



REPUBLIC OF BULGARIA
NATIONAL AIR, MARITIME AND RAILWAY TRANSPORT, ACCIDENTS
INVESTIGATION BOARD (NAMRTAIB)

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FINAL REPORT

from

**investigation of significant railway accident – run over of two employees by locomotive
№98522051522-7, between Inspection point № 4 and Iliyantsi station on 07.11.2023**



Sofia 2024

OBJECTIVE OF INVESTIGATION AND EXTENT OF RESPONSIBILITY

An independent investigation body, National Air, Maritime and Railway Transport Accidents Investigation Board (NAMRTAIB) within the Council of Ministers (CM) carries out an independent investigation of significant accidents, accidents and incidents. The purpose of the investigation is to determine the causes, make safety improvements and prevent further accidents.

The investigation that NAMRTAIB performs is independent from each judicial investigation and does not involve the determination of guilt or liability.

The investigation is performed in accordance with the requirements of DIRECTIVE (EU) 2016/798 of the European Parliament and of the Council dated May 11 2016 on the railway transport safety, the Railway Transport Act (RTA) and Ordinance No. 59 of 5.12.2006 on the management of safety in railway transport, and Agreement for interaction in the investigation of accidents and incidents in air, waterborne and rail transport between the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Interior and the Ministry of Transport, Information Technology and Communications, effective from 17.04.2018.

The Investigation report is prepared as per 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

TOS – Train operation schedule
SE NRIC – State entity „National railway Infrastructure Company “(railway infrastructure manager)
EI – Electric interlocking
RS – Railway section – a Division within the railway infrastructure manager
RTA – Railway Transport Act
HSWCA – Health and Safety Working Conditions Act
TOU – Traffic organization unit within the railway infrastructure manager
RAEA/NSA – Railway Administration Executive Agency, National Safety Authority
km – Kilometre along the rail track
OCL – Overhead contact line (catenary)
CTVB JSC – „Cargo Trans Vagon Bulgaria“ JSC – (railway undertaking)
ST – Shunting train
MoI – Ministry of Interior
SL – Shunting locomotive
ORDINANCE № 13 of 30.12.2005 for ensuring health and safety working conditions in the rail transport
Ordinance № 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
(Independent Accident Investigation Body of the Republic of Bulgaria)
NIS – National Investigation Service (pre-trial investigation body at the Prosecutor's Office of the Republic of Bulgaria)
TF – Task Force
SE – Signalling equipment
RRS – Rail Rolling Stock
RTORI – Rules of technical operation of the railway infrastructure of SE NRIC
TOMR – Train operation management and reporting
IP4 – Inspection point № 4 (it splits the interstation in two parts)
RD MoI – Regional directorate of the Ministry of Interior
ECM – Entity in charge of maintenance
SMS – Safety Management System
TI – Technical inspection
TOSAMD – Train operation and station activity management Division – division at the railway infrastructure manager (SE NRIC)
DCCM – Device for communications, connections and messages
PRC-Personnel requalification centre for the staff of SE NRIC
PTC – Professional training centre at, Holding BDZ EAD
RITS – Regional Inspection, Traffic Safety “

1. Summary

1.1. Brief description of the event.

On 07.11.2023 at 09:23 a.m. ST No. 10890 consisting of 6 coaches, 24 axles, 454 tons, served by locomotive No. 98522051522-7, departed from the sixth track at Iliyantsi station with a permissive indication at the exit semaphore and an order from the traffic manager on-duty second person for IP 4 and industrial branch of "Toplivo" JSC.

At 09:27 a.m., ST No. 10890 arrived at IP 4 and continued its movement without stopping to the industrial branch of "Toplivo" JSC.

At around 09:45 a.m. a work group of three workers belonging to the infrastructure manager arrived by road transport in the area of IP 4. The group carried a chainsaw, a chainsaw and two canisters of fuel and oil, necessary to complete the task. Without notifying the traffic manager on duty, they left for the RP 4 - Iliyantsi interstation to start work, after the "Beginning of the 25 km/h restriction" signal placed at km 0+170. From km 0+180, two of the workers started mowing the grass on the railway track, and the third worker was walking about 30 meters ahead of them (as can be seen from his written statement given to the pre-trial authorities). An occupational health and safety briefing was held for the performance of the activity.

Around 10:00 a.m., after completing the shunting, locomotive No. 98522051522-7 departed from the "Toplivo" JSC industrial branch in the direction of IP 4 for Iliyantsi station. The locomotive engineer on the radio station in the locomotive reported to the traffic manager on duty of IP 4 that the shunting work was over and only the locomotive was traveling to IP 4.

At 10:02 a.m., the traffic manager on duty of IP 4 requested "consent" from the first-person traffic manager on duty at Iliyantsi station to send ST No. 10891 from IP 4. After receiving the "consent" through the signalling equipment, he prepared the route for passing without stopping, opened the entrance and exit signal for the third track of IP 4 in the direction of Iliyantsi station.

At 10:10 a.m. IT No. 10891 (insulated locomotive No. 98522051522-7) passed without stopping on the third track of IP 4. The movement of the locomotive to the Iliyantsi station in the interstation was in a left curve with a radius of 250 meters.



Fig.1.1. Locomotive № 98522051522-7 at the place of the accident.

Around 10:12 a.m. at km 0+320, the locomotive hit and killed two workers working in the interstation one after the other.

Locomotive No. 98522051522-7, assigned as ST No. 10891, was served by a locomotive driver. The transport crew, consisting of three members, also travelled in the cabin.

As a result of the movement of ST No. 10891 on 07.11.2023 in the interstation IP 4 - Iliyantsi, two workers of the manager of the railway infrastructure (SE NRIC) were run over during work.

1.2. Location and time of the event occurrence.

The event occurred between Inspection point № 4 and Iliyantsi station at around 10:12 a.m. at km 0+320 in the left curve with radius 250 meters with inclination 4 ‰ in downhill in the area with movement speed restriction up to 25 km/h. ST № 10891 (locomotive № 98522051522-7) hit and killed one after another two workers of the railway infrastructure manager (SE NRIC) (fig.1.2).

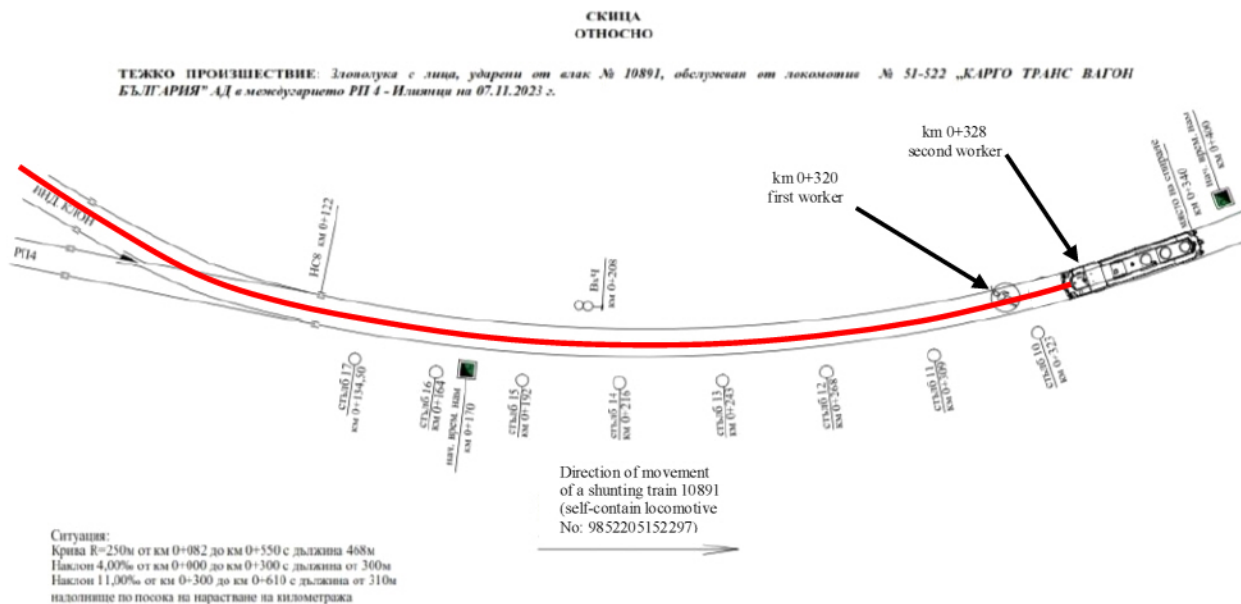


Fig. 1.2. Scheme of the area where the accident with locomotive №98522051522-7 occurred.

1.3. Factors determining and contributing the event.

A determining factor for the occurrence of the event is the start of work by two of the workers (mowing grass with a motor mower) from km 0+180 without providing protection by signalmen or signalling with portable signals "Workplace of a group of workers". The pointer obliges the locomotive driver to signal "Caution!"

A contributing factor to the occurrence of the accident was the limited visibility of the locomotive driver when operating the locomotive with the right console I in a left curve on the rail track. The locomotive moved with its long part in the direction of movement. When entering a left curve, the locomotive driver's visibility in the area in front of the locomotive was significantly reduced.

1.4. Direct causes and consequences of the event.

The immediate cause of the accident was the preceding circumstances related to the performance of the assigned tasks. The requirements of the normative acts, which ensure safety at work in the workplace, have not been met. There were no signalmen guarding the work group, and no warning signs have been placed surrounding the workplace. The locomotive was operated with only a locomotive driver without an assistant locomotive driver. After the locomotive left the station, it entered a left curve on the rail track with a radius R=250 meters. The locomotive driver was operating the locomotive from the right console, which limited his forward visibility, and he did not see the two workers working in the interstation.

Consequences of the event was the running over of two workers during work on the rail track. The third worker, who saw the two being run over, walked towards the locomotive and the locomotive driver stopped the locomotive. The locomotive driver then came to know that he had run over two persons and follow-up action was taken by both of them by notifying the concerned departments and officials.

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

In order to prevent other similar accidents, the Investigation Commission proposes to the National Safety Authority RAEA safety recommendations related to the railway undertaking “Cargo Trans Vagon Bulgaria” JSC and SE NRIC.

- With recommendation 1, it is proposed that SE NRIC and CTVB JSC familiarize the interested personnel with the content of this report;
- With recommendation 2, it is proposed to the SE NRIC that the occupational safety and health authorities undertake systematic inspections regarding the quality of the types of briefings conducted (including daily ones) by direct supervisors and the entries in the briefing books;
- With recommendation 3, it is proposed to the SE NRIC that the occupational safety and health authorities organize and conduct trainings for the direct supervisors conducting the types of staff briefings in the railway sections, paying attention to the risk assessment and accompanying hazards in the types of works on the rail track;
- With recommendation 4, it is proposed that SE NRIC systematically conduct trainings for personnel working with mechanized equipment and machines for which legal capacity is required;
- With recommendation 5, it is proposed that CTVB JSC supplement the texts regarding safety and control over the implementation of the provisions in the "Instructions for the work of locomotive drivers and assistant drivers when performing train and shunting activities" and in "Management of "Movement" of " Cargo Trans Wagon Bulgaria JSC, part of the Safety Management System;
- With recommendation 6, it is proposed that CTVB JSC correct and supplement the texts in the book for daily instruction regarding the safety of shunting trains in the interstation IP 4 - Iliyantsi;

2. Investigation

2.1. Decision for starting the investigation.

The decision to initiate a safety investigation was taken by the member of the Management Board of NAMRTAIB in the Republic of Bulgaria, leading the investigation of railway accidents and incidents in accordance with Art. 22, paragraph 3 of Directive (EU) 2016/798 of the European Parliament and of the Council. Given the severity of the accident and its impact on safety in railway transport, the investigation is mainly oriented towards establishing the causes and the analysis aimed at preventing other accidents of a similar nature within SE NRIC.

2.2. Motives for the decision to initiate the investigation.

The member of the Management Board of the NAMRTAIB, leading the railway unit 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 of Ordinance No 59 dated 5.12.2006.

The investigation was undertaken considering the circumstances that led to the run over and killing of two workers during work by locomotive № 98522051522-7, running as ST № 10891 from industrial branch of „Toplivo“ JSC – IP 4 – Iliyantsi.

2.3. Scope and restrictions of the investigation.

The scope of the investigation included and analysed the organizational and human factors, the Safety Management System related to repair and maintenance, including the risk assessment with registered hazards of the traction rolling stock in the railway undertaking CTVB JSC and the normative acts to it.

Restrictions and delays during the investigation were not allowed.

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

The member of the Management Board of the NAMRTAIB, 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 – human and organizational factor, railway infrastructure, rail rolling stock, and management and operation of the railway transport.

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

The commission determined the parameters of the investigation and coordinated its actions with the Task force, which includes heads of the divisions and transport safety authorities of the two entities (SE NRIC and CTVB JSC). The Task force collected all documents, samples, materials and the written statements of the personnel of the two entities, on 23/11/2023. The materials and documents were provided to the head of the safety investigation at the NAMRTAIB. On the day of the accident, the Investigation Commission conducted an interview with the locomotive driver, the transport crew on shift in the locomotive and the traffic manager on duty of IP 4. Subsequently, it also conducted an interview with the second person traffic manager on duty at Iliyantsi station, were acquainted with the testimony of the persons related to the accident. Additional information was requested and provided by SE NRIC and CTVB JSC. An interview was conducted with the safety authority and with the management of the CTVB JSC railway undertaking.

2.6. Degree of cooperation from the participating entities.

Based on the materials and documents provided by the entities, the Investigation Commission found that omissions and inaccuracies were made in the report of the Task force. The railway undertaking CTVB JSC provided the Commission with a special opinion on the report.

During the investigation carried out by the Commission in the NAMRTAIB, the management of the railway undertaking CTVB JSC provided full assistance and the necessary set of materials and documents concerning the SMS and documents relating to the operation and maintenance of the

locomotive since its commissioning. Access was provided to locomotive No. 98522051522-7, located at the base of CTVB JSC, for inspections, measurements and expertise.

2.7. Methods and techniques of investigation and analysis.

On 07.11.2023 at 10:28 a.m., the Management Board of the NAMRATIB with the competence to investigate railway accidents received a written notification by SMS on the mobile phone from the duty central dispatcher of the manager of the railway infrastructure with the text:

"At 10:10 a.m., train No. 10891 - insulated locomotive No. 98522051522-7 of CTVB JSC in the interstation IP 4 - Iliyantsi hit two people. Traffic is suspended."

The member of the Management Board of NAMRATIB with competence to investigate railway accidents at 11:20 a.m. arrived at the place of the accident, which took place on the territory of Sofia-city. He carried out several inspections of the area from the station building of IP 4 to the place where the two workers were run over. He reviewed the station diaries and books regarding the movement of the train in the direction of Iliyantsi station. Conducted an interview with the shift manager on duty in IP 4. Conducted an on-site interview with the locomotive driver who drove the locomotive, as well as the transport crew who travelled in the locomotive. Conducted an interview with the third worker who witnessed the two workers being run over. Conducted an interview with the manager who briefed the three workers before the accident, as well as on site with representatives of the SE NRIC.

After the arrival at the scene of the accident, the pre-trial proceedings authorities from the National Investigation Service (NIS), together with the member of the Board of the NAMRATIB with the competence to investigate railway accidents, organized and conducted joint inspections. NIS draw up a report on the carried out inspections and a report on the questioning of the worker, a witness at the scene of the accident.

