agreed with the word „good“ to ST No. 30802 to depart from the industrial branch for Svetovrachene station, after which the shunting crew left from Kremikovtsi station, again each with his or her own personal car.

Around 15:00 p.m., the shipper provided the commercial manager with the wagon bills processed by customs for the composition of ST No. 30802 and prepared a physical list of the train, handing over a copy with the wagon bills of lading to TMRV.

After composing DFT No. 30595 of the railway enterprise "Pimk Rail" EAD at Voluyak station, the same departed at 15:12 p.m. in a composition of 32 wagons, 96 axles, 497 meters, 686 tons, with locomotive No. 92520007063-7, serviced by a locomotive driver (attached to the train, in working

condition and using the route to Tulovo station) and at the head of the train locomotive No. 915210800131, serviced by a driver and an assistant locomotive driver. It passed through Sectional post 4 without stopping at 15:25 p.m. and arrived at Iliyantsi station at 15:30 p.m., where it stayed for 5 minutes to meet with IC No. 20245.

Around 15:30 p.m., the shunting crew arrived in their personal cars at Iliyantsi station.

At 15:30 p.m., the commercial manager and the TMRV appeared in the office of the traffic manager on duty at Kremikovtsi station. The commercial manager handed over to the traffic manager on duty one copy of the Waybill of ST No. 30802, and the TMRV presented him with the certificate of the train's brake mass for signature. At that moment the train dispatcher called the traffic manager on duty (a conversation was held on personal mobile phones) and told him that FT No. 4610 was "coming" from Yana station and would pass through Kremikovtsi station without stopping. In response, he said "okay" and informed that ST No. 30802 was ready to depart and dictated the train's composition, then asked when to send it to Svetovrachene station. The train dispatcher replied "after the fast train". After the conversation and signing the brake mass certificate of IT No. 30802, the duty traffic controller informed the TMRV that he would "let them go" after FT No. 4610, and the TMRV left the office.

At 15:33 p.m., FT No. 4610 passed without stopping along the first main track of Kremikovtsi station and occupied the inter-station area towards Svetovrachene station.

At 15:31 p.m., the duty traffic controller at Iliyantsi station called the train dispatcher on the official landline phone with a request for consent to send DFT No. 30595 and received such consent. At 15:35 p.m., the train departed for Svetovrachene station. The train stopped for 16 seconds in front of the entrance semaphore at Svetovrachene station, due to the ordered transit passage of FT No. 4610 in the direction of Kurilo station.

Shortly after 15:40 p.m., the train dispatcher went to the office of the head of the department/unit of the TOU Sofia, who is qualified to work with the TRIS CTC dispatch interlocking. Given the end of his working hours, he asked him to be replaced for a few minutes to go to the toilet. Going to the workplace, the train dispatcher provided information about the location of the trains and, after the passage of FT No. 4610 through Svetovrachene station - to order a transit route for the passage of DFT No. 30595, in order to move to Stolnik station to meet with PT No. 30114. Immediately after that, the train dispatcher left the workplace and, according to written instructions, went to the store, about which he did not notify the senior train dispatcher. However, in the conversation, the train dispatcher failed to notify the head of the TOU Sofia that Kremikovtsi station was under reserve local control, and that ST No. 30802 was about to depart from the industrial branch of "SIEN 99" EOOD, and that he had ordered the duty traffic controller of ST No. 30802 to depart from Kremikovtsi station to Svetovrachene station after the passage of FT No. 4610. He also failed to notify the duty traffic controller at Kremikovtsi station that DFT No. 30595 was departing from Iliyantsi station and that he would temporarily leave his workplace.

From the sample of events from the TRIS CTC system at 15:44 p.m. (and the indication on the light-scheme board at the station), the direction of the automatic blocking from Kremikovtsi station to Svetovrachene station switches from the "sending" mode to the "free direction", since the inter-station route was free after FT No. 4610 (passed without stopping through Svetovrachene station to Kurilo station).

Given the order of the train dispatcher IT No. 30802 to depart from Kremikovtsi station after FT No. 4610 and the fact that the interstation to Svetovrachene station at 15:45 p.m. was free, the traffic controller on duty "took" the RLHDI station and allowed a shunting position at Post No. 2 and ordered the switchman/level crossing guard to remove the barriers at the crossing and prepare the route from the industrial branch of "SIEN 99" EOOD, since the train would depart from there to Svetovrachene station. After these actions, the traffic controller on duty left the reception building and went to the industrial branch to send ST No. 30802.

After receiving the shunting position from the switchman/crossing guard at Post No. 2, he used the shunting console (route for exiting the industrial branch of "SIEN 99" EOOD), which led to the current route to Svetovrachene station. The same person went out in front of the signalman Post No. 2 and gave a manual signal for the shunting "Ready!" At 15:48 p.m., ST No. 30802 departed in the direction of Svetovrachene station.

Due to a physiological need, the traffic controller on duty went to the sanitary unit located in the waiting room of the station.

Meanwhile, observing the movement of FT No. 4610 through Svetovrachene station and its departure to Kurilo station, the head of the TOU Sofia convinced by the monitors of the DC that the automatic blocking to the station Kremikovtsi was free and all tracks at Kremikovtsi station were free, he arranged a transit route for passing through Svetovrachene station for DFT No. 30595 (which at that moment has stopped in front of the entrance semaphore at Svetovrachene station).

At 15:49 p.m., DFT No. 30595 passed through Svetovrachene station without stopping and occupied the interstation to Kremikovtsi station.

At that time, the head of the TOU Sofia noticed on the monitor that at Kremikovtsi station there was a permitted shunting position at Post No. 2 for performing a shunting in the neck towards Svetovrachene station. For that reason, he repeatedly tried to contact the direct dispatching connection with the traffic controller on duty at Kremikovtsi station and decided to call on his work mobile phone.

However, while the unsuccessful attempts to connect continued, ST No. 30802 with 15 wagons full of scrap, hauled by train locomotive 98520055093-7 and an auxiliary locomotive in the lead 98520055155-6, travelled in the inter-station area towards Svetovrachene station.

At 15:51 p.m., the switchman/crossing guard at Post No. 2 restored the switches to normal position and at 15:52 p.m. returned the shunting position to the duty traffic controller.

At 15:52 p.m., the head of the TOU Sofia managed to contact the duty traffic controller at Kremikovtsi station on his official mobile phone, asking him if he was making a shunting because he had ordered a transit from Svetovrachene to DFT No. 30595. In response, he heard "many" and the connection was disconnected.

Entering his office (after returning from the toilet), the traffic controller on duty at Kremikovtsi station saw that the direction of the automatic blocking was in the direction of reception and was busy. At 15:54 p.m., he called the train dispatcher's personal mobile phone on his personal mobile phone to ask which train he would send to Kremikovtsi station and to close the permitting display at the exit semaphore at Svetovrachene station, because ST No. 30802 has occupied the interstation. He replies that he was not at his workplace and told him to call the dispatcher of the replacement, several exchanges between the two followed.

The traffic controller on duty at Kremikovtsi station promptly called the direct dispatching line and had a conversation with the head of the TOU Sofia, who asked him if he was performing a shunting that DFT No. 30595 must pass without stopping. In response, the traffic controller on duty said that 30802 was traveling to Svetovrachene", which led to sharp remarks between the two. Then the head of the TOU Sofia ordered: "Stop the power!" and asked the duty traffic manager "From which track did the train depart?" to which he received no answer and the connection was interrupted.

The energy dispatcher, in turn, at 15:55 p.m. issued an order to the person on duty at the Stolnik railway station and he mistakenly turned off the connections between Kremikovtsi and Yana.

After the conversation, the traffic controller on duty immediately called the direct inter-station connection of the traffic controller on duty at the Svetovrachene station to ask whether DFT No. 30595 has passed through the Svetovrachene station and the answer was that the train was on the Svetovrachene - Kremikovtsi inter-station route.

Hoping to be able to stop the movement of DFT No. 30595, the duty traffic controller at Kremikovtsi station took action with the remote control panel and switched off disconnectors 08 and 10, thereby cutting off the power supply to the catenary in the inter-station area. Immediately after the action, the duty traffic controller called the train manager, freight traffic, from his personal mobile phone and told him to contact the drivers of shunting train No. 30802 and tell them to stop and return to Kremikovtsi station, as well as to give the phone number of one of them. At that time, the head of the TOU Sofia Central Railway Station entered the office and the duty traffic controller asked him to call one of the locomotive drivers in order to stop and return the train. Meanwhile, he ordered the switchman/crossing guard at Post No. 2 to remove the barriers at the crossing located in the area of the station and after they were activated, the traffic controller on duty took action with the RRI and opened a permitting display of the input signal.

According to the indications of the locomotive crew, locomotive No. 91521080013-1, DFT No. 30595, leaving the area of the Svetovrachene station, continued its movement in the inter-station area. "After passing the Lokorsko stop and exiting the right curve," the locomotive driver, second person, saw that a train was moving about 300-400 meters in front of them. He managed to shout to his colleague "A train is coming!" and run to the second cabin of the locomotive. The reaction of the locomotive driver, first person, was to immediately take "quick stop of the train" and run to the other cabin of the locomotive. The two managed to lie down on the floor in the rear cabin and wait for the impact between the two trains.

At that time, the locomotive driver of the train locomotive No. 92520007063-7 heard "the noise of the locomotive's braking system, which merged with two consecutive impacts", during which the cabin was deformed, the front windows broke, and the locomotive control panel pressed down on the locomotive driver.

At 15:57 p.m. at km 11+949 in the Svetovrachene - Kremikovtsi interstation, a collision occurred between DFT No. 30595 and ST No. 30802.

Because of the impact, locomotive No. 98520055093-7 of ST No. 30802 derailed, the locomotive's car was disconnected from the bogies and it caught fire.

Locomotive No. 91521080013-1 of DFT No. 30595 derailed to the right of the railway track along the mileage line.

Locomotive No. 98520055155-6 of ST No. 30802 and wagon No. 31525400142-5, the first of the train, derailed with the second bogie.

Wagon No. 31524722752-5, the twenty-second of the train of DFT No. 30595, derailed with one axle of the first bogie at km 11+588.

Pole No. 105 of the catenary was broken and the contact wire was torn, which lied on both trains.

At 15:56 p.m., the senior train dispatcher ordered the energy dispatcher to turn off the voltage at the Svetovrachene - Kremikovtsi interstation. The energy dispatcher, in turn, at 15:56 p.m. issued an order to the duty officer at the Stolnik substation to turn off the Kremikovtsi terminal, and he turned it off at 15:57 p.m. At that hour, he also issued an order to the duty officer at the Iliyantsi substation to turn off the Lokorsko terminal, and he turned it off at 15:59 p.m.

At 16:03 p.m., the train dispatcher returned to his workplace and, after realizing that the voltage in the catenary has been ordered to be turned off, tried to contact the duty dispatcher of Pink Rail EAD by phone. At 16:05 p.m., he managed to contact him, requesting the telephone numbers for the contact numbers of the train drivers of DFT No. 30595, so that they could stop the train.

During these few minutes, after the requested telephone numbers from the duty dispatchers of "Pink Rail" EAD and BDZ-Cargo EOOD, other duty employees at the Sofia Railway Station tried to contact the locomotive drivers of DFT No. 30595 and ST No. 30802, but no one succeeded. The senior train dispatcher received "repeated calls to the service phones from the duty operational dispatch services of the Ministry of Interior, Gendarmerie and Fire Safety and Civil Protection about a burning diesel locomotive in the area of the village of Lokorsko", while at the same time he was requested information about the operational situation in the area, identification of the load in the two compositions, as well as the locomotive and shunting crews serving them. The senior train dispatcher transmitted the requested information to the emergency number 112.

After the train dispatcher learned about the reported diesel locomotive fire, he called the on-duty traffic controller at Kremikovtsi station on his personal mobile phone and ordered him to go to the inter-station area and check what happened.

The head of the OT section at the Sofia Railway Station, who was in his personal car, was also present in the office of the on-duty traffic controller at Kremikovtsi station. The two set off to search for the location of ST No. 30802 and DFT No. 30595.

Meanwhile, immediately after the collision between the two trains occurred, the locomotive crew of locomotive No. 91521080013-1 of DFT No. 30595 managed to get out of the derailed locomotive almost immediately.

After ten minutes, the locomotive driver in locomotive No. 92520007063-7 of DFT No. 30595 managed to free himself from the locomotive control panel that had pressed against him, during which

time he also saw flames from a strongly burning fire. He left the locomotive and saw his colleagues from the electric locomotive, who were already outside the locomotive.

At around 16:10 p.m., patrol teams of the Ministry of Interior arrived at the scene.

At around 16:20 p.m., teams of emergency medical care, FSaCP and the Ministry of Interior arrived at the scene.

The traffic controller on duty from Kremikovtsi station and the head of the OT section arrived at the scene, with the traffic controller on duty maintaining constant telephone contact with the train dispatcher and informing him of what had happened. He informed the FSaCP authorities about the number of traveling personnel in the two locomotives of ST No. 30802.

Ambulance vehicles took the injured to specialized hospitals in Sofia.

The burned bodies of the locomotive driver and the assistant locomotive driver of BDZ-Cargo EOOD were found in locomotive No. 98520055093-7.

At around 16:30 p.m., employees of the State Enterprise NRIC and Pimk Rail EAD arrived at the scene of the accident, but were not allowed nearby due to the ongoing procedural and investigative actions by the NIS and NAMRATIB.

After receiving an order on the mobile phone of the head of Kremikovtsi station, the traffic controller on duty and the head of the OT section left the interstation by car back to Kremikovtsi station, where the traffic controller on duty began to manipulate the RRI, closed the given permission indication at the entrance semaphore towards Svetovrachene station and raised the barriers at the crossing in the area of the station. He drew up the handover note in the train movement log and at 17:00 p.m. handed over the duty to the station chief. Duty officers of the Sofia Railway and the Ministry of Interior arrived at the station prohibited any manipulations with the RRI control panel and seized the personal documents of the traffic controller and the stationmaster. After the arrival of the investigating officers from the structures of NIS and NAMRATIB, an interrogation was conducted; the pre-trial investigation bodies of the NIS detained the traffic controller on duty for 24 hours.

At 16:25 p.m., the train dispatcher issued an order to all stations in the section from Svetovrachene to Sopot to switch to reserve local control via the keys of the RRI.

At 16:56 p.m., by order of the Head of the Sofia Railway Traffic Control Unit, the senior train dispatcher took over the daily duty from the train dispatcher and took over the management of the Iliyantsi - Kurilo - Svetovrachene - Sopot - Karlovo dispatching section.

After handing over the duty, the train dispatcher went to the office of the operational sector of the Sofia Railway Traffic Control Unit, where at around 23:00 p.m., tests for the use of alcohol and narcotic substances were performed, which were negative (-).

At 17:30 p.m., an employee of the Ministry of Interior called the official mobile phone at the Svetovrachene station and informed the traffic controller on duty at the Svetovrachene station to remain at the station until the investigative bodies of the National Investigation Service and the NAMRATIB arrived.

At 17:40 p.m., employees of the CCT Sofia arrived at the Svetovrachene station and draw up a report on the current state of the signalling equipment.

At 18:40 p.m., the traffic controller on duty at the Svetovrachene station handed over the duty to the traffic controller on duty (new shift).

At 21:30 p.m., employees of the Ministry of Interior performed tests for alcohol use on the traffic controller on duty at the Svetovrachene station, the result was negative (-), and a test for the use of narcotics, the result was positive (+). At 23:10 p.m., the traffic controller on duty at the Svetovrachene station was sent to a specialized laboratory of the Military Medical Academy for taking a blood sample and identifying the narcotics.

After the blood tests, it was established that the use of drugs "benzodiazepine" medications.

At around 02:00 a.m. on 16.01.2025, the investigative bodies of the NIS and the head of the safety investigation of the NAMRATIB questioned the train dispatcher. The train dispatcher was released at 03:00 a.m. with an order to appear at 11:00 a.m. on 16.01.2025 at the NIS for repeated questioning.

On 16.01.2025 at 11:11 a.m., by order of the train dispatcher, the exit of recovery vehicles from both Svetovrachene and Kremikovtsi stations was permitted.

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

The event occurred on 15.01.2025 at 15:57 p.m. at km 11+949 along Svetovrachene-Kremikovtsi interstation (fig. 3.3).

3.1.3. Description of the event location:

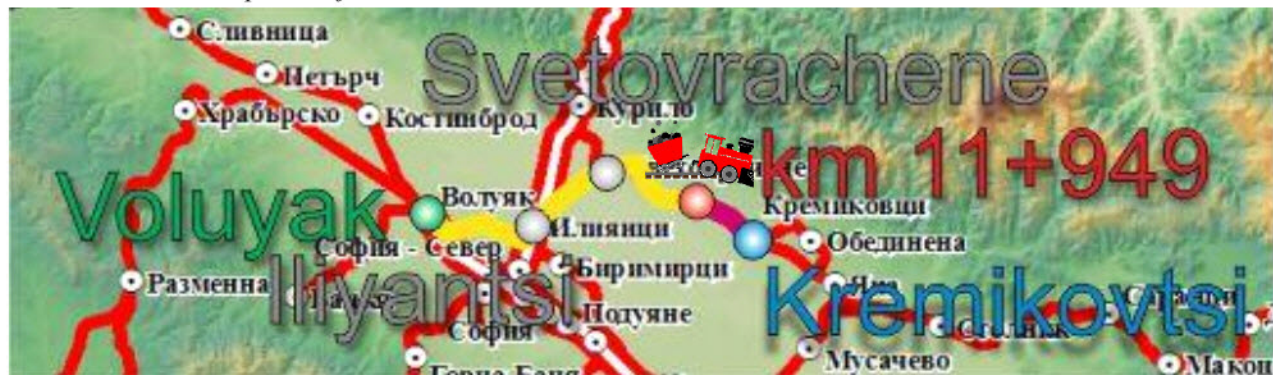


Fig. 3.3. Routes of DFT № 30595 and ST № 30802 to the place of the accident.

- - Origin station of movement of DFT № 30595 – Voluyak;
- - Origin station of movement of ST № 30802 – Kremikovtsi;
- - Main stations along the alignment of DFT № 30595;
- - Place of the accident, km 11+949;
- - Track, which DFT № 30595 had passed;
- - Track, which ST № 30802 had passed.

3.1.3.1. Layout of the accident along the railway network (fig. 3.4).

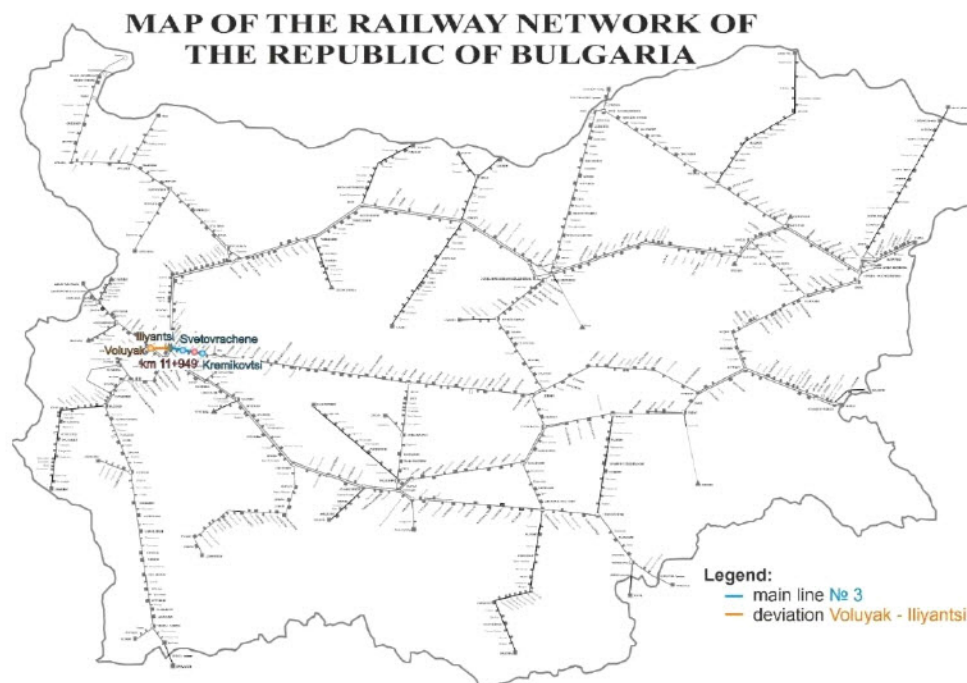


Fig. 3.2. Layout of the accident along the railway network.

3.1.3.2. Location of the place of the accident (fig. 3.5).

- Geographic width: 42°46'1.72"N;

- Geographic length: 23°26'42.64"E.

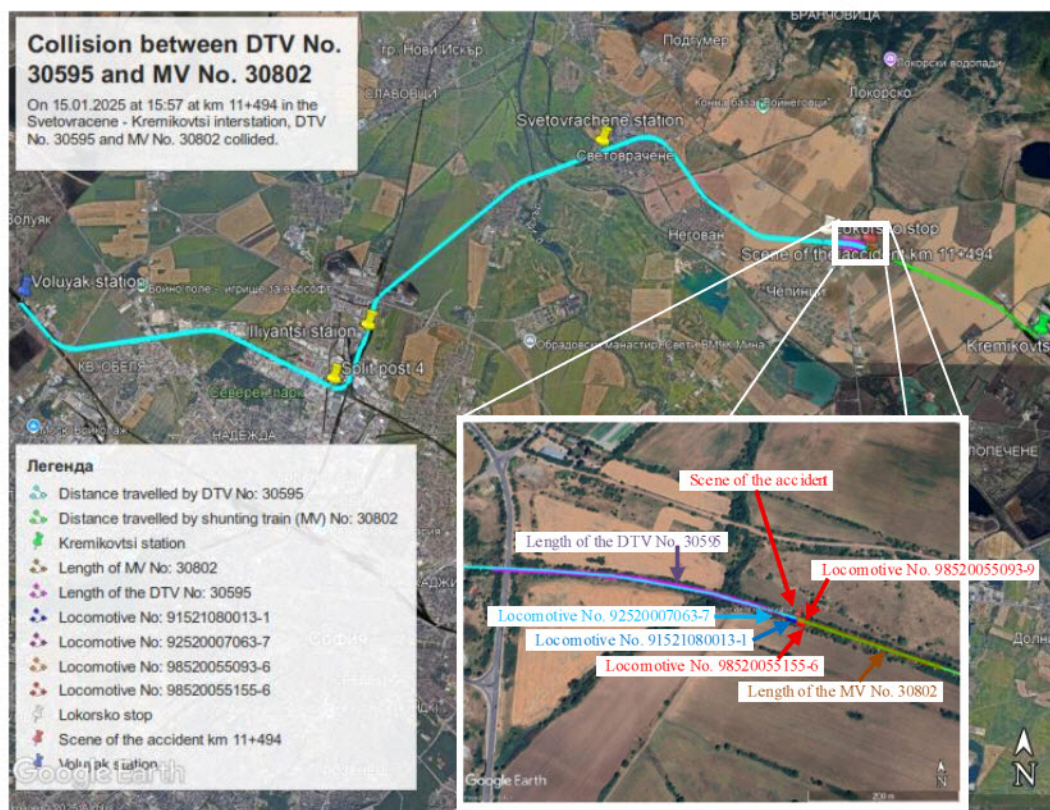


Fig. 3.5.

3.1.3.3. Meteorological and geographic conditions at the time of the event on 15.01.2025

- In the light part of the day – 15:57 p.m. (under data of the speedometer in locomotive № 91521080013-1);
- Air temperature: 2° C;
- Weather – clear;
- Wind – 14 km/h, Northwest;
- Average relative humidity 55 %;
- No registered rains.

3.1.3.4. Performance of construction activities on the site or in vicinity.

Construction works at the site and near the accident on the Svetovrachene - Kremikovtsi interstation were not carried out before and during the occurrence of the accident.

