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**R E P U B L I C OF B U L G A R I A**

**NATIONAL AIR, MARITIME AND RAILWAY TRANSPORT ACCIDENTS INVESTIGATION BOARD**

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**ANNUAL REPORT**

**NATIONAL RAILWAY TRANSPORT ACCIDENTS INVESTIGATION BOARD**



**2020**

The present report is issued in accordance with:

* Directive (EU) 2016/798 of the EP and the Council of 11 May 2016;
* Railway Transport Act, SG issue 108, in force since 01.01.2007;
* Ordinance № 59, SG issue 102, in force since 05.12.2006.

The acts are accessible at:

https://www.mtitc.government.bg/bg/category/161

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# Preface

The annual report presents the investigated railway events and issued safety recommendations in 2020, as well as the activity of the National Investigation Body of the Republic of Bulgaria as per the requirements of article 24, paragraph 3 of Directive (EU) 2016/798/EP and of the Council on railway safety.

In 2020, the National Investigation Body was restructured in order to comply with the requirements for independence and to ensure an independent budget for investigation in accordance with the requirements of art. 21 of Directive 2004/49/EC.

By Decree of the Council of Ministers of the Republic of Bulgaria of January 6, 2020, the “National Air, Maritime and Railway Transport Accidents Investigation Board” (NAMRTAIB) was established within the Council of Ministers under the direct supervision of the Prime Minister. There were adopted Rules of the activity, structure and organization of the National Air, Maritime and Railway Transport Accidents Investigation Board. The Board is a secondary spending unit with a guaranteed and secured separate budget for each accident investigation area. The investigation functions in the field of National Railway Accidents Investigation Board (NRAIB) are stipulated in the Railway Transport Act (RTA), Ordinance № 59 of 05.12.2006 on railway safety management, Agreement for cooperation in investigation of accidents and incidents in air, maritime and railway transport between the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Interior and the Ministry of Transport, Information Technology and Communications, and Rules of the National Railway Transport Accidents Investigation Board.

The report includes data on the railway accidents investigated in 2020, including the causes for their occurrence and the recommendations issued to improve the safety in railway transport, as well as information on the measures taken by the entities for their implementation and performance. Summary data from the railway events realized in 2020 and the damages registered by the State Enterprise “National Railway Infrastructure Company” (NRIC) and the railway undertakings (carriers).

# INVESTIGATION BODY

## Legal base

The investigation body investigates accidents and incidents in accordance with the requirements of Directive 2016/798/EP and of the Council of 11 May 2016 on railway safety, which has been transposed into the Railway Transport Act (RTA) and Ordinance №59/05.12.2006 for management of safety in railway transport and Ordinance H-32 19.09.2007 on the coordination of actions and the exchange of information in the investigation of railway accidents and incidents.

**Chronology and restructuring of the investigation body**

In 2006 in the Republic of Bulgaria, with an amendment to the Rules of Procedure of the Ministry of Transport, Information Technology and Communications (MTITC), an investigation body was established under the direct authority of the Minister of Transport for Investigation of Railway Accidents and Incidents -"Specialized Railway Transport Accidents and Incidents Investigation Unit" (SRTAIIU).

In 2009, with an amendment and complementation to the Rules of Procedure of the Ministry of Transport, Information Technology and Communications (MTITC), was established Directorate “Air, Maritime and Railway Transport Accidents Investigation Unit” (AMRTAIU). The Directorate is a multimodal body consisting of three specialized units for the investigation of aviation, maritime and railway accidents and incidents.

By Decree of the Council of Ministers of the Republic of Bulgaria of January 6, 2020, was established the “National Air, Maritime and Railway Transport Accidents Investigation Board” (NAMRTAIB) at the Council of Ministers under the direct supervision of the Prime Minister. There were adopted Rules of the activity, structure and organization of the National Air, Maritime and Railway Transport Accidents Investigation Board.

## Purposes and functions

The purposes of the NRAIB in the investigation of accidents and incidents is to establish the circumstances and causes that led to the occurrence of railway accidents and incidents and to issue effective recommendations in order to minimize the accidents and to improve the safety in railway transport.

The prevention in investigations conducted by the investigation body is to establish the causes for their occurrence and to elaborate relevant safety recommendations in order to improve the safety and to prevent significant accidents without seeking personal fault and responsibility.

The functions and tasks of the NRAIB are described in detail in the European and National normative acts.