At 17:30 p.m., the inspections were completed and a written permission was given by the authorities of NIS and NAMRATIB to carry out emergency recovery activities to restore train traffic and release locomotive No. 98522051522-7 from supervision. The locomotive was moved to CTVB JSC in Iliyantsi station (place of residence).

On 09.11.2023, the Investigation Commission at the NAMRATIB carried out several experiments at the site of the accident in the interstation IP 4 - Iliyantsi with the same locomotive No. 98522051522-7, owned by CTVB JSC, to establish the visibility and cleanliness of the rail track, as well as perception of the signals from the locomotive driver when controlling the locomotive from the right and left control panels in the direction of movement.

When controlling the locomotive from console I, which is positioned on the right in the direction of movement (in the case under consideration), visibility to the gauge in left curves is severely limited.

Locomotive control panel II was located on the left (in the case under consideration) and was used when moving in the opposite direction, visibility in left curves is greater.

On 10.11.2023, a Commission of experts of the manager of the railway infrastructure SE NRIC and of the railway undertaking CTVB JSC in the interstation IP 4 - Iliyantsi station carried out a recording with a video recorder from the cabin of the same locomotive No. 98522051522-7. The rail track is in a left curve with a radius $R=250$ meters and a slope in the direction of movement from 4 ‰ to 11 ‰ downhill in the direction of movement of the train.

The following results were found:

- When the locomotive was controlled from panel I (from the right side in the movement direction in the considered case), before the locomotive from km 0+122 to km 0+320 in the left curve there was no visibility towards the rails;
- Within observation from the side of panel II (from the left side in the movement direction in the considered case), before the locomotive from km 0+122 to km 0+320 in the left curve the visibility towards the rail track was around 85 meters;

On 13.11.2023 the Investigation Commission of NAMRATIB performed test movements from third track in Iliyantsi station with the same locomotive № 98522051522-7, in order to establish the serviceability of the speedometer installation, registering the movement parameters. The segment of the speedometer tape was downloaded for performing of expertise in a specialized laboratory of „BDZ Cargo“ EOOD (fig. 2.1). From the figure is evident that the speedometer installation of the locomotive is functional and all the registrations of the speedometer tape are correct and legible.

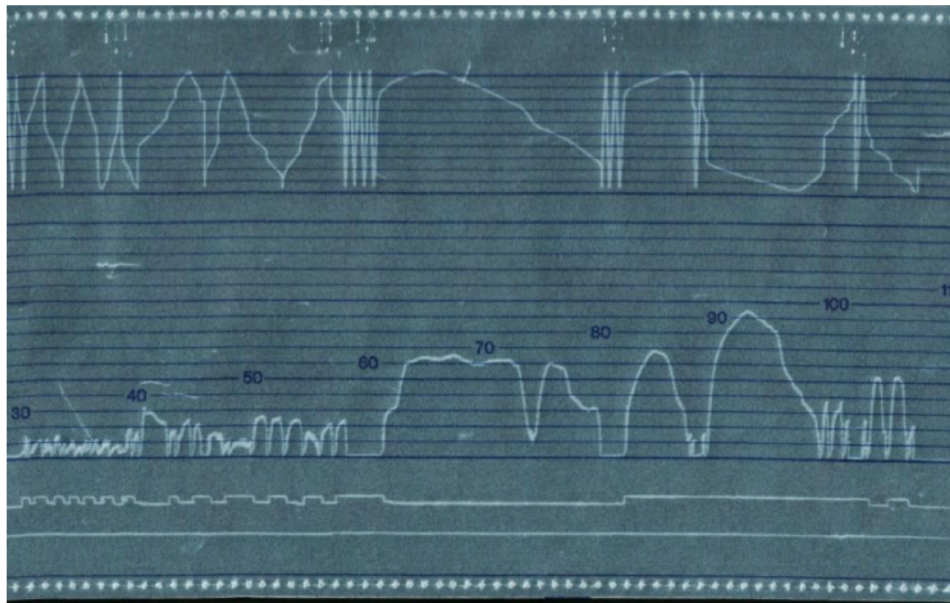


Fig. 2.1. Speedometer tape of locomotive № 98522051522-7 from the performed tests in Iliyantsi station.

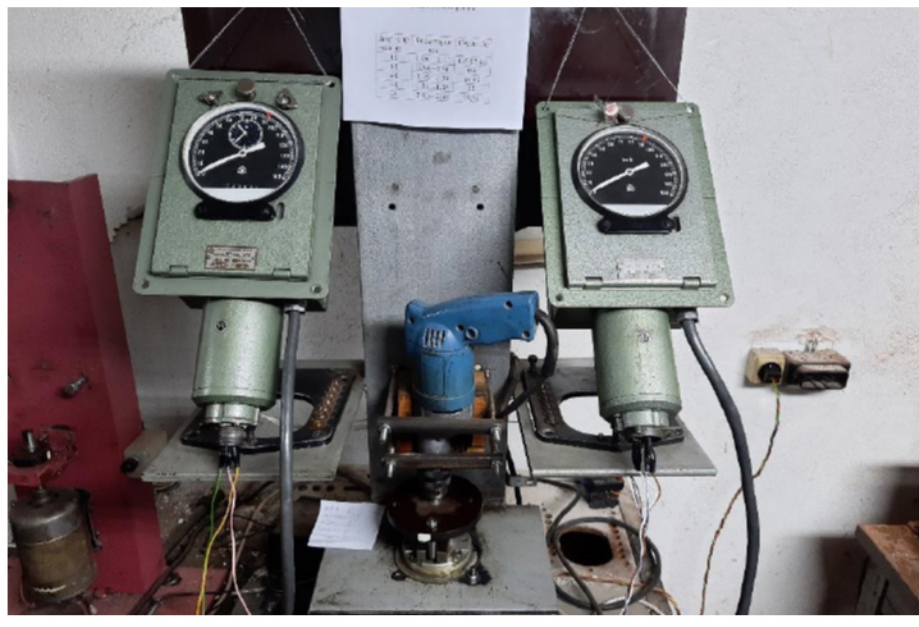


Fig. 2.2. Stand for control of the speedometers of locomotive №98522051522-7 in the laboratory of locomotive depot Stara Zagora at BDZ Cargo.

On 23.11.2023 the Chair of the Safety Investigation Commission at NAMRATIB received from the chief of the Task force at TOSAMD Sofia the collected materials and documents regarding the accident.

"БДЗ-ГТ" – ЕООД
ЛОКОМОТИВНО ДЕПО СТАРА ЗАГОРА
ВЕДОМСТВЕНА ЛАБОРАТОРИЯ ЗА ПРОВЕРКА НА "СИ"

ПРОТОКОЛ
ЗА ПРОВЕРКА НА СКОРОСТОМЕР

Днес 20.12.2023 г. се извърши проверка на скоростометър № 862A314 – регистриращ
Файр № 88224 от лок. № 9822051522-7 с действителна форма ТТД (ООД)

Проверката се извърши по изискване на Председателя на Комитета за разследване към НТРИНЖТ, отнасящо
към извършеното престъпление от 07.11.2023 г.

1. Скоростометърът е изпитан при следните скорости:

Скорост км/ч	10	20	30	40	50	60	70	80	90	100
Етал. об. об/мин	55,25	110,5	165,7	221	276,25	331,5	386,75	442,00	497,25	552,50
Изм. об. об/мин	64	120	176	232	288	344	400	456	512	568
Разлика об/мин	8,75	9,5	10,3	11	11,75	12,5	13,25	14	14,75	15,5
Разлика км/ч	10	20	30	40	50	60	70	80	90	100
Разлика мм	1,58	1,72	1,86	1,99	2,12	2,25	2,38	2,51	2,64	2,77
Скорост км/ч										

2. Скоростометърът е изпитан при следните скорости:

Скорост км/ч	100	90	80	70	60	50	40	30	20	10
Етал. об. об/мин	552,5	497,25	442,00	386,75	331,5	276,25	221	165,7	110,5	55,25
Изм. об. об/мин	560	502	445	389	332	277	224	171	123	67
Разлика об/мин	7,47	4,72	3,97	3,21	2,45	1,75	1,29	0,83	0,35	0,15
Разлика км/ч	10	20	30	40	50	60	70	80	90	100
Разлика мм	1,35	0,85	0,63	0,42	0,31	0,20	0,14	0,09	0,04	0,02
Скорост км/ч										

Заклучение: Резултатите от изпитанията показват, че скоростометърът е в работно състояние. Точност на измерването на скоростометър – 2,5%.

Извършил проверката: инж. Емануел Перишков Р.П. 106

Автом. Асистирано измерване

Модул Експертно измерване

Председател – КТБВ АД Карло Радевски (а/д)

"БДЗ-ГТ" – ЕООД
ЛОКОМОТИВНО ДЕПО СТАРА ЗАГОРА
ВЕДОМСТВЕНА ЛАБОРАТОРИЯ ЗА ПРОВЕРКА НА "СИ"

ПРОТОКОЛ
ЗА ПРОВЕРКА НА НЕРЕГИСТРИРУЕМ СКОРОСТОМЕТЪР

Днес 20.12.2023 г. се извърши проверка на нерегистрируем скоростометър № 872A313 – регистриращ
Файр № 88224 от лок. № 9822051522-7 с действителна форма ТТД (ООД)

Проверката се извърши по изискване на Председателя на Комитета за разследване към НТРИНЖТ, отнасящо
към извършеното престъпление от 07.11.2023 г.

1. Скоростометърът е изпитан при следните скорости:

Скорост км/ч	10	20	30	40	50	60	70	80	90	100
Етал. об. об/мин	55,25	110,5	165,7	221	276,25	331,5	386,75	442,00	497,25	552,50
Изм. об. об/мин	64	120	176	232	288	344	400	456	512	568
Разлика об/мин	8,75	9,5	10,3	11	11,75	12,5	13,25	14	14,75	15,5
Разлика км/ч	10	20	30	40	50	60	70	80	90	100
Разлика мм	1,58	1,72	1,86	1,99	2,12	2,25	2,38	2,51	2,64	2,77
Скорост км/ч										

2. Скоростометърът е изпитан при следните скорости:

Скорост км/ч	100	90	80	70	60	50	40	30	20	10
Етал. об. об/мин	552,5	497,25	442,00	386,75	331,5	276,25	221	165,7	110,5	55,25
Изм. об. об/мин	560	502	445	389	332	277	224	171	123	67
Разлика об/мин	7,47	4,72	3,97	3,21	2,45	1,75	1,29	0,83	0,35	0,15
Разлика км/ч	10	20	30	40	50	60	70	80	90	100
Разлика мм	1,35	0,85	0,63	0,42	0,31	0,20	0,14	0,09	0,04	0,02
Скорост км/ч										

Заклучение: Резултатите от изпитанията показват, че скоростометърът е в работно състояние. Точност на измерването на скоростометър – 2,5%.

Извършил проверката: инж. Емануел Перишков Р.П. 106

Автом. Асистирано измерване

Модул Експертно измерване

Председател – КТБВ АД Карло Радевски (а/д)

Fig. 2.3. Protocol of testing the registering speedometer.

Fig. 2.4. Protocol of testing the non-registering speedometer.

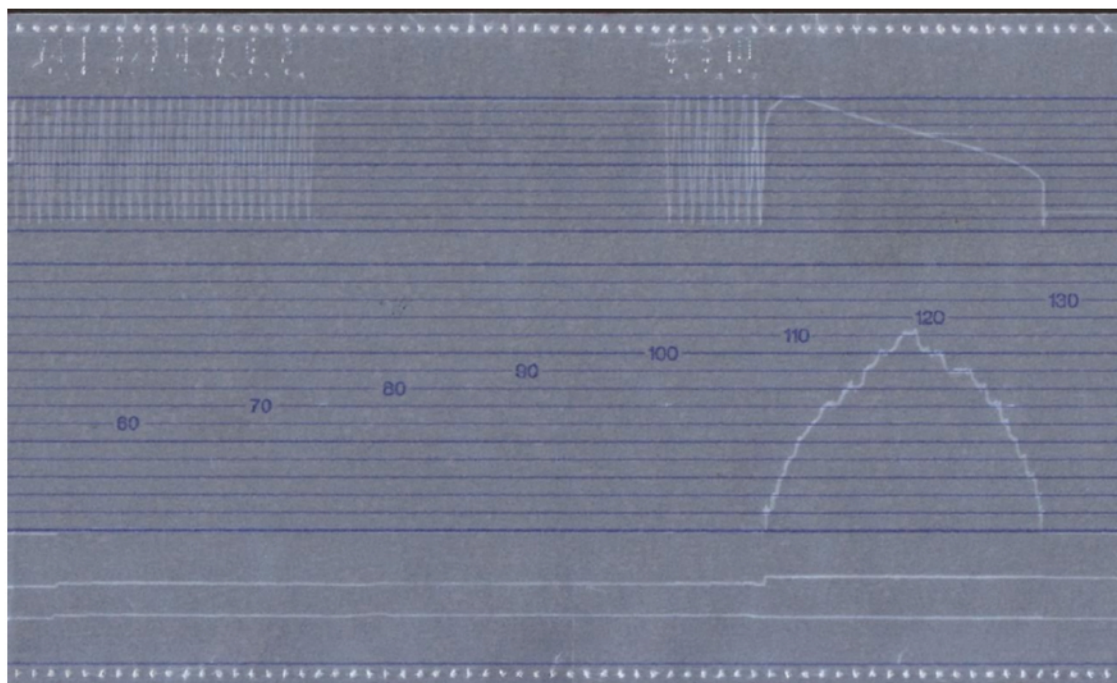


Fig. 2.5. Speedometer tape of locomotive № 98522051522-7 from the performed tests of the stand in the laboratory of Stara Zagora locomotive depot at BDZ Cargo.

On 20.12.2023 the Investigation Commission at NAMRATIB demanded from the railway undertaking CTVB JSC the two speedometers of locomotive No. 98522051522-7 to perform a

speedometer check in the "Departmental Laboratory for Checking Information Systems" at the Stara Zagora Locomotive Depot. A committee of experts carried out the measurements of speedometer type 662A514 - registering with factory no. No. 88224. A speedometer type 672A313 was also checked - non-registering with factory No. 86051. The measurement accuracy of both speedometers is 2.5% (typical) (Fig. 2.3 and 2.4). The results of the measurements show that the speedometers are serviceable.

On 07.03.2024, the Chair of the Investigation Commission demanded in writing from the management of SE NRIC to provide, by 15.03.2024, in the "Category TPS" - certificates of legal capacity to work with agricultural and forestry equipment to the three employees from the railway Sofia North section of the Sofia railway station, who are assigned to perform grass cutting and "opening of the lower gauge" in the track with chainsaws and scythes between IP 4 and Iliyantsi station on 07.11.2023.

By letter No. 10-20-8/14.03.2024, the management of SE NRIC informed the Chair of the Investigation Commission in the NAMRATIB that the persons assigned to perform grass cutting and detection of the lower gauge in the gauge between IP 4 and Iliyantsi station on 07.11.2023, do not have a license to work with "stationary agricultural and forestry equipment (motor saws and scythes)". The persons involved in the accident have other specified legal capacities that are not related to the day's activities on the rail track.

The Investigation Committee at the NAMRATIB, after receiving the documents and materials from the entity, continued the investigation of the accident until a final report was prepared.