3.1.3.5. Fatalities, injuries, material damages:

3.1.3.5.1. Employees of the railway infrastructure manager or the railway undertaking with fatal outcome.

Two employees of the railway company BDZ-Cargo EOOD died – locomotive driver and assistant locomotive driver of locomotive No. 98520055093-7;

3.1.3.5.2. Employees of the railway infrastructure manager or the railway undertaking with injuries and traumas.

Three employees of the railway enterprise BDZ-Cargo EOOD – locomotive driver and assistant locomotive driver of locomotive No. 98520055155-6 and TMRV;

Three employees of the railway enterprise “Pink Rail” EAD – two locomotive drivers, first and second person, of locomotive No. 91521080013-1 and the locomotive driver of locomotive No. 92520007063-7 of “Pink Rail” EAD with severe contusions and injuries;

3.1.3.5.3. *Other persons officially related to the place of the accident.*

None.

3.1.3.5.4. *Passengers:*

None.

3.1.3.5.5. *External persons.*

None.

3.1.3.5.6. *Freights, luggage and other property.*

None.

3.1.3.6. *Rolling stock, infrastructure and environment.*

- Damage caused to locomotive No. 91521080013-1 of "Pink Rail" EAD - for 39,100.00 BGN;
- Damage caused to locomotive No. 92520007063-7 of "Pink Rail" EAD - for 47,800.00 BGN;
- Damage caused to auxiliary locomotive No. 98520055155-6 of BDZ-Cargo EOOD - for 371,200.00 BGN;
- Damage caused to train locomotive No. 98520055093-7; of BDZ-Cargo EOOD - for 352,600.00 BGN;
- Damage caused to wagon No. 31525400298-5 of BDZ-Cargo EOOD damage caused for 26,947.42 BGN;
- Damage to wagon No. 31525401192-9 of BDZ-Cargo EOOD – damage of 834.23 BGN;
- Damage to wagon No. 31525400361-1 of BDZ-Cargo EOOD – damage of 2,672.44 BGN;
- Damage to wagon No. 31525400142-5 of BDZ-Cargo EOOD – damage of 32,896.92 BGN;
- Damage to railway track – none;
- Damage to the catenary for 15,963.84 BGN;
- Damage to the signalling equipment – none;
- • Damage to the environment – none;

Total caused damages: 890 014, 85 BGN.

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

In the period from 16:00 p.m. on 15.01.2025 to 15:04 p.m. on 18.01.2025, the railway infrastructure manager and the railway undertakings have generated additional costs for changing the train schedule and capacity in the section.

- Delayed trains of railway undertakings – 6 – 1,290.00 BGN;
- Cancelled trains – 26 – 1,662.91 BGN;
- Deviated trains – 10 – 181.75 BGN;
- Assigned trains of railway undertakings – none;
- Costs for recovery funds - recovery train for 14,088.00 BGN;
- Costs for recovery funds – UNIMOG for 10,013.50 BGN;

Total other expenses: 27,236.16 BGN.

Total damage for the accident: 917,251.01 BGN.

3.1.5. *Identity of the participants and their functions.*

- Infrastructure manager
- Personnel of SE NRIC:
 - Head of Unit, Service in Sofia Railway Station;

- Traffic Manager/Senior Train Dispatcher in Sofia Railway Station on 15.01.2025;
- Traffic Manager/Train Dispatcher in Sofia Railway Station on 15.01.2025;
- Traffic Manager on Duty at Kremikovtsi Station on 15.01.2025;
- Switchman/Level Controller at Kremikovtsi Station on 15.01.2025;

- Railway undertaking

- Personnel of BDZ-Cargo EOOD:

- train chief, freight traffic on shunting train No. 30802;
- shunting switchman on shunting train No. 30802;
- Technician mechanic inspector wagons on shunting train No. 30802;
- Shift manager of BDZ-Cargo at Iliyantsi station;
- Locomotive driver on locomotive No. 98520055093-7;
- Assistant locomotive driver on locomotive No. 98520055093-7;
- Locomotive driver on locomotive No. 98520055155-6;
- Assistant locomotive driver on locomotive No. 98520055155-6;

- Personnel of Pimk Rail EAD:

- Locomotive crew of DFT № 30595 - locomotive № 91521080013-1;
- Driver, locomotive 1st person;
- Driver, locomotive 2nd person;
- Locomotive crew of locomotive № 92520007063-7;
- Driver, locomotive.

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

3.1.6.2. Type of the signaling, catenary and rail track.

The Svetovrachene - Kremikovtsi interstation is part of the third main conventional railway line. The distance between the stations is 9,435 meters. The stations are in a section equipped with a dispatching interlocking TRIS CTC (Iliyantsi - Kurilo - Svetovrachene - Karlovo) managed by a train dispatcher in the Single Train Traffic Control Center (STTCC), located in the station building of Sofia Station. Both stations are equipped with route-relay interlocking RRI type "Russian block for small stations", and the Svetovrachene - Kremikovtsi interstation - with automatic blocking without passing signals with axle counters.

The line is a single-track electrified line.

The railway track in the area of the collision between the trains is in a straight section at km 11+949. Continuously welded rail track, with a slope of 4.0 ‰ in the direction of the mileage, rails type S49, reinforced concrete sleepers type ST-4, fastening type GEO.

3.1.7.1. Interstation block system, station interlocking, type of signalling and messages.

Interstation block system

The movement of trains in the Svetovrachene - Kremikovtsi interstation and in the Iliyantsi - Karlovo section is ensured by dispatching interlocking type TRIS CTC, Automatic Interlocking (AB) without passing signals with axle counters on a single-track railway line - in working order (Fig. 3.6).



Fig. 3.6. Dispatching interlocking along the section Iliyantsi-Karlovo type TRIS CTC.

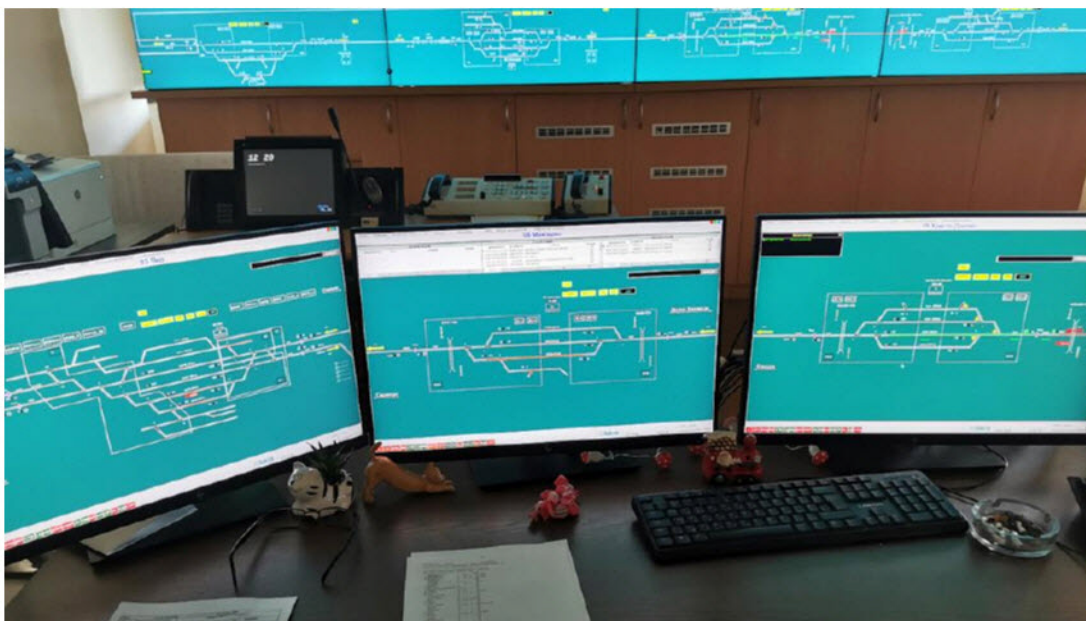


Fig. 3.7. Workplace of the train dispatcher for control of the dispatching interlocking Iliyantsi-Karlovo at EUCDV.

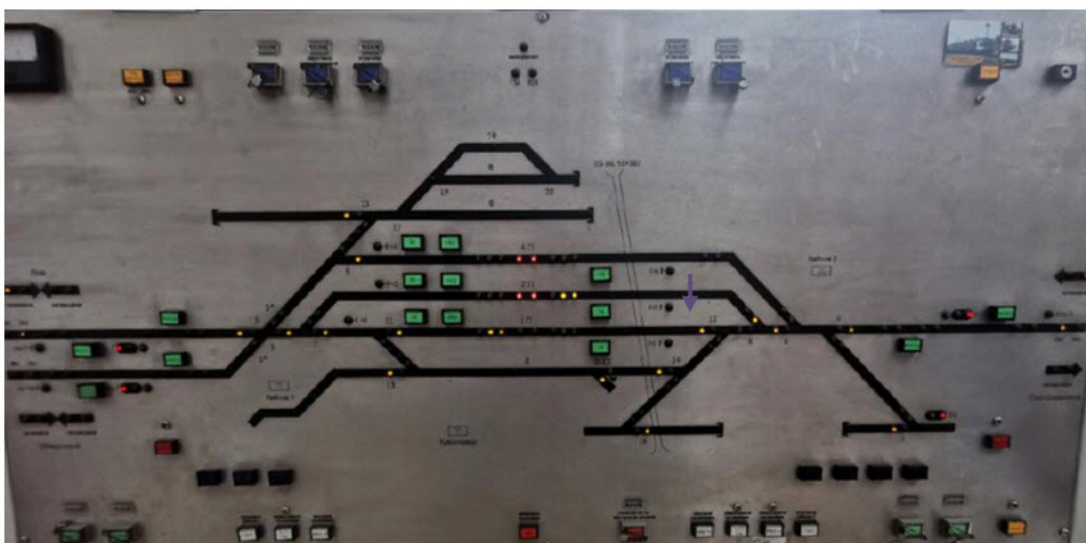


Fig. 3.8. Signalling equipment in Kremikovtsi station RRI.

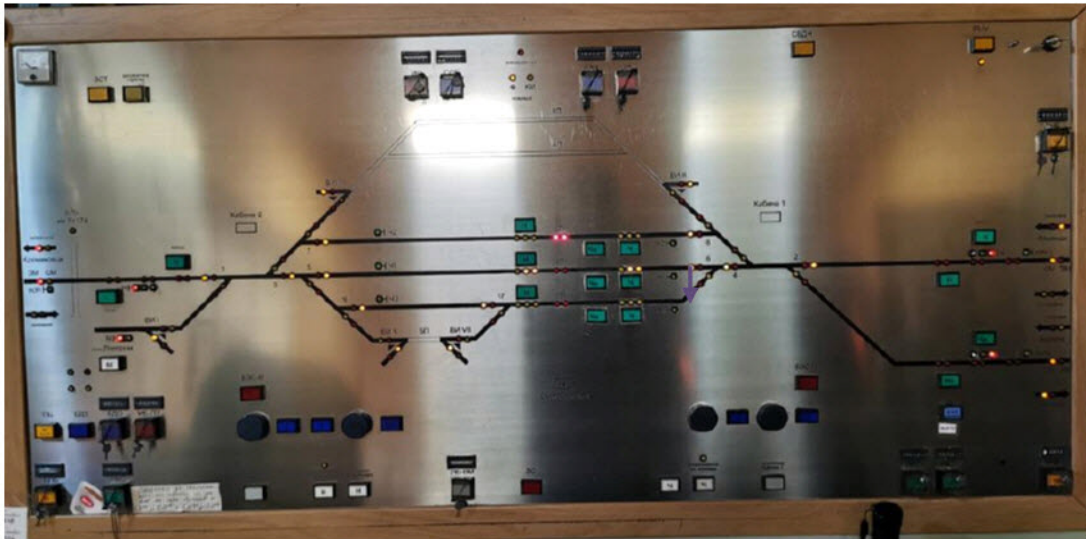


Fig. 3.8. Lightning scheme board of the signaling equipment at Svetovrachane station – Route-relay interlocking.

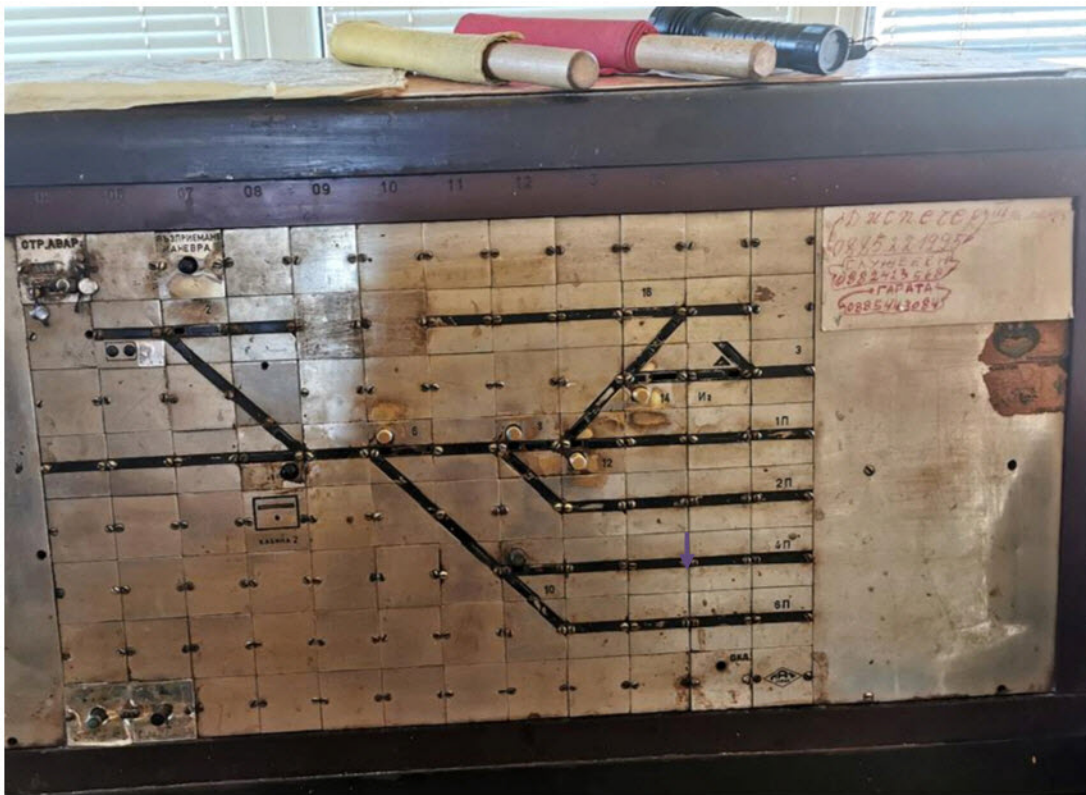


Fig. 3.10. Shunting panel in Post 2 in Kremikovtsi station.

Station interlocking

At the Svetovrachane and Kremikovtsi stations, the signalling equipment is the RRI type "Russian block for small stations" - in working order (Fig. 3.8, 3.9, 3.10).

Type of signalling

The entrance and exit signals in both stations and in the section are under a speed signalling – functional;

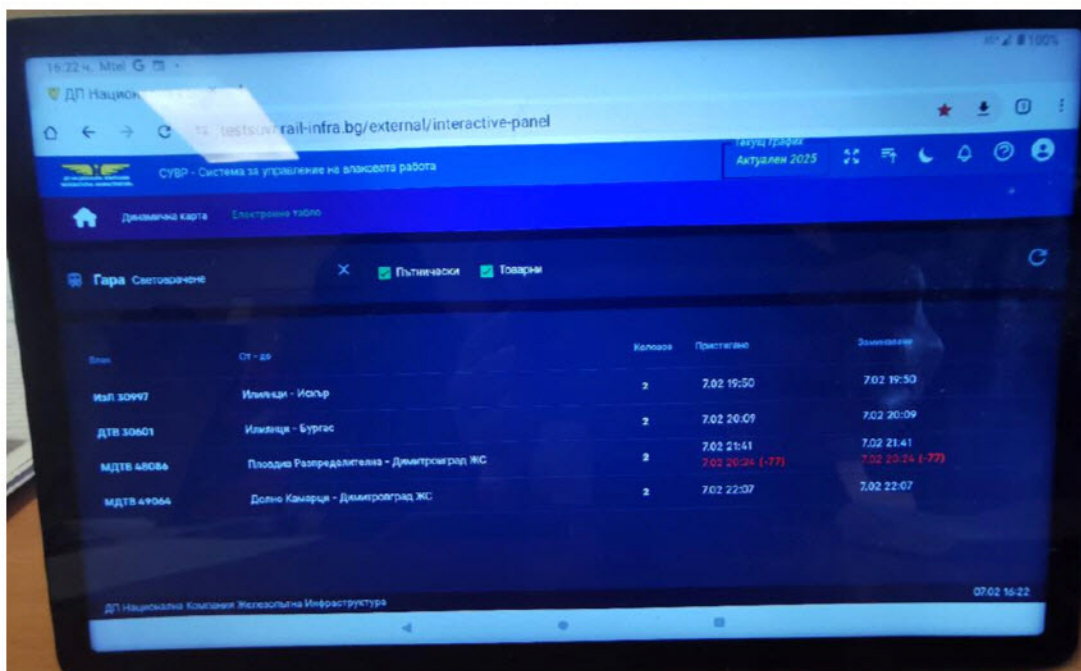


Fig. 3.11. Display of TOMS in Svetovrachane station.

Messages

The communications (incoming and outgoing) between the stations Svetovrachane and Kremikovtsi are performed via DCCM 8 direct interstation connection – functional (fig. 3.12).

To the train dispatcher at the dispatching center and in all stations along the section Iliyantsi-Karlovo are given official mobile phones for emergency needs.



Fig. 3.12. Apparatus for direct interstation connection DCCM 8.

3.1.7.2. Train protection systems.

The stations Svetovrachane and Kremikovtsi do not have train protection systems.

3.1.8. Other information referring the event.

3.1.8.1. Train documents of DFT № 30595 and ST № 30802.

Train documents „Waybill“ (fig. 3.13 – 3.18):

PIMK Rail

СЛУЖБА ПИНА-РЕЙА		ПЪТЕН ЛИСТ № 34660		ЛОКОМОТИВ № 040637		СЛУЖБА ПИНА-РЕЙА СОБСТВ. РЕЙА		ДАТА 15.01.25	
основна служба, пункт		проз.		сер. номер		кл.		ден, месец, година	

ЛОКОМОТИВНА БРИГАДА				ЯВЯВАНЕ				ОСВОБОЖДАВАНЕ				ПЪТУВАНЕ БЕЗ СЛУЖБА			
пункт	име, презиме, фамилия	инф.	пункт	час, мин.	заверка	пункт	час, мин.	заверка	пункт	час, мин.	заверка	пункт	час, мин.	заверка	
6	Борислав Н. Готев	8	9	1500	11	10	11	1500	12	14	15	16	17	18	

ПРИЕМАНЕ И ПРЕДАВАНЕ НА ЛОКОМОТИВА				ДОПЪЛНИТЕЛНО ПОЛУЧЕНО ГОРИВО ИЛИ МАСЛО			
пункт	лок. е. топлофикация подготв. за експлоатация съгласно ИТИ	поставяне на електропривод	налично гориво лок. електропривод	час, мин.	предатриер	лок. масл.	подпис
19	Готев	39550	4990	1500	30	31	32

ИНСТРУКТОР/ИНСПЕКТОР				СТАРШИ КОНДУКТОР				СВЕРКА НА ЧАСОВНИЦИТЕ			
случаи	фамилия	от гара	до гара	случаи	фамилия	от гара	до гара	случаи	фамилия	от гара	до гара
41		42	43	44	45	46	47	48	49	50	51

ОСЛУЖВАНЕ НА ВЛАСОВЕТЕ И МАНЕВРЕНА РАБОТА				ДАНИИ ЗА СЪСТАВА НА ВЛАСОВЕТЕ			
№ на влак	гара, от	гара, до	час, мин.	№ на влак	гара, от	гара, до	час, мин.
30595	64	65	1511	66	67	68	69

Fig. 3.13. Waybill of locomotive № 92510007063-7 – front part.

ОСЛУЖВАНЕ НА ВЛАСОВЕТЕ И МАНЕВРЕНА РАБОТА				ДАНИИ ЗА СЪСТАВА НА ВЛАСОВЕТЕ			
№ на влак	гара, от	гара, до	час, мин.	№ на влак	гара, от	гара, до	час, мин.
60	61	62	63	64	65	66	67

ДРУГИ ОТБЕЛЖАВАНИЯ, ЗАБЕЛЕЖКИ

ВЪРНО С ОРИГИНАЛА

ПРЕДАВАНЕ НА ПЪТНИЯ ЛИСТ				КОНТРОЛ НА РЕГ. ПАРАМЕТРИ				СТАТИСТИЧЕСКА ОТЧЕТНОСТ				ЕНЕРГИЙНА ОТЧЕТНОСТ			
пункт	бр. контрол	дата	час, мин.	пункт	констатирано нарушение	проверено	подпис	пункт	констатирано нарушение	проверено	подпис	пункт	констатирано нарушение	проверено	подпис
70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85

Fig. 3.14. Waybill of locomotive № 92510007063-7 – rear part.

PIMK Rail

СЛУЖБА ПЪТЕН ЛИСТ № 41771		ЛОКОМОТИВ № 80 013 1		СЛУЖБА ОБСЛУЖ. ДАТА 15.11.20	
ОСНОВНА СЛУЖБА, ПУНКТ		ПУНКТ		ДЕН, МЕСЕЦ, ГОДИНА	

ЛОКОМОТИВНА БРИГАДА						ПЪТНО ПОСЛУЖИЕ						ОСВОБОЖДАВАНЕ						ПЪТУВАНЕ БЕЗ СЛУЖБА					
лич. №	име, презиме, фамилия	град	пункт	час, мин.	заверши	пункт	час, мин.	заверши	пункт	час, мин.	заверши	пункт	час, мин.	заверши	пункт	час, мин.	заверши						
6	И. И. И.	Б. Г.	Б. Г.	13:30	13:30	13	13:30	13:30	13	13:30	13:30	13	13:30	13:30	13	13:30	13:30						

ПРИЕМАНЕ И ПРЕДАВАНЕ НА ЛОКОМОТИВА						ДОПЪЛНИТЕЛНО ПОЛУЧЕНО ГОРИВО ИЛИ МАСЛО					
пункт	лок. в технически пункт за експлоатация съгласно НТИ	показания на километромер	час, мин.	приемател	подпис	пункт	вид	количество	час, мин.	отпускател	подпис
13	Б. Г.	51937	51937	Б. Г.	Б. Г.	13	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.

ИНСТРУКТОРСКИ СПЕКТОР						СТАРШИ КОНДУКТОР						СВЕРКА НА ЧАСОВНИЦИТЕ					
Служба	пункт	от	до	подпис	пункт	Служба	пункт	от	до	подпис	пункт	Служба	пункт	от	до	подпис	
Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	

ОБСЛУЖВАНЕ НА ВЪЛКОВЕТЕ И МАНЕВРНА РАБОТА						ДАНИИ ЗА СЪСТАВА НА ВЪЛКОВЕТЕ					
№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи
Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.

Fig. 3.15. Waybill of locomotive № 91521080013-1 – front part.

ОБСЛУЖВАНЕ НА ВЪЛКОВЕТЕ И МАНЕВРНА РАБОТА						ДАНИИ ЗА СЪСТАВА НА ВЪЛКОВЕТЕ					
№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи	№ на вълк.	гара, на която работи
Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.

ПРЕДАВАНЕ НА ПЪТНИЯ ЛИСТ						КОНТРОЛ НА РЕГ. ПАРАМЕТРИ						СТАТИСТИЧЕСКА ОТЧЕТНОСТ						ЕНЕРГИЙНА ОТЧЕТНОСТ					
пункт	от	до	час, мин.	лок. маш.	подпис	пункт	от	до	час, мин.	лок. маш.	подпис	пункт	от	до	час, мин.	лок. маш.	подпис	пункт	от	до	час, мин.	лок. маш.	подпис
Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.	Б. Г.

Fig. 3.16. Waybill of locomotive № 91521080013-1 – rear part.