Main functions and responsibilities of the NRAIB:

- Organizing and leading the investigation of significant accidents, accidents and incidents that occurred on the territory and at the border crossings of the Republic of Bulgaria;

- Establishing the causes, circumstances and facts related to the occurrence of significant accidents, accidents and incidents, including identification of evidence, performance of analysis, including the human factor, decision-making, preparation of expertise and documentation of events;

- Coordination of the activities for conducting investigations in which the competent bodies of the Prosecutor's Office of the Republic of Bulgaria - the Investigation Bodies and the Ministry of Interior (MoI) also participate;

- Preparation and sending to all affected entities a draft final report with safety recommendations from the completed investigation of an accident or incident;

- Preparation and sending to all stakeholders a final report with safety recommendations, which is public in order to prevent other accidents of a similar nature;

- Participation in the working meetings of the Network of National Investigation Bodies of the EU Member States, coordinated by the European Union Railway Transport Agency;

- Participation in working groups for harmonization of the national normative acts with the European legislation, related to the safety and investigation of railway accidents and incidents;

- Analysis of data on accidents and incidents in the railway transport system;

- Keeping an archive of the investigated accidents and incidents and maintaining an information database;

## Organization of the activity

The main activity of the NRAIB is in its quality of national investigation body for railway accidents and incidents, is investigation of accidents and incidents classified in accordance with the requirements of art. 20 of Directive (EU) 2016/798/EP and the Council.

The investigation of railway events in 2020 was carried out by:

- NRAIB Division, which consists of the Deputy President of the Management Board of NAMRTAIB, who chairs the investigation commissions with qualification Doctor, Master Engineer with qualification "Operation and management of railway transport" and;

- External experts, involved in investigation commissions, on civil contracts with experience and qualifications relevant to the respective accident.

The budget funds for the NRAIB direction within the NAMRTAIB are provided as a secondary spending unit.

The decisions to undertake an investigation are taken in accordance with the requirements of the European and national regulations by the Deputy President of the Management Board of NAMRTAIB, Head of NRAIB:

* Directive 2016/798/EP and Council;
* Railway Transport Act;
* Ordinance № 59 of 05.12.2006 on railway safety management

The Head of the NRAIB shall inform in writing the Agency for Railway Transport of the European Union about any undertaken investigation of a railway event through the notification system. The investigations are completed with a draft final report and, if necessary, safety recommendations are issued and sent to all stakeholders;

The Head of the NRAIB shall inform the European Union Railway Agency in writing of any completed investigation, providing an electronic copy of the original final report in English in accordance with the requirements of Regulation (EU) 2052/2020/EC of 24 April 2020. After validation of the report by the Agency, it becomes publicly available on the website of the NAMRTAIB.

**International activity in 2020**

1. Participation of the Head of the NRTAIB in the 42nd plenary meeting of the Network of Railway Accident Investigation Bodies of the EU Member States, held in the period 25 ÷ 26 February 2020, the last live meeting in Lille, France.

Since March 2020, a global pandemic of COVID-19 has developed. In view of the restrictive medical safety measures introduced in the Member States, the European Railway Agency of the European Union for minimizing the risk of transmission and spread of the virus proposed and switched to a remote form of communication (home office). The Investigation bodies from EU member states switched to a virtual form of communication and subsequent plenary meetings.

2. Virtual participation of the Head of the NRAIB in the 43rd plenary session of the Network Investigation Bodies of Railway Accidents from the EU Member States held on 23 and 24 September 2020;

3. Virtual participation of the Head of the NRAIB in the 44th plenary session of the Network of Investigation Bodies of Railway Accidents from the EU Member States held on 25 and 26 November 2020;

**Participation in direction NRAIB in other events**

1. After receiving monthly statistical information on the general safety indicators from the manager of the railway infrastructure and the railway undertakings, in connection with the requirements of Ordinance № 59/5.12.2006, the head of the NRAIB department performs analysis and summarizes the data for the safety management in the railway transport. In this regard, an analysis of safety management for 2020 has been made, based on the data provided by the annual reports provided by the railway infrastructure manager and railway undertakings (carriers);

2. The head of the NRAIB unit shall be acquainted daily with the irregularities on the railway network, prepared by the manager of the railway infrastructure, in connection with the safety requirements;

3. Preparation and publication of an annual report on the activity during the previous year, which was sent in time to the European Union Railway Agency.

4. In connection with the structural changes that have occurred with the Investigation Body, the head of the NRAIB took part in a working group with the National Safety Authority (RAEA) and the Legal Directorate at the MTITC in order to amend and complement the Railway Transport Act.