2.8. Difficulties faced during the investigation.

During the investigation, the Investigation Commission of the NAMRATIB did not encounter any difficulties. The representatives of the two entities CTVB JSC, SE NRIC and the Task Force provided full cooperation to the Investigation Commission.

2.9. Interaction with the judicial authorities.

In accordance with the requirements of the Agreement on interaction between the bodies of the pre-trial proceedings, the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Internal Affairs and the NAMRATIB in force from 11/04/2023, joint inspections and actions were carried out. Before carrying out the inspection, the authorities of the pre-trial proceedings from the NIS and the head of the safety investigation from the NAMRATIB agreed on the boundaries of the accident scene and the sequence of the investigation actions with a view to safe handling and preservation of the established evidence. The authorities of the Ministry of Interior guarded the scene of the accident, as well as all traces of the vehicle, and did not allow evidence to be moved or destroyed during the inspections. Only the investigation bodies from the NAMRATIB, National Investigation Service, the Ministry of Interior, bodies from Forensic Medicine and representatives of the two entities involved in the accident were admitted to the protected area. Independent parallel inspections were carried out in relation to safety and pre-trial proceedings. The pre-trial proceedings were carried out by the competent investigation bodies of the NIS, under the supervision of a supervising prosecutor from the Sofia City Prosecutor's Office. Media access to the scene was restricted.

2.10. Other important information for the investigation context.

In accordance with the Agreement on cooperation in the investigation of accidents and incidents in air, water and railway transport between the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Interior and the National Board for the Investigation of Accidents in Air, Maritime and Railway Transport in force from 11.04.2023, the Commission for Safety Investigation in the NAMRATIB requested from the NIS, the following materials on the investigation and were provided:

- Protocol for the interrogation by the NIS of the third worker, an eyewitness to the run-over on 07.11.2023;
- Book for daily instruction on safety and health at work, started from 03.07.2023. in the railway section Sofia North at the Railway Section Sofia;
- Protocol № 791/07.12.2023 for performing a complex expertise by NIS;
- Forensic examinations of the two workers who were run over:

Forensic medical examination No. 687/2023 on 08.11.2023 at the UMBAL "Alexandrovska" EAD in the Clinic of Forensic Medicine and Deontology of the 1st railway worker, according to the decree of 07.11.2023 at the NIS in connection with SD no. 54/2023;

Forensic medical examination No. 688/2023 on 08.11.2023 at UMBAL "Alexandrovska" EAD in the Clinic of Forensic Medicine and Deontology of the 2nd railway worker, according to the decree of 07.11.2023 at the NIS in connection with SD no. 54/2023;

Forensic medical examination according to SD No. 54/2023 according to the inventory of the NIS at the Prosecutor's Office of the Republic of Bulgaria, prepared on 26.04.2024 based on materials provided of a specialist in forensic medicine at the Pernishki District Court for the 1st and 2nd railway worker run over by locomotive No. 98520051522-7 in the interstation IP 4 - Iliyantsi on 07.11.2023.

The Investigation Commission at the NAMRATIB familiarized itself with and analysed the materials provided by the NIS, which clarified facts and circumstances preceding the accident and assisted the Commission in establishing the causes that led to the occurrence of the accident.

1. From the protocol of interrogation of the worker – eyewitness to the accident, conducted around 13:00 p.m. on 07.11.2023 from the NIS authorities in the day of the accident is evident as follows:

- A working group of three workers arrived in the area of IP 4 with official transport from Sofia North station. The head of the group left by another bus and was not present at the workplace during the work being done. The workers carried the tools for the assigned work, but did not carry warning signs to signal the workplace. The three on-site workers assigned tasks without the work supervisor presence. At one point, the eyewitness worker, who had been walking about 30 meters ahead of the others, turned and saw the oncoming locomotive from IP 4, which run over the two workers one after the other. At that moment, the two workers were working close to each other with the motor scythe and due to the noise made by the engine, they did not hear or see the locomotive approaching them. The eyewitness worker, after the accident, informed the foreman via mobile phone that two workers were run over and he left the place of the accident

2. From the daily instruction book in the period 03.11.÷09.11.2023 of the workers group, performed different types of work along the rail track, the following is evident:

- The records in the book of the instructed group of workers, worked in different working places in the rail section area, are similar, brief and unclear and the types of works are not described;
- In the section on safety and health at work, the records are similar for all types of activity without specifying the types of hazards and requirements for signaling the places of work, the presence of the workers with work clothing and personal protection means;

3. From Protocol № 791/21.12.2023 of NIS for performing the complex expertise of the Instruction book on safety and health in railway section Sofia North within Sofia railway section, started on 03.07.2023, numbered and laced, consisting 95 sheets, the following conclusion is evident:

- „The handwritten text of sheet 41 of Instruction book on safety and health for performed daily instruction on 07.11.2023, was performed by the same person.“

- „It was found the difference within the inscription of the phrase, consisting the text of sheet 41 „*The movement to the place of work to be performed beside the rail track*“, which probably is ought to its additional inscription on the page.“ (Fig. 2.6)

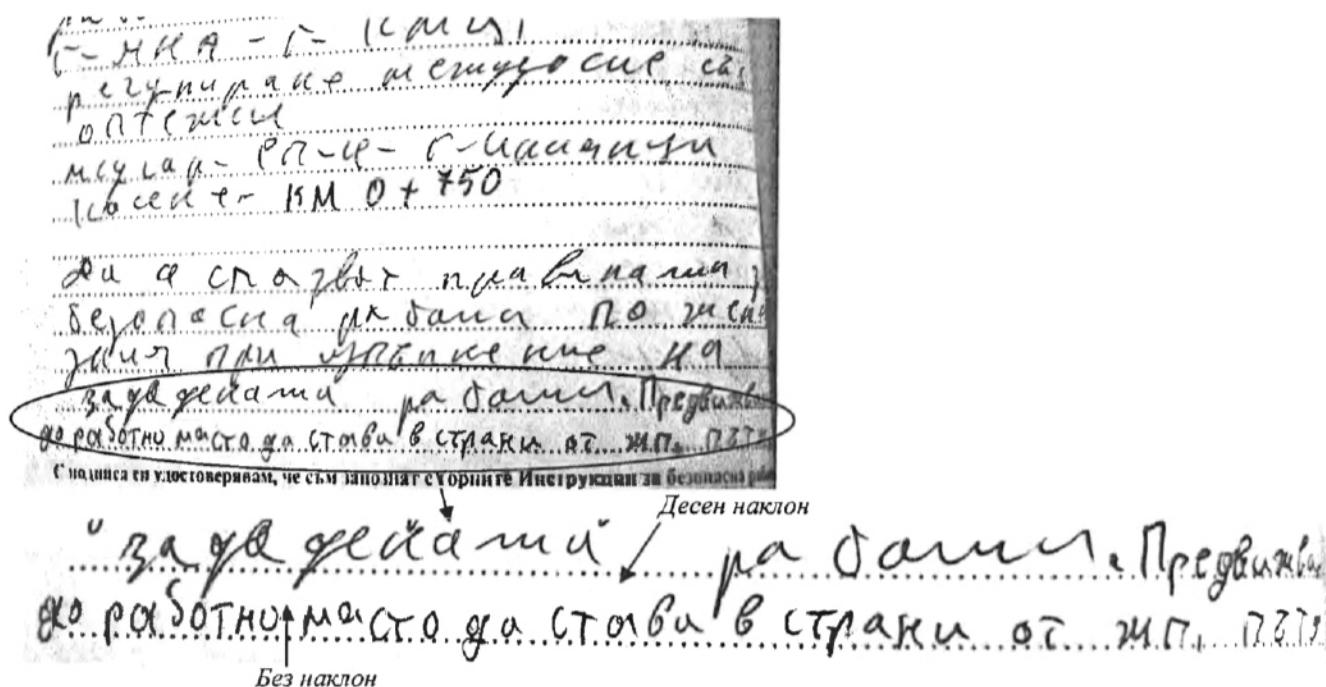


Fig. 2.6. Text of sheet 41 from the expertise

- „It was found a change in the pressure and the inclination within the inscription of the text of sheet 41 „KM 0+750“ compared to the rest of the handwritten text, which probably is due to its additional inscription on the page.“ (fig. 2.7)

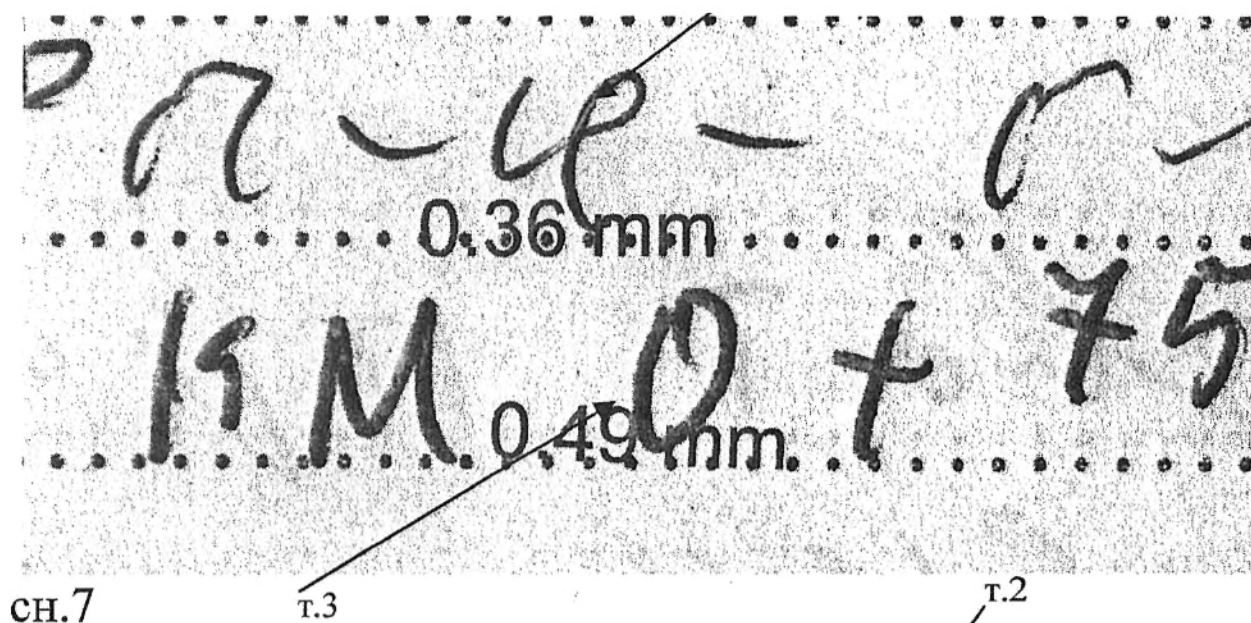


Fig. 2.7. Added text with kilometre

- „The signatures placed in the boxes „Performed the instructions“, „Supervisor of the work“, „Instructing“ and „Instructed“ – line № 5 and № 6 are placed by the same person.“ (fig. 2.8)

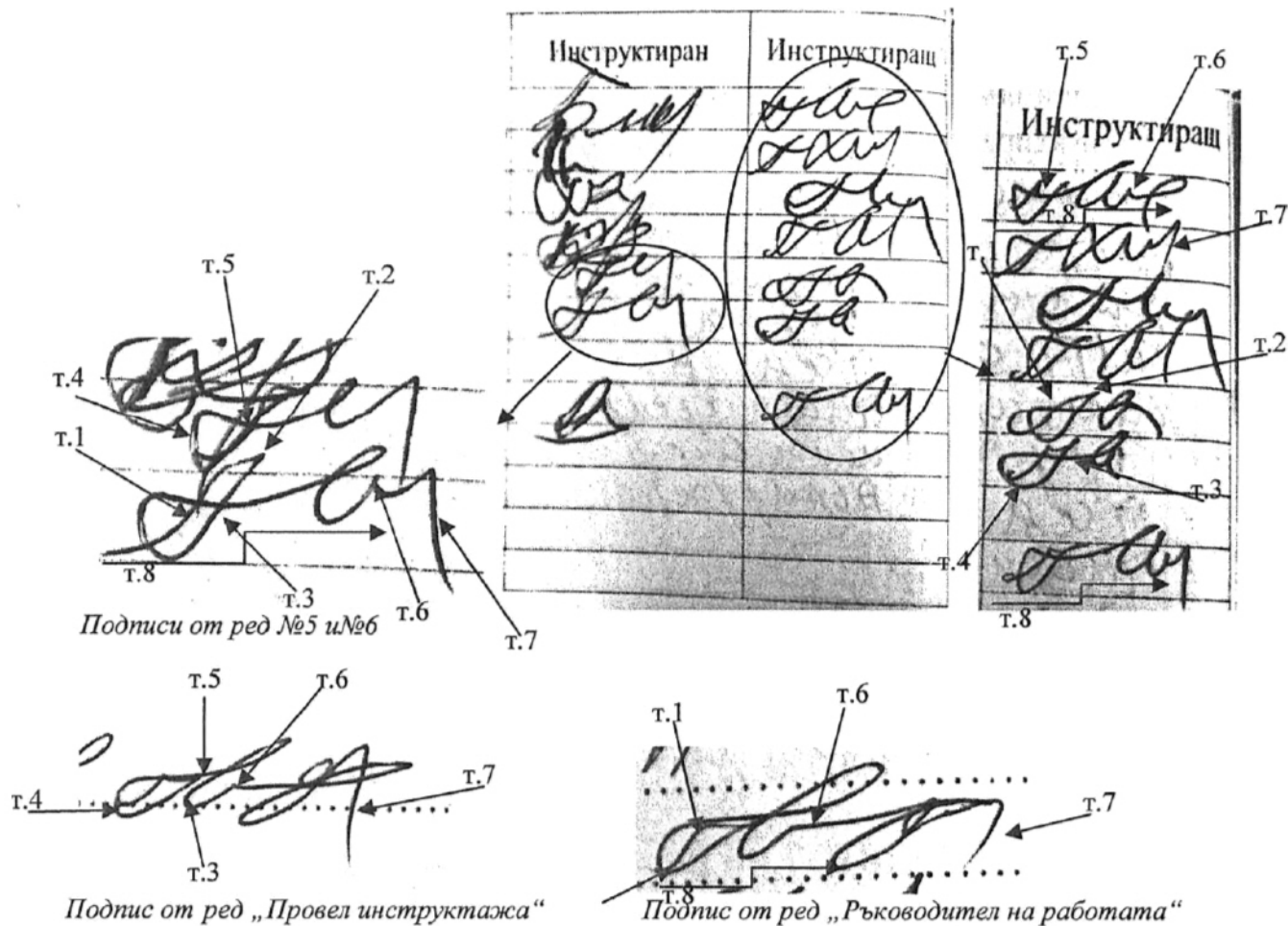


Fig. 2.8. The signatures placed in the boxes

4. The Safety Investigation Commission analysed three of the questions raised by the NIS to the forensic experts when preparing the Forensic Medical Expertise:

- The blood and urine tests did not reveal the presence of ethyl alcohol, narcotic substances or drugs;

- Based on the Forensic Medical Examination of the 1st railway worker, it can be concluded that at the time of the initial impact from the locomotive, the victim was in an upright position, facing the left side of the vehicle;

- Based on the Forensic Medical Expertise of the 2nd railway worker, it can be concluded that at the time of the initial impact from the locomotive, the victim was in a standing position, with his back to the vehicle;

- There is a causal relation between the resulting traumatic injuries and the resulting death.