Nature sheets (fig. 3.19, 3.20)

АДМИНИСТРАЦИЯ НА ОБЩИНА БУРГАС
ОТДЕЛ ЗА ИЗИЖАВАНЕ НА КАЧЕСТВОТО НА ВОДУШОТО ПОСРЕДСТВО

НАТУРЕН ЛИСТ НА ВЛАК №30802

Гара на съставяне на влака: БУРГАС

Дата, час на тръгване: 15.1.2025 15:20

Крайна гара: БУРГАС

Дата, час на пристигане: 16.1.2025 9:00

№	№1	№2	Серия	оси	тара	нето	бруто	дължина на	отправна гара	получаваща гара	вид на товара
1	3152472	23813	S	4	18	25	43	14.04	Волуяк	Бургас	контейнери
2	2178332	92329	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
3	2178332	92469	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
4	2178332	92477	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
5	3152472	28382	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
6	3152472	24556	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
7	3152472	81332	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
8	2178332	91511	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
9	2178332	90582	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
10	3152472	34448	S	4	17	4	21	14.04	Волуяк	Бургас	контейнери
11	3152472	32040	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
12	2178332	91085	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
13	2178332	90998	K	2	13	4	40	13.86	Волуяк	Бургас	контейнери
14	2178332	90125	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
15	3152472	22906	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
16	2178332	91933	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
17	2178332	91412	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
18	2178332	92296	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
19	8252472	31137	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
20	2178332	91479	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
21	2178332	90691	K	2	13	4	17	14.04	Волуяк	Бургас	контейнери
22	3152472	27525	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
23	3380496	03271	S	6	27	8	35	26.39	Волуяк	Бургас	контейнери
24	3380496	03230	S	6	27	8	35	26.39	Волуяк	Бургас	контейнери
25	2178332	92154	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
26	2178332	92245	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
27	3352472	22169	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
28	2178332	91487	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
29	2178332	90693	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
30	3152472	34661	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
31	2178332	90598	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
32	8252471	70434	Rps	4	21	4	25	19.90	Волуяк	Бургас	контейнери

Всичко: 32 96 806 167 886 496.78

Възвешаване: 0 0 0 0 0 0

Дължина на locomotive: 20

ВЕРНО С ОПРИГАНА

ПРИМ РЕАКТ

Fig. 3.19. Nature sheet of ST № 30802.

ПРИМ РЕАКТ

НАТУРЕН ЛИСТ НА ВЛАК №30595

Гара на съставяне на влака: Волуяк

Дата, час на тръгване: 15.1.2025 15:20

Крайна гара: Бургас

Дата, час на пристигане: 16.1.2025 9:00

№	№1	№2	Серия	оси	тара	нето	бруто	дължина на	отправна гара	получаваща гара	вид на товара
1	3152472	23813	S	4	18	25	43	14.04	Волуяк	Бургас	контейнери
2	2178332	92329	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
3	2178332	92469	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
4	2178332	92477	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
5	3152472	28382	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
6	3152472	24556	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
7	3152472	81332	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
8	2178332	91511	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
9	2178332	90582	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
10	3152472	34448	S	4	17	4	21	14.04	Волуяк	Бургас	контейнери
11	3152472	32040	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
12	2178332	91085	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
13	2178332	90998	K	2	13	4	40	13.86	Волуяк	Бургас	контейнери
14	2178332	90125	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
15	3152472	22906	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
16	2178332	91933	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
17	2178332	91412	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
18	2178332	92296	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
19	8252472	31137	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
20	2178332	91479	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
21	2178332	90691	K	2	13	4	17	14.04	Волуяк	Бургас	контейнери
22	3152472	27525	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
23	3380496	03271	S	6	27	8	35	26.39	Волуяк	Бургас	контейнери
24	3380496	03230	S	6	27	8	35	26.39	Волуяк	Бургас	контейнери
25	2178332	92154	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
26	2178332	92245	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
27	3352472	22169	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
28	2178332	91487	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
29	2178332	90693	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
30	3152472	34661	S	4	18	4	22	14.04	Волуяк	Бургас	контейнери
31	2178332	90598	K	2	13	4	17	13.86	Волуяк	Бургас	контейнери
32	8252471	70434	Rps	4	21	4	25	19.90	Волуяк	Бургас	контейнери

Всичко: 32 96 806 167 886 496.78

Възвешаване: 0 0 0 0 0 0

Дължина на locomotive: 20

ВЕРНО С ОПРИГАНА

ПРИМ РЕАКТ

подрезан фр. фронт

подрезан фр. фронт

Fig. 3.20. Nature sheet of DFT № 30595.

Brake mass certificate VP-11 for the composition (fig. 3.21)

Превозвач PIMK Rail				Обр. ВП-11	
Удостоверение за спирачни маса					
Гара	Волуяк 36994			(K)	
Дата	15-1-2025г. Влах № 30595			D	
Маса на влака	686 t			R = 15 ⁸⁰	
Спирачен процент	45 %				
Необходима спирачна маса	309 t				
Mg	оси	АВС (Автоматична влакова спирачка)	РС (Ръчна спирачка)		
R	оси				
P	оси	Спирачна маса, t	Оси бр.	Спирачна маса, t	Оси бр.
G	оси				
Начална /останала маса / оси		46	40%	62	
Допълнителна маса / оси					
Всичко: Налична спир. маса / оси		40%	62	Иванов Николай Иллев	
Неплътност на локомотива		0,2		bar / min TMPB	
Неплътност на влака				bar / min (bar / 0,5 min)	
Влака натегнат / ненаатегнат		Извършил пробата на спирачките			
Дежурен ръководител движение		Иванов			
№ на вагон	Спирачна маса	№ на вагон	Спирачна маса		
3152 442 23813	28	2148 332 92295	14		
2148 332 92329	15	8252 442 31137	25		
2148 332 92469	14	2148 332 91449	14		
2148 332 92447	14	2148 332 90661	14		
3152 442 28382	28	3152 442 24525	28		
3152 442 24555	14	3380 446 05241	35		
3152 442 81332	28	3380 446 05230	35		
2148 332 91511	14	2148 332 92154	15		
2148 332 90562	14	2148 332 92246	14		
3152 442 34448	14	2352 442 22163	28		
3152 442 32046	28	2148 332 91487	14		
2148 332 91065	14	2148 332 90895	15		
2148 332 90968	14	3152 442 34661	28		
2148 332 90125	14	2148 332 90596	14		
3152 442 22906	28	8252 447 40454	28		
2148 332 91075	14				
2148 332 91442	15	16162	40%		

Fig. 3.21. Brake mass certificate of DFT № 30595.

3.2. Factual description of the occurred.

3.2.1. Direct sequence of events that led to the accident, including:

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

At 06:30 a.m., the duty traffic controller came on duty at Kremikovtsi station and accepted the station from the central dispatching department (CDD).

At 07:30 a.m., the stationmaster arrived at Kremikovtsi station to participate in a commission to conduct a monthly inspection of the railway infrastructure. The commission conducted the monthly inspection between 09:30 a.m. and 12:00 p.m.

At 08:00 a.m. the train master, freight traffic, shunting switchman and wagon inspector technician at BDZ-Cargo EOOD reported to Iliyantsi station for a shift. The shift manager conducted a pre-shift briefing for the three employees.

At around 09:40 a.m. the train master, freight traffic and shunting switchman head to Kremikovtsi station in their personal cars.

At 10:00 a.m., locomotive No. 98520055093-7 departed from Iliyantsi station, with a wagon mechanic inspector (TMRI) and a locomotive driver in the cabin.

At 10:14 a.m., according to the samples for objective control of events from the TRIS CTC system, Kremikovtsi station switched from CDC to reserve local control (RLHDI), which was not mentioned in the written statements of the train dispatcher and the duty traffic manager at Kremikovtsi station.

At 10:22 a.m., locomotive No. 98520055093-7 was accepted on the second track at Kremikovtsi station and, with a permitted shunting position at Post No. 2, was shunted at the industrial branch of SIEN 99" EOOD.

At 13:11 p.m., locomotive No. 985200551556 arrived on the fourth track at Kremikovtsi station.

At the industrial branch of SIEN 99" EOOD, locomotive No. 98520055093-7 performed shunting activities on composing ST No. 30802, a technical inspection of the train and sample A (full sample) of the automatic brakes were also performed.

Around 12:30 p.m., the commercial manager at Kremikovtsi station handed over to the shipper the processed documents of ST No. 30802 for declaring the cargo to customs.

During the preparation period of ST No. 30802, the head of the freight train went to the office of the duty traffic controller and informed him that a shunting must be performed with two damaged wagons, which from the industrial branch of "SIEN 99" EOOD should be pulled out and parked on a third ramp track at Kremikovtsi station. The duty traffic controller authorized Post No. 2 to perform the shunting.

After the arrival of locomotive No. 98520055155-6, at 13:28 p.m., the duty traffic controller at Kremikovtsi station called the train dispatcher (the conversation was conducted on personal mobile phones) with a request to take the station to the RLHDI so that they do not make "unnecessary shunting". According to the written testimony of the duty traffic controller, the term "unnecessary shunting" is a tacit agreement to send ST No. 30802 from the industrial branch of "SIEN 99" EOOD to Svetovrachene station.

With the consent of the train dispatcher, without performing the necessary manipulations with the TRIS CTC system and without issuing a dispatch order, the traffic controller on duty used an unregulated key (available at the station before the TRIS CTC system was put into regular operation) and at 13:30 p.m. without permission took the Kremikovtsi station of the RLHDI (according to the objective control data in the TRIS CTC system) and allowed a shunting position at Post No. 2.

At 13:34 p.m. the shunting position is accepted by Post No. 2, the switchman/crossing guard arranged the relevant route, gave the signal "Ready" and locomotive No. 98520055093-7 departed with the two damaged wagons from the industrial branch of "SIEN 99" EOOD to the third ramp track at Kremikovtsi station.

At 14:03 p.m. after the performed shunting on overrunning, locomotive No. 98520055093-7 returned to the industrial branch of "SIEN 99" EOOD, and after it entered the branch and locomotive No. 98520055155-6, after these maneuvers, the shunting position of the station was returned. The shunting crew attached the two locomotives at the head of ST No. 30802.

As it can be seen from the testimony of the duty traffic controller at around 14:30 p.m., the train manager, freight traffic, went to his office and informed him that he had "urgent work and had to leave" with an agreement to call when he sent ST No. 30802 to Iliyantsi station to wait for him there. In the conversation, the duty traffic controller asked him whether the train would depart from the industrial branch of "SIEN 99" EOOD without performing a shunting on the station track, to which he received a positive answer. In addition, the train chief, freight traffic, mentioned that the train's documents were being awaited from the customs. The duty traffic manager replied with "okay", ST No. 30802 would leave from the industrial branch to Svetovrachene station and after the conversation the shunting crew left Kremikovtsi station with their personal cars.

Around 15:00 p.m. the shipper provided the commercial manager with the documents from the customs for the composition of ST No. 30802, he prepared a waybill (form DP-1), handing over a copy with the waybills of the TMRV wagons to move to Iliyantsi station.

At 15:12 p.m., DFT No. 30595 of Pimk Rail EAD departed from Voluyak station with 32 wagons, 96 axles, 477 meters, 670 tons, locomotive No. 92520007063-7 (attached to the wagons, in working condition and using the route to Tulovo station) and at the head of the train locomotive No. 915210800131. At 15:25 p.m., it passed sectional post 4 without stopping and at 15:30 p.m. arrived at Iliyantsi station.

Around 15:30 p.m., the head of the train, freight traffic and the shunting switchman arrived in their personal cars at Iliyantsi station.

Around 15:30 p.m., the commercial manager and the TMRV entered the office of the duty traffic manager at Kremikovtsi station. The commercial manager handed over to the duty traffic manager a copy of the Nature sheet of ST No. 30802, and the TMRV presented the certificate of the train's brake mass for signature. At that moment, the train dispatcher called the duty traffic manager (the conversation was again conducted on personal mobile phones), saying that ST No. 4610 was coming from Yana station, which would pass without stopping at Kremikovtsi station. In response, he answered "okay" and informed the train dispatcher that ST No. 30802 was ready to depart and dictated its composition, then asked when to release it for Svetovrachene station, the train dispatcher answered "after FT No. 4610". After the conversation, the duty traffic controller informed the TMRV that ST No. 30802 would depart from the industrial branch after FT No. 4610. The TMRV left the office, headed to ST No. 30802, got into the cabin of the first locomotive and informed the locomotive driver that the train would depart from the industrial branch after FT No. 4610.

At 15:33 p.m., FT No. 4610 passed without stopping at Kremikovtsi station for Svetovrachene station.

At 15:34 p.m., the duty traffic controller at Iliyantsi station called the train dispatcher on the official phone with a request for consent to send DFT No. 30595 and received it. At 15:35 p.m., the train departed for Svetovrachene station. The train dispatcher stopped DFT No. 30595 at the entrance semaphore of Svetovrachene station, due to passing through the station of FT No. 4610 to Kurilo station.

At 15:40 p.m., the train dispatcher went to the office of the head of Sofia TOU with a request to be relieved for a few minutes to go to the toilet. When the two of them went to the workplace, the train dispatcher introduced the operational situation in the section to the head of Sofia TOU. However, in the conversation, he did not inform the head of the TOU that Kremikovtsi station was under reserve local control, and that he had ordered the traffic controller on duty at Kremikovtsi station to let ST No. 30802 for Svetovrachene station after the passage of FT No. 4610. He also did not inform the head of the TOU that he had allowed DFT No. 30595 to leave Iliyantsi station and that it was standing at the entrance signal at Svetovrachene station. At 15:44 p.m. from the sample for objective control of the TRIS CTC system, the direction of the automatic blocking from Kremikovtsi station to Svetovrachene station switched to the "free direction" mode, since the interstation was freed by the passing FT No. 4610, without stopping at Svetovrachene station in the direction of Kurilo station.

The traffic controller on duty at Kremikovtsi station, after seeing that the inter-station track to Svetovrachene station was free, at 15:45 p.m. took Kremikovtsi station of the RLHDI without permission from the train dispatcher and authorized a shunting position at Post No. 2, verbally ordering the switchman/level crossing guard to remove the barriers at the level crossing and prepare the route from

the industrial branch of "SIEN 99" EOOD, since the train from there would depart for Svetovrachene station. After these actions, the traffic controller on duty left the reception building and went to ST No. 30802 to send it from the industrial branch.

After perceiving the shunting position, the switchman/level-crossing guard at Post No. 2 arranged the route from the industrial branch of "SIEN 99" EOOD, which led to the current route to Svetovrachene station, went out in front of the cabin of the signal post and gave a signal for the shunting "Ready". At 15:48 p.m., ST No. 30802 departed from the industrial branch for Svetovrachene station.

The traffic controller on duty, after sending the train, due to a physiological need, went to the sanitary unit located in the waiting room of the station.

Meanwhile, the head of the TOU monitored the movement of FT No. 4610 through Svetovrachene station and its passage to Kurilo station and saw that the automatic blocking to Kremikovtsi station was free. At Kremikovtsi station, all tracks were free; he arranged a route for DFT No. 30595 to pass without stopping at Svetovrachene station, which at that moment has stopped in front of the entrance semaphore of Svetovrachene station, towards Iliyantsi station.

At 15:47 p.m., due to the ordered route, the automatic blocking in the inter-station area switched to the "blocked direction" mode in the direction of Kremikovtsi station.

At 15:49 p.m., DFT No. 30595 passed without stopping at Svetovrachene station and occupied the inter-station area towards Kremikovtsi station.

The head of the TOU saw on the monitor that a shunting was performed in the neck of Kremikovtsi station towards Svetovrachene station. He tried several times to contact the direct dispatching connection with the traffic controller on duty at Kremikovtsi station, as well as on his official mobile phone, but failed.

While the unsuccessful attempts to contact the traffic controller on duty continued, ST No. 30802 with the two diesel locomotives in the lead travelled in the inter-station area towards Svetovrachene station.

At 15:52 p.m., the switchman/crossing guard at Post No. 2 at Kremikovtsi station restored the switches to normal position and returned the shunting position of the traffic controller on duty at the station.

At 15:52 p.m., the head of the TOU managed to contact the traffic controller on duty at Kremikovtsi station on his official mobile phone, asking him if he was maneuvering with many wagons because he had ordered a transit from Svetovrachene on DFT No. 30595. In response, he heard "many" and the connection was disconnected.

Entering the office, the traffic controller on duty saw that the direction of the automatic blocking was in the direction of reception and was busy. At 15:54 p.m., he called the train dispatcher's personal mobile phone from his personal mobile phone and asked which train has been sent to Kremikovtsi station to be stopped, since ST No. 30802 has occupied the interstation. He replied that he was not at work and told him to call the dispatcher. The train dispatcher ordered him to turn off the voltage in the overhead contact line and to contact the engine drivers of ST No. 30802 to stop, after which the connection was disconnected without an answer. The train dispatcher left for the workplace.

The traffic controller on duty promptly called the direct dispatcher connection and had a conversation with the head of the TOU, who told him that he has seen shunting activity being carried out at the station and that DFT No. 30595 must pass without stopping. In response, the duty traffic controller said that ST No. 30802 was traveling to Svetovrachene station. Sharp remarks followed between the two and the conversation ended. After the conversation, the head of the TOU ordered the energy dispatcher to turn off the power and asked the duty traffic controller which track the train had left from, to which he received no answer, the connection was interrupted.

After the conversation, the duty traffic controller immediately called the direct inter-station connection of the duty traffic controller at Svetovrachene station to ask whether DFT No. 30595 had passed through Svetovrachene station, he replied that the train had passed and was on the Svetovrachene - Kremikovtsi interstation.

Hoping that he would be able to stop the movement of DFT No. 30595, the duty traffic controller took action with the remote control panel by turning off disconnectors 08 and 10, which he believed

would cut off the power supply to the catenary in the inter-station. Immediately after the action, the duty traffic controller called the train manager, freight traffic, from his personal mobile phone and ordered him to contact the engine drivers of ST No. 30802 who should stop the train and return to Kremikovtsi station.

In the time range from 15:49 p.m. to 15:55 p.m., according to the indications of the locomotive crew of locomotive No. 91521080013-1 headed by DFT No. 30595, they passed through Svetovrachene station without stopping and the train continued to move in the inter-station area. After passing the Lokorsko stop and exiting the right curve, the locomotive driver, second person standing on the left, saw that a train was moving about 300-400 meters in front of them, managed to shout to his colleague "A train is coming" and run to the rear cabin of the locomotive. The locomotive driver, first person, immediately initiated a "quick stop" of the train and run to the rear cabin of the locomotive, managing to lie down on the floor.

At the time, the locomotive driver of the second locomotive No. 92520007063-7 of DFT No. 30595, heard the noise of the activated train brake of the front locomotive and then two consecutive impacts, during which the locomotive cabin was deformed, the windows broke, and the locomotive control panel pressed the locomotive driver.

At 15:56 p.m. the senior train dispatcher ordered the energy dispatcher to turn off the voltage in the Svetovrachene - Kremikovtsi interstation. The energy dispatcher, in turn, at 15:56 p.m. issued an order to the duty officer at the Stohik substation to turn off the "Kremikovtsi" terminal - the terminal was turned off at 15:57 p.m. At that time, he also issued an order to the duty officer at the Iliyantsi substation to turn off the "Lokorsko" terminal - at 15:59 p.m. the terminal was turned off.

At 15:57 p.m., according to data downloaded from the recording device of locomotive No. 91521080013-1 of DFT No. 30595 at km 11+949 in the Svetovrachene - Kremikovtsi interstation, a head-on collision occurred with locomotive No. 98520055155-6 of ST No. 30802. Because of the collision until the final stop of the two trains, DFT No. 30595 pushed ST No. 30802 by 29 meters, with the bodyshell of train locomotive No. 98520055093-7 being separated from the running gear, the frame and the bodyshell receiving severe deformations from the collision and it caught fire.

Because of the collision, locomotive No. 91521080013-1 of DFT No. 30595 derailed to the right along the mileage, as well as locomotive No. 98520055155-6 with the first wagon No. 31525400142-5 of the ST No. 30802 train. Wagon No. 31524722752-5 derailed with the second bogie of the DFT No. 30595 train. Pole No. 105 of the catenary was broken and the contact wire was torn and hanging on the ground.

At 16:03 p.m., the train dispatcher returned to his workplace and, after realizing that an order had been given to turn off the voltage in the catenary, he attempted to contact the duty dispatcher of Pimk Rail EAD by phone.

At 16:05 p.m., he managed to contact him by asking for the mobile number to contact the locomotive crew of DTV No. 30595 and ordered him to call so that they can stop the train. At 16:07 p.m. he received the mobile phone number of the locomotive driver I, tries to contact him, but to no avail.

During these few minutes, after receiving the phone numbers from the on-duty dispatchers of "Pimk Rail" EAD and BDZ Cargo EOOD, attempts were made to contact the locomotive drivers of DFT No. 30595 and ST No. 30802, but without any result.

At 16:10 p.m., the senior train dispatcher received repeated calls on the service phones from the on-duty operational dispatch services of the Ministry of Interior and the FSaCP about a burning diesel locomotive in the area of the village of Lokorsko. Information was requested about the operational situation, the identification of the load in the compositions of the two trains, as well as the locomotive and shunting crews serving them. The senior train dispatcher transmitted the information via the emergency phone 112 to the services of the Ministry of Interior.

After the train dispatcher learned about the signal submitted about a burning diesel locomotive in the inter-station area, he called the personal mobile phone of the on-duty traffic manager at Kremikovtsi station and ordered him to went to the siding and check what had happened.

The locomotive crew of locomotive No. 91521080013-1 managed to get off the derailed locomotive. The locomotive driver of locomotive No. 925200070637 managed to free himself and left the locomotive.

At 16:25 p.m. the train dispatcher ordered by order all stations in the section from Svetovrachene station to Sopot station to switch to reserve local control via the emergency keys of the RRI.

From 16:56 p.m., the senior train dispatcher took over the duty from the train dispatcher and took over the management of the dispatching section Ilyantsi/Kurilo – Svetovrachene – Sopot – Karlovo.

The head of Kremikovtsi station ordered via his mobile phone the traffic controller on duty to return to Kremikovtsi station.

At 17:00 p.m., the head of Kremikovtsi station took over the duty from the traffic controller on duty. Duty officers of RITS Sofia and the Ministry of Interior arrived at the station, prohibiting any manipulation of the RRI console, and the personal documents of the traffic controller on duty and the station manager were seized. After the arrival of the investigative bodies from the NIS and the NAMRTAIB, an interrogation was conducted of the traffic controller on duty, who was detained for 24 hours by the pre-trial investigation authorities. The signalman/crossing guard at Post No. 2 and the station manager were also questioned.

At around 16:30 p.m., employees of the State Enterprise NRIC, BDZ Cargo EOOD and "Pimk Rail" EAD arrived at the scene of the accident, but they were not allowed near it due to the upcoming procedural and investigative actions by the authorities of the NIS and the Deputy Chairman of the Board of the NAMRTAIB.

At 18:40 p.m., the traffic manager on duty at the Svetovrachene station handed over the duty to the new shift.

At 17:30 p.m., on the official mobile phone at the Svetovrachene station, he notified the traffic manager on duty to remain at the station until the arrival of the investigative authorities.

At 17:40 p.m., employees of the SST arrived at the Svetovrachene station and drew up a report on the condition of the signalling equipment.

At around 21:30 p.m., employees of the Ministry of Interior took a sample for alcohol use, the result was negative, and a sample for drug use, the result of which was the presence of "benzodiazepine" and at 23:10 p.m., it was sent to a specialized laboratory at the Military Medical Academy for blood sampling.

Around 23:00 p.m., samples for alcohol and drug use were taken from the train dispatcher, which were negative.

Around 02:00 a.m. on 16.01.2025, the train dispatcher was questioned by the pre-trial authorities of the NIS in the presence of the Deputy Chairman of the NAMRTAIB.

3.2.1.2. Rolling stock and technical facilities functioning.

A commercial and technical inspection was carried out on DFT No. 30595 from the Voluyak starting station, as well as a full brake test. The train was provided with the necessary brake mass and was technically repaired. DFT No. 30595 departed from the entrance signal at Svetovrachene station for Kremikovtsi station according to the route order of the train dispatcher through the dispatch interlocking of the TRIS STS system, since the station is on the CDU.

A commercial and technical inspection was carried out on ST No. 30802 in the industrial branch of "SIEN 99" EOOD at Kremikovtsi station, as well as a full brake test. The train was provided with the necessary brake mass and was technically repaired.

ST No. 30802 did not depart from the receiving-departing track at Kremikovtsi station according to the rules of the dispatch interlocking of the TRIS CTC system.

ST No. 30802 departed from the industrial branch of "SIEN 99" EOOD with the consent of the traffic controller on duty at Kremikovtsi station, coordinated with the train dispatcher.