5. With reference to the structural changes with the Investigation Body, the head of the NRAIB took part in a working group with the National Safety Authority (RAEA) and the Legal Directorate at the MTITC for amendment and complementation of Ordinance № 59 on safety management in rail transport.

In order to create optimal conditions and organization for timely and efficient work, in the process of investigations of the three types of transport in NAMRTAIB are carried out under the Agreement of 17.04.2018 for cooperation in the investigation of accidents and incidents in air, maritime and railway transport between the Prosecutor's Office of the Republic of Bulgaria, the Ministry of Interior and the Ministry of Transport, Information Technology and Communications.

In the process of investigation, the Head of the NRAIB establishes working contacts with the actors involved in the accident - the railway infrastructure manager (NRIC), the railway undertakings, the National Safety Authority (RAEA) and the users of railway services in relation to the investigated accident or incident as well as with other structures, institutions and specialized administrations for preparation of opinions and expertise.

**Interaction of the NRTAIB with other authorities and institutions**

# PROCESS OF INVESTIGATION

## Events that are subject to investigation

In accordance with the requirements of Directive (EU) 2016/798/EP and of the Council, the Railway Transport Act and Ordinance № 59, the National Railway Accident Investigation Board investigates railway events:

- Significant railway accidents;

- Accidents and incidents that in different circumstances, could lead to significant accidents;

- At its discretion, investigates technical failures in the structural subsystems and interoperability constituents, taking into account their significance.

In the event of an accident or incident occurrence, the authorized officials of the railway infrastructure manager and railway undertakings shall immediately notify the Head of the NRAIB department in accordance with approved by NRIC Safety Procedures as per the SMS and Ordinance № 59.

## Institutions related to the investigation.

After analysing and classifying a railway event, the Head of the NRAIB department decides to undertake an investigation and establishes an investigation commission. A chair - the Head of the NRAIB department, heads the commission. The commission includes independent external experts from the scientific community and higher technical universities, with relevance given the type of event under investigation. In the course of the investigation, the President of the Commission assigns technical expertise, requests analysis and opinions from:

- Research Institute of Transport;

- Technical University of Sofia;

- Higher School of Transport "Todor Kableshkov";

- Professional Training Centres for railway staff;

- Bulgarian Academy of Sciences;

- National multidisciplinary transport hospitals in the country;

- Fire safety laboratory;

- Other institutions for each specific case.

**Structure of the Investigation Commission for railway events**

## Process of investigation and Investigation Body Approach

After receiving the notification of an occurred railway event, the Head of NRAIB department, given its importance, takes action to move quickly to the place of occurrence. After the on-site inspection, he classifies the event in accordance with the normative acts. The Head of NRAIB department, when making a decision to initiate an investigation, notifies all the interested parties in the event. Within a week after the initiation of the investigation, he shall inform in writing the Agency for Railway Transport of the European Union for undertaking an investigation through the notification system.

The Chair of the commission manages and coordinates the activities of the investigation independently of the bodies of the pre-trial proceedings - Prosecutor's Office, Investigation, Ministry of Interior, and other investigation institutions, in order to ensure the necessary conditions for conducting an independent investigation. He supports the activities related to the teams of "Emergency Medical Aid", "Fire Safety and Civil Protection" (FSaCP). The Infrastructure Manager, the Railway Undertaking and other legal entities involved in the event shall provide the Chair of the Investigation Commission with all the records and conversations of the staff involved in the train traffic management, as well as any other important information and documents related to signalling, rail track and rolling stock. At the request of the Investigation Commission, the National Safety Authority (RAEA) shall provide any important information giving clarity on the accident or incident under investigation. The Commission conducts interviews with the personnel involved in the accident, as well as with eyewitnesses and witnesses of the event and requires written testimony from all legal entities and individuals directly and indirectly related to the event. The Commission receives the full support and assistance from the competent investigation authorities of the Prosecutor's Office and the Ministry of Interior, which conduct their own parallel investigation, in accordance with the requirements of the Code of Criminal Procedure (CPC). The safety investigation carried out by the NRAIB is conducted as openly as possible in order to exchange information, opinions and statements at all levels and with all parties involved in the event. The Commission analyses the collected documents and materials provided by the Task force, the opinions and expertise prepared before, during and after the accident in order to clarify the circumstances and the causes that led to its occurrence.