3. Description of the event

3.1. Information on the event and the context.

3.1.1. Description of the event type.

On 07.11.2023 at 08:05 a.m. the railway company CTVB JSC sent requests No. 1114 and No. 1115 to TSAOMD Sofia for a route request for two shunting trains outside the annual capacity request.

On 07.11.2023 at 08:30 with telegram No. 64 of TSAOMD Sofia, two shunting trains of CTVB JSC were appointed for movement:

1. ST No. 10890 with the following parameters: gross weight - 480 tons, length 135 meters, brake percentage 40% with locomotive No. 98522051522-7, departed from Iliyantsi station at 09:00 a.m. and arrived at IP 4 at 09:04 a.m. (fig. 3.1, item 1);

2. ST No. 10891 with the following parameters: gross mass - 290 tons, length 225 meters, brake percentage 40% with locomotive No. 98522051522-7, departed from IP 4 at 10:10 a.m. and arrived at Iliyantsi station at 10:14 a.m. (fig. 3.1, item 2).

1. ST №№ 10892 and 10893 were cancelled as a result from the accident.

Телеграма № 64/07.11.2023 г.
По експресна заявка на „Карго Транс Вагон България“ АД на 07.11.2023 г. се назначават следните

1. Влак № 10890 със следните параметри: брутна маса - 480 т., дължина - 135 м., спирачен процент - 40%, локомотив 51-522:	1
МВ 10890 Карго Транс 40% лож.51 / 07.11.2023	
ИЛИЯНЦИ	09:00
40 IP 4	09:04
2. Влак № 10891 със следните параметри: брутна маса - 290 т., дължина - 225 м., спирачен процент - 40%, локомотив 51-522:	2
МВ 10891 Карго Транс 40% лож.51 / 07.11.2023	
IP 4	10:10
40 ИЛИЯНЦИ	10:14
3. Влак № 10892 със следните параметри: брутна маса - 640 т., дължина - 135 м., спирачен процент - 40%, локомотив 51-522:	
МВ 10892 Карго Транс 40% лож.51 / 07.11.2023	
ИЛИЯНЦИ	10:55
40 IP 4	10:59
4. Влак № 10893 със следните параметри: брутна маса - 280 т., дължина - 135 м., спирачен процент - 40%, локомотив 51-522:	
МВ 10893 Карго Транс 40% лож.51 / 07.11.2023	
IP 4	11:40
40 ИЛИЯНЦИ	11:43

Съгласувано с „Карго Транс Вагон България“ АД.....

Директор УДВГД София
инж. Голуб Петров

ВС

Fig. 3.1. Schedule of the movement of ST №№ 10890, 10891, 10892, 10893 from Iliyantsi station to IP 4 and vice versa.

At 09:17, the traffic manager on duty first person at Iliyantsi station requested "consent" from the traffic manager on duty at IP 4 to send ST No. 10890 from Iliyantsi station to IP 4, and after receiving such, he notified the traffic manager on duty second person at Iliyantsi station for the upcoming departure of the train from the sixth track at the station. Took actions through the station interlocking to prepare the route and opened the exit signal from the sixth track for IP 4. The traffic manager on duty in IP 4 had previously prepared the route for the third track leading to the "Toplivo" JSC industrial branch (continuation of the route from the Iliyantsi station) and opened the input signal, a necessary condition for direct connection of the interstation signalling equipment.

At 09:23 a.m. ST № 10890 in composition of 6 wagons, 24 axles, 133 meters, 454 tons, served by locomotive № 98522051522-7, departed from sixth track of Iliyantsi station with allowing indication of the exit semaphore and an order, given personally by the traffic manager on duty second person.

At 09:27 a.m. ST № 10890 arrived in IP 4 and without stopping its movement to industrial branch of „Toplivo“ JSC.

At around 09:45 a.m. a working group of three railway workers from the railway section Sofia North, carrying a chainsaw, a chainsaw and two canisters of fuel and oil, arrived by road transport at IP 4 without notifying the traffic manager on duty about the upcoming work on the rail track, they went in the direction of Iliyantsi station. From km 0+180, two of the workers switched on the motor mower and

started mowing the grass in the gauge to open a lower gauge. In order to carry out the activity, the work manager in the railway section gave the workers.

The first run over worker was wearing work clothes and a reflective vest, the other two were without work clothes and reflective vests. Up to km 0+320, the two workers at a distance of about 2-3 meters from each other with the motor scythe worked on the track with their backs to IP 4. The third worker was ahead of them about 30 meters in the direction of Iliyantsi station, carrying the chainsaw and a tube of oil.

At around 10:00 a.m. after the completion of the shunting activity, locomotive No. 98522051522-7 departed from the industrial branch "Toplivo" JSC, the locomotive driver informed the traffic manager on duty in IP 4 via the radio station in the locomotive that they have finished the shunting work and were moving without wagons to IP4.

After the notification received, the traffic manager on duty in IP 4 at 10:02 a.m. requested "consent" from the traffic manager on duty first person at Iliyantsi station to send ST No 10891 from IP 4 to Iliyantsi station. After receiving "consent", through the station's interlocking, it prepared the route for receiving the locomotive on the third track, opened the input and output signal of IP 4 for Iliyantsi station.

At 10:10 a.m. ST No. 10891, consisting of locomotive No. 98522051522-7, passed IP 4 without stopping in the direction of Iliyantsi station, upon a permissive indication at the exit semaphore. The forward movement of the locomotive was with the long part of the engine compartment. The locomotive driver controlled the locomotive from the right console I in the direction of travel. The shunting crew consisting of three members also traveled in the cabin of the locomotive. The locomotive passed the output signal of IP 4. At km 0+170, a signal has been placed for a temporary speed limit to 25 km/h due to the compromise of the rail track between IP 4 and Iliyantsi station.

At that moment, the locomotive driver noticed the presence of a part of a tool outside the gauge of the locomotive. He made immediately a quick stop with the direct brake of the locomotive and announced "people" without having seen them. After stopping the locomotive, according to the testimony of the shunting crew, they looked back through the windows and saw the body of a worker lying motionless in the siding and to the right of the railway track in the direction of movement there was a motor scythe.

At that time the third worker was at km 0+350, carrying with him a chainsaw and a tube of oil, turned and saw the two workers run over by the locomotive. He dropped the saw and the tube and run to the locomotive and pointed under the cab, which the engine driver realized that there was another body of a run over worker. The worker called the group supervisor's cell phone to notify him about the accident. At this point, the worker, frightened by the sight, panics and flees the scene. At the time of the accident, the work supervisor was not with the workers, there was no security, and there were no "group of workers workplace" signs posted around the work area.

The locomotive driver, after understanding about the two workers being run over, immediately called the national emergency number 112 and reported the railway accident that had occurred.

At around 10:15 a.m., the shunt operator notified the first-person traffic manager on duty at Iliyantsi station about what had happened by phone. He, in turn, notified the train dispatcher on duty at TOU Sofia and sent a telegram notifying the concerned services.

At 10:41 a.m., by order of the train dispatcher from the Sofia railway station, the movement of trains was closed at the interstation IP 4 - Iliyantsi.

3.1.2. Date, punctual time and place of the event

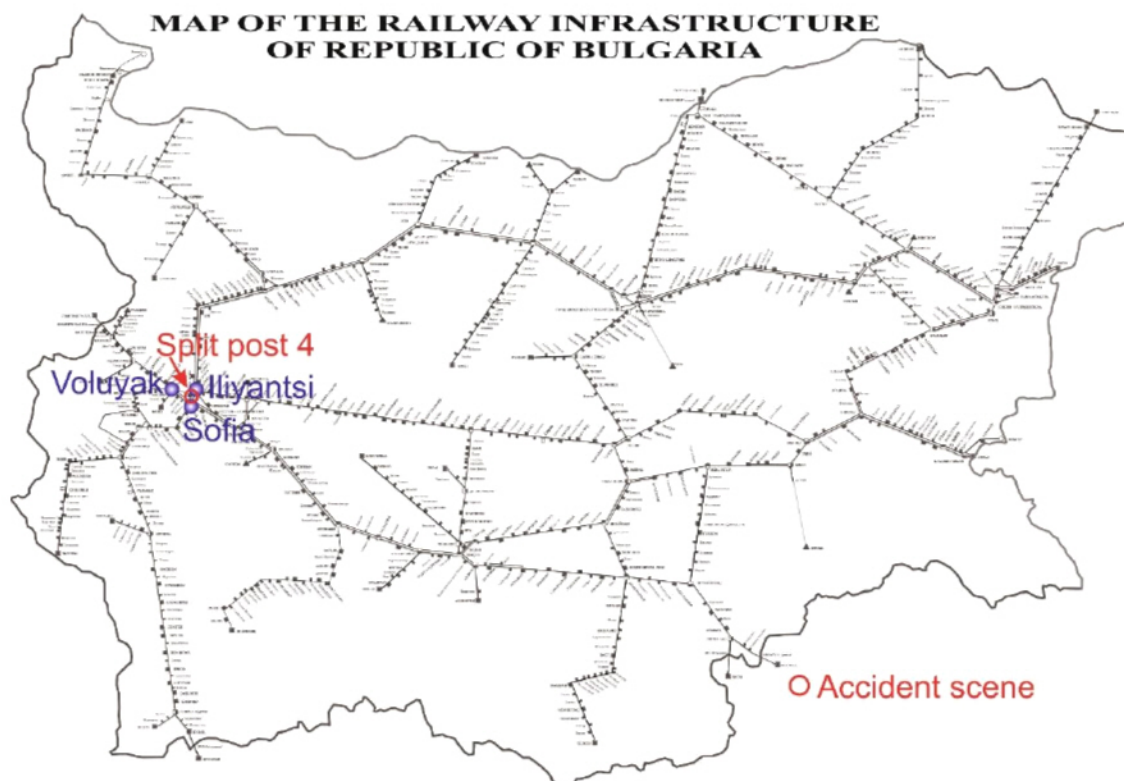


Fig. 3.2. Layout of the place of the rail network.

On 07.11.2023, at around 10:02 a.m., locomotive No. 98522051522-7, after completion of the shunting activity, departed from the industrial branch of "Toplivo" JSC to IP4 (fig. 3.2). The locomotive driver used the radio station in the locomotive to notify the traffic manager on duty in IP 4 to move the locomotive to IP 4. The traffic manager on duty in IP 4 prepared the route to receive the locomotive on the third track and opened the entry and exit signal. The locomotive passed without stopping at IP 4 at 10:10 a. m. ST No. 10891 was moving towards the Iliyantsi station and at km 0+320 in the siding it hit the worker, working with a chainsaw and after 2-3 meters it hit the back of the second worker standing in the siding.

3.1.2. Description of the place of event

3.1.2.1. Location and place of the accident (fig. 3.3).

Geographic width: 42°44'28.09"N

Geographic length: 23°19'16.13"E

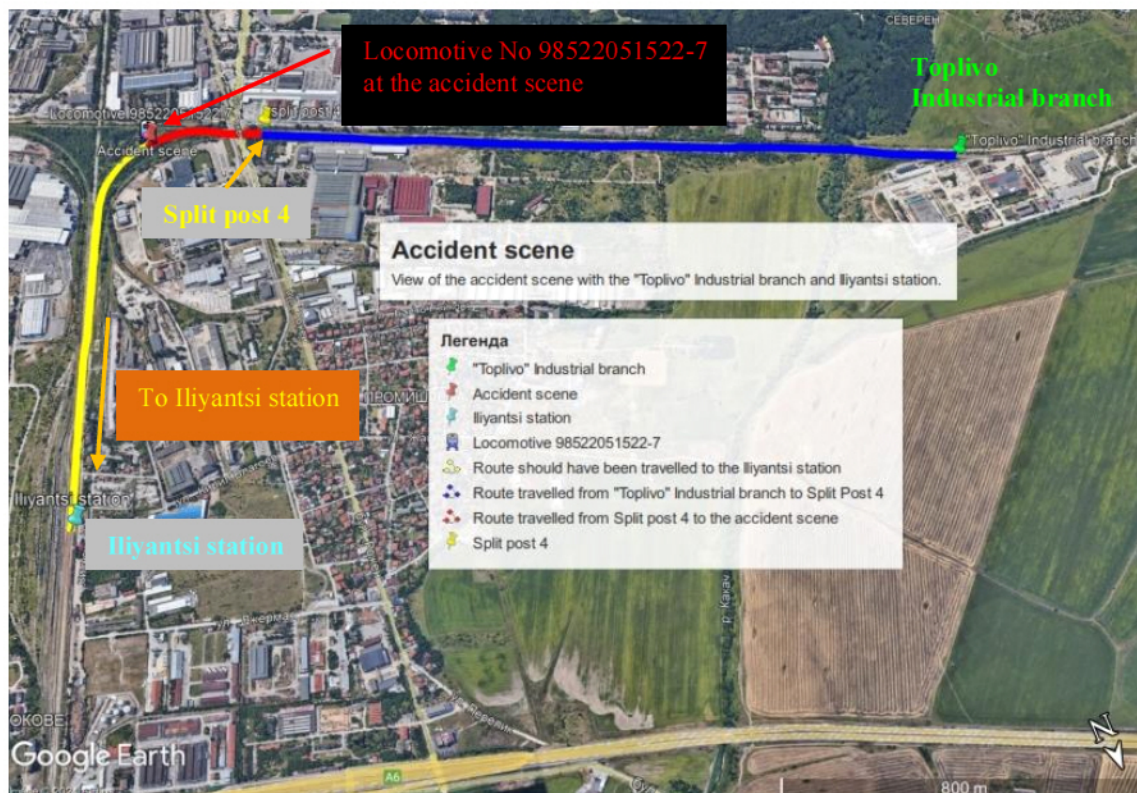


Fig. 3.3. GPS location of the accident in the interstation IP 4 –Iliyantsi station

3.1.2.2. Meteorological and geographical condition at the time of the event on 07.11.2023

- In the light part of the day approximately 10:12 hours (as per data of logbook II-76 of the traffic manager on duty in IP 4);
- Air temperature: 17° C;
- Weather– clear with normal visibility;
- Average relative humidity 45 %;
- There were no registered rains.

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

On 07.11.2023, the head of the railway section Sofia North ordered the head of the transport group with three workers, employees of the Sofia Railway Section within the manager of the railway infrastructure, to carry out grass cutting on the rail track - opening of a lower gauge between IP 4 and Iliyantsi station. The on-site work was carried out with a motorized scythe, began after the exit signal of IP 4 from km 0+180 in the direction of Iliyantsi station, and ended at km 0+320, where the accident occurred.

3.1.2.4. Fatalities, injuries and material damages:

3.1.2.5. Employees of the railway infrastructure manager or railway undertaking.

Fatalities – two employees of the railway infrastructure manager.

3.1.2.6. Other persons officially connected with the location of the event.

3.1.2.7.

None.

3.1.2.8. Passengers.

None

3.1.2.9. External persons.

None

3.1.2.10. Cargo, luggage or other property.

None.

3.1.2.11. Rolling stock, infrastructure and environment.

- Damages caused to locomotive № 98522051522-7 – none;
- Damages caused to the track – none;
- Damages caused to the catenary – none;
- Damages caused to the signalling equipment – none;
- Damages caused to the environment – none;

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

In the period 10:41÷17:39 on 07.11.2023, the railway infrastructure manager and the railway undertakings have generated additional costs because of the amendment of the train operation schedule and capacity in the section.