3.2.1.3. Operational system functioning.

The TRIS CTC operational system at the time of the accident at the Kremikovtsi and Svetovrachene stations in the Svetovrachene and Kremikovtsi interstation and in the Ilyantsi - Karlovo dispatching section, which is part of the third main conventional railway line, was functioning normally.

It would not have allowed manipulations to send and receive a train from a neighboring station when DFT No. 30595 previously occupied the interstation in the opposite direction of the autoblock.

An exchange of information via personal mobile phones, not via the direct dispatching connection, followed, which was not regulated by the rules for the train traffic management and safety, between the traffic controller on duty at Kremikovtsi station and the train dispatcher on the Iliyantsi - Karlovo section. The full operational information on the movement of trains in the Iliyantsi - Kremikovtsi section and Kremikovtsi station, which worked as a reserve local control (RLHDI) when sending ST No. 30802, was not transmitted.

The train dispatcher was replaced by the head of a unit/service in the Sofia TOU, without permission from the senior train dispatcher.

Dispatching Interlocking (DI) Sofia - Karlovo was put into operation in accordance with the procedure of the TPA with a permit for use No. ST-05-375/01.08.2023, issued by the Ministry of Regional Development and Public Works, Directorate for National Construction Control, for the commissioning of construction: "Increasing the throughput capacity by improving the parameters of the railway track and increasing the design speeds of the railway line "Sofia - Karlovo - Zimnitsa" - LOT 1 "Sofia - Karlovo", sub-project: "Rehabilitation of the facilities and devices of the signaling equipment and the telecommunications network in the railway section "Sofia - Karlovo", including the restoration of dispatching interlocking at stations equipped with DCs in the section "Sofia - Karlovo". In accordance with the requirements set out in Art. 44a, para. 4 and 5 of Ordinance No. 57 of 9 June 2004 "On achieving interoperability of the national railway system with the railway system within the European Union" the following text is written:

"(4) The authorisation for putting into operation within the meaning of the Railway Transport Act and this Ordinance is independent of the commissioning under the Territory Planning Act. The trial operation under this Ordinance shall be carried out after issuing an authorisation for commissioning under the Territory Planning Act, when the latter is required."

"(5) The structural subsystem or part thereof for which trial operation has been carried out under para. 2, item 3, but an authorisation for commissioning has not been obtained, cannot be used in the national railway system until it receives an authorisation for commissioning under the Railway Transport Act and this Ordinance."

It follows from the provisions of these two paragraphs of Ordinance No. 57 that the dispatching interlocking on the Sofia - Karlovo section must receive a permit for commissioning in accordance with Regulation (EU) No. 402/2013 on railway safety and Article 7, paragraph 1, item 5 of the Railway Transport Act.

By Order of the Director General of the State Enterprise NRIC dated 22.02.2024, the following safety procedures have been approved in connection with the movement of trains on the Iliyantsi/Kurilo - Karlovo section:

- Safety Procedure PB 5.03 "Instructions for the movement of trains and shunting work with TRIS CTC dispatching interlocking on the Iliyantsi/Kurilo - Karlovo section;
- Safety Procedure PB 5.03-01 "Instructions for working with the TRIS CTC centralized traffic management system on the Iliyantsi/Kurilo - Karlovo section;
- Safety Procedure PB 5.03-02 "Instructions for working with the TRIS CTC dispatching interlocking train description system on the Iliyantsi/Kurilo - Karlovo section;
- Safety Procedure PB 5.03-03 "Instructions for working with the TRIS CTC automatic route scheduling system on the Iliyantsi/Kurilo - Karlovo section TRIS CTC dispatching interlocking in the Iliyantsi/Kurilo - Karlovo section;
- Safety Procedure PB 5.03-04 "Instructions for working with the train recorder system of the TRIS CTC dispatching interlocking in the Iliyantsi/Kurilo - Karlovo section.

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.

At around 16:10 p.m., patrol bodies of the MoI arrived at the scene of the accident and began to fence off a large perimeter of the accident. The scene of the accident was isolated and guarded by the

bodies of the MoI. The area around the accident was blocked in a large perimeter and no outsiders, cars and media were allowed in. Access to the employees of the railway infrastructure manager, railway undertakings and safety authorities' presence was restricted. Only the bodies of the rescue services of the EMC, the MoI, NIS and the head of the safety investigation at the NAMRTAIB were allowed to the scene of the accident.

3.2.2.2. Actions of the emergency rescue services.

At around 16:20 p.m., teams from Emergency Medical Care and Fire Safety and Civil Protection arrived at the scene of the accident.

The EMC teams on site provided first aid to the injured six employees of the two railway enterprises, three employees of BDZ Cargo EOOD (locomotive crew of locomotive No. 98520055155-6 and TMRV) and three employees of "Pink Rail" AD (locomotive drivers of locomotives No. 91521080013-1 and No. 92520007063-7). EMC vehicles took the same to specialized hospitals in Sofia for assistance and treatment. The charred bodies of the two locomotive drivers were found in the cabin of the train locomotive No. 98520055093-7 of ST No. 30802 of the railway enterprise BDZ-Cargo EOOD and taken to Forensic Medicine - Sofia. The pre-trial proceedings authorities of the NIS have ordered forensic medical examinations.

3.2.2.3. Actions of the emergency rehabilitation services

On 16.01.2025 at 07:25 a.m., by order of the senior train dispatcher, the exit of the recovery vehicles for the restoration of the railway infrastructure from the accident at the Svetovrachene - Kremikovtsi interstation was permitted.

At 11:11 a.m., by order of the train dispatcher on the Iliyantsi - Karlovo section, the Svetovrachene - Kremikovtsi interstation was closed to regular trains, with the exception of the recovery vehicles, which can exit from both stations.

At 11:30 a.m. on 16.01.2025, after the completion of the procedural and investigative actions by the NIS and the head of the investigation at the NAMRTAIB, a written permit was issued to begin the emergency and restoration works.

At 12:48 a.m., a group of 10 wagons from the DFT No. 30595 train was collected from the interstation at Svetovrachene station and at 13:13 p.m. it was taken to Iliyantsi station. At 16:35 p.m. the second group of 22 wagons from the DFT No. 30595 train was collected from the interstation at Svetovrachene station and at 16:44 p.m. it was taken to Iliyantsi station.

At 14:00 p.m. ST No. 30802 of 15 wagons was collected from the interstation at Kremikovtsi station.

The following actions were being taken to sequentially lift the two locomotives of the railway enterprise "Pink Rail" EAD onto the railway track with recovery railway cranes.

At 23:30 p.m. on 17.01.2025, locomotive No. 92520007063-7 was lifted and taken with another locomotive to Svetovrachene station.

At 02:42 a.m. on 18.01.2025, locomotive No. 91521080013-1 was lifted and taken with another locomotive to Svetovrachene station.

The remaining structural elements of locomotives No. 98520055155-6 and No. 98520055093-7 of BDZ-Cargo EOOD were moved aside at a clearance distance from the railway track.

On 18.01.2025, after the clearance of the rolling stock, inspections of the railway track and restoration work on the catenary and installation of a new pole were carried out.

At 14:48 p.m. in the dispatch order log at Svetovrachene station, the technical manager of the OCL entered the serviceability of the OCL in the Svetovrachene - Kremikovtsi interstation.

At 14:49 p.m. in the dispatch order log at Svetovrachene station, a transport construction technician entered the serviceability of the railway track in the Svetovrachene - Kremikovtsi interstation.

At 15:04 p.m. by order of the train dispatcher, the Svetovrachene - Kremikovtsi interstation was opened for movement of all trains and vehicles with a speed reduction front of up to 25 km/h in the accident zone until full restoration from km 11+900 to km 12+000.

3.2.2.4. Actions that SE NRIC undertook for recovering the schedule and capacity along the railway line

On 18.01.2025, after the restoration of the railway infrastructure in the Svetovrachene - Kremikovtsi interstation, the movement of trains according to the schedule in the section was restored. All categories of canceled and deviated trains were restored in the section for movement.

4. Analysis of the event

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

Infrastructure manager

Analysis of the movement of locomotives № 91521080013-1, serviced DFT № 30595 on 15.01.2025

The analysis of the movement of DFT No. 30595 was made based on the registrations of the recording device of locomotive No. 91521080013-1 - at the head of the train.

The locomotive was manufactured by Siemens Mobility - Germany in 2024 with factory No. 23762/2024 and is registered in the register of railway vehicles of the Republic of Bulgaria under No. 91521080013-1 BG-PIMK.

The locomotive is a "Siemens Smartron" type from the 1080 locomotive series.

A digital speedometer installation, the "REDBOX" system, is installed on the locomotive, which registers and records the main and most important parameters during the movement of the locomotive, respectively the train.

The analysis of the movement of the train is carried out based on the values of the data registered and recorded in the recording device.

The registered data are split in two packages: analogue and digital. The following parameters were used for the data reading (fig. 4.1):

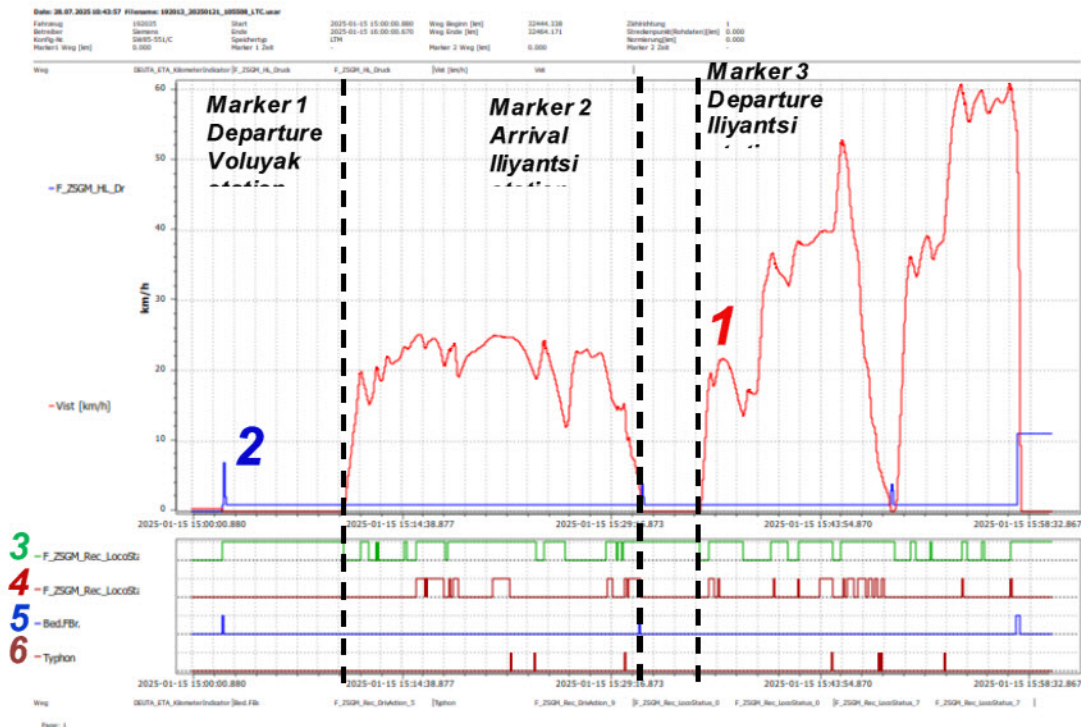


Fig. 4.1.

- Analogue data (the upper part of the chart):
 - Movement speed (km/h): pos. 1, marked in red colour;
 - Pressure in the main air duct: pos. 2, marked in blue colour (the values of the pressure are reflected in Table 4.1):

Table 4.1

Registration of the chart	Position of the drivers brake valve	Pressure in the main air duct, [bar]
0	Impact filling	>5.0
1	Travel (fully charged and brake released) 1A	5.0
2	Final loosening degree 1B	4.8
3	First Degree Detention	4.6
4	Second Degree Detention	4.4
5	Third Degree Detention	4.28

6	Fourth Degree Detention	4,15
7	Fifth Degree Detention	4,0
8	Sixth Degree Detention	3,85
9	Seventh Degree Detention	3,7
10	Full Detention	3,5
11	Quick Detention	<3.2

- Digital data (the lower part of the chart):
 - Information about applied traction force: position 3, green color, (F_ZSGM_Rec_LocoStatus_0); indications: 0 – traction mode; 1 – lack of traction mode (runout);
 - Information about applied electrodynamic braking: position 4, dark red color, (F_ZSGM_Rec_LocoStatus_7); indications: 1 – presence of electrodynamic braking; 0 – lack of electrodynamic braking;
 - Information about activation of the automatic pneumatic brake by the crane driver (F_ZSGM_Rec_DrivAction_5): position 5, blue color; indications: 1 – presence of pneumatic braking; 0 – lack of pneumatic braking;
 - Information about activated air horn (F_ZSGM_Rec_DrivAction_9): position 6, brown color; indications: 1 – sound signal; 0 – lack of sound signal.

DFT No. 30595 departed from Voluyak station at 15:10:39 p.m. (Fig. 4.1, marker 1). During the movement, the speed varied between 12 and 25 km/h and at 15:31:20 p.m. it arrived at Ilyantsi station after traveling 6.933 km in 20 minutes and 41 seconds (Fig. 4.1, marker 2). The locomotive driver used the electrodynamic brake to reduce the speed from 20 km/h to 1 km/h, when the automatic pneumatic train brake was also activated, which reduced the pressure in the main air duct to 4.4 bar, with which the train settled on the station track. It stopped for 4 minutes and 9 seconds (Fig. 4.1, the distance between marker 2 and marker 3).

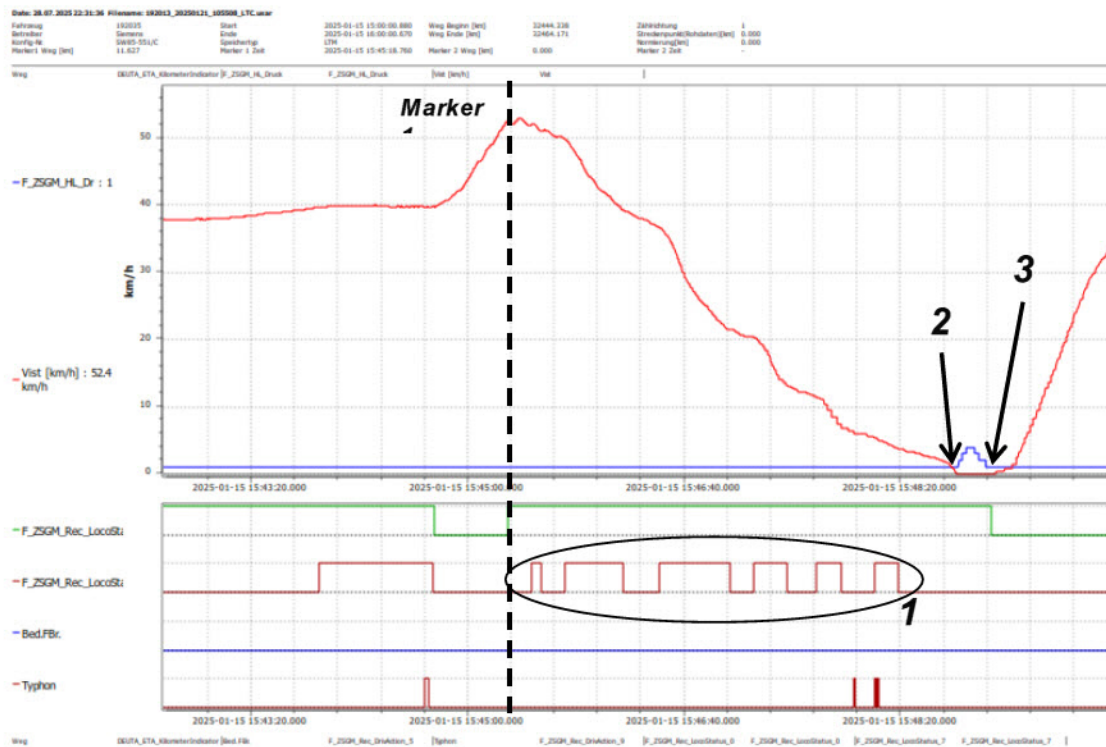


Fig. 4.2.

The train departed at 15:35:30 p.m. from Ilyantsi station to Svetovrachene station (Fig. 4.1, marker 3). The speed of movement in the Ilyantsi – Svetovrachene interstation section changed from 13.6 to 52.9 km/h. At 15:45:18 p.m. at a speed of 52.4 km/h, the traction force of the locomotive was turned off and it switched to free-running (inertia) mode (Fig. 4.2, marker 1). The speed increased to 52.9 km/h at 15:45:23 p.m. and began to decrease to 0 km/h by successive application of electrodynamic braking (Fig. 4.2, pos. 1). At 15:48:46 p.m., the train stopped in front of the entrance signal of

Svetovrachene station, having traveled 6.103 km since its departure from Iliyantsi station in 13:16 minutes (Fig. 4.2, pos. 2).

After a 16.5 second stopped at the entrance signal of Svetovrachene station, DFT No. 30595 departed at 15:49:02 p.m. (Fig. 4.2, pos. 3). It passed Svetovrachene station without stopping. The speed increased to about 36 km/h, decreased slightly to about 33 km/h, increased again to about 40 km/h, then increased to about 60 km/h and for 3.298 km fluctuated between 56.5 and 60.9 km/h for 3:23 minutes (Fig. 4.1).

At 15:57:07 p.m. at a speed of 60.8 km/h, the locomotive driver switched off the traction force of the locomotive and activated the electrodynamic brake (Fig. 4.3, item 1). After 7 seconds, at 15:57:14 p.m., after the train traveled 123 meters, the locomotive driver switched off the electrodynamic brake (Fig. 4.3, item 2) and the speed decreased due to the natural resistance of movement (Fig. 4.3, speed graph between positions 2 and 3). At 15:57:34 p.m., the locomotive driver activated the automatic pneumatic train brake to the quick hold position (Fig. 4.3, item 3). At 15:57:35 p.m. the braking effect of the automatic pneumatic train brake was present (Fig. 4.3, item 4) and the speed started to decrease at a faster rate (Fig. 4.3, item 5). The rate of decrease was maintained until 15:57:46 p.m. at a speed of 29.4 km/h (Fig. 4.3, item 6). At that point, the rate of decrease in speed increased further and after 0.99 seconds for 7 meters the speed decreased to 17 km/h, i.e. the decrease was 12.4 km/h (Fig. 4.3, item 7). From 15:57:47 p.m., the rate of decrease in speed returned to its previous value until 15:57:54 p.m. when the speed value was 0 km/h (Fig. 4.3, item 8).

The following conclusions could be made from the performed analysis:

- The engine driver activated the pneumatic train brake at 15:57:34 p.m., 19,656 km after its departure from Voluyak station, within 54,1 km/h speed. The train permissible speed along the interstation is 60 km/h;

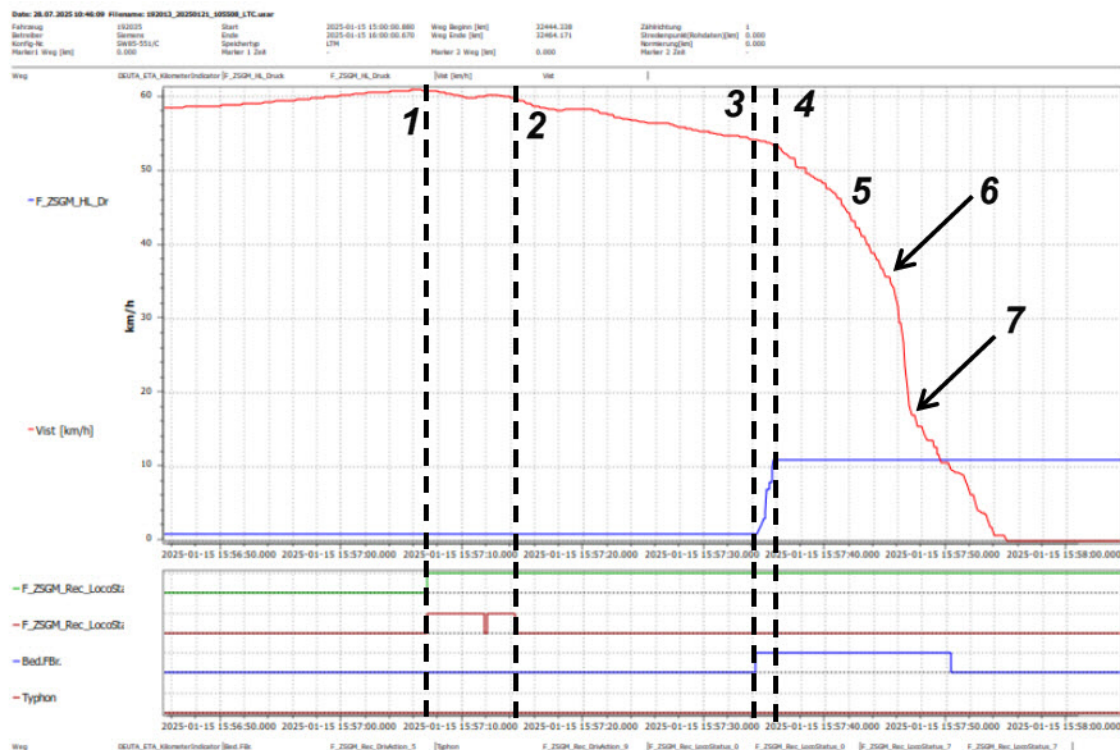


Fig. 4.3.

- The braking effect of the automatic pneumatic train brake occurred at 15:57:35 p.m., 19,680 km after departure from Voluyak station, 24 meters and one second from the moment of its activation, at a speed of 53.4 km/h;

- The moment of impact was at 15:57:47 p.m., 19.809 km after departure from Voluyak station, 153 meters and 12 seconds after the automatic pneumatic train brake was activated, 136 meters and 11 seconds after the braking effect was obtained, at a speed of 29.4 km/h;
- Because of the collision, the speed decreased by 12.4 km/h from 29.4 km/h to 17 km/h, with the train traveling 7 meters in 0.99 seconds. The aforementioned 7 meters were the result of the deformations obtained in the locomotives;
- After the impact, the speed decreased from 17 km/h to 0 km/h in 7.8 seconds, covering 17 meters. The distance was conditional, because as a result of the derailment, the locomotive's wheels no longer had contact with the rails, but continued to rotate;
- At 15:57:54 p.m., DFT No. 30595 stopped moving, having traveled 19.833 km from its departure from Voluyak station. The train's braking distance was 177 meters from the moment the automatic pneumatic train brake was activated, 19.656 km from its departure from Voluyak station to its final stop - 19.833 km from its departure from Voluyak station;
- The train stopping time from the moment the automatic pneumatic train brake was activated at 15:57:34 to its final stop at 15:57:54 p.m. was 20 seconds.

Analysis of the movement of locomotive № 98520055155-6, serviced ST № 30802 on 15.01.2025

The analysis of the movement of ST No. 30802 was made based on the speedometer tape recorded of locomotive No. 98520055155-6 – at the head of the train.

Diesel locomotive No. 98520055155-6 was manufactured at the Locomotive Plant “23 August” (now “FAUR”) – Bucharest in 1977 with serial number 23166. A 6LDA28B diesel engine powered it with a power of 1250 hp/932 kW, equipped with a hydraulic transmission system, BO-BO axle formula, maximum speed in train mode 100 km/h, in shunting mode 60 km/h, and axle load 17.5 t.

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

- Track speed (V-S);
 - Astronomical time through a graph and print on the tape, as well as the travel and stop time (T diagram);
 - Distance traveled for the individual track sections (through perforations on the tape - 2.5 mm = 0.5 km);
- The speedometer tape was checked to establish:
- Has the prescribed maximum speed of the train been observed;
 - Has the speed been limited to the prescribed one when passing a section that must be passed at a limited speed?
 - Has the duration of movement at reduced speed been observed, i.e. to cover a distance equal to the length of the reduction plus the length of the entire train;
 - Were there any unforeseen stops at the station;
 - Were there any locomotive slippages noted?
 - Availability of all records for the relevant TPR.

Speedometer control strips could also be used for other clarifications in the train movement, namely:

- Delays in departure and arrival;
- Stopping at closed signals and at stations;
- When calculating energy consumption, etc.

The speedometer control tapes are reviewed as a valuable objective document within the investigation of the safety of transport and the railway accidents.