The Chair of the Commission, depending on the severity of the accident under investigation, prepares a draft final report, which he sends to the RAEA and the affected entities, structures and organizations, as well as to the relatives of the victims in the accident (if any). In accordance with the requirements of the Directive, any accident or incident investigated within one year from the date of its occurrence shall end with a final report, and in the event of an extension, an interim report shall be drawn up describing the action taken to date. The final report shall set out the chronology of events, the actions of the staff, describe the established data (if any persons were killed and injured) and the material damage, shall include the analysis of the event and the circumstances and shall substantiate the causes for its occurrence. If necessary, recommendations are made to improve the safety, in order to prevent other events of similar nature. The safety recommendations are addressed to the RAEA and the entities involved in the event - the railway infrastructure manager, the railway undertakings, and other interested participants in the event. The National Safety Authority RAEA and other bodies or structures to which the recommendations are addressed shall regularly report to the Investigation Body on the measures taken and planned as a result from the recommendations.

The Head of the NRAIB shall inform the European Union Railway Agency in writing of the completion of the investigation, sending a copy of the final report with the safety recommendations given. The final report is made publicly available on the website of the NAMRTAIB in the field of railway transport.

## Safety research based on the annual reports from 2020.

The Head of the NRAIB unit received the annual reports from the railway infrastructure manager and railway undertakings (carriers) with registered in them totally 627 railway events in 2020, of which:

• **264** accidents, incl., 150 – train collision in obstacle, 28 – RRS derailment, 21 – level-crossing accidents, 28 – accidents with persons, 9 – fire in RRS and 9 – other, and 9 – suicides;

• **54** incidents, incl. 7 – rail track failure, 16 – deformed rail track, 1 – signalling failure, 28 – SPAD (signal passed at danger), and 2 – RRS broken wheel;

• **309** situations, close to incidents.

There were registered 33 significant accidents – incl. 1–train collision with obstacle within the limits of the clearance gauge, 2–derailments, 9–accidents at railway level crossings, 21–accidents with persons, caused by rolling stock in motion, except for suicides.

The summarized data from railway accidents indicate that in 2020 there were:

* 22–fatalities from accidents caused by rolling stock in motion;
* 17–seriously injured persons from accidents caused by rolling stock in motion;
* 4–seriously injured passengers, from accidents caused by rolling stock in motion;
* 20–suicides;
* 0–suicide attempts;

As a result from the occurred significant railway accidents, the value of the caused material damages to the railway infrastructure and rolling stock amount to 1 156 291 BGN (EUR 592 970).

**Railway events registered in 2020**

| **№** | **TYPE OF EVENTS** | **NUMBER** |
| --- | --- | --- |
| **ACCIDENTS** | | |
| 1 | Train collision with railway vehicle | 0 |
| 2 | Train collision with obstacle | 150 |
| 3 | RRS Derailment | 28 |
| 4 | Level crossing accident | 21 |
| 5 | Accident with persons | 38 |
| 6 | Fire in RRS | 9 |
| 7 | Suicides | 20 |
| **Total**: | | **266** |
| **INCIDENTS** | | |
| 1 | Rail track failure | 7 |
| 2 | Signalling failure | 1 |
| 3 | SPAD (signal passed at danger) | 28 |
| 4 | Broken wheel of RRS | 2 |
| **Total:** | | **38** |
| **SITUATIONS, CLOSE TO INCIDENTS** | | |
| 1 | RRS failure on the RI, caused the delay | 11 |
| 2 | Rail track failure | 125 |
| 3 | Signalling failure | 40 |
| 4 | Catenary failure | 61 |
| 5 | Incorrect or incoherent actions of EP from RI | 12 |
| 6 | Missed train | 0 |
| 7 | Train accepted on occupied track | 0 |
| 8 | Dispatched train without approval | 2 |
| 9 | Dispatched train to occupied interstation | 1 |
| 10 | Uninsured train with brake mass | 0 |
| 11 | No dropped manual barriers for trains | 0 |
| 12 | Movement on unprepared route | 5 |
| 13 | RRS failure on RI, leading to derailment | 1 |
| 14 | RRS self-propelling | 0 |
| 15 | Abandoned RRS outside the remote indicators | 0 |
| 16 | Interruption of movement | 51 |
| **Total :** | | **309** |

**Chart of the railway events in 2020**

Train collision with a railway vehicle

Train collision with obstacle

Derailment of RRS

Level -crossing accident

Accident with persons

Fire in RRS

Rail track failure

Signalling equipment failure

SPAD

Broken wheel of RRS

RRS failure on RI

Catenary failure

Incorrect action by the EP

Missed train

No manual barriers for train

Movement on unprepared route

Self-propulsion of RRS

Interruption of movement

TOTAL

**Railway events with caused damages**

In 2013 compared to 2012, the deviation damages/BGN is + 206 902 BGN (+105 787 EUR)