- Deviated trains of the railway undertakings – none;
- Cancelled trains – 5 units – 32,00 BGN;
- Assigned trains of railway undertakings – none;
- Delayed passenger trains – 1 unit – 621,60 BGN;
- Costs for rehabilitation means – none;
- Total other costs: 653,60 BGN

3.1.2. Identity of the participants and their functions.

Railway infrastructure:

SE National Railway Infrastructure Company ensures equal and non-discriminatory access to all licensed and certified railway undertakings for the transport of passengers and cargo on the railway infrastructure of the Republic of Bulgaria.

SE NRIC personnel, involved in the accident:

- Head of RRS transport group at Sofia Railway section;
- Railway worker at Sofia railway section;
- Traffic manager on duty in IP 4 on 07.11.2023;
- Traffic manager on duty in Iliyantsi station – first person on 07.11.2023;
- Traffic manager on duty in Iliyantsi station – second person on 07.11.2023;

Railway undertaking:

CTVB JSC has a single safety certificate, which guarantees the performance of safety railway service for freight transport along the railway network of the Republic of Bulgaria.

Personnel of CTVB JSC involved in the accident:

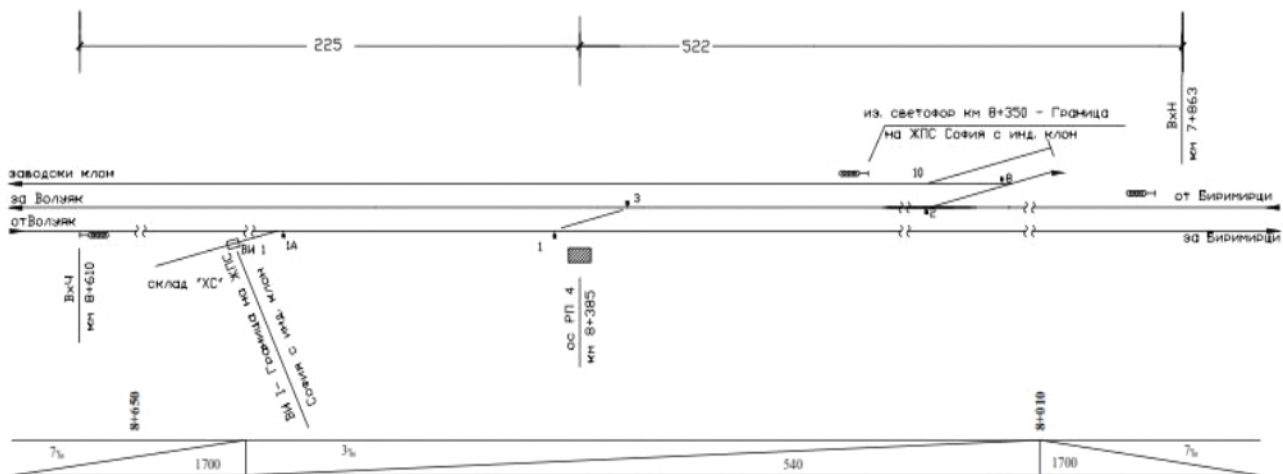
- Engine driver, locomotive of locomotive № 98522051522-7 of ST № 10890/10891;
- Shunter – first person;
- Shunter – second person;
- Shunting switchman

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

3.1.3.1. Type of the track, railway switch, rail crossing etc.

Interstation distance of IP 4 and Iliyantsi station is of 1520 meters' length. The line connects the North with South-western rail network. The track is with rails type S 49, sleepers type ST-4 and fastening

СХЕМА на Разделен пост 4



The mileage from IP 4 to Iliyantsi station is increasing, the rail track is in a left curve with a radius $R=250$ m and slopes in the range of $4\div 11$ % downhill. IP 4 divides the Voluyak - Iliyantsi interstation into two interstation. IP 4 divides the interstation Voluyak - IP Birimirtsi into two interstation. IP 4 makes a connection during the movement of the shunting trains of CTVB JSC from Iliyantsi station to the "Toplivo" JSC industrial branch and vice versa. IP 4 has three receiving-departure tracks (fig. 3.5). The Iliyantsi station has eight receiving-departure tracks and four shunting tracks (Fig. 3.6). In the railway network, Iliyantsi station is a junction station and connects the first, second, third, fifth and sixth main railway lines.



Fig. 3.6. Scheme of Iliyantsi station.

3.1.3.2. Interstation block system, station installation, type of signalling.

Interstation block system

The interstation IP 4 – Iliyantsi is equipped with Automatic block system-direct connection – functional;

Station interlocking

IP 4 is equipped with RRI type MH-68 – functional;

Iliyantsi station is equipped with RRI type WSSB – functional.

Type of signalling

The entrance and exit semaphores of IP 4 and Iliyantsi station are under the speed signalling – functional;

3.1.3.3. Train protection systems.

IP 4 and Iliyantsi station do not have train protection systems. The stations and interstation are equipped with a train dispatcher radio link (TDRL), with the help of which radio connections are made between the locomotive driver and the traffic manager on duty, with the train dispatcher, with individual stations and with the trains in the relevant railway section - serviceable.

Locomotive No. 98522051522-7 is equipped with a vigilance device of active type, recording device "Hasler 662A514" - upright and non-recording device "Hasler 672A313" - upright.

Locomotive No. 98522051522-7 is equipped with radio communication

3.1.4. Other information referring the event.

3.1.4.1. Train documents of ST № 10891 in CTVB JSC.

The train document „Waybill“ (fig. 3.7 and 3.8) corresponds to the actual train movement under the presented data.

СЛУЖБА ТТЛ		ПЪТЕН ЛИСТ № 3004		ЛОКОМОТИВ № 51-522-7		СЛУЖБА СОБСТВЕНОСТ ТТЛ		07.11.2012	
ЛОКОМОТИВНА БРИГАДА		ЯВЯВАНЕ		ОСВОБОЖДАВАНЕ		ПЪТУВАНЕ БЕЗ СЛУЖБА			
лич. №	име, презиме, фамилия	сиф.	пункт	час, мин.	пункт	час, мин.	пункт	час, мин.	пункт
6	Р.Б.Бохорски	01	ТТЛ	08.00					
ПРИЕМАНЕ И ПРЕДАВАНЕ НА ЛОКОМОТИВА		ДОПЪЛНИТЕЛНО ПОЛУЧЕНО ГОРИВО ИЛИ МАСЛО							
пункт	пос. в технически гараж за експлоатация съгласно НТУ	пункт	пос. в технически гараж за експлоатация	пункт	пос. в технически гараж за експлоатация	пункт	пос. в технически гараж за експлоатация	пункт	пос. в технически гараж за експлоатация
ТТЛ	Горен	22671	1540	08.10					
ТТЛ	Горен								
ИНСТРУКТОР / ИНСПЕКТОР		СТАРШИ КОНДУКТОР		СВЕРКА НА ЧАСОВНИЦИТЕ					
служба в	фамилия	от гара	до гара	пункт	час, мин.	пункт	час, мин.	пункт	час, мин.
61		62	63	64	65	66	67	68	69
ОСЛУЖВАНЕ НА ВЛАКОВЕ И МАНЕВРЕНА РАБОТА		ДАНИИ ЗА СЪСТАВА НА ВЛАКОВЕТЕ							
№ на влак	гара км	вж. сиф.	пункт	час, мин.	пункт	час, мин.	пункт	час, мин.	пункт
№ на маневра	ман. район	ман. район	ман. район	ман. район	ман. район	ман. район	ман. район	ман. район	ман. район
1/301	ТТЛ		09.00						
10890	ИЛ		09.20	09.40					
10890	ИЛ		09.25	09.25					
1301	РДН		10.07	10.07					
	КМ		11.10						
ДРУГИ ВПИСВАНИЯ, ЗАБЕЛЕЖКИ		<p>Детектор, се не сема изготвя откъдето е-се</p> <p>Р.Б.Бохорски</p>							
ПРЕДАВАНЕ НА ПЪТНИЯ ЛИСТ		КОНТРОЛ НА РЕГ. ПАРАМЕТРИ		СТАТИСТИЧЕСКА ОТЧЕТНОСТ		ЕНЕРГИЙНА ОТЧЕТНОСТ			
пункт	ср. контр. пункт	дата	час, мин.	пункт	ср. контр. пункт	дата	час, мин.	пункт	ср. контр. пункт
ТТЛ		01	08	02	03	04	05	06	07

Fig. 3.6.Waybill of locomotive № 98522051522-7 – front part

ОСЛУЖВАНЕ НА ВЛАКОВЕ И МАНЕВРЕНА РАБОТА		ДАНИИ ЗА СЪСТАВА НА ВЛАКОВЕТЕ	
№ на влак	гара км	вж. сиф.	пункт
№ на маневра	ман. район	ман. район	ман. район
1/301	ТТЛ		09.00
10890	ИЛ		09.20
10890	ИЛ		09.25
1301	РДН		10.07
	КМ		11.10
ДРУГИ ВПИСВАНИЯ, ЗАБЕЛЕЖКИ		<p>Детектор, се не сема изготвя откъдето е-се</p> <p>Р.Б.Бохорски</p>	
ПРЕДАВАНЕ НА ПЪТНИЯ ЛИСТ		КОНТРОЛ НА РЕГ. ПАРАМЕТРИ	
пункт	ср. контр. пункт	дата	час, мин.
ТТЛ		01	08
СТАТИСТИЧЕСКА ОТЧЕТНОСТ		ЕНЕРГИЙНА ОТЧЕТНОСТ	
пункт	ср. контр. пункт	дата	час, мин.
ТТЛ		01	08

Fig. 3.6.Waybill of locomotive № 98522051522-7 – rear part

3.2. Factual description of the occurred.

3.2.2. Immediate sequence of events that led to the accident, including:

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

At 08:05 a.m. on 07.11.2023, the railway company CTVB JSC submitted a request to TOSAMD Sofia for a route request for two shunting trains outside the annual capacity request;

At 08:30 a.m. on 07.11.2023 with telegram No. 64 of the TOSAMD - Sofia, two shunting trains of the railway company CTVB JSC were assigned for movement;

At 09:17 a.m. the first-person traffic manager at Iliyantsi station prepared the route for departure from sixth track ST No. 10890 consisting of 6 wagons, 24 axles, 133 meters, 454 tons, served by locomotive No. 98522051522-7;

At 09:23 a.m. according to a permissive indication at the exit semaphore and an order given by the traffic manager on duty, a second person from the sixth track of the Iliyantsi station departed ST No. 10890;

At 09:27 a.m. ST No. 10890 arrived on the third track in IP 4 and without stopping continued its movement towards the industrial branch of "Toplivo" JSC.

Around 09:45 a.m. a working group of three railway workers from the railway section Sofia North to the Sofia Railway Station with a chainsaw, a chainsaw and two canisters of fuel and oil arrived by road transport at IP 4. Without notifying the duty supervisor, they headed to direction Iliyantsi station. From km 0+180, two of the workers turned on the motor mower and started mowing grasses in the gauge to find a lower gauge. For the performance of that activity, the group leader in the railway section conducted a daily briefing in the railway section of the Sofia North station, in which a text on safety and health at work was written.

One of the workers was wearing work clothes and a reflective vest, and the other two were without work clothes. Around km 0+320 the two workers were working with the motor mower on to cut grass in the track at a distance of 2-3 meters from each other. The third worker moved away from them about 30 meters in the direction of Iliyantsi station, to leave the chainsaw and oil tube he was carrying. The same person was supposed to guard and notify colleagues when a train arrived from Iliyantsi station.

After the completion of the shunting activity in the "Toplivo" JSC industrial branch around 10:00 a.m., locomotive No. 98522051522-7 without wagons started back. At about 10:02 a.m., the locomotive driver informed the traffic manager on-duty in IP 4 via the radio station in the locomotive that the shunting work has been completed and was moving without wagons to IP 4.

At 10:02 a.m., the traffic manager on duty of IP 4 requested "consent" from the first-person traffic manager at Iliyantsi station to send ST No. 10891 from IP 4 to Iliyantsi station. After receiving "consent", through the station's interlocking, it prepared the route for receiving the locomotive on the third track, opened the input and output signal of IP 4 for Iliyantsi station.

At 10:10 a.m. ST No. 10891 (locomotive No. 98522051522-7) passed IP 4 without stopping in the direction of Iliyantsi station. The forward movement of the locomotive was with the long part of the engine compartment. The right-hand console I in the direction of movement controlled the locomotive. A locomotive driver served ST No. 10891 consisting of locomotive No. 98522051522-7. A shunting crew consisting of three members also travelled in the cabin of the locomotive. A locomotive passed the output signal of IP 4. At km 0+170, a signal "Beginning of restriction 25 km/h" has been placed due to a compromised rail track.

During the movement of the locomotive in the direction of the Iliyantsi station, the locomotive driver noticed the presence of a part of an instrument outside the gauge of the locomotive immediately took a quick stop with the direct brake of the locomotive and announced "people" without having seen them. After stopping the locomotive, according to the shunting crew in the cab of the locomotive, they looked back through the windows and saw the body of a worker lying in the siding.

At that time, at km 0+350, there was the third worker carrying with him a chainsaw and a can of oil, he turned and saw the two workers being run over by the locomotive. He dropped the saw and the pipe, run to the locomotive, and pointed under the cab, which told the engine driver that there was another body of a run over worker. The worker called the group leader's cell phone to notify him of the accident.

At that point, the worker, frightened by the sight, panicked and fled the scene. At the time of the accident, the work supervisor was not with the workers, there were no security guards, and there were no "work group workplace" signs posted around the work area.

The chainsaw and the canister of oil were found at km 0+350 by the authorities for pre-trial proceedings (NIS) and the Investigation Commission at the NAMRATIB.

The locomotive driver, after learning about the two workers being run over, immediately called the national emergency number 112 and reported the railway accident that had occurred.

At 10:13 a.m., the shunt driver notified the first-person traffic manager at Iliyantsi station by phone about what had happened.

At 10:15 a.m., the first-person traffic manager on duty at Iliyantsi station transmitted the information to the on-duty train dispatcher at TOU Sofia and sent a telegram notifying the concerned services.

At 10:41 a.m., by order of the train dispatcher from the Sofia railway station, the IP4 - Iliyantsi interstation was closed for train movement.

3.2.2.2. Rolling stock and technical facilities functioning.

Until the time of the accident, locomotive No. 98522051522-7 was technically up and running.

During servicing of ST No. 10890/10891, the locomotive driver of locomotive No. 98522051522-7 did not detect failures and damage to the locomotive. The locomotive is regularly registered in the European Vehicle Register (EVR).

3.2.2.3. Operational system functioning.

The operational system for managing train traffic between IP 4 and Iliyantsi station before and after the accident is functional and functioning normally. Train traffic between IP 4 and Iliyantsi station is carried out on a single railway line. The line specializes in two-way train movement.

After the occurrence of the accident, the operational system for managing train traffic between IP 4 and Iliyantsi station did not function from 10:41 a.m. to 5:39 p.m. on 07.11.2023.

3.2.3. Sequence of the events from the beginning of the occurrence until the end of the rescue services actions:

3.2.3.1. Actions of the emergency rescue services.

Around 10:30 a.m., the authorities of the MoID and RS FSaCP arrived at the scene of the accident, after clarifying the situation; the area was restricted to outsiders. The bodies of RS FSaCP, NIS, NAMRATIB and the interested officials of the entities were admitted to the site.