Fig. 4.4. Tape tachograph RT12



Fig. 4.5. Tachometer A28

Any falsification of the speedometer tape, intentional destruction or intentional interference with the clock or recording mechanism is considered a violation of the transport safety.

Locomotive No. 98520055155-6 is equipped with a speedometer installation of the “Hasler” type, which consists of a three-phase alternating current collector converter (geber), driven by one of the locomotive’s axles. The resulting three-phase voltage with variable frequency, depending on the speed of movement, drives the mechanical speedometer synchronous electric motors mounted to it. One speedometer is installed in the locomotive’s cabin: the recording device (tape tachograph) RT12 on control panel No. 1 (Fig. 4.4) and the non-recording device (tachometer) A28 on control panel No. 2 (Fig. 4.5). The two speedometers have a range of 0÷120 km/h.

The tape tachograph measures and displays on a clear dial the following data during the movement of the locomotive:

- Track speed in km/h;
- Time in hours and minutes;
- Total distance traveled in km (odometer);

The tachometer measures and displays on a clear dial the same data that the tape tachograph shows, without the distance traveled and without recording the information. It is electrically connected to the tachograph and in the event of a power cable interruption, both devices stop recording the speed of movement.

The recording devices of the RT12 tachograph record the following basic parameters:

- Track speed in km/h;
- Astronomical time, as well as travel and stop time;
- Distance traveled for individual track sections;

- Other parameters of the locomotive movement.

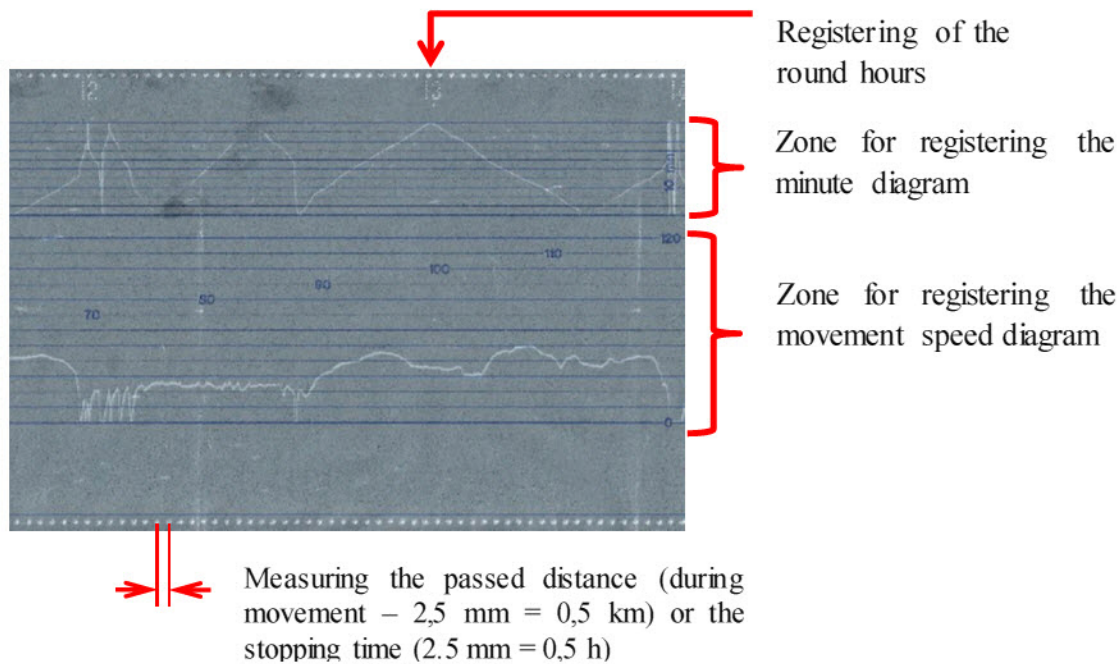


Fig. 4.6.

The recording (speedometer) tape is made of waxed paper. It has linear fields for recording the information transmitted by the tape tachograph (Fig. 8). The speedometer tape is a valuable objective source of data for the accurate determination of the beginning, course and end of processes related to movement.

The following are recorded on the speedometer tape:

- Track speed in km/h;
- Astronomical time;
- Travel time;
- Stop time;
- Distance traveled for individual track sections;
- Other data (optional).

Locomotive No. 98520055155-6 arrived at Kremikovtsi station at 13:16:00 p.m. and settled on the station track (Fig. 4.7, pos. 1). It stayed there from 13:16:00 p.m. to 14:05:35 p.m. for 49:35 minutes (Fig. 4.7, pos. 2). At 14:05:35 p.m. it started, accelerated to 24 km/h, covering 400 meters in 1:55 minutes until 14:07:30 p.m. (Fig. 4.7, pos. 3), after which the speed decreased to 0 km/h, covering another about 220 meters in 40 seconds until 14:08:10 p.m. (Fig. 4.7, pos. 4). There was a 30-second stop (Fig. 4.7, pos. 11) and the locomotive started again at 14:08:40 p.m., accelerated to 18 km/h, decreased to 9 km/h, accelerated again to 12 km/h, then the speed decreased to 0 km/h at 14:13:10 p.m., after having traveled 680 meters in 4:30 minutes (Fig. 4.7, pos. 5). After the locomotive stopped, a single movement at a speed between 1 and 2 km/h was registered, which was due to the coupling of locomotive No. 98520055155-6 to locomotive No. 98520055093-9, which was currently coupled to the train set on the track in the industrial branch (Fig. 4.7, pos. 6). Locomotive No. 98520055155-6, already attached to the head of ST No. 30802, stayed on the track of the industrial branch from 14:13:10 p.m. to 15:43:30 p.m. for 1:30:20 hours (Fig. 4.7, pos. 7).

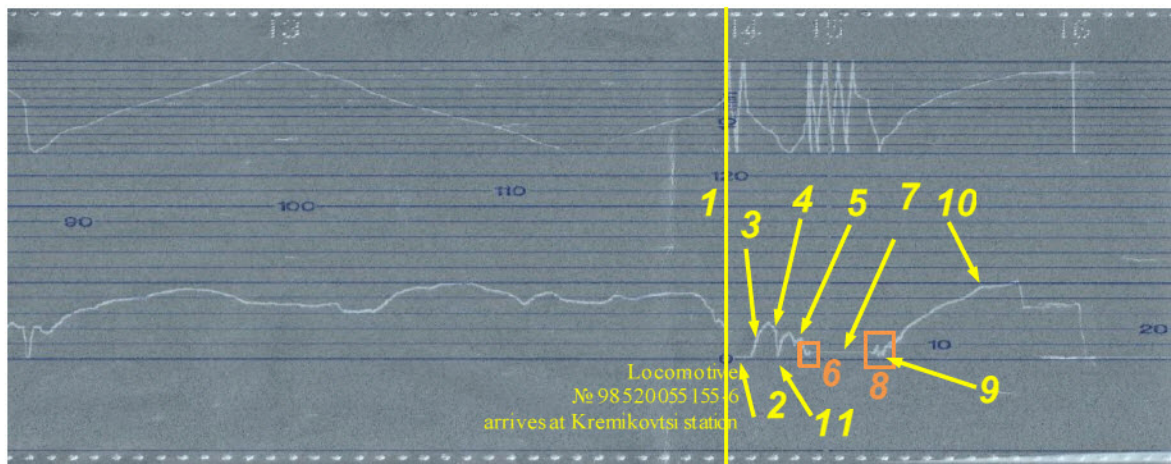


Fig. 4.7.

At 15:43:30 p.m. are registered several movements with speed up to 6 km/h (fig. 4.7, pos. 8).

At 15:51:40 p.m. locomotive № 98520055155-6 headed by ST № 30802 departed from the track



Fig. 4.7, pos. 6.



Fig. 4.7, pos. 8.

on the industrial branch at Kremikovtsi station (Fig. 4.7, pos. 9). The speed increased to 10 km/h, at which a fluctuation between 8 and 12 km/h was observed due to a slight pull in the train, after which it began to increase to 48 km/h, with ST No. 30802 covering 4,280 km in 8 minutes (Fig. 4.7, pos. 10). The speed was maintained at that value for 300 meters in 30 seconds and then increased to 52 km/h after covering 420 meters in 35 seconds (Fig. 4.8, pos. 1). At 15:58:30 p.m. the speed began to decrease sharply and from 52 km/h it reached 34 km/h in less than 10 seconds, covering 200 meters (Fig. 4.8, pos. 2).

That was followed by an almost horizontal registration caused by the shocks received during the collision (Fig. 4.8, pos. 3), after which the line dropped almost vertically to 0 km/h (Fig. 4.8, pos. 4). From the moment of collision at a speed of 34 km/h (Fig. 4.8, pos. 5) until the final stop of the locomotive at 0 km/h, the movement was conditional, since the wheels of the locomotive were not in contact with the rails of the railway track.

The following conclusions can be drawn from the analysis:

- Locomotive No. 98520055155-6 arrived at Kremikovtsi station at 13:16:00 p.m. and settled on the station track;
- Stayed on the station track from 13:16:00 p.m. to 14:05:35 p.m. for 49:35 minutes;

- From 14:05:35 p.m. to 14:13:10 p.m. it performed shunting movements and was relocated to the track in the industrial branch behind Kremikovtsi station, attaching to the train locomotive No. 98520055093-9 and through it to the train set of ST No. 30802;

- It stayed on the track of the industrial branch from 14:13:10 p.m. to 15:43:30 p.m. for 1:30:20 hours;

- At 15:51:40 p.m. locomotive No. 98520055155-6 at the head of ST No. 30802 departed from the track of the industrial branch at Kremikovtsi station;

- From the departure from the industrial branch track at Kremikovtsi station, at 15:51:40 p.m. until the moment of collision, ST No. 30802 traveled about 3,150 km in 7:10 minutes;

- At 15:58:30 p.m., the speed of 52 km/h began to decrease sharply and reached 34 km/h, traveling about 180 meters in about 10 seconds;

At 15:58:50 p.m. at a speed of 34 km/h, followed a collision and the speed decreased to 0 km/h.

Analysis of the work of work group on rail track and structures.

At the collision site between ST No. 30802 – 15 wagons and DFT No. 30595 – 32 wagons on 15.01.2025.

- Collision site around km 11+949 in the SVC-KMTS interstation, in a straight section.

- The site is 13 m from the beginning of the transition curve (right in the mileage) and in the direction of movement of DFT No. 30595.

- The curve has a radius = 1160 m.

- Cant in the circular curve = 80 mm.

- Total length of the curve = 454 m'.

- Length of the transition curves on both sides of the circular curve = 65 m' each and circular curve = 324 m', total = 454 m'.

- Circular curve = 324 m' with R=1160 m'.

- Continuously welded railway track on reinforced concrete sleepers St-4 and fastening PAK 68I, rails type 49 kg/m'.

- Collision location – slope 4‰, uphill direction KMC.

- Distance between Kremikovtsi and Svetovrachene stations – 9,770 m.

- Visibility for DFT No. 30595 is low moving in a curve to the right according to the mileage

- Visibility for ST No. 30802, moving in a straight section, is high compared to the collision location.

- The speed in the interstation area is 60 km/h.

Because of the accident, material damage was caused to the rolling stock, the catenary facilities, two dead engine drivers of the second locomotive of ST No. 30802 and serious injuries and abrasions to six more employees of the locomotives of PIMK RAIL EAD and one TMRV.

Analysis of the work of the staff on the train traffic

During the analysis of the events that occurred and additional familiarization with the safety procedures of the NRIC regarding the organization of the train traffic management in the Iliyantsi/Kurilo - Karlovo section, it was established:

The train dispatcher did not seek out a senior shift train dispatcher or a senior daily train dispatcher when deciding to leave his workplace, but agreed directly with the head of the TOU, without informing him on the previous conversations held with the duty traffic controller at Kremikovtsi station regarding the movement of ST No. 30802 of "BDZ-Cargo" EOOD, the method of departure from Kremikovtsi station and the fact that the station operates on RLHDI.

These circumstances were not mentioned in the conversation between the head of the TOU and the train dispatcher after the departure of DFT No. 30595 of "Pimk Rail" EAD from Iliyantsi station before leaving the workplace, when he informed him that the train was going to the entrance signal of the Svetovrachene station and after the head of the TOU Sofia asked about its movement, he replied that it should be ordered a transit route through the Svetovrachene station to the Kremikovtsi station after the FT 4610 of "BDZ-Passenger Transport" EOOD left for the Kurilo station.

With these actions, the train dispatcher created real prerequisites for the accident that occurred.

The conversations held on personal mobile phones between the train dispatcher and the duty traffic controller at the Kremikovtsi station are unacceptable for the safety of transport.

The agreements between the duty traffic controller at Kremikovtsi station and the locomotive and freight crews of ST No. 30802 of "BDZ-Cargo" EOOD with the decision that the train should depart directly from the industrial branch without being re-stationed at the station on a receiving-departing track, from where it should depart with a regular exit signal are also inadmissible.

Kremikovtsi station worked on the RLHDI without an order for that being given in the established manner, which was recorded in the dispatch order log.

Analysis of the dispatching interlocking TRIS CTC along Iliyantsi – Karlovo section.

The Kremikovtsi and Svetovrachene stations are equipped with a "Russian" type RRI for small stations.

The Kremikovtsi - Svetovrachene interstation is equipped with automatic interlocking (AB) without passing signals with axle counters.

The Sofia - Karlovo railway section, part of which are the Kremikovtsi and Svetovrachene stations, is equipped with a dispatching interlocking (DI), TRIS STS system, in which the stations can be controlled both by the train dispatcher of the Sofia - Karlovo section and by the station traffic controller on duty. The main operating mode of the station interlocking in the section is "Central Dispatching Control" (CDC) - control by the train dispatcher, and control by the station traffic controller on duty is only in emergency circumstances - "Reserve Local Control" (RLC) mode.

At the time of the accident, Kremikovtsi station was in the "Reserve Local Control" mode.

The Kremikovtsi - Svetovrachene section is equipped with a Train Dispatch Radio Communication (TDRC), operating on frequency band No. 65.

At the time of the accident, the TDRC was not working and was not used by either the train dispatcher, the traffic controller on duty at Kremikovtsi station (which is on the RLHDI), or the drivers of the two trains - No. 30802 and No. 30595.

There are multiple violations of the Rules for the Movement of Trains and Shunting Work in Railway Transport (PDV) and the Rules for Technical Operation (PTE) of the State Enterprise "National Railway Infrastructure Company".

The requirements of the Railway Transport Act for the commissioning of the Sofia - Karlovo dispatch interlocking according to art. 115d, para. 1 and para. 4.

For the dispatching interlocking Sofia - Karlovo, no permit has been issued for commissioning in accordance with the procedure of Art. 44 and Art. 45 of Ordinance No. 57 of 9 June 2004 on achieving interoperability of the national railway system with the railway system within the European Union.

This means that the dispatching interlocking Sofia - Karlovo cannot be operated in the national railway system in accordance with Art. 44a, paragraph 4 and paragraph 5 of Ordinance No. 57 of 9 June 2004, which read:

„Art. 44a (4) (Amended - SG, issue 71 of 2013) the permit for commissioning in accordance with the Ordinance is independent of the commissioning as per the procedure of the Territory Planning Act. The trial operation under this Ordinance shall be carried out after issuing a permit for commissioning in accordance with the Territory Planning Act, when the latter is required.”

“Art. 44a (5) (Supplemented - SG, No. 71 of 2013, amended - SG, No. 70 of 2019) A structural subsystem or part thereof for which a trial operation has been carried out under para. 2, item 3, but a permit for commissioning in accordance with the Railway Transport Act and this regulation has not been obtained, may not be used in the national railway system.”

The accident was not due to the technical condition of the signalling and telecommunications systems in the Kremikovtsi - Svetovrachene section.

The main causes for the occurrence of the accident are because of gross violations of the regulatory acts related to the safety of railway traffic.

Analysis of the accident

The collision between the two trains took place at the Svetovrachene – Kremikovtsi interstation at km 11+949.

In order to calculate the collision force between the two bodies, several key factors must be known: the masses of the bodies, their initial and final velocities, as well as the duration of the collision. The formula for calculating the collision force is related to the momentum and the change in momentum of the bodies.

Stages in solving the problem:

1. Determining the masses of the two trains.

The mass of DFT No. 30595 is:

- Mass of the wagons: 686 tons;
- Mass of locomotive No. 92520007063-7 – second in the train: 119 tons;
- Mass of locomotive No. 91521080013-1 – at the head of the train: 83 tons;
- The total mass of DFT No. 30595 is: 888 tons;

The length of DFT No. 30595 is:

- Length of the wagons: 496 meters;
- Length of locomotive No. 92520007063-7 – second in the train: 21 meters;
- Length of locomotive No. 91521080013-1 – at the head of the train: 19 meters;
- The total length of DFT No. 30595 is: 536 meters;

The mass of ST No. 30802 is:

- Mass of the wagons: 1089 tons;
- Mass of locomotive No. 98520055093-9 – second in the train: 68 tons;
- Mass of locomotive No. 98520055155-6 – at the head of the train: 68 tons;
- The total mass of ST No. 30802 is: 1225 tons;

The length of DFT No. 30802 is:

- Length of the wagons: 210 meters;
- Length of locomotive No. 98520055093-9 – second in the train: 14 meters;
- Length of locomotive No. 98520055155-6 – at the head of the train: 14 meters;
- The total length of ST No. 30802 is: 238 meters;

2. Initial and final speeds.

- The speed of DFT No. 30595 at the moment of collision is $29.4 \text{ km/h} = 8.17 \text{ m/s}$.
- The speed of ST No. 30802 now of collision is $34 \text{ km/h} = 9.44 \text{ m/s}$. Since the two trains are moving in opposite directions, the speed of ST No. 30802 is considered with a "-" sign.
- The total speed at collision is 63.4 km/h .
- The automatic train pneumatic brake of DFT No. 30595 was activated at a speed of 54.1 km/h .
- The automatic train brake of ST No. 30802 was activated at a speed of 52 km/h .
- The braking distance of DFT No. 30595 is 177 meters, and the stopping time is 20 seconds.
- The braking distance of ST No. 30802 is about 180 meters, and the stopping time is about 10 seconds.

Brake data:

• For DFT No. 30595:

- o Required braking rate: $\lambda=45\%$;
- o Available braking mass: $B=407 \text{ tons}$;
- o Available braking rate: $\lambda_{\text{nal}}=59\%$;

• For ST No. 30802:

- o Required braking rate: $\lambda=40\%$;
- o Available braking mass: $B=\text{no information}$;
- o Available braking rate: $\lambda_{\text{nal}}=\text{no information}$.

3. Collision time.

The duration of the collision is a difficult to measure quantity. In this case, it is assumed that the duration of the collision is 1 second, based on the data of the recording device of locomotive No. 91521080013-1. The cause for this is the registration of a change in speed (Fig. 4.3, the distance on the graph from pos. 6 to pos. 7), the rate of change of which is greater and is caused by the collision between the two trains. The duration of the process is 0.99 seconds.

4. Calculation of the impulse of the bodies during movement.

The impulse p of one body is defined as a product of the mass and velocity.

$$(1) \quad p = m \cdot v$$

where:

p – impulse of the body;

m – mass of the body;

v – velocity of the body at the moment of the collision.

Thus the impulse of DFT № 30595 is:

$$p_1 = 888\,000 \cdot 8,17 = 7\,252\,000 \text{ kg.m/s}$$

The impulse of ST № 30802 is:

$$p_2 = 1\,225\,000 \cdot (-9,44) = -11\,569\,444,44 \text{ kg.m/s}$$

In an inelastic collision between two bodies moving in opposite directions, the total momentum is conserved, but some of the kinetic energy is converted into heat, sound energy, and deformation. To calculate the force of the collision, it is necessary to know the masses and velocities of the bodies before the collision, as well as the coefficient of elasticity of the material. After the collision, the two bodies move together as one, with a velocity that can be calculated from the conservation of momentum.

5. Keeping the impulse.

Within each collision, the total impulse of the system is kept so the total impulse before the collision is equal to the total impulse after the collision:

$$(2) \quad m_1 \cdot v_{H1} + m_2 \cdot v_{H2} = (m_1 + m_2) v_K$$

where:

$m_1 \cdot v_{H1} + m_2 \cdot v_{H1}$ – Total impulse of the system before the collision;

$(m_1 + m_2) v_K$ – Total impulse of the system after collision;

m_1 – mass of DFT № 30595;

m_2 – mass of ST № 30802;

v_{H1} – velocity of DFT № 30595 before the collision;

v_{H2} – velocity of ST № 30802 before the collision;

v_K – velocity of the two trains after the collision.

6. Calculation of the velocity after the collision.

In an inelastic collision between two oppositely moving bodies, the law of conservation of momentum determines the velocity after the collision. In this case, the total momentum before the collision is equal to the total momentum after the collision, taking into account the opposite directions of motion. The velocity after the collision can be calculated using the formula:

$$(3) \quad v_K = \frac{m_1 \cdot v_{H1} + m_2 \cdot v_{H2}}{(m_1 + m_2)} = \frac{888\,000 \cdot 8,17 + 1\,225\,000 \cdot (-9,44)}{(888\,000 + 1\,225\,000)} = -2,04 \text{ m/s}$$

After conversion, the value of the speed of the two trains after the collision is 7.36 km/h.

7. Calculation of the collision force.

The direct calculation of the collision force is complicated, as it varies during the collision itself, and depends on the deformation of the bodies. Instead, the concept of average collision force is used, which is calculated by the change in momentum over the time of collision. Since in an inelastic collision the two bodies move together after collision, the collision force can be calculated from the momentum conservation equation (2) by finding the velocity after collision and then using the formula:

$$(4) \quad F_{cp} = \frac{\Delta p}{\Delta t} = \frac{(m_1 \cdot v_{H1} + m_2 \cdot v_{H2} - (m_1 + m_2) v_K)}{\Delta t}$$

$$F_{cp} = \frac{(88\,000 \cdot 8,17 + 1\,225\,000 \cdot (-9,44)) - (88\,000 + 1\,225\,000)(-2,04)}{1}$$

$$F_{cp} = -4\,317\,444,44\,N = -4\,317,4\,kN$$

8. Movement direction after the collision.

After an inelastic collision, the two bodies move together as one. The direction of motion after the collision depends on the signs of the velocities before the collision and the masses of the bodies. If v_{n1} and v_{n2} have opposite signs (as in the case under consideration), then the direction after the collision will depend on which body has the greater momentum before the collision.

When calculating the momentum of the two trains before the collision, we obtain (2):

$$p_1 = 888\,000 \cdot 8,17 = 7\,252\,000\,kg \cdot m/s$$

$$p_2 = 1\,225\,000 \cdot (-9,44) = -11\,569\,444,44\,kg \cdot m/s$$

Obviously, the momentum p_2 of ST No. 30802 is greater; therefore, the direction of motion after the collision will be towards DFT No. 30595, i.e. towards Svetovrachene station, in other words, ST No. 30802 has “pushed” DFT No. 30595. The exact value of the displacement depends on many factors, including: the value of the residual momentum after the collision, friction, the shape of the two bodies, etc.

Consequences from the accident

The investigation commission conducted several detailed inspections of the accident site and at the Kremikovtsi and Svetovrachene stations, where the remains of the locomotives involved in the accident were left.

At the Kremikovtsi station, the diesel locomotives of ST No. 30802 were located, placed on platform wagons.

The Investigation commission examined the damaged diesel locomotives in detail and in-depth and established:

- As a result of the collision, the two leading locomotives No. 91521080013-1 of DFT No. 30595 and 98520055155-6 of ST No. 30802 rose into the air, then tilted to the right (as viewed in the direction of the mileage, i.e. the movement of DFT No. 30595) and fell to the ground outside the gauge of the railway track (Fig. 4.9);

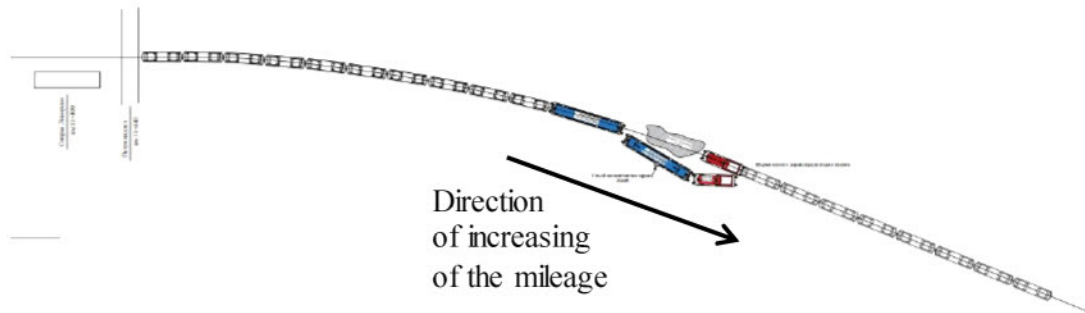


Fig. 4.9. Scheme of the place of the accident – collision of DFT № 30595 with ST № 30802 at km 11+949 along Svetovrachane-Kremikovtsi interstation.