3.2.3.2. Actions of the emergency rescue services.

Around 16:30 p.m. after the completion of the inspections by the pre-trial investigative bodies from the NIS and the safety investigation bodies from the NAMRATIB, permission was given to move the locomotive and take the bodies of the two run over workers to Forensic Medicine for the preparation of examinations.

3.2.3.3. Actions of the emergency rehabilitation services

Not applicable.

3.2.3.4. Actions undertaken from SE NRIC and CTVB JSC for restoring the schedule and the capacity of the railway line

On 07.11.2023, after the completion of the procedural-investigative actions by the pre-trial investigation bodies from the NIS and the safety investigation bodies from the NAMRATIB at 17:30 p.m., written permission was given to the head of the Task Force to undertake emergency recovery activities.

At 17:35 p.m., locomotive No. 98522051522-7 arrived at Iliyantsi station under its own power and was parked at the CTVB JSC railway undertaking.

At 17:39 p.m., the train dispatcher restored the movement of trains and vehicles between IP 4 and Iliyantsi station at scheduled speed.

4. Analysis of the event

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

4.1.1. Railway undertaking.

Analysis of the movement of ST № 10891.

The analysis was performed from the data, registered from the recording device of locomotive №98522051522-7, travelled as ST № 10890 on 07.11.2023.

The speedometer installation of locomotive № 98522051522-7 and „Hasler“, provided by two speedometers:

- Registering: type 662A514, with factory № 88224 (fig. 4.1);
- Non-registering type 672A313, with factory № 86051 (fig. 4.2).



Fig. 4.1. Tape tachograph



Fig. 4.2. Tachograph

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

- Track speed (V-S);
- Astronomic time with schedule and stamp on the tape, as well as the travelling and stay time (diagram T);
- Passed track for the separate track sections (through perforations on the tape – 2,5 mm = 0,5 km);

On the speedometer, tape within apparatuses type 662A514 (as it is of locomotive №98522051522-7) can be registered also the following additional parameters:

- Movement direction;

The speedometer tape is verified for establishing:

- Whether the prescribed maximum speed of train movement;
- Whether the speed is up to the prescribed such within passing a section, which must to be passed with reduced speed;
- Whether the continuation of movement with reduced speed, i. e. distance to be passed equal to the length of reduction plus the length of the whole train;
- Are there any unpredictable stops along the interstation;
- Are there indicated any slippages of the locomotive;
- In which direction the locomotive movement is performed;
- Presence of all the records for the respective TRRS.

The speedometer control tapes are considered a valuable objective document in the investigation of transport safety accidents and railway accidents.

Any falsification of the speedometer tape, intentional destruction or deliberate impact of the clock or recording mechanism is considered a transportation safety violation.

Locomotive № 98522051522-7 is equipped with speedometer installation „Hasler“, which consists of a three-phase AC collector converter (Geber), activated by one of the wheel-set of the locomotive. The resulting three-phase voltage with a variable frequency depending on the speed of movement drives the mechanical speedometer synchronous electric motors mounted on it. Two speedometer devices are installed in the locomotive cabin: the recording device (tape tachograph) 662A514 on console No. 1 (Fig. 4.3) and the non-recording device (tachometer) 672A313 on console No. 2 (Fig. 4.4). The two speedometers have a range of 0÷150 km/h.

The tape tachograph measures and displays on an overview dial the following data when the



Fig. 4.3. Layout of the facilities and apparatuses of panel № 1 of locomotive № 98522051522-7.

locomotive is moving:

- Track speed in km/h;
- The time in hours and minutes;
- The entire distance travelled in km (odometer);

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

The recording equipment of the 662A514 tachograph registers the following basic parameters:

- Track speed in km/h;
- Astronomic time, as well as the travelling time and the time of stay;
- The passed track for separate track sections;
- The locomotive movement direction;
- Other parameters for the locomotive movement.



Fig. 4.4. Layout of the facilities and apparatuses of panel № 2 of locomotive № 98522051522-7.

The recording (speedometer) tape is made of waxed paper. It has linear fields for recording the information transmitted by the tape tachograph (Fig. 4.5). The speedometer tape is a valuable objective data source for accurately determining the beginning, course and end of movement-related processes.

On the speedometer tape are registered:

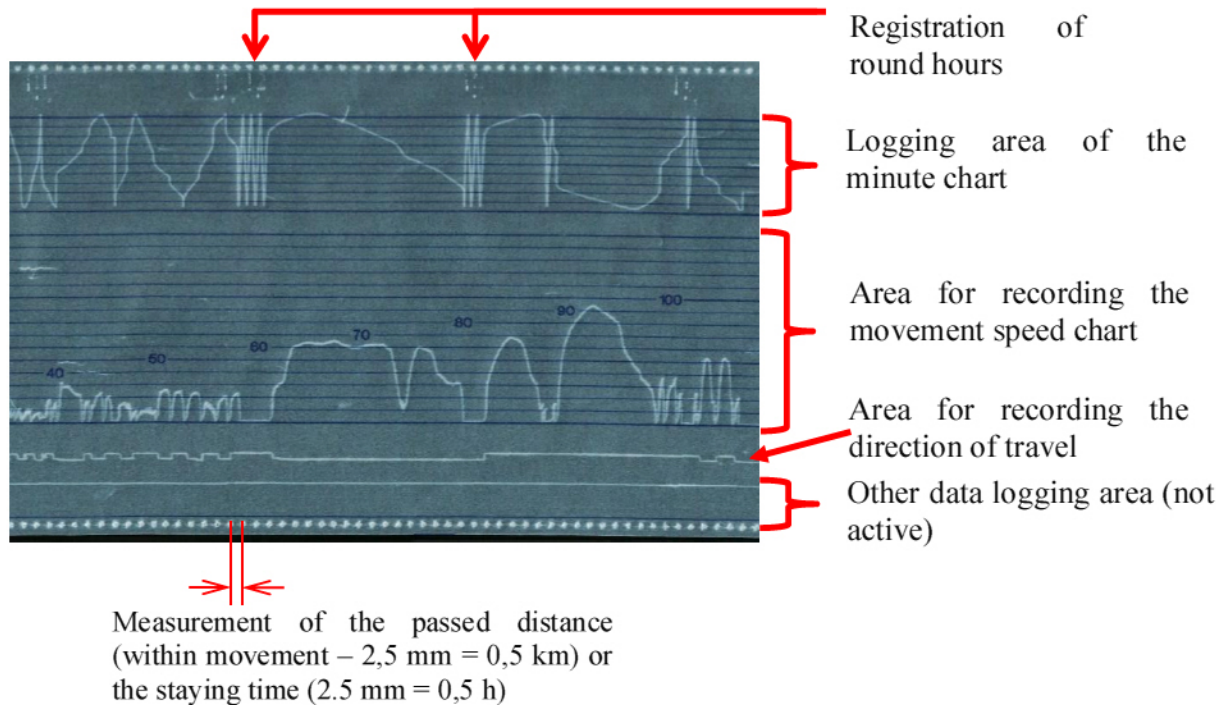


Fig. 4.5. Illustrating the registering areas of the separate movement parameters of the speedometer installation of locomotive № 98522051522-7.

- Track speed in km/h;
- Astronomic time;
- Travelling time;
- Staying time;
- Passed track for separate track sections;
- The locomotive movement direction;
- Other data (non-obligatory).

The analysis of the train movement has been performed from Inspection point № 4 in the area of industrial branch of „Toplivo“ JSC to the place of the accident occurrence (fig. 4.6).

СКИЦА
ОТНОСНО

ТЕЖКО ПРОИЗШЕСТВИЕ: Злополука с лица, ударени от влак № 10891, обслужван от локомотив № 51-522 „КАРГО ТРАНС ВАГОН БЪЛГАРИЯ“ АД в междоусетието РП 4 - Илияти на 07.11.2023 г.



Fig. 4.6. Passed track of locomotive № 98522051522-7 from IP 4 to the place of the accident.

Initially, it is necessary to analyse the condition of the speedometer installation and the registrations on the speedometer tape (Fig. 4.7)

Correct registrations on the tape:

- Movement speed (fig. 4.7, pos. 1);
- Passed track (fig. 4.7, pos. 2);
- Movement direction: the upper part of the diagram registers movement in the "backward" direction (with the short part of the locomotive in the direction of movement - fig. 4.7, pos. 3); the lower part of the diagram registers movement in the "forward" direction (with the long part of the locomotive in the direction of movement - fig. 4.7, pos. 4);
- Minute diagram in time of movement from 11:53 p.m. to 12:20 p.m. according to the tape readings (the speedometer clock is not calibrated and the recorded time does not correspond to the actual astronomic time) (fig. 4.7, item 5);
- Minute diagram during downtime (fig. 4.7, pos. 6);

Unreadable registrations:

- Round hours on the tape (fig. 4.7, pos. 7). The clock of the recording apparatus was not calibrated and the recorded time did not match the astronomic time.

Incorrect registrations:

- The minute diagram in motion time (fig. 4.7, pos. 8).

The grey lines at the lower end of the tape indicate the end of the tape and do not record data (Fig. 4.7, item 9).

As it has been already noted, the clock of the recording apparatus was not calibrated and the time registrations did not correspond to the actual astronomic time (fig. 4.5, fig. 4.7, pos. 7). In addition, the minute diagram (see Fig. 4.5) does not record the time when the locomotive is moving.

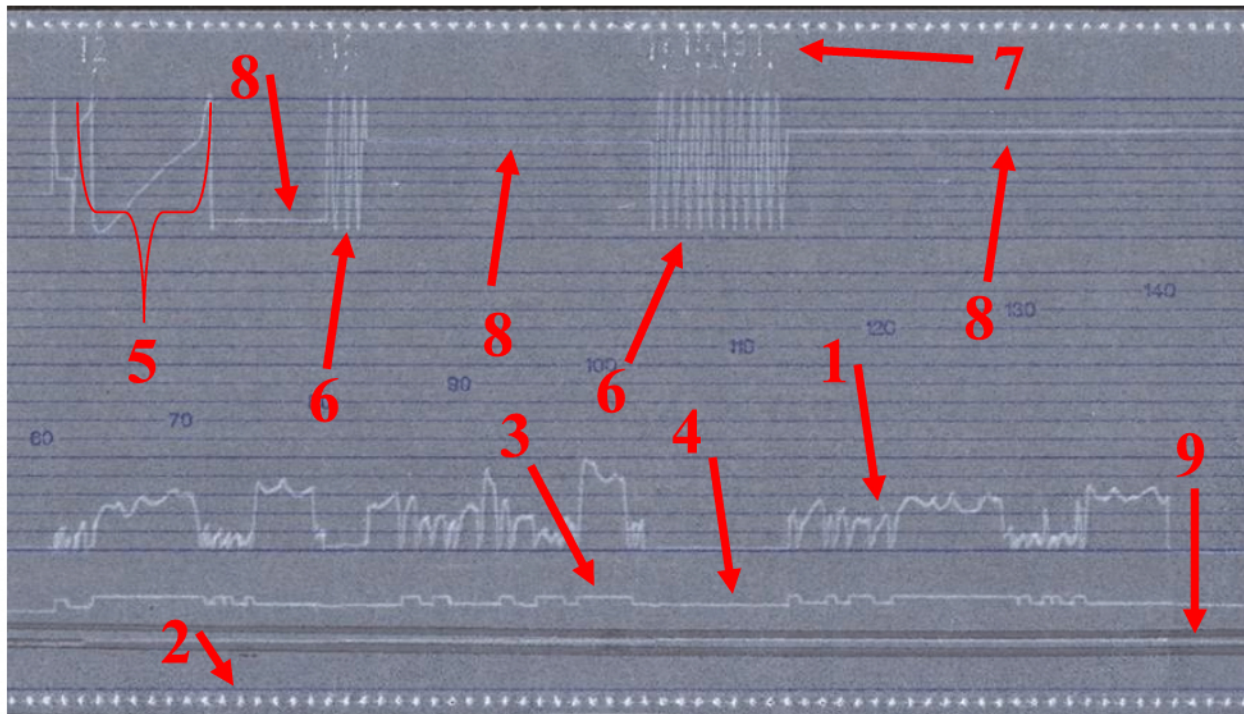


Fig. 4.7. General overview of the speedometer tape of the locomotive № 98522051522-7 from the day of the accident.

The last movement of the locomotive was recorded in fig. 4.8, pos. 1, after which the tape was removed. According to the testimonies of the witnesses and according to the documents reporting the movement of ST No. 10891, the accident occurred at 10:12 a.m. The analysis of the movement of locomotive No. 98522051522-7 was made from that moment back to its passage through IP 4. From the moment of holding with the direct brake of the locomotive to its final stop, the locomotive travels about 16-17 meters. At the time of detention, the locomotive was moving at a speed of about 28-29 km/h. About 150 meters before the arrest, the speed was 25-26 km/h

IP 4 is located at km 0+000 on the railway line from IP 4 to Iliyantsi station (Fig. 4.8). Therefore, locomotive No. 98522051522-7 travelled about 340 meters and after the accident settled at km 0+340 (Fig. 4.8, item 2).

Locomotive No. 98522051522-7 passed IP 4 at 10:10 a.m. (as recorded in the telephone messages exchanged between IP 4 and Iliyantsi station), and its speed was about 33 km/h (fig. 4.8, item 3). From that moment on, the speed of the locomotive began to decrease and after traveling about 200 meters, about 30 meters after the signal "Beginning of the limit 25 km/h" (Fig. 4.6, pos. 1) it reached a value of 25 km/h. After that, the speed started to increase again and after about another 100-120 meters it reached 28-29 km/h. At that moment, a hold was made with the direct brake of the locomotive (Fig. 4.8, pos. 5) and the speed decreased to 0 km/h for about 16-17 meters (Fig. 4.8, section **d**). Locomotive No98522051522-7 was located at km 0+340.

Time travel cannot be counted accurately due to incorrect registration in the minute chart area. The movement of the locomotive was carried out with the long part of the locomotive forward (fig. 4.8, pos. 4).

Before the accident, locomotive No. 98522051522-7 performed shunting movements in the "Toplivo" JSC industrial branch and moved from the industrial branch to IP4, which is not related to the accident and is not reflected in the analysis

10. On the left side of the rail track there are logs of felled trees and large grass vegetation in order to detect the visibility of the entrance signal for IP 4 side Iliyantsi;
11. The work on the rail track is performed in the light part of the day and within a clear visibility of the rail track.

4.1.3. Entities in charge of the technical maintenance.

CTVB JSC holds a Certificate of a structure responsible for maintenance with EIN BG/31/0023/0003, valid from 13/04/2023 to 12/04/2028.

RAILWAY CAPITAL A.S. holds a Certificate of Structure Responsible for Locomotive Maintenance No. 98522051522-7 with EIN CZ/31/0022/0148, valid from 01/02/2022 to 01/02/2025;

SE NRIC has a Certificate of an entity in charge of maintenance with EIN BG /31/0020/ 0003, valid from 01.07.2020 to 30.06.2025.

SE NRIC has a Certificate for an entity in charge of maintenance of vehicles with EIN BG/31/0023/0001, valid from 22.03.2023 to 21.03.2028.

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

Diesel locomotive manufactured by CKD PRAHA, model 741,522-7, production number 11267, EVN 92542741522-7, which is owned by the railway company CTVB JSC

4.1.5. National safety authority.

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

4.1.6. Notified bodies or Risk assessment authorities.

„TINSA" Ltd. holds 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, 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 evaluation body for performing an independent assessment of the implementation of the risk management procedure and its results, valid from 02.05.2023 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;
- Support;
- Telematics 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.