Locomotive No. 91521080013-1 was deformed in the front in the area of the buffers, which were completely destroyed, absorbing a large part of the collision energy (Fig. 4.10). The cladding of the front wall of the front cabin was deformed and torn in places, as were the broken but intact windshields of the cabin (Fig. 4.11).



Fig. 4.10.

- There are observed slight deformations on the sidewalls of the locomotive bodysell behind the front (first) cabin (fig. 4.12).

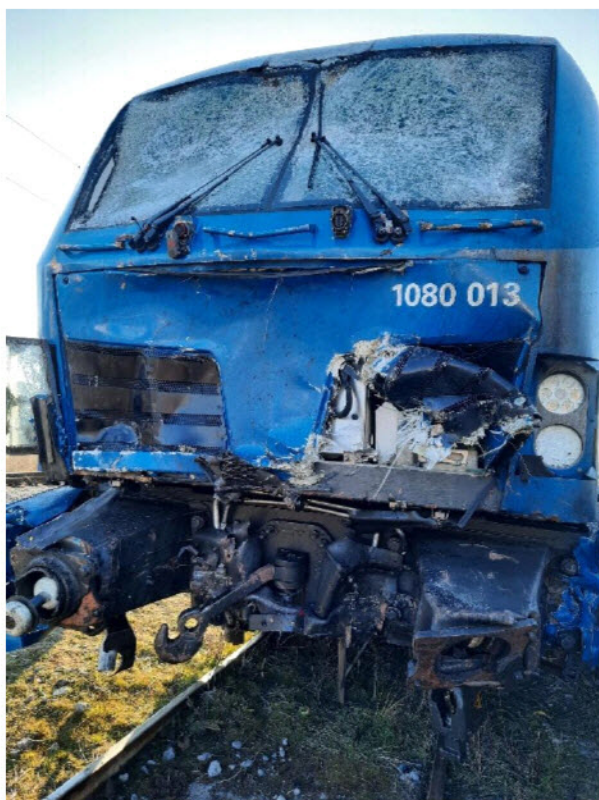


Fig. 4.11.



Fig. 4.12.

- The damages from the rear part of the cabin of locomotive № 91521080013-1 are almost identical (fig. 4.13).

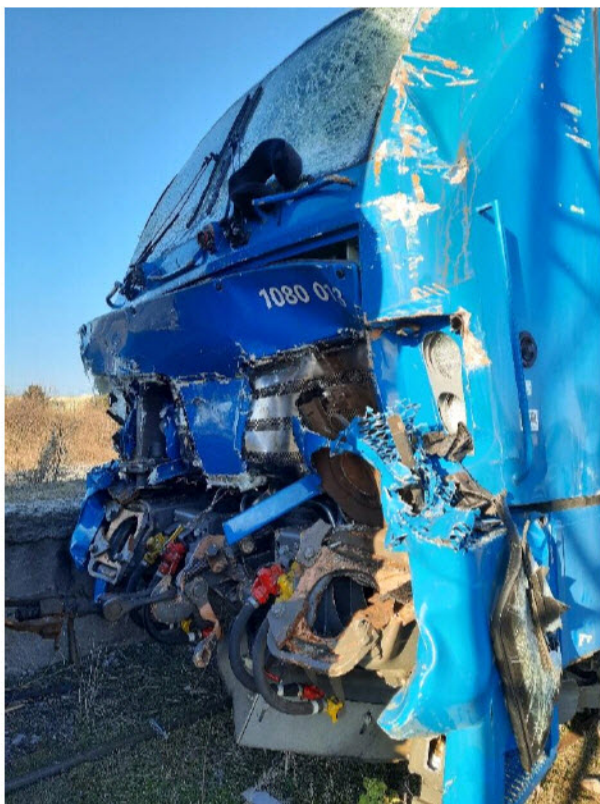


Fig. 4.13.



Fig. 4.14.

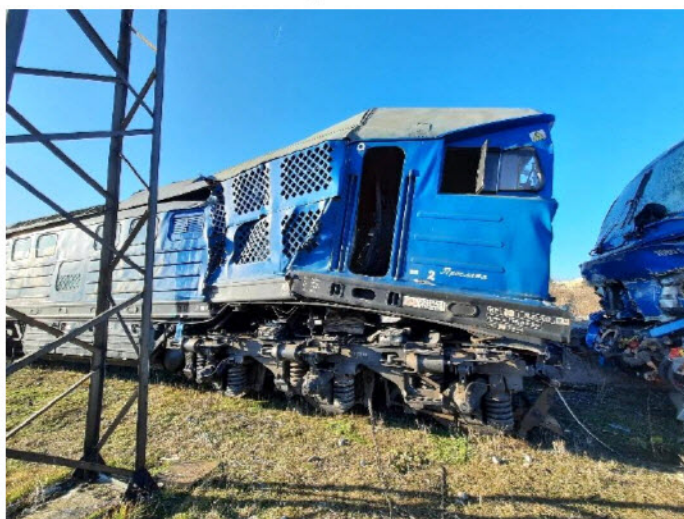


Fig. 4.15.

- Locomotive № 92520007063-7 is with one deformed cabin № 2 (front on the movement direction), smashed front wall, with broken missing glasses of the front windows and destroyed buffers (fig. 4.14). The leading frame of locomotive is thorn and deformed in the area of the colling block after the second cabin (fig. 4.15). There are observed deformations on the frame and the lever brake system of the second bogie.

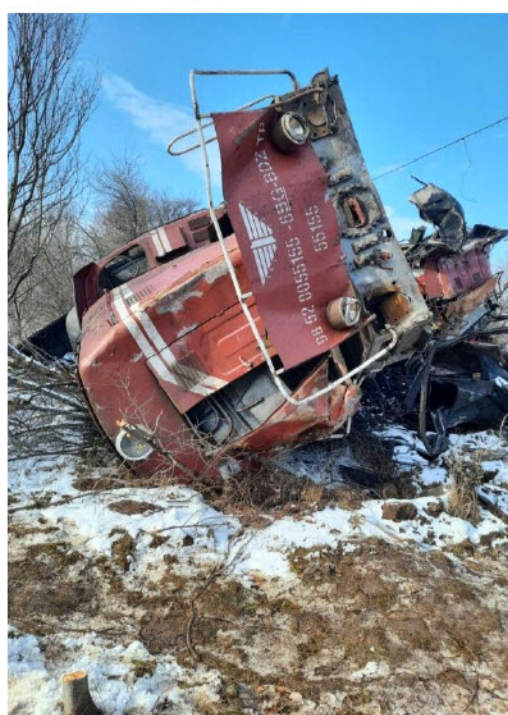


Fig. 4.16.



Fig. 4.17.

- Locomotive № 98520055155-6 fell on its left side in the movement direction after the clearance of the rail track with totally deformed bodyshell (fig. 4.16). The bodyshell is totally separated from the bogies and together with the locomotive № 91521080013-1 fell aside from the rail track (fig. 4.17), while the bogies, nevertheless the damages remained on the track (fig. 4.18). The bogies are with deformed frames, wheelset together with wheelset reducers, and the cardan shafts are separated from them, as the corpuses of the reducers are broken. Elements of the spring hanging and the lever brake system are missing and deformed (fig. 4.19).



Fig. 4.18.



Fig. 4.19.

- Locomotive № 98520055093-9 is with a totally deformed bodyshell (fig. 4.20). The bodyshell is separated from the bogies, but continues to lay on them (fig. 4.21). The bogies are on the rail track. The frames of the bogies are deformed with missing and damaged elements of the traction driving, spring hanging and the lever brake system (fig. 4.22). Some of the wheelset redactors and cardan shafts are dismantled and broken (fig. 4.23). Deformed and punctured is the main fuel tank (fig. 4.24). Fire occurred in the locomotive encompassed the area of the control cabin, which is almost totally burnt outside and inside (fig. 4.25). The fire did not encompass the engine compartment where is located the diesel engine, the fuel and the oil system of the locomotive, neither the air compressor (fig. 4.26).



Fig. 4.20.

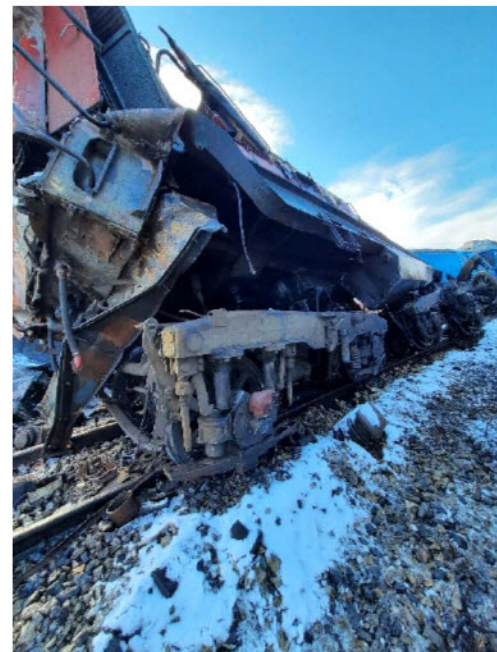


Fig. 4.21.



Fig. 4.22.

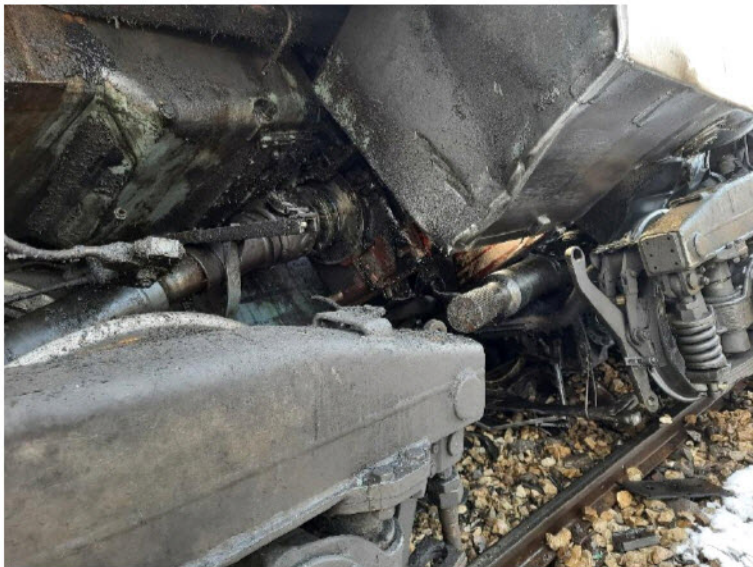


Fig. 4.23.



Fig. 4.24.

Causes for the ignition of locomotive № 98520055093-9

Diesel locomotive № 98520055093-9 is a train locomotive of ST № 30802, i.e. second in the train composition, attached on the rear to the wagons of the train composition, and on the front – to the leading auxiliary locomotive № 98520055155-6. The locomotive is with totally deformed and burnt control cabin (fig. 4.20, 4.25, 4.27). The Investigation commission performed a detailed and thorough inspection and analyzed the facts, evidences and circumstances regarding the locomotive ignition.

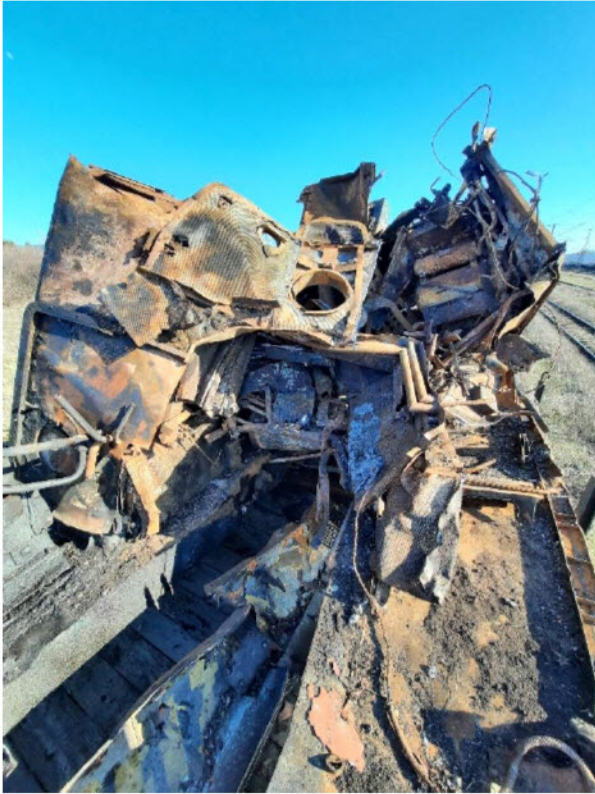


Fig. 4.25.

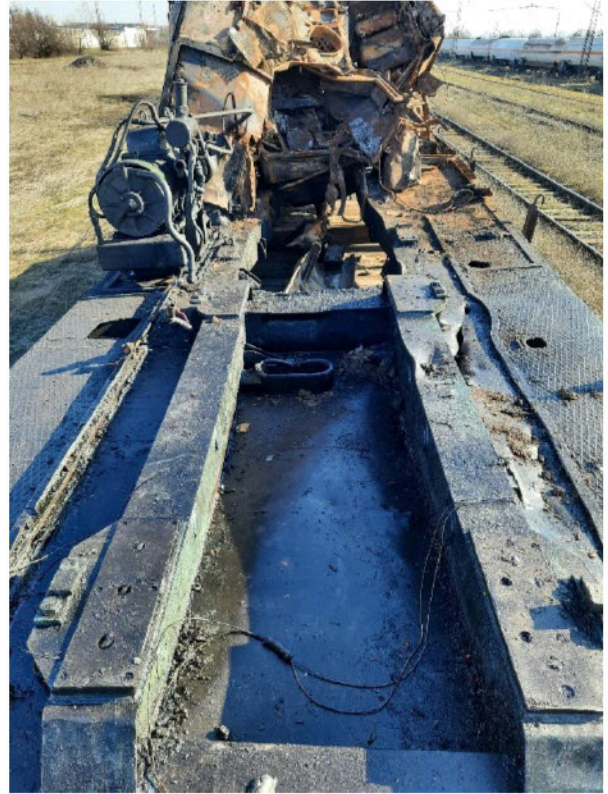


Fig. 4.26.



Fig. 4.27.

The ignition of diesel locomotive № 98520055093-9 is not a result from leaked and burnt fuel. The burn marks do not indicate the presence of petroleum products. Furthermore, there are no tanks or pipelines containing fuel or lubricants located in the control cabin.

The inspection did not find any traces of metal or plastic containers used to transport flammable or easily flammable substances.



Fig. 4.28.

Initially, attention was focused on the starter-generator, which had a completely burned and destroyed rotor, as well as a burned stator and a charred stator housing (Fig. 4.28). The traces left on the starter-generator housing indicate subsequent combustion rather than a source of fire.



Fig. 4.29.

The traces of combustion indicate that the ignition started from the cavity under the control cabin, to the right in the direction of travel of ST No. 30802, where the locomotive's batteries are located (Fig. 4.29).

The traces left on the metal parts of the cavity in which the batteries are located indicate the presence of an extremely high temperature in this area (Fig. 4.29, pos. 1). This leads to the conclusion that the ignition was caused by a spill of electrolyte (sulfuric acid) and the destruction of the battery boxes. Sulfuric acid itself does not burn, but in contact with other materials, it increases their temperature, which leads to self-ignition of these materials - the plastic battery boxes, cables and other combustible materials. Because of the collision, the locomotive drivers in the control cabin lost consciousness, which led to the uncontrolled spread of the fire and the burning of the entire control cabin, which is lined with oiled wooden and plastic panels and paint. Even if the drivers regained consciousness, the room was already too smoky and they were gassed, which contributed to their inability to evacuate the locomotive.

Causes for the accident occurrence

The main cause for the occurrence of the accident was the failure to comply with the provisions of the regulatory documents in railway transport.

According to Art. 314, item 7 of the RTOSART: "A train is considered ready for dispatch when it meets the following conditions: ... item 7. is located on a departure track."

In this case, ST No. 30802 was located on a track in the industrial branch behind Kremikovtsi station, is not included in the station interlocking of Kremikovtsi station and is not equipped with an exit semaphore. Therefore, ST No. 30802 departed from Kremikovtsi station illegally.

Art. 318. (1) It is not allowed to depart a train between stations without permission or without a written order for movement under special conditions.

(2) Permission for a train to depart from a station is the permitting indication of the exit semaphore and an order to depart, given personally by the traffic controller on duty with an order disk or a signal flashlight.

The locomotive drivers of ST No. 30802 knew that the train was on a track from which the dispatch of trains was not permitted and nevertheless departed from the track without the necessary permission, without making sure that the area between stations was clear.

The engine drivers of the two locomotives of ST № 30802, which moves with a transport crew, allowed the train departure without the members of the crew to be located in the train.



Fig. 4.30.



Fig. 4.31.

Within the inspections of the diesel locomotives, it was found that during movement, the brake valve at console No. 2 of locomotive No. 98520055093-9 (rear in the direction of movement) was set to the third insulated position, but the key was in the lock, which indicated that the brake valve was not locked in this position (Fig. 4.30, pos. 1). The locomotive driver controlled the locomotive from console

No. 1 (front in the direction of movement) and activated the automatic train brake of ST № 30802 by that brake valve (fig. 4.31, pos. 1).

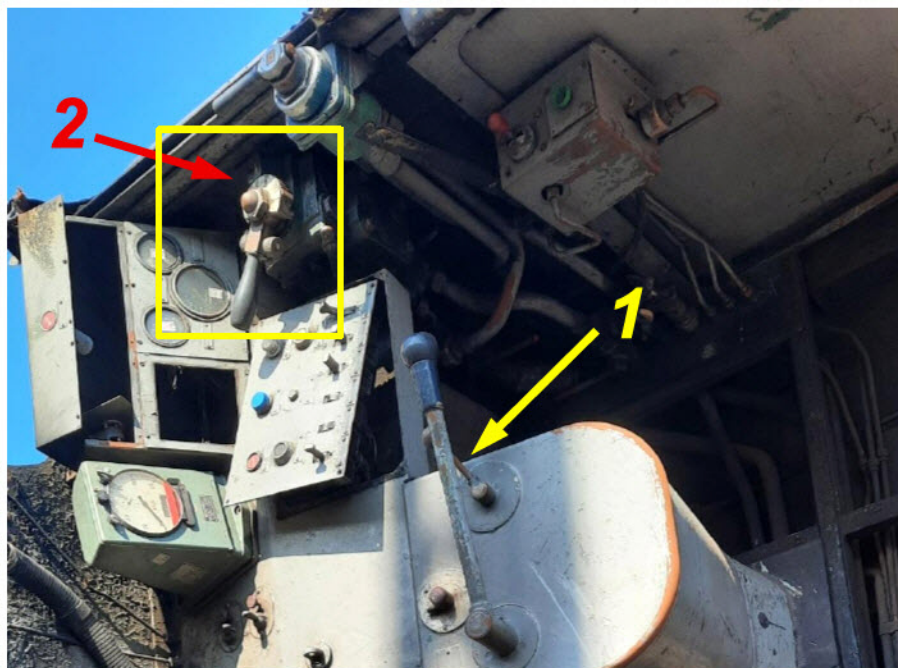


Fig. 4.32.

Locomotive No. 98520055155-6 has a severely deformed cab and other parts described above. During the inspection, it was found that the locomotive was controlled by console No. 1 (front in the direction of travel), evident from the position of the turn signal handle, set to the forward position (Fig. 4.32, pos. 1). At the same time, the brake valve was set to the insulated position, but the key in the lock was missing, which means that the brake valve was unlocked without a key and cannot be locked (Fig. 4.32, pos. 2), and also that the other brake valve was also unlocked and manipulations could be performed with it.



Fig. 4.32, pos. 2. The switch shows that the brake valve for the automatic brake is on an *insulated position*.

The observations, inspections and analyses conducted clearly show that the locomotive driver of the leading locomotive No. 98520055155-6 of ST No. 30802 did not activate the automatic train brake,

but it was activated by the locomotive driver of the train (second in the train) locomotive No. 98520055093-9 (Fig. 4.31, pos. 1).

4.1.3. Entities in charge of the technical maintenance.

Infrastructure manager

- SE NRIC has a Certificate of a structure responsible for maintenance with EIN BG /31/0023/0001, valid from 22.03.2023 to 21.03.2028. Scope of activities of a structure in charge of maintenance, Vehicle category: freight wagons, passenger coaches and RSPSM, owned by SE NRIC

Railway undertaking

- BDZ Cargo EOOD holds an updated/amended Certificate of a structure responsible for maintenance with EIN BC/31/0022/0007, valid from 12.12.2022 to 31.12.2025. Scope of the activities of a structure in charge of maintenance, Vehicle category: freight wagons, specialized wagons for the transport of dangerous goods, diesel and electric locomotives;

- „PIMK Rail“ EAD

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

Non-applicable.

4.1.5. National Safety Authority.

Railway Administration Executive Agency (RAEA) is the National Safety Authority for railway transport in the Republic of Bulgaria.

4.1.6. Notified bodies or Risk assessment bodies.

Notified body for the risk assessment bodies (NoBo) of the Republic of Bulgaria is "TINSA" EOOD. The company owns Permit No. 002-2 for carrying out activities to evaluate activities of a subsystem or a part of a subsystem with the requirements of the national safety rules or with the technical rules, issued by RAEA and valid from 15.07.2021.

Scope of permission

Subsystems:

- Energy;
- Infrastructure;
- Control, command and signalling;
- Rolling stock - freight wagons;
- Rolling stock - locomotives and passenger rolling stock.

"TINSA" EOOD holds Certificate No. BG/36/0021/0001 for an assessment body for performing an independent assessment of the implementation of the risk management procedure and its results, valid from 05.02.2023 to 02.04.2026.

Scope of evaluation activities

Structural areas of the railway system:

- Infrastructure;
- Energy;
- Control, command and signalling on railway lines;
- On-board control, command and signalling;
- Rolling stock.

Functional areas of the railway system:

- Traffic operation and management;
- Maintenance;
- Telematic applications for freight and passengers.

Assessing the overall coherence of risk management:

- The organization;
- The methodology;

- Technical aspects necessary to assess the compliance and completeness of the risk assessments and the safety level of the system.

4.1.7. Certifying bodies of the entities in charge of the technical 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.

Railway infrastructure

- SE NRIC implements Safety Procedure SP 2.09 "Methodology for determining, assessing and managing of the risk" version 05 effective from 01.03.2019, part of the SMS.
- SE NRIC maintains a permanent Register of the railway infrastructure (RINS) at ERA in which includes all components of the railway infrastructure.

Railway undertaking

- BDZ Cargo EOOD
- „PIMK Rail“ EAD

4.2. Rolling stock and technical facilities.

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

Non-applicable.

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

Non-applicable.

4.2.3. Factors deriving from manufacturers or another provider of railway products.

Non-applicable.

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

Non-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.

Non-applicable.

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

Non-applicable.

4.3. Human factor

4.3.1. Individual human characteristics:

4.3.1.1. Training and development, including skills and experience.

Personnel of the Infrastructure manager:

Head of Unit, TOU Sofia:

Diploma No. 000037, acquired qualification "Head of Traffic and Commercial Operation", training conducted in the period 1990÷1995, training institution VVTU "Todor Kableshkov", issued by VVTU "Todor Kableshkov";

Certificate No. 499 for holding the position of "Head of Unit, Service in Sofia Railway Department" in Sofia Railway Department from 01.04.2022.

Certificate No. II-331 from 31.08.2025 with the right to work with the devices and systems of the SE of the TRIS STS type DC in the Svetovrachene - Sopot section.

- Traffic manager/senior train dispatcher in Sofia Railway Department on 15.01.2025:

Certificate of professional qualification series S-97, No. 000199, acquired qualification "Traffic manager and commercial operation", training conducted in the period 30.08. ÷ 02.08.1997, training institution VVTU, issued by VVTU "Todor Kableshkov";

Certificate No. 6484 for holding the position of "TM/senior train dispatcher" in TOSAMD Sofia from 01.01.2023

- Traffic manager/train dispatcher in TOU Sofia on 15.01.2025:

Certificate of competence No. 21000, acquired competence for "Traffic manager", training conducted in the period 06.03. ÷ 12.10.2018, training institution PQC at SE NRIC, issued by "Railway Administration" EA;

Certificate No. 6763 for holding the position "Train Traffic Manager" at TOSAMD Sofia, issued on 01.11.2024

- Traffic Manager at Kremikovtsi station on 15.01.2025:

Certificate of competence No. 15333, acquired qualification "Traffic Manager", training conducted in the period 01.10.2012 ÷ 06.03.2013, training institution PQC at SE NRIC, issued by "Railway Administration" EA;

Certificate No. 6435 for holding the position "Traffic Manager" at TOSAMD Sofia from 13.10.2022

- switchman/level-crossing guard at Kremikovtsi station on 15.01.2025;

Certificate of competence No. 410, acquired qualification "Switchman/level crossing guard", training conducted in the period 05.04. ÷ 08.06.1999, training institution PQC - Sofia, issued by NC BDZ;

Certificate No. 5715 for holding the position of "Switchman/level crossing guard" at TOSAMD Sofia, issued on 01.03.2022

Personnel of railway undertaking BDZ-Cargo EOOD:

- Driver, locomotive driver of locomotive No. 98520055155-6;

Certificate of qualification No. 12013, acquired qualification for "Locomotive driver", training conducted in the period 23.11.2009 ÷ 15.02.2010, training institution PQC at BDZ, issued by "Railway Administration" EA;

Certificate for driving a locomotive BG 71 2010 0065, issued by RAEA;

Certificate No. 734 for holding the position of "Locomotive driver" at the PTP Sofia from 24.08.2024;

Additional certificate No. 71 2019 0065 from BDZ Cargo EOOD for rolling stock for which the driver is allowed to drive - Diesel locomotives series 55, 06, 07.00 and El. loco. Series 40.00 from 15.05.2023 on the national railway infrastructure of the Republic of Bulgaria until 15.05.2026;

- Assistant driver, locomotive driver on locomotive No. 98520055155-6;

Certificate of competence No. 20745, acquired competence for "Assistant locomotive driver", training conducted in the period 31.07. ÷ 19.12.2017, training institution PQC at BDZ, issued by the "Railway Administration" EA;

Certificate No. 781 for holding the position of "Assistant Locomotive Driver" at PTP Sofia from 01.08.2019

- Driver, locomotive driver on locomotive No. 98520055093-7;

Certificate of competence No. 26153, acquired competency for "Locomotive Driver", training conducted in the period 22.01. ÷ 07.06.2024, PQC training institution at BDZ, issued by the "Railway Administration" EA;

Certificate No. 340 for holding the position of "Locomotive Driver" at the PTP Sofia from 24.09.2024;

- Assistant driver, locomotive of locomotive No. 98520055093-7;

Certificate of competence No. 20742, acquired competency for "Assistant locomotive driver", training conducted in the period 31.07. ÷ 19.12.2017, PQC training institution at BDZ, issued by the "Railway Administration" EA;

Certificate No. 213 for holding the position of "Assistant Locomotive Driver" at the PTP Sofia from 15.04.2022

- Train Chief, Freight Traffic on ST No. 30802;

Certificate of Competence No. 10470, acquired qualification for "Train Dispatcher", training conducted in the period 25.05. ÷ 08.07.1984, training institution PQC BDZ, issued by PQC at BDZ;

Certificate No. 213 for holding the position of "Assistant Locomotive Driver" at the PTP Sofia from 15.04.2022

- Technician Mechanic Wagon Inspector on ST No. 30802;

Certificate of Competence No. 413, acquired qualification for "Wagon Inspector", training conducted in the period 03.04. ÷ 13.08.2006, PQC training institution at BDZ, issued by the "Railway Administration" EA;

Certificate No. 923 for holding the position of "Technician Mechanic Inspector of Wagons" at the PTP Sofia from 09.03.2022.

Personnel of PIMK RAIL EAD:

- Driver, locomotive driver 1st person of locomotive № 91521080013-1;

Certificate of competence № 14946, acquired qualification for "Locomotive driver", training conducted in the period 02.04. ÷ 20.07.2012, training institution PQC at BDZ, issued by "Railway Administration" EA ;

Certificate for driving a locomotive BG 71 2016 0328, issued by RAEA;

Certificate № 83 for holding the position of "Locomotive driver" in "Pimk Rail" EAD from 08.07.2021;

Additional certificate № 71 2016 0328 from "Pimk Rail" EAD for rolling stock for which the driver is allowed to drive - El. series 43, 44, 45,00 and from 15.06.2025 series 80 from 23.07.2023 on the national railway infrastructure of the Republic of Bulgaria until 23.07.2026;

- Driver, locomotive second person of locomotive No. 91521080013-1;

Certificate of competence No. 16798, acquired qualification for "Locomotive driver", training conducted in the period 03.02. ÷ 12.10.2014, training institution PQC at BDZ, issued by the "Railway Administration" EA;

Certificate No. 82 for holding the position of "Locomotive driver" at "Pimk Rail" EAD dated 08.07.2021;

- Driver, locomotive driver of locomotive No. 92520007063-7;

Diploma No. 23065, acquired qualification "Locomotive driver of diesel locomotives", training conducted in the period 1986÷1989, training institution VVTU "Todor Kableshkov", issued by VVTU "Todor Kableshkov";

Certificate for driving a locomotive BG 71 2016 0109, issued by the RAEA;

Certificate No. 90 for holding the position of "Locomotive Driver" in "Pimk Rail" EAD from 01.11.2021

Additional certificate No. 71 2016 0109 from "Pimk Rail" EAD for rolling stock for which the driver is permitted to drive - diesels series 51, 55, 06 and 07.00 from 12.08.2023 on the national railway infrastructure of the Republic of Bulgaria until 12.08.2026.

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

- Head of Unit, Sofia TOU, daily;

Single Health Information File No. 2527 dated 29.07.2022, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for Head of Unit, Service in Sofia Regional Office;

Psychological certificate for the position held is not required.

- Traffic Manager/Senior Train Dispatcher in Sofia Regional Office on 15.01.2025:

Single Health Information File No. 2998 dated 04.07.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for Traffic Manager/Senior Train Dispatcher.

Psychological certificate No. 1212/21.11.2023, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital - Sofia for a traffic manager/senior train dispatcher.

Conclusion: admitted for a period of 5 years.

- Traffic manager/train dispatcher at the Sofia TOU on 15.01.2025:

Preliminary medical examination card dated 12.11.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for a traffic manager/train dispatcher;

Psychological certificate No. 225/20.02.2024, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital - Sofia for a traffic manager/train dispatcher.

Conclusion: admitted for a period of 5 years.

- Traffic manager at Kremikovtsi station on 15.01.2025:

Single health information file No. 3455 dated 07.07.2023, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for traffic manager;

Psychological certificate No. 1150/07.11.2023, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital - Sofia for traffic manager.

Conclusion: admitted for a period of 1 year / 15.12.2024.

- Switchman/crossing guard at Kremikovtsi station on 15.01.2025:

Single health information file No. 2860 dated 16.07.2021, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion – fit for a switchman/crossing guard;

Psychological certificate No. 703/19.07.2023, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a switchman/crossing guard;

Conclusion: admitted for a period of 3 years.

Personnel of railway undertaking BDZ Cargo EOOD:

- Locomotive driver of locomotive No. 98520055155-6;

Single health information file No. 803 of 20.03.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for a locomotive driver;

Psychological certificate No. 134/27.01.2020, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a locomotive driver;

Conclusion: admitted for a period of 5 years.

- Assistant locomotive driver on locomotive No. 98520055155-6;

Single health information file No. 3446 of 28.10.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for an assistant locomotive driver;

Psychological certificate No. 844/25.09.2024, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for an assistant locomotive driver;

Conclusion: admitted for a period of 5 years.

● driver, locomotive driver of locomotive No. 98520055093-7;

Single health information file No. 1140 of 17.04.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for a locomotive driver;

Psychological certificate No. 808/12.09.2024, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for an assistant locomotive driver;

Conclusion: admitted for a period of 1 year.

● Assistant locomotive driver, locomotive driver of locomotive No. 98520055093-7;

Single health information file No. 821 of 21.03.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for an assistant locomotive driver;

Psychological certificate No. 872/02.10.2024, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for an assistant locomotive driver;

Conclusion: admitted for a period of 5 years.

● train chief, freight traffic of ST No. 30802;

Single health information file No. 1036 of 09.04.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for train chief, freight traffic;

Psychological certificate No. 659/10.07.2023, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for train chief, freight traffic;

Conclusion: admitted for a period of 3 years.

● Technician mechanic inspector wagons of ST No. 30802;

Single health information file No. 965 of 04.04.2024, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion - fit for technician mechanic inspector wagons;

Psychological certificate No. 465/07.04.2022, issued by the Psychological Laboratory for Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a technician mechanic inspector of wagons;

Conclusion: admitted for a period of 3 years.

Personnel of railway undertaking Pimk Rail EAD:

● Driver, locomotive I-person of locomotive No. 91521080013-1;

Preliminary medical examination card dated 11.10.2024, issued by the Transport Diagnostic and Consultative Center - Burgas;

Conclusion - fit for a locomotive driver;

Psychological certificate No. 943/12.10.2020, issued by the Psychological Laboratory of Railway Transport Plovdiv at the Multidisciplinary Transport Hospital Plovdiv for an assistant locomotive driver;

Conclusion: admitted for a period of 5 years.

● Driver, locomotive II-person of locomotive No. 91521080013-1;

Preliminary medical examination card dated 14.10.2024, issued by the Transport Diagnostic and Consultative Center - Burgas;

Conclusion - fit for a locomotive driver;

Psychological certificate No. 498/22.06.2020, issued by the Psychological Laboratory of Railway Transport Plovdiv at the Multidisciplinary Transport Hospital Plovdiv for a locomotive driver;

Conclusion: admitted for a period of 5 years.

● Driver, locomotive driver of locomotive No. 92520007063-7;

Preliminary medical examination card dated 01.09.2025, issued by the Multidisciplinary Transport Hospital - Plovdiv;
Conclusion - fit for a locomotive driver;
Psychological certificate No. 400/25.03.2022, issued by the Psychological Laboratory of Railway Transport Plovdiv at the Multidisciplinary Transport Hospital Plovdiv for a locomotive driver;
Conclusion: admitted for a period of 3 years.

4.3.1.3. Fatigue.

Railway infrastructure:

- Head of TOU Sofia:

Break: from 14.01.2025 at 16:00 p.m. to 15.01.2025 at 06:30 a.m.;

Started work: 15.01.2025 at 06:30 a.m. – (14 hours and 30 minutes);

- Traffic Manager/Senior Train Dispatcher in TOU Sofia on 15.01.2025:

Break: from 14.01.2025 at 07:00 a.m. to 16.12.2025 at 06:30 a.m.;

Started work: 15.01.2025 at 06:30 a.m. – (23 hours and 50 minutes);

- Traffic Manager/Train Dispatcher in Sofia TOU on 15.01.2025:

Break: from 14.01.2025 hour 08 minutes 00 to date 15.01.2025 hour 06 minutes 50;

Started work: 15.01.2025 hour 06 minutes 50 – (22 hours and 50 minutes);

- Traffic manager at Kremikovtsi station on 15.01.2025:

Break: from 10.01.2025 hour 07 minutes 00 to date 15.01.2025 hour 06 minutes 30;

Started work: 15.01.2025 hour 06 minutes 30 – (119 hours and 30 minutes);

- Switchman/crossing guard at Kremikovtsi station on 15/01/2025:

Break: 13/01/2025 07:30 a.m. to 15/01/2025 06:45;

Started work: 15/01/2025 06:45 a.m. – (47 hours and 15 minutes).

Personnel of BDZ Cargo EOOD:

- Driver, locomotive engineer of locomotive No. 98520055155-6:

Break: from 14.01.2025 at 18:30 p.m. to date 15.01.2025 at 06:30 a.m. Started work: 15.01.2025 at 06:30 a.m. – (12:00)

- Assistant driver, locomotive engineer on locomotive No. 98520055155-6:

Break: From 14.01.2025 at 19:10 p.m. to date, 15.01.2025 hour 07 minutes 20 Started work: 15.01.2025 hour 07 minutes 20 – (12 hours and 10 minutes);

- driver, locomotive on locomotive № 98520055093-7:

Break: from 12.01.2025 hour 07 minutes 00 to date 15.01.2025 hour 06 minutes 30;

Started work: 15.01.2025 hour 06 minutes 30 – (71 hours and 30 minutes);

- Assistant driver, locomotive of locomotive № 98520055093-7:

Break: from 13.01.2025 hour 11 minutes 00 to date 15.01.2025 hour 06 minutes 30;

Started work: 15.01.2025 hour 06 minutes 30 – (52 hours and 30 minutes);

- train chief, freight traffic of ST No. 30802:

Break: from 14.01.2025 hour 18 minutes 00 to date 15.01.2025 hour 08 minutes 00;

Started work: 15.01.2025 hour 08 minutes 00 – (14 hours and 00 minutes);

- Technician mechanic inspector wagons of ST No. 30802:

Break: from 14.01.2025 hour 18 minutes 00 to date 15.01.2025 hour 08 minutes 00;

Started work: 15.01.2025 hour 08 minutes 00 – (14 hours and 00 minutes).

Personnel of the railway undertaking Pimk Rail EAD:

- Driver, locomotive I-person of locomotive No. 91521080013-1:

Break: from 15.01.2025. hour 02 minutes 30 to date 15.01.2025. hour 13 minutes 30;

Started work: 15.01.2025. hour 13 minutes 30 – (11 hours and 00 minutes);

- Driver, locomotive II-person of locomotive No. 91521080013-1:

Break: from 15.01.2025. hour 02 minutes 30 to date 15.01.2025. hour 13 minutes 30

Started work: 15.01.2025. hour 13 minutes 30 – (11 hours and 00 minutes);

- Driver, locomotive engineer of locomotive No. 92520007063-7:

Break: from 11.01.2025 hour 16 minutes 30 to date 15.01.2025 hour 01 minutes 30;
Started work: 15.01.2025 hour 01 minutes 30 – (105 hours and 00 minutes).

4.3.1.4. Motivation and attitudes

Non-applicable

4.3.2. Work related factors:

4.3.2.1. Tasks planning.

Railway infrastructure

- SE NRIC –manager carries out maintenance, repair and operation of the railway infrastructure. Prepares a year-round timetable for the movement of all categories of trains on the main and secondary railway lines. Prepares schedules and timetables for additionally requested trains and vehicles submitted by the railway undertakings for movement on the railway network. Performs ongoing maintenance of railway infrastructure and facilities with regulated "operational windows".

Railway undertakings

- BDZ Cargo EOOD is a sole proprietorship with limited liability, established under the Commercial Act. The company consists of a Central Office and three Freight Divisions – Sofia, Plovdiv and Gorna Oryahovitsa. A manager manages the company, the freight divisions – by directors. The scope of activity of BDZ Cargo EOOD is the provision of rail freight transport, using diesel and electric traction and freight wagons in domestic and/or international traffic, including dangerous goods, maintenance and repair of rolling stock (locomotives and wagons). The company is the largest state-owned freight railway carrier in the country. To carry out its activities, the company has a license and safety certificates, as well as a structure responsible for maintenance. The company annually develops and approves a plan for composing freight trains in accordance with the train schedule.

- „Pimk Rail“ EAD is a sole proprietorship, established under the Commercial Act on 15.11.2015 with its own capital. In Bulgaria, a national license N 214 dated 14.03.2016 was issued for the carriage of goods by rail on the territory of the Republic of Bulgaria. The same was reviewed due to the expiration of the five-year period and issued on 24.03.2021. The subject of activity of „Pimk Rail“ EAD is the performance of railway carriages of goods, by diesel and electric traction and freight wagons in domestic and international traffic, including dangerous goods, maintenance and repair of rolling stock (locomotives and wagons). To carry out its activities, the company has safety certificates, as well as a structure responsible for maintenance.

The railway enterprise operates the following traction rolling stock:

- Electric and diesel mainline locomotives – 26 pcs.
- Diesel shunting locomotives – 3 pcs.

Non-traction rolling stock

Now, the railway enterprise has 820 of its own wagons, including specialized ones from various series for the transport of goods.

The railway enterprise has an approved annual plan for composing freight trains on the railway network;

Freight transportation procedures:

- related to ship traffic in ports for loading and unloading of railway transport;
- Arriving tankers with fuels in ports for loading and unloading of railway transport;
- developed and approved procedures for the transport of transit trains.

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

Non-applicable.

4.3.2.3. Communication means.

Railway infrastructure

The communication links between the traffic controllers on duty at the stations on the Iliyantsi - Karlovo section, as well as with the train dispatcher of the dispatch interlocking are carried out through the DCCM-8 direct connection system (conversations are recorded).

At each station on the Iliyantsi - Karlovo section, a service mobile phone is provided for emergency and urgent communication of the traffic controller on duty (conversations are recorded).

The stations on the Iliyantsi - Karlovo section are equipped with TDRC for quick connection of the train dispatcher on the section with the traffic manager on duty at the respective station and with the locomotive driver of the train on the section, (conversations are recorded).

Railway undertaking

- BDZ Cargo EOOD communication between personnel working in operation is carried out with provided service mobile phones and in mainline locomotives with installed TDRC.

- "Pink Rail" EAD communication between personnel related to operation and train dispatcher, locomotive driver, duty traffic manager is carried out through installed onboard radio stations MESA 25 in electric locomotives 8000 and 8100 via the GSM-R system.

The diesel locomotives series 07 are installed onboard radio stations MESA 23 with the same communications without the GSM-R system.

4.3.2.4. Practices and processes.

Non-applicable.

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

Railway infrastructure

- SE NRIC applies national and departmental regulations part of the SMS, relevant to the activities of the railway infrastructure manager:

- Working procedure RP 5.01-08 Rules for interaction between the operational services of SE NRIC and railway undertakings/carriers in the daily planning and management of trains on the railway infrastructure of SE NRIC;

- Working procedure RP 5.01-07 Instructions for work of switchman/posts at the operational points of SE NRIC;

- Working procedure RP 5.01-04 Instructions for work of the traffic manager on duty at the operational points of SE NRIC;

- Instruction VND – 1 for interruption and restoration of the operation of railway infrastructure sites managed by SE NRIC, when carrying out reconstructions, modernizations, renewals, rehabilitations and repairs;

- Instruction VND-130 for the movement of trains during reconstruction, modernization, renovation (renewal), rehabilitation and replacement (repair) within the framework of maintenance of railway infrastructure sites managed by SE NRIC.

Railway undertaking

- BDZ Cargo EOOD applies national and departmental regulations part of the SMS, relevant to the activities of the enterprise:

- Updated Contract No. 6023 for access to and use of the railway infrastructure by BDZ Cargo EOOD - public state property in the Republic of Bulgaria in force from 20.02.2018;

- Work instructions for locomotive and assistant locomotive driver at BDZ Cargo EOOD;

- Work instructions for a technician mechanic inspector wagons at BDZ Cargo EOOD;

- Work instructions for a train manager, freight traffic at BDZ Cargo EOOD;

- Work instructions for a shunting switchman at BDZ Cargo EOOD;

- Safety procedure PB-1.08 for determining the composition of the shunting crew;
- Instructions for servicing the industrial branch "SIEN 99" EOOD at Kremikovtsi station, prepared and approved by BDZ Cargo EOOD, coordinated with the State Enterprise NRIC and the RAEA, effective from 28.05.2025.

- "Pink Rail" EAD applies national and departmental regulatory acts part of the SMS, relevant to the activities of the enterprise:

- Instructions for the operation of diesel locomotives series 55.000 in "Pink Rail" EAD, version 02/21.03.2016;

- Manual for the driver in "Pink Rail" EAD, effective from 20.11.2015;

- Instructions for the work of a technician mechanic inspector of wagons in "Pink Rail" EAD, version 02/01.12.2015;

- Instructions for safe work of officials from the shunting crew during shunting activities in "Pink Rail" EAD, version 01/ 01.12.2015;

- Instructions for operation and repair of wagons in "Pink Rail" EAD, version 01/01.12.2015;

- Work of locomotive and transport crews when splitting a train in "Pink Rail" EAD, version 01/01.12.2015;

- Action plan for emergencies in "Pink Rail" EAD, version 01/01.12.2015;

- Program for maintaining and improving safety in "Pink Rail" EAD, version 01/01.12.2015;

- Manual for managing transportation safety in "Pink Rail" EAD, version 02/01.12.2015;

4.3.2.6. Working time of the involved personnel.

- In accordance with the requirements for the implementation of Ordinance No. 50 of 28.12.2001 and the Labor Code of the personnel involved in the accident of the State Enterprise NRIC:

Part of the personnel works full-time, 8-hour working day, 40-hour working week and 12-hour work shifts for which a summed calculation of working hours is applied.

4.3.2.7. Risk treatment practices.

Railway infrastructure

- SE NRIC applies safety procedure PB 2.09 "Methodology for determining, assessing and managing risks" version 06 in force from 01.09.2021, part of the SMS;

- SE NRIC applies a Program for carrying out a risk assessment for the health and safety of workers and employees in force from 09.09.2024, part of the SMS;

- SE NRIC applies a Methodology for quantitative risk assessment in force from 02.09.2024, part of the SMS;

- SE NRIC applies Instructions, Rules and Orders in relation to assigned work of employees in the operating divisions, as well as work performed by External Contractors under specific circumstances and hazards, consistent with the specific requirements for repair and maintenance of the railway infrastructure, part of the SMS.

Railway undertaking

- BDZ Cargo EOOD, in order to analyze, identify and manage risks, the following departmental acts have been prepared, scheduled and approved:

- Methodology for identifying and assessing risks that may counteract the implementation of the objectives of BDZ-Cargo EOOD, version 02/22.02.2022;

- Strategy for managing risks that threaten the implementation of the operational objectives of BDZ-Cargo EOOD, version 02/22.02.2022;

- Methodology for analyzing and assessing safety risks in BDZ-Cargo EOOD from 2013;

- Safety Procedure PB I.10 for monitoring the processes and procedures of the safety management system in BDZ-Cargo EOOD.

- "Pink Rail" EAD

- Hazard identification and risk calculation in "Pink Rail" EAD, version 02 / 01.12.2015;

- Hazard register in "Pink Rail" EAD, version 02 / 12.04.2024;

- "Pink Rail" EAD applies Instructions, Rules and Orders in relation to assigned work of employees in operation, as well as work performed under specific circumstances and hazards, consistent with the specific requirements for the repair and maintenance of rolling stock, part of the SMS.

4.3.2.8. Context, machinery, equipment and indications for shaping the working practices
Non-applicable.

4.3.3. Organizational factors and tasks:

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

SE NRIC, in accordance with the requirements of European and national regulations, have approved methodologies and working models of good European practices in accordance with professional experience. The work is planned and relevant in accordance with the rules set out in the SMS for the personnel directly responsible for the safety and operation of railway transport.

4.3.3.2. Communications, information and teamwork.

Non-applicable.

4.3.3.3. Recruitment, staffing requirements, resources.

Railway infrastructure

- SE NRIC has an approved "Strategy for Human Resources Management 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 database of the personnel;
 - Creation of a system of selection techniques for recruitment;
 - Carrying out the selection together with the head of the unit;
 - Documenting the process and communicating with staff;
 - Appointment.