In accordance with Permit No. 002-2/04.03.2020 of MTITC for carrying out activities to assess the compliance of a subsystem or a part of a subsystem with the requirements of national safety rules or technical rules, "TINSA" Ltd. issues the present Certificate of Conformity no. 002-2/10/47/2022/JIOK/BГ/2022-21/V01, on an subject of subsystem "Rolling stock - locomotives and passenger rolling stock" - diesel locomotive No. 92 54 2 741 522-7 is indicated with the original registration number of ČKD Prague.

The certificate certifies the compliance of the vehicle with the requirements of the national safety rules or with the technical rules for traffic on the railway infrastructure network of the Republic of Bulgaria, determined by the National Reference Document for Bulgaria (ERA NATIONAL REFERENCE DOCUMENT: National Reference Document for Bulgaria, 15.08.2019).

The results of the evaluation, the conditions and limitations of use are presented in Appendix No. 1, which is an integral part of the certificate.

The certificate is valid for an unlimited period for the subject of evaluation mentioned above and until it and/or the relevant enclosed documents are not changed.

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

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

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

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

- SE NRIC implements Safety Procedure PB 2.09 "Methodology for determining, assessing and managing of the risk" version 05 effective from 01.03.2019, part of the SMS.
- CTVB JSC implements the "Monitoring and Information" procedure from 13.12.2018 and Methodology for assessing the safety risk in BDZ PP EOOD from 23.02.2012.

4.2. Rolling stock and technical facilities

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

Not applicable.

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

Not applicable.

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

Not applicable.

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

Not applicable.

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

Not applicable.

4.2.6. *Other factors or consequences considered as involved within the investigation objectives.*
Not applicable.

4.3. Human factor

4.3.1. Individual human characteristics:

4.3.1.1. Training and development, including skills and experience.

Railway undertaking:

- Locomotive driver of a locomotive No. 98522051522-7 - Certificate of qualification No. 21672 acquired qualification for "Locomotive driver", training conducted in the period 08.04.÷17.05.2019, training institution VTU T. Kableshkov, issued by EARA;

- Locomotive driving license BG 71 2021 0025, issued by EARA;

- Certificate No. III-1203 for occupying the position of "Locomotive driver" in BDZ PP EOOD from 16.05.2024.

Additional certificate No. 7120210025 from BDZ PP EOOD for rolling stock for which the locomotive driver is allowed to drive – Electric series 43, 44, 45.00, 46200, 80.00, Diesel series 10.00, 5100, 5200 and 5500 from 26.10.2022 on the national railway infrastructure of the Republic of Bulgaria until 26.10.2025.

- Shunter of the ST No. 10891 - Certificate of qualification No. 22716 acquired qualification for "Shunter", training conducted in the period 17.08.÷20.10.2020, training institution PQC at BDZ, issued by EARA;

- Certificate No. 144 for holding the position of "Shunter" in CTVB JSC from 08.02.2022.

- Shunter of ST No. 10891 - Certificate of qualification No. 15740 acquired qualification for "Shunter", training conducted in the period .10.1987÷15.01.1988, training institution under. 58950 issued by sub. 58950;

- Certificate No. 171 for holding the position of "Shunter" in CTVB JSC dated 09.10.2023.

- Shunter of the ST No. 10891 - Certificate of qualification No. 1498-101 acquired qualification for "Shunter", training conducted in the period 06.02.÷13.03.2023, training institution PQC at BDZ, issued by EARA;

- Certificate No. 173 for holding the position of "Shunter" in CTVB JSC from 01.11.2023.

Railway infrastructure:

- Head of transport group - Certificate of qualification No. 4384, acquired legal capacity for "Railway construction technician", training conducted in the period 28.11.2005 ÷ 16.05.2006, training institution PQC at the SE NRIC, issued by EARA;

- Certificate No. 1091 for holding the position of "Transport Group Manager" in the Sofia Railway Section from 01.06.2022.

- Traffic manager at Inspection Point 4 - Certificate of qualification No. 22189, acquired qualification for "Traffic Manager", training conducted in the period 22.04. ÷ 27.11.2019, training institution PQC at the SE NRIC, issued by EARA;

- Certificate No. 5143 for occupying the position of Traffic Manager in TOSAMD- Sofia from 21.07.2020.

- Traffic manager at Iliyantsi station, first person - Diploma No. 00124 for acquired qualification for "Traffic manager and commercial operation", training conducted in the period 31.08.1996÷15.12.1999, training institution VVTU "Todor Kableshkov";

- Certificate No. 5636 for occupying the position of Traffic Manager in TOSAMD - Sofia from 01.03.2022.

- Traffic manager at Iliyantsi station second person - Certificate of legal capacity No. 19879 acquired legal capacity for "Traffic manager", training conducted in the period 10.07.÷18.08.2017, training institution VTU, "Todor Kableshkov", issued by EARA;

Certificate No. 5008 for occupying the position of Traffic Manager in TOSAMD - Sofia from 05.09.2019.

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

Railway undertaking:

- Locomotive driver of locomotive No. 98522051522-7:

Single health information file No. 1448 of 04/10/2023, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for a locomotive driver.

Psychological certificate No. 154/28.01.2021, issued by the Railway Transport Psychological Laboratory at the National Multidisciplinary Transport Hospital - Sofia for a locomotive driver.

Conclusion: allowed for a period of 5 years.

- Shunter of ST No. 10891:

Card for medical examination No. 4201 of 10.11.2023, issued by the National Multidisciplinary Transport Hospital - Sofia

Conclusion: fit for Shunter.

Psychological certificate No. 897/08.09.2021, issued by the Psychological Laboratory for Railway Transport at the National Multidisciplinary Transport Hospital - Sofia for a shunter.

Conclusion: admitted for a period of 5 years.

- Shunter of ST No. 10891:

Single health information file No. 1326 of 04/05/2023, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: suitable for a Shunter.

Psychological certificate No. 257/23.02.2022, issued by the Psychological Laboratory of Railway Transport at the National Multidisciplinary Transport Hospital - Sofia for a shunter.

Conclusion: admitted for a period of 3 years.

- Shunter of ST No. 10891:

Single health information file No. 2224 of 18.05.2023, issued by the National Multidisciplinary Transport Hospital - Sofia;

Conclusion: fit for Shunter.

Psychological certificate No. 987/09.10.2023, issued by the Psychological Laboratory of Railway Transport at the National Multidisciplinary Transport Hospital - Sofia for a shunter.

Conclusion: admitted for a period of 5 years.

Railway infrastructure:

- Head of transport group:

Single health information file No. 346 of 02.02.2024, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion - suitable for a Head of transport group.

- Traffic manager on duty in Inspection post 4:

Single health information file No. 3385 of 13.07.2023, issued by the National Multidisciplinary Transport Hospital - Sofia.

Conclusion - suitable for Traffic manager.

Psychological certificate No. 734/20.07.2020, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: allowed for a period of 5 years.

- First-person traffic manager on duty at Iliyantsi station:

Card for periodic medical examination dated 08.11.2023, issued by the National Multidisciplinary Transport Hospital Sofia;

Conclusion: fit for Traffic manager.

Psychological certificate No. 27/11.01.2022, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: admitted for a period of 5 years.

- Second person traffic manager on duty at Iliyantsi station:

Card for periodic medical examination No. 1076 of 04/03/2023, issued by the Sofia National Multidisciplinary Transport Hospital;

Conclusion: fit for Traffic manager.

Psychological certificate No. 1072/03.09.2019, issued by the Psychological Laboratory of Railway Transport Sofia at the National Multidisciplinary Transport Hospital Sofia for a traffic manager.

Conclusion: admitted for a period of 5 years.

4.3.1.3. Fatigue.

Railway undertaking:

- Locomotive driver of locomotive No. 98522051522-7:

Rest: from 06.11.2023 hour 18 minutes 00 to 07.11.2023 hour 08 minutes 00

Started work: 07.11.2023 hour 08 minutes 00 – (14 hours and 00 minutes)

- Shunter of ST No. 10891:

Rest: from 06.11.2023 hour 18 minutes 00 to 07.11.2023 hour 08 minutes 00

Started work: 07.11.2023 hour 08 minutes 00 – (14 hours and 00 minutes)

- Shunter of ST No. 10891:

Rest: from 03.11.2023 at 20 minutes 00 to 07.11.2023 at 08 minutes 00

Started work: 07.11.2023 hour 08 minutes 00 - (84 hours and 00 minutes)

- Shunter of ST No. 10891:

Rest: from 05.11.2023 hour 18 minutes 00 to 07.11.2023 hour 08 minutes 00

Started work: 07.11.2023 hour 08 minutes 00 – (38 hours and 00 minutes)

Railway infrastructure:

- Head of transport group:

Rest: from 06.11.2023 hour 16 minutes 45 to date 07.11.2023 hour 08 minutes 00

Started work: 07.11.2023 hour 08 minutes 00 – (16 hours and 15 minutes)

- Traffic manager on-duty at Inspection post 4:

Rest: from 05.11.2023 hour 06 minutes 50 to date 07.11.2023 hour 06 minutes 50

Started work: 07.11.2023 hour 06 minutes 50 – (48 hours and 00 minutes)

- First-person traffic manager on duty at Iliyantsi station:

Rest: from 05.11.2023 hour 07 minutes 00 to date 07.11.2023 hour 06 minutes 40

Started work: 07.11.2023 hour 06 minutes 40 (47 hours and 40 minutes)

- Traffic manager on-duty, second-person at Iliyantsi station:

Rest: from 06.11.2023 hour 07 minutes 00 to date 07.11.2023 hour 07 minutes 00

Started work: 07.11.2023 hour 07 minutes 00 (24 hours and 00 minutes)

4.3.1.4. Motivation and attitudes

Not applicable

4.3.2. Work related factors:

4.3.2.1. Tasks planning.

- SE NRIC – railway infrastructure manager, carries out maintenance, repair and operation of the railway infrastructure. Prepares an annual schedule for the movement of all categories of trains on the main and secondary railway lines. Prepares schedules and timetables for additional requested trains and vehicles submitted by railway undertakings/carriers for movement on the railway network.

- CTVB JSC is a licensed railway carrier that carries out shunting activities and transport of goods along the route Iliyantsi station – Inspection point 4 - industrial branch of "Toplivo" JSC and back to Iliyantsi station

4.3.2.2. Constructive particularities of the facilities that influence the connection human-machine.
Not applicable.

4.3.2.3. Communication means.

Communication connections are made in IP 4 with DCCM -8 and in Iliyantsi station with CAS-22.

A device has been installed in the locomotive cabin for radio communication between the locomotive driver and the traffic manager on duty in IP 4, Iliyantsi station and the shunting crew. The operational staff working on a shift basis in SE NRIC and CTVB JSC are provided with official mobile phones for quick communication

4.3.2.4. Practices and processes.

Not applicable.

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

- SE NRIC implements national and departmental normative acts, part of the SMS, relevant to the activities of the manager of the railway infrastructure.

- CTVB JSC implements national and departmental normative acts, part of the SMS, applicable to the activity of the railway enterprise:

Instruction on the relations between the employees and workers of the SE NRIC, Iliyantsi station, IP 4 and CTVB JSC for the performance of shunting activities, technical inspections, samples of the trains and the order and way of entering and exiting the industrial branch "Corporation Toplivo" JSC in force from 12.09.2022;

- Instruction for the operation of the railway network of the industrial railway branch of "Corporation Toplivo" JSC in the interstation IP 4 and Iliyantsi station with a locomotive and shunting crew of CTVB JSC, agreed with the NSA, SE NRIC and "Toplivo" JSC in force from 03.08.2020;

Agreement in force from 15.09.2021 between "Corporation Toplivo" JSC and "Cargo Trans Vagon Bulgaria" JSC, which regulates the relations between the parties in connection with the transportation of freight trains between station Iliyantsi - IP 4 - "Corporation Toplivo" JSC carrying out shunting activities in the branch and vice versa. Safe operation when carrying out transport and shunting activities with the locomotive of CTVB JSC from and to the industrial branch of "Corporation Toplivo" JSC. The agreement was renewed with a new one on 30.06.2023;

- Instruction for the work of the shunting crews when performing shunting activities from the traffic control of CTVB JSC in force from 03.04.2019;

- Instruction on the status and functions of the specialized bodies and officials responsible for the safety of the movement of trains and shunting work in CTVB JSC in force from 03.04.2019;

Regulations for the internal working rules for traffic management in CTVB JSC effective from 30.03.2018.

4.3.2.6. Working time of the involved personnel.

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

4.3.2.7. Risk treatment practices.

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

- CTVB JSC implements the procedure "Methodology for safety risk assessment in CTVB JSC";

Register of hazards during operation of locomotive No. 98522051522-7 in the areas of movement and performance of shunting activity.

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

4.3.3. Organizational factors and tasks:

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

CTVB JSC and SE NRIC, in accordance with the requirements of the European and national normative acts, carry out their activities in accordance with established methodologies based on models of good European practices and professional experience. The work is planned and related to the staff directly responsible for the safety and operation of railway transport in accordance with the norms prescribed in the SMS.

4.3.3.2.Communications, information and teamwork.
Not applicable.

4.3.3.3.Recruitment, staffing requirements, resources.

Railway undertaking

• At CTVB JSC, the selection of personnel is carried out according to the approved "Procedure for the management of human resources in the maintenance of the public transport system" in force from 09.12.2021, which includes:

- o Scope and field of application;
- o Regulatory documents used;
- o Implementation of the personnel selection and evaluation process;
- o Rules for ensuring HSWCA, Ecology, and organization of the activity.

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

Railway infrastructure manager

- SE NRIC has an approved "Strategy for the management of human resources 2021÷2025"
In the SE NRIC, the selection of personnel is carried out according to the established "Rules for recruitment, selection and appointment of personnel in the central administration of the SE NRIC" in force from 01.12.2020.

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

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

4.3.3.4.Implementation management and supervision

Not applicable

4.3.3.5.Compensation (remuneration).

Railway undertaking

CTVB JSC implements "Internal rules for the organization of wages" in force from 09.12.2021, which regulate the wages of workers in terms of labour law:

- Formation of the funds for wages in the enterprise;
- Determination and amendment of basic monthly salaries;
- Determining the amounts of additional remuneration;
- Calculation and payment of monthly staff salaries;

- Determination of minimum values and/or ranges of basic salaries.

Railway infrastructure manager

• SE NRIC has approved "Internal rules for wages" in force since 01.09.2014, which regulate issues related to the wages of the company's personnel:

- General provisions for the organization of the salary in the enterprise;
- Determining and distributing the funds for salaries - sources, order and way of forming the remuneration;
- Determination and amendment of salaries and additional remuneration;
- Regulation, order and method of payment of the working salaries.

4.3.3.6. Leadership, powers related issues.

Not applicable.

4.3.3.7. Organizational culture.

Not applicable.

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

Not applicable.

4.3.3.9. Regulatory framework conditions and applying of the safety management system.

Railway undertaking.

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

Railway infrastructure.

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

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

4.3.4. Environmental factors:

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

Not applicable for SE NRIC and CTVB JSC.

4.3.4.2. Meteorological and geographic conditions.

IP 4 and Iliyantsi station are located in the western part of the railway network;

Detailed description in item 3.1.3.2.

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

Described in details in item 3.1.3.3.