Railway undertaking

- In BDZ Cargo EOOD, recruitment and selection of personnel is carried out according to the approved "Rules for Recruitment and Selection of Personnel in the Railway Enterprise;
- Candidates for a position related to the transport safety are required to possess the relevant legal capacity, according to the list of positions related to transport safety, approved based on Art. 39, para. 4 of the Railway Transport Act;
- Candidates for positions for driving locomotives are subject to the requirements regulated in TP PLS 506/22 Instructions for work of locomotive drivers-instructors in "BDZ-Cargo" EOOD, version 02/28.03.2022;
- Candidates for the position of depot master are subject to the requirements regulated by "TP PLS 507/22 Instructions for the work of depot masters in "BDZ-Cargo" EOOD, version 01/23.02.2022;
- Candidates for the position of locomotive driver and assistant locomotive driver are subject to the requirements regulated by "TP PLS 505/22 Instructions for work of locomotive drivers and assistant locomotive drivers in "BDZ-Cargo" EOOD, version 04/26.01.2022.
- In "Pink Rail" EAD, the selection of personnel is carried out according to the approved "Rules for Human Resources Management", version 03 of 18.06.2025.
- The activities of recruitment, selection and appointment of personnel are carried out by the "Human Resources Management" department, which is responsible for:
 - Procedure for recruitment, selection and management of personnel, version 02/13.08.2025;
 - Selection and assessment of personnel competence;

- Determination of the competences of positions related to transport safety and positions related to the maintenance of rolling stock staff;
- Procedure for training, additional qualifications and increasing the competence of personnel, version 01/01.12.2015
- Personnel training.

4.3.3.4. Implementation management and supervision

Non-applicable

4.3.3.5. Compensation (remuneration).

Railway infrastructure

• SE NRIC has approved "Internal rules for wages" in force from 01.09.2024, which regulate issues related to the wages of the company's personnel:

- General provisions for the organization of the salary in the entity;
- 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.

Railway undertaking

• In BDZ Cargo EOOD, the procedure and manner of payment of wages are regulated by the "Internal Rules for Wages" (IRW). IRW govern the structure, elements, organization, procedure for determining and distributing funds for wages. The procedure and manner for determining and amending additional wages and the wages of employees working under employment relations. The wages of workers and employees in the railway enterprise are determined in accordance with the time-based system for payment of labor based on the time actually worked and the wage under an individual employment contract. The basic wages for the relevant positions in the railway enterprise are collectively agreed in accordance with the Ordinance for Negotiating Wages, through coefficients to the minimum wage for the country, which is also adopted as the minimum wage for the railway enterprise. The agreed coefficients to the minimum wage are listed in the Appendix to the "Collective Labor Agreement" (CLA) in 2024.

The periodicity of the payment of wages, regulated in the CLA in 2024 and in individual labor contracts;

In the CLA in 2024, in Section V for Additional and Other Remunerations, the amounts of payment of additional wages are agreed

• In "Pimk Rail" EAD, the procedure and manner of payment of wages are regulated by the "Internal Rules for Wages" (IRW) dated 01.07.2016. IRW governs the organization of wages for employees employed in "Pimk Rail" EAD and is prepared in accordance with the Labor Code, the Ordinance on the Structure and Organization of Wages, as well as all the regulatory acts governing issues related to wages and their organization. These IRW apply to all workers and employees employed in "Pimk Rail" EAD.

4.3.3.6. Leadership, powers related issues.

Non-applicable.

4.3.3.7. Organizational culture.

Non-applicable.

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

Non-applicable.

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

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 the requirements for the safety management system 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 management of the railway transport safety.

Railway undertaking

BDZ Cargo EOOD and „Pink Rail“ EAD

- 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 the requirements for the safety management system 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 management of the railway transport safety.

4.3.4. Environmental factors:

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

Non-applicable.

4.3.4.2. Meteorological and geographic conditions.

Described in detail in item 3.1.3.2.

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

Described in detail in item 3.1.3.3.

4.3.5. Any other significant factor for the investigation objectives.

Non-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 the requirements for the safety management system 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 management of the railway transport safety.

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

Railway Infrastructure Manager.

- SE NRIC implements safety procedure PB 2.09 "Methodology for risk identification, assessment and management" version 06 in force from 01.09.2021, part of the SMS;
- SE NRIC implements Methodology for quantitative risk assessment in force from 02.09.2024, part of the SMS;
- SE NRIC implements Program for minimization of risk for safety and health, at work in force from 16.08.2024, part of the SMS;
- SE NRIC implements Program for assessment of workplaces and occupational risks in force from 16.08.2024, part of the SMS;
- SE NRIC implements the "Safety Rules for Current Railway Maintenance" in force since 2021; SE NRIC has approved regulatory acts, instructions and rules that outline risk management and assessment, but control over implementation by the company's safety structures is formal.

Railway undertaking

In BDZ Cargo EOOD, in order to analyze, identify and manage risks in BDZ Cargo EOOD, the following strategies and methodologies have been prepared and described:

- Methodology for identifying and assessing risks that may hinder the realization of the objectives of "BDZ-Cargo" EOOD, version 02/22.02.2022;
- Strategy for managing risks that threaten the implementation of the strategies and operational objectives of "BDZ-Cargo" EOOD, version 02/22.02.2022;
- Methodology for analysis and assessment of safety risk in BDZ-Cargo EOOD – 2013;
- Safety Procedure PB I.16 for training personnel in disasters, accidents, catastrophes and threats of terrorist acts, version 01/06.12.2013;
- Safety Procedure PB I.10 for monitoring the processes and procedures of the safety management system in BDZ-Cargo EOOD;

"Pink Rail" EAD, in order to analyze, identify and manage risks in BDZ Cargo EOOD, the following strategies and methodologies have been prepared and described:

- Strategy for ensuring the safety of transportation and maintenance of rolling stock, version 01/01.12.2015;
- Program for maintaining and improving safety in "Pink Rail" EAD, version 01/01.12.2015;
- Program for maintaining and improving the existing level of safety of railway transportation in "Pink Rail" EAD, version 02/01.12.2015;
- Manual for managing the safety of transportation in "Pink Rail" EAD, version 02/01.12.2015;

4.4.2.1. Producers and all other participants.

Non-applicable.

4.4.2.2. 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:

The railway infrastructure managers and railway undertakings have established their own safety management systems that ensure that the railway system meets the minimum common safety criteria and complies with the national safety rules and the safety requirements formulated in the TSIs and implemented in parts of the CSM. The safety management systems are adapted to the type, scope and areas of activities and ensure control of the risks of the railway infrastructure manager or railway undertaking. Existing national and European safety rules, the safety management system takes into account the risks arising from the activities of other participants in the transport process.

Infrastructure manager.

● The Safety Management System (SMS) has been developed and described on the basis of the transposed European regulatory acts – DIRECTIVE (EU) 2016/798, DELEGATED REGULATION (EU) 2018/762, IMPLEMENTING REGULATION (EU) 2019/779 and IMPLEMENTING REGULATION (EU) No. 402/2013 in the national legislation relevant to railway undertakings and railway infrastructure:

- Railway Transport Act;
- Ordinance No. 59 on safety management in railway transport;
- Safety Procedure PB. 2.52 “Procedure for the development and implementation of the safety management system with regard to the management function” of 06.06.2018, which regulates the steps to achieve the set goals.
- SMS implementation policies are outlined in the "Strategy for the Development of the Safety Management System" in force since 2018.

Railway undertaking

● The safety management system in BDZ Cargo EOOD has been built and described on the basis of the transposed European regulatory acts into the Bulgarian legislation:

- DIRECTIVE (EU) 2016/798 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on railway transport safety;

- COMMISSION DELEGATED REGULATION (EU) 2018/762 of 8 March 2018 laying down common safety methods with regard to 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 for the 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 identification and assessment and repealing Regulation (EC) No 352/2009;

- Railway Transport Act;

- ORDINANCE No 59 of 5.12.2006 on railway safety management.

- Safety Procedure PB. 1.06 "Safety Development Procedure, with which the personnel of BDZ TP EOOD, responsible for safety, is familiar with since 27.11.2014, which regulates the steps to achieve the set goals.

● The safety management system in "Pimk Rail" EAD has been built and described on the basis of the transposed European regulatory acts into Bulgarian legislation:

- DIRECTIVE (EU) 2016/798 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on railway transport safety;

- COMMISSION DELEGATED REGULATION (EU) 2018/762 of 8 March 2018 laying down common safety methods with regard to 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 for the 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 identification and assessment and repealing Regulation (EC) No 352/2009;

- Railway Transport Act;

- ORDINANCE No 59 of 5.12.2006 on safety management in railway transport.

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

Infrastructure manager.

The safety management system also includes a system for certification of the structures (entities) responsible for the technical maintenance of the vehicles of the SE NRIC and the railway undertakings in accordance with the requirements of Commission Implementing Regulation (EU) 2019/779 of 16 May 2019 establishing detailed provisions on a system for certification of the structures responsible for the maintenance of vehicles in accordance with Directive (EU) 2016/798 of the European Parliament and of the Council and repealing Commission Regulation (EU) 445/2011, transposed into national legislation.

- SE NRIC holds a Certificate of a structure responsible for maintenance with EIN VS/31/0023/0001, valid from 22.03.2023 to 21.03.2028. Scope of activities of a structure responsible for maintenance, Vehicle category: freight wagons, passenger wagons and RSPSM;

- SE NRIC holds a Safety Certificate IN EC BG 21 2023 0001, valid from 01.07.2023 to 30.06.2028.

Railway undertaking

- BDZ Cargo EOOD holds an updated/amended Certificate of a structure responsible for maintenance with EIN BC/31/0022/0007, valid from 12.12.2022 to 31.12.2025. Scope of activities of a structure responsible for maintenance, Vehicle category: freight wagons, specialized wagons for the transport of dangerous goods, diesel and electric locomotives;

- "Pimk Rail" EAD holds a new Certificate of a structure responsible for maintenance with EIN BC/31/0022/0003, valid from 20.10.2022 to 19.10.2027. Scope of activities of a structure responsible for maintenance, Vehicle category: freight wagons, specialized wagons for the transport of dangerous goods, diesel and electric locomotives.

- Formation of a file for the maintenance of the rolling stock for which "Pimk Rail" EAD is responsible, version 02 of 18.06.2025.

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

The results of the audits and inspections carried out regarding the functioning of the Safety Management System of SE NRIC in accordance with the requirements of Regulation (EU) 2018/761, Regulation (EU) No. 1169/2010, Ordinance No. 56 and Ordinance No. 59 for meeting 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 meet the requirements provided for in the relevant regulatory acts.

Infrastructure manager

1. In the period from 25.04.2023 to 05.05.2023, the National Safety Authority (RAEA) carried out an annual planned supervision of the SMS of SE NRIC for the renewal of the Safety Certificate in accordance with Delegated Regulation (EU) 2018/762 of the Commission for the establishment of common safety methods in relation to the requirements for SMS according to Directive (EU) 2016/798, no inconsistencies were found.

2. In the period from 22.04.2024 to 15.05.2024, the National Safety Authority (RAEA) carried out an annual planned supervision of the SE NRIC to establish common safety methods in relation to the requirements of the SMS according to Directive (EU) 2016/798 no discrepancies were found.

3. In the period from 07.12.2024 to 23.12.2024, the National Safety Authority (NSA) carried out an extraordinary safety inspection of SE NRIC in connection with the implementation of the SMS

requirements in accordance with Directive (EU) 2016/798, in view of the serious accidents that occurred in the company.

Railway undertaking

●BDZ Cargo EOOD

1. In the period from 27.11.2024 to 08.12.2024, the National Safety Authority (NSA) carried out an annual planned supervision of the SMS of BDZ Cargo EOOD in accordance with Commission Delegated Regulation (EU) 2018/762 establishing common safety methods with regard to the requirements for SMS pursuant to Directive (EU) 2016/798, not any inconformities were found.

● "Pimk Rail" EAD

1. In the period from 16.09.2024 to 20.09.2024, the National Safety Authority (NSA) carried out an annual planned supervision of the documented safety management system (SMS) of "Pimk Rail" EAD in accordance with Commission Delegated Regulation (EU) 2018/762 establishing common safety methods in relation to the requirements for SMS under Directive (EU) 2016/798. Not any inconformities were found.

2. In the period from 17.10.2024 to 18.10.2024, the National Safety Authority (NSA) carried out an annual planned supervision of the Assessment of the correct implementation of the developed maintenance system when performing the functions of a structure responsible for the maintenance of railway vehicles under the requirements of Regulation (EU) 2019/779. Not any inconformities were found.

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

Safety Authorization of the involved infrastructure manager.

● SE NRIC has a Safety Authorization IN EC BG 21/2023/0001, valid from 01/07/2023 to 30/06/2028;

4.4.6.1. Safety certificates of the involved railway undertaking.

● BDZ Cargo EOOD holds a Single Safety Certificate with IN EU BG 10 2022 0297, valid from 31.12.2022 to 30.12.2027. Rail transport of goods, including transport of dangerous goods, Transport volumes over 500 million ton-kilometers per year. Large enterprise;

● „Pimk Rail“ EAD holds a Single Safety Certificate with IN EU BG 10 2021 0058, valid from 06.06.2021 to 05.06.2026. Rail transport of goods, including transport of dangerous goods. Transport volumes over 500 million ton-kilometers per year. Large enterprise;

4.4.6.2. Certificate of Assessment body for risk assessment.

● "TINSA" Ltd. holds Certificate EIN BG/36/0021/0001 of an assessment body for performing an independent assessment on the implementation of the risk management procedure, valid from 05.02.2021 to 04.02.2026.

4.4.6.3. Authorizations for placing in service of permanently fixed equipment and permits for placing on the market of vehicles.

Non-applicable.

4.4.7. Other system factors.

Non-applicable.

4.5. Previous similar cases.

Previous cases of a similar nature NIB – BG has conducted an investigation into a railway accident that occurred on 04.10.2010 at 07:55 a.m. at km 47+796 in the Dragoman – Dragoil interstation. Front collision between a work-service train No. 10352 moving in the direction Dragoman – Dimitrovgrad (Serbian Railways) and an international fast train No. 293 moving in the direction Belgrade – Sofia. „BDZ-Passenger Transport“ EOOD services the rolling stock of the two trains and the personnel.

Because of the subsequent collision, the rolling stock of the two trains did not derail. Because of the accident, major material damage was caused to the two locomotives. Passengers and personnel in both trains were seriously injured, as well as the locomotive crew of international fast train No. 293.

Cause for the occurrence of the accident:

The executive staff of SE NRIC and „BDZ-Passenger Transport“ EOOD violated basic regulations and rules regulating the dispatch and reception of trains at stations.

5. Conclusions

5.1. Summary of the analysis for the event causes.

The investigation commission conducted several inspections of the accident site, both at the two stations Kremikovtsi and Svetovrachene and at the ECUVD, where the TRIS CTC dispatching interlocking is positioned for managing the train traffic in a section with automatic blocking, Iliyantsi/Kurilo – Karlovo.

At Svetovrachene station, inspections were carried out on the derailed locomotives No. 91521080013-1 and No. 92520007063-7 of "Pink Rail" EAD.

At Kremikovtsi station, inspections were carried out on the derailed locomotives No. 98520055155-6 and No. 98520055093-7 of BDZ Cargo EOOD, loaded in parts into three wagons.

The requirements for the appointment of DFT No. 30595, presented by "Pink Rail" EAD and implemented by the train traffic management at the State Enterprise NRIC, were met.

ST No. 30802 of BDZ Cargo EOOD is a train running daily according to a schedule, included in the train traffic schedule from Kremikovtsi station to Iliyantsi station.

There is a timetable for the movement of DFT No. 30595 from Voluyak station to Burgas station.

Unregulated exchange of information about the movement of ST No. 30802 via (personal mobile phones) between the traffic manager on duty at Kremikovtsi station and the train dispatcher of the dispatching interlocking in the Iliyantsi/Kurilo - Karlovo section. Unregulated leaving the workplace by the train dispatcher without notifying the direct supervisor - senior train dispatcher. The head of the unit/service of the Sofia Regional Office in the ECUDV sat down to work at the control panel, the same was not given full information about the movement of trains in the section, which subsequently led to the occurrence of the accident.

The traffic controller on duty at Kremikovtsi station, after seeing that the automatic interlocking was in the "free interstation" position, took action to prepare for sending ST No. 30802.

The traffic manager on duty at Kremikovtsi station had an unauthorized key from the RRI at the station with which he took the RLHDI station without asking the train dispatcher's consent. He ordered the switchman/level-crossing guard to prepare a route from the industrial branch and lowered the barriers at the crossing in the area of the station, since ST No. 30802 would depart from there for Svetovrachene station. He sent ST No. 30802 unauthorized from the industrial branch track to Svetovrachene station, without asking the train dispatcher's permission in advance.

The movement of ST No. 30802 in the interstation is not indicated, since the train had departed for the interstation, without an exit signal. At that time, the (substitute) head of the unit/service of the Sofia Regional Office saw that the interstation was free and prepared a route through the dispatching interlocking for the departure of DFT No. 30595 from the entrance signal for Kremikovtsi station, without stopping at the Svetovrachene station.

The head of the unit/service of the Sofia Regional Office in the ECUDV attempted several times to contact the duty traffic controller at Kremikovtsi station with all available communication links, but they were unsuccessful, since the duty traffic controller, after sending the train, was not in the station office. When he returned to the station, he saw on the RRI that the autoblock has been activated in the direction of Kremikovtsi station and at that moment, the head of the unit/service of the Sofia Regional Office in the ECUDV contacted him. A heated conversation ensued between the two, realizing that the two trains were traveling towards each other. Attempts are made by both of them, by turning off the voltage in the contact network and telephone conversations to avoid a head-on collision, but at 15:57 at km 11+949 in the interstation area, a collision occurred between the locomotives of the two trains.

The Commission reviewed the documents and materials in the course of the investigation, analyzed the actions of the officials involved in the accident, the functionality of the signalling equipment at the Kremikovtsi and Svetovrachene stations, as well as the serviceability of the dispatching interlocking in the section. It analyzed the additionally requested materials provided by the NIS. It established violations committed by the shift personnel in the performance of their official duties. Violations of safety regulations were established in connection with the commissioning of the dispatching interlocking, as well as in the rules for train traffic management:

"Art. 314, item 7 of the RTOSART: A train is considered prepared for dispatch when it meets the following conditions:

item 7. is located on a designated track."

In that case, ST No. 30802 was on a track that is in the industrial branch behind Kremikovtsi station, is not included in the station interlocking of Kremikovtsi station and is not equipped with an exit semaphore. Therefore, ST No. 30802 departed illegally.

"Art. 318. (1) It is not allowed to depart a train between stations without permission or without a written order for movement under special conditions.

(2) Permission for the departure of a train from a station is the permitting indication of the exit semaphore and an order for departure, given personally by the traffic controller on duty with an order disk or a signal flashlight."

5.2. Undertaken measures after the event occurrence.

Measures that SE NRIC undertook after the event occurrence:

1. As of 29.01.2025, the employment contract between the Sofia Railway Traffic Management Department and the train dispatcher on shift on 15.01.2025 was terminated. The same held the position with a second employment contract at the Sofia Railway Traffic Management Department;

2. By order dated 28.01.2025 of the Director of the Sofia Railway Traffic Management Department, Kremikovtsi station was designated as a support operating point, and Yana station - as an attached one, whereby the main workplace of the head of both stations was changed to Kremikovtsi station;

3. On the basis of an order dated 22.01.2025 of the Director General of the State Enterprise NRIC, the signalling equipment at Kremikovtsi station was reconstructed, and the possibility of the traffic controller on duty to grant permission for a local shunting in a blocked direction of the Automatic Blocking from neighboring stations and vice versa was taken away.

Measures that the railway undertaking undertook after the event occurrence:

5.3. Additional findings.

The train dispatcher worked on 15.01.2025 in the section of the dispatching interlocking Iliyantsi - Karlovo on a second fixed-term employment contract from 01.11.2024 to 30.04.2025 in the Sofia Central Railway Department at the State Enterprise NRIC, without the same being coordinated with the employer in the main railway enterprise "DB Cargo Bulgaria" EOOD, where he had a permanent employment contract from 07.10.2024 in the position of a train dispatcher.

The Svetovrachene and Kremikovtsi stations are part of the Iliyantsi - Karlovo section, in which a TRIS CTC dispatching interlocking has been built. The dispatching interlocking has a permit for use under the Territory Planning Act (TPA) of the Republic of Bulgaria, issued on 01.08.2023.

In Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union, which is harmonised in the Republic of Bulgaria by the Railway Transport Act and Ordinance No. 57 of 9 June 2004 on achieving interoperability of the national rail system with the rail system within the European Union, the following definition is given for the Control-Command and Signalling Subsystem on the Railway Line (CCS-RL): "All the equipment on the railway line necessary to ensure safety and to command and control the movement of trains admitted to operate on the network".

Commission Implementing Regulation (EU) 2023/1695 of 10 August 2023 on the technical specification for interoperability relating to the control-command and signalling subsystems of the rail system in the European Union and repealing Regulation (EU) 2016/919 – TSI CCS, uses the same definition of the subsystem CCS-RL, and in point 2.2. Scope, only those requirements that are necessary to ensure the interoperability of the Union rail system and the satisfaction of the essential requirements are defined. A footnote states: "Currently, the TSI CCS does not yet include any requirement for the interoperability of interlockings, crossings and certain other elements of the control-command and signalling system". Therefore, these "other elements" also include dispatching centres.

At the end of point 2.2., it is stated: "All subsystems "Control, Command and Signalling", even when not specified in this TSI, must be assessed in accordance with Commission Implementing Regulation (EU) No 402/2013".

Consequently, the Sofia - Karlovo dispatching interlocking is subject to commissioning in accordance with the Railway Transport Act and Ordinance No 57 of 9 June 2004, harmonised with Directive (EU) 2016/797.

At the time of the significant accident - 15.01.2025, as well as up to the time of preparation of the report, the infrastructure manager (SE NRIC) has not submitted an application to the national safety authority of the Republic of Bulgaria - RAEA, for issuing a permit for commissioning in accordance with Article 115 g of the Railway Transport Act and Article 45 of Ordinance No 57 of 9 June 2004 and such a permit has not been issued.

This is a violation of Article 44c, paragraph 1 of Ordinance No. 57 of June 9, 2004, which states: "...

Art. 44c. (New – SG, issue 55 of 2006, amended – SG, issue 88 of 2007) (1) (Supplemented – SG, issue 1 of 2016, effective 01.01.2016) After the construction and installation of the subsystem or part thereof, the person who will put the subsystem into operation shall submit to the Railway Administration Executive Agency an application for issuing a permit for putting into operation. The application for putting into operation shall be submitted to the Railway Administration Executive Agency within 1 year after receiving a permit for use under the TPA.

6. Safety recommendations

In order to improve the safety in the rail transport, the Chairperson of the Investigation Commission at NAMRATIB proposes to the National Safety Authority (RAEA) the following safety recommendations adapted to SE NRIC, BDZ Cargo EOOD and "Pink Rail" EAD.

- Recommendation 1 proposes that SE NRIC, "BDZ-Cargo" EOOD and "Pink Rail" EAD familiarize interested personnel with the content of the report;
- Recommendation 2 proposes that SE NRIC request a risk assessment of the "Control, Command and Signalling" subsystems in the Ilyantsi/Kurilo – Karlovo section in accordance with Commission Implementing Regulation (EU) No. 402/2013 and Art. 7, item 16 of the Railways Act;
- Recommendation 3 proposes that SE NRIC restore the operation of the TDRC in sections where there is no GSM-R communication, including the Ilyantsi/Kurilo – Karlovo section;
- Recommendation 4 proposes that SE NRIC should carry out constant control over the implementation of Order No. ŽI-43705/05.12.2024 of the Director General of SE NRIC determining the procedure and manner for the movement of rolling stock not equipped with TDRC and GSM-R in sections equipped with TDRC and GSM-R;
- Recommendation 5 proposes that the personnel of "Pink Rail" EAD, related to the safety of transport, should be trained in licensed educational institutions according to the register of NAVET;
- Recommendation 6 proposes that "Pink Rail" EAD should ensure reliable communications between the personnel engaged in train control and train movement management in SE NRIC;
- Recommendation 7 proposes that BDZ Cargo EOOD shall install TDRC in diesel locomotives (mainline and shunting).

With reference to the requirements of art. 24, paragraph 2 of Directive (EU) 2016/798, and art. 91, paragraph 3 of Ordinance No 59 dated 5.12.2006, the member of the Management Board of NAMRATIB on 10.09.2025 provides a final report that contains information on the performed investigation to establish the circumstances and causes that led to the accident. In the report are formulated and agreed safety recommendations in order to improve safety in railway transport and to avoid other accidents of similar nature.

Chairperson:

Dr Eng. Boycho Skrobanski

Deputy President of the NAMRTAIB AB