4.3.5. Any other factors for the investigation objective.

Not applicable.

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

4.4.1. Regulatory framework conditions.

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

Commission Delegated Regulation (EU) 2018/762 of 8 March 2018 establishing common safety methods on 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 undertakings.

- CTVB JSC implements normative levels and scoring units of the Safety Risk Assessment Methodology; "Periodic control of the implementation of the SMS is carried out through internal audits: monthly and complex. Comprehensive audits are conducted once a year of all safety-related structures."

- In accordance with the requirements of the "Safety Risk Assessment Methodology", the CTVB JSC railway undertaking prepares and presents reports for the current year, as well as an audit report for the previous year regarding risk monitoring.

Infrastructure Manager.

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

4.4.2.1. Entities in charge of the technical maintenance.

Railway undertaking

CTVB JSC owns a Certificate of a structure responsible for maintenance with EIN BG/31/0019/0003, valid from 19.04.2021 to 18.04.2026, including a tank wagons for dangerous goods;

RAILWAY CAPITAL holds a Certificate of Structure Responsible for Locomotive Maintenance No. 98522051522-7 with EIN CZ/31/0022/0148, valid from 06/01/2022 to 02/01/2025.

Infrastructure Manager.

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

- SE NRIC is a certified ECM for vehicles with Certificate No. EIN BG/31/0023/ 0001, valid from 22.03.2023 to 21.03.2028.

4.4.2.2. Manufacturers and all other participants.

Not applicable.

4.4.2.3. 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:

Railway undertakings.

CTVB JSC implements the "Methodology for analysis and assessment of safety risk", which is part of the SMS.

Railway Infrastructure.

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

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

Railway undertaking.

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

Infrastructure manager.

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

SE NRIC implements approved "Rules for current maintenance of a rail track" in force from 2021, which is part of the SMS.

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

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

Infrastructure manager

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

In the period from 21.11.2022 to 25.11.2022, the National Safety Authority (RAEA) carried out an annual planned supervision of ECM, part of SMS of SE NRIC.

In the period from 24.04.2023 to 05.05.2023, the National Safety Authority (RAEA) performed an audit of the SMS for renewal of the safety authorization of the infrastructure manager (SE NRIC).

Railway undertaking

On 07/04/2023, the National Safety Authority (NSA) conducted an audit under the SMS for the issuance of a certificate for a structure in charge of maintenance of "Cargo Trans Vagon Bulgaria" JSC;

On 13.04.2022, the National Safety Authority (NSA) carried out an audit under the SMB for the issuance of a single safety certificate of "Cargo Trans Vagon Bulgaria" JSC;

On 19.03.2021, the National Safety Authority (NSA) conducted an audit for the submission of a license to "Cargo Trans Vagon Bulgaria" JSC;

On 26.03.2023, the National Safety Authority (NSA) carried out an annual scheduled audit of the SMS of "Cargo Trans Vagon Bulgaria" JSC.

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

4.4.6.1. Safety authorization of the involved infrastructure manager.

SE NRIC holds Safety Authorization No IN EC BG 21 2023 0001, valid from 01.07.2023 to 30.06.2028.

4.4.6.2. Safety certificates of the involved railway undertaking.

CTVB JSC has a Single Safety Certificate with IN EC BG 10 2022 0067, valid from 17.04.2022 to 16.04.2027;

4.4.6.3. Certificate of risk management assessment body.

"TINSA" Ltd. holds Certificate EIN BG/36/0021/0001 of an assessment body for independent assessment of the application of the risk management procedure and its results, valid from 05/02/2021 to 04/02/2026.

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

On 20.03.2023, the company TTL Ltd. submitted an application with ID V-20230320-014 for the issuance of a permit for railway vehicles to the National Safety Authority - EARA for putting vehicles on the market.

In the period 21.03.-20.04.2023, in accordance with the requirements of Art. 2, paragraph 2 of Regulation (EU) 2018/545 the National Safety Authority - EARA has evaluated the submitted application for placing on the market a vehicle with No. 98522051522-7.

On 24.04.2023, a vehicle type permit was issued.

On 15.11.2023, the National Safety Authority - EARA issued a new Vehicle Marketing Authorization with EIN: BG8020230079, Vehicle Type Authorization (Application in EUAR One Stop Service System (OSS) No. V- 20220616-002), due to a change of identification number in ERATV on the recommendation of ERA to change the method of registration.

4.4.7. Other system factors.

Not applicable.

4.5. Previous cases of similar nature.

In the period from 2006 ÷ 2023 NIB – BG did not investigate accidents of a similar character.

5. Conclusions

5.1. Summary of the analysis for the event causes.

The Investigation Commission carried out several inspections of locomotive No. 98522051522-7. It familiarized itself with the documentation provided for risk assessment and compliance under national rules, as well as the introduction of the vehicle on the transport market, the technical condition of the locomotive (operation and repairs) before the accident.

The Investigation Commission made several inspections at the scene of the accident. It requested and received additional documents and materials from the Assessing Body TINSA Ltd., the National Safety Authority (EARA), the Railway Infrastructure Manager (SE NRIC) and the railway company (CTVB JSC). The Commission analysed the documents and materials provided by the Task Force assigned to the accident. It analysed the materials provided by the Sofia District Prosecutor's Office and the National Prosecutor's Office.

The Investigation Commission analysed the facts and circumstances of the accident, which are not in accordance with the current regulations on transport safety and safe working conditions of the two entities.

From the inspections, findings and analyses, the Investigation Commission established the causes of a serious accident at the IP4 - Iliyantsi interstation on 07.11.2023:

- The instruction book does not record how the movement of the work group will be carried out to the place of work;
- The place of work is not specified in writing from which kilometre it will start;
- It is not recorded that the work will be carried out without interruption of the train movement;
- The workplace is not signalled in accordance with the requirements of the normative acts;
- Safety is not provided at the workplace in accordance with the requirements of the normative acts and control of the work on site has not been carried out;
- The traffic managers on duty in IP 4 and Iliyantsi station were not informed that work will be carried out on the rail track in the interstation on 07.11.2023;
- It was found that the locomotive driver had limited visibility when the locomotive was moving in a left curve on the siding, due to which he did not see the work group working in the siding;
- The established speed of movement of the locomotive in the area of the accident is 28-29 km/h, with a speed limit of 25 km/h;
- In the movement of locomotive No. 98522051522-7 in the interstation IP 4 - Iliyantsi as shunting train No. 10891, the condition of art. 11 of the "Instructions for the work of locomotive drivers and assistant drivers when performing train and shunting activities in the "Movement" Department of "Cargo Trans Vagon Bulgaria" JSC".

The following safety requirements have not been met:

1. Safety working conditions of the working group are not ensured when performing their official duties in the interstation IP 4 - Iliyantsi;
2. An analysis has not been carried out to assess the hazards leading to an increased risk of injury when working with mechanization in an interstation without guarding and signalling;

The requirements of legal acts have not been met:

Ordinance No. 58:

"Art. 160. It is not allowed:

1. starting work endangering the life and health of workers or the safety of the movement of the transports before the place of their performance is signalled;
3. remove the signals that surround the place of work before it is fully completed and the condition of the rail track, catenary has been checked and the gauge."

"Art. 468. (1) The sign "Workplace of a group of workers" is a square plate with a red stripe along the edges, divided into four square fields, the upper left and lower right are coloured black, and the remaining two fields are coloured yellow."

„(2) The directory under para. 1 is placed on both sides of the workplace, to the right of the rail track on which the works are carried out, depending on the maximum speed at a distance of at least:

1. for speed up to 100 km/h - at 400 m;
2. for a speed of 100 to 120 km/h - at 500 m;
3. for a speed of 120 km/h and greater - at 600 m."

„(3) The visibility of the directory under para. 1 is not less than 200 m. The sign obliges the locomotive driver to signal "Caution!" repeatedly at intervals of 3 - 5 s until entering the workplace area. Depending on the dimensional conditions, the sign may be reduced in size.'

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"Art. 364. (1) It is prohibited:

1. Starting work before the work site is signalled according to the requirements of Ordinance No. 58.
2. Removal of signals that surround the work site before it is fully completed and the condition of the railway track, catenary and gauge has been checked.

"Art. 94. (1) The traffic manager on duty checks the clocks of the locomotive driver, the driver of a non-removable or removable railway vehicle and the train master (senior conductor, shunter) in the following cases:

1. before departure from the starting station;
2. when changing the locomotive or transport crew;
3. upon delivery of a movement order under special conditions and a plan for shunting;
4. of the station shunting locomotives - before the start of the shunting."

"(2) Clocks are also checked at a station from which a working train, shunting train, non-removable or removable railway vehicle leaving for work at an interstation and during the movement of vehicles with a time difference are dispatched."

"(5) When the vehicle does not have an accompanying document, the clock check is reflected in the relevant way-bill."

"(6) The locomotive driver checks the clock on the recording device."

„(7) (Amended by Ordinance No. 673/23.04.2020) Checking the clock on the recording device is done when the traffic manager on duty asks the locomotive driver about the readings of the clock, after which he informs him of the exact time. If a difference is found, the driver adjusts the clock to the exact time of the traffic manager on duty. In an analogous way, the watches of the train master and the drivers of non-removable and removable vehicles from the rail track are checked. In the event of a technical impossibility for the locomotive driver to correct the clock readings on the recording device, he shall make an entry in box 79 of the waybill.'

HSLCA:

"Art. 33. Every worker is obliged to take care of his own health and safety, as well as the health and safety of other persons directly affected by his activity, in accordance with his qualifications and the instructions given by the employer."

Ordinance No. 13:

"Art. 11. Everyone working in railway transport is obliged to take care of his safety and health, as well as the safety and health of other persons affected by his activity, in accordance with the requirements of this regulation, the normative acts on health and safety at work, the railway regulations and the employer's instructions.'

"Art. 23. (1) Movement in the areas of stations and depots and between stations is carried out with increased vigilance, paying attention to uneven terrain, ditches, canals, shafts, distance signs, poles and other facilities obstructing movement.

"Art. 60. (1) All works on the rail track are carried out by groups of workers working under the supervision and control of the head of the specified work (head of the railway section, organizer of the production group, technical supervisor, assistant technical supervisor, etc.)."

„(3) When carrying out work by a group, each of which consists of two or more workers, the work manager appoints for each group one of the most experienced workers as a senior with the task of being observed and respected by the workers in the group health and safety rules. The designated

senior is instructed by the head of work (which is reflected in the relevant document) and is signed in the briefing book.'

"Art. 71. (1) The workplace is opened by signalling and guarding it.

(2) The manager of the work on the rail track:

1. provides signalling at the workplace in accordance with the Ordinance on determining the rules for the movement of trains, shunting work and signalling in railway transport;
2. provides safety for the working group;
3. allocates workers, tools and equipment to workplaces;
4. creates an organization at the workplace;"

Appendix No. 3 to Art. 90 (1), item 78:

„ item 78. When cleaning is carried out organized by the railway maintenance group, the location is flagged. When a train approaches, the work is stopped and the workers are removed to a safe distance together with their tools until the train has passed."

"Instructions for the work of locomotive drivers and assistant drivers when performing train and shunting activities in the "Movement" Department of "Cargo Trans Vagon Bulgaria" JSC":

Art. 11 of the Instruction:

"Art. 11: Depending on the operational activity, the crews are formed as follows: When servicing trains:

- Locomotive driver – 1;

Assistant locomotive driver (locomotive driver) - 1."

On 24.01.2024, the Investigation Commission at the NAMRTAIB, together with inspectors from the "Regional Railway Inspection Sofia" at the EARA, conducted a review of the books for daily and periodic briefing and the audit book of the railway section Sofia North and the following was established:

1. In the Daily Briefing Book, which was started on 03/07/2023, it was not found that any checks by control bodies were carried out until 07/11/2023 (seized by the NSA authorities);
2. In the Periodic Instruction Book it was established that the last inspection by a control body was carried out on 11.01.2019;
3. Four transport safety checks were carried out by control bodies in RITS - Sofia with revision sheets issued in the period 02.08.÷18.09.2023 with irregularities found in the area of the railway section Sofia North.

5.1. Undertaken measures after the event occurrence.

After completion of the procedural-investigative actions and written permission, the Manager of the railway infrastructure SE NRIC undertook timely organization and actions to restore the schedule and capacity of the railway infrastructure.

Locomotive No. 98252051522-7 from the interstation IP 4 - Iliyantsi was moved to the Iliyantsi station at 17:35 p.m. at the railway undertaking CTVB JSC (home location) for inspections.

Traffic on the line was restored at 17:39 p.m. according to schedule.

5.2. Additional findings.

On 07.11.2023, a work group for the railway section Sofia North of three workers arrived by road transport in the area of Inspection point 4 around 09:45 a.m. The group moved in the direction of the Iliyantsi station in the siding, as new reinforced concrete sleepers have been arranged on the right near the rail track to carry out the renewal of the rail track. To the left, the rail track is overgrown with bushes, tall grass, and felled tree trunks. The benches on both sides of the rail track for pedestrian movement have been obliterated, and for these reasons, the three workers moved on the siding in the direction of Iliyantsi station (Fig. 5.1).



Fig. 5.1. Part of the interstation IP 4 – Iliyantsi

6. Safety recommendations

In order to improve the safety in the rail transport, the Chairperson of the Investigation Commission at the NAMRTAIB proposes the following safety recommendations to the National Safety Authority (RAEA), related to SE NRIC and "Cargo Trans Vagon Bulgaria" JSC.

- With recommendation 1, it is proposed that SE NRIC and CTVB JSC familiarize the interested personnel with the content of this report;

- With recommendation 2, it is proposed to the SE NRIC that the occupational safety and health authorities undertake systematic inspections regarding the quality of the types of briefings conducted (including daily ones) by direct supervisors and the entries in the briefing books;

- With recommendation 3, it is proposed to the SE NRIC that the occupational safety and health authorities organize and conduct trainings for the direct supervisors conducting the types of staff briefings in the railway sections, paying attention to the risk assessment and accompanying hazards in the types of works on the rail track;

- With recommendation 4, it is proposed that SE NRIC systematically conduct trainings for personnel working with mechanized equipment and machines for which legal capacity is required;

- With recommendation 5, it is proposed that CTVB JSC supplement the texts regarding safety and control over the implementation of the provisions in the "Instructions for the work of locomotive drivers and assistant drivers when performing train and shunting activities" and in "Management of "Movement" of Cargo Trans Wagon Bulgaria JSC, part of the Safety Management System;

- With recommendation 6, it is proposed that CTVB JSC correct and supplement the texts in the book for daily instruction regarding the safety of shunting trains in the interstation IP 4 - Iliyantsi;

In accordance with the requirements of Art. 24 (2) of Directive (EU) 798/2016 and Art. 91, para. 3 and para. 94, (1) and (4) of Ordinance № 59 of 5.12.2006, the member of the MB in NAMRTAIB on 25.06.2024, provides a final report containing information on the circumstances and causes that led to the accident with formulated and coordinated safety recommendations in order to improve the railway transport safety.

In connection with Art. 26, paragraph 3 of Directive (EU) 798/2016 the National Safety Authority (RAEA) and the railway undertakings to which the safety recommendations are addressed shall regularly report to the member of the management board of the NAMRTAIB on the measures taken and planned as a consequence of the recommendations.

Chairperson:

Dr. Eng. Boycho Skrobanski

Deputy President of the NAMRTAIB AB