In 2014 compared to 2013, the deviation damages/BGN is + 5 402 000 BGN (+2 762 000 EUR)

In 2015 compared to 2014, the deviation damages/BGN is – 4 842 076 BGN (–2 472 591 EUR)

In 2016 compared to 2015, the deviation damages/BGN is + 863 286 BGN (+440 452 EUR)

In 2017 compared to 2016, the deviation damages/BGN is – 136 200 BGN (–69 597 EUR)

In 2018 compared to 2017, the deviation damages/BGN is + 1 641 141 BGN (+839 115 EUR)

In 2019 compared to 2018, the deviation damages/BGN is – 74 728 BGN (–35 135 EUR)

In 2020 compared to 2019 the deviation damages/BGN is + 1 156 291 BGN (+592 970 EUR)

**Chart of the railway events and caused damages in the period 2009 ÷ 2020**

# Damages (thousand BGN) Number of accidents

# INVESTIGATIONS

# **Summary of the investigations completed in 2020**

In 2020 the NRAIB investigated six railway accidents.

Table 1: Investigated accidents and incidents in 2020

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of investigated accidents and incidents** | **Number of accidents** | **Number of victims** | | **Damages** | |
| **Fatalities** | **Seriously injured** | **BGN** | **EURO** |
| Fire in RRS | 1 | - | - | 76 938,00 | 39 455 |
| Derailment of RRS | 2 | - | - | 1 304 158 | 668 799 |
| Train collision with railway vehicle | - | - | - | - | - |
| Level crossing accident | - | - | - | - | - |
| **TOTAL:** | **3** | **-** | **-** | **1 381 096** | **708 254** |

* 1. Investigations, started and completed in 2020

Table 2: Investigations, completed in 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Date of the event** | **Visit card of the investigation** | **Legal base** | **Completed on** |
| 15.05.20210 | Railway accident – derailment of freight train № 80561 in Nova Zagora station on 15.05.2020 | Directive 2016/798/EP, art. 20, par. 2/а, art. 115i, par. 2 of RTA, art. 76, par. 2 of Ordinance № 59 | 18.11.2020 |
| 15.07.2020 | Railway accident – derailment of locomotive of freight train № 30682 on 3-rd track while entering in Kostenets station on 15.07.2020 | Directive 2016/798/EP, art. 20, par. 2/а, art. 115i, par. 2 of RTA, art. 76, par. 2 of Ordinance № 59 | 22.12.2020 |
| 28.09.2020 | Railway accident – fire in electric locomotive № 44094 in motion, servicing FT № 3621 between Chernograd – Aytos stations on 28.09.2020 | Directive 2016/798/EP, art. 20, par. 2/а, art. 115i, par. 2 of RTA, art. 76, par. 2 of Ordinance № 59 | 20.04.2021 |

* + 1. Derailment of freight train № 80561 in transit through Nova Zagora station on 15.05.2020

*Brief description*

On 14.05.2020 from Zlatitsa station departed at 18:13 p. m. DFT № 80561. The train had 25 full wagons, gross weight 2148 tons with locomotive № 88030 at the head and auxiliary pushing locomotive № 88025. The train was carrying copper pyrite in the direction Zlatitsa - Sofia - Plovdiv - Port of Burgas (Fig. 1). Second auxiliary locomotive № 88016 was attached to the train in Sofia station and departed at 20:43 p.m. In Vakarel station, the pushing auxiliary locomotive № 88025 was uncoupled from the train and departed at 21:52 p.m. At Todor Kableshkov station, the locomotive drivers of locomotive № 88030 shifted and the train departed at 00:23 a.m. The auxiliary locomotive headed by № 88016 was uncoupled at Plovdiv station and the train departed with one locomotive № 88030 at 00:36 a.m.

At Khan Asparuh station, after a meeting with FT № 8636, it departed at 03:02 a.m. to Nova Zagora station. The traffic manager on-duty at Nova Zagora station prepared the route for the train to pass on the fourth - main track without stopping. The train entered in the entrance switches of the station at a speed of 67.7 km/h. The locomotive with the first five wagons passes through the entrance switches № 8, № 16 and through switch № 20 and 10 wagons derailed from the 6th to the 15th wagon. From the subsequent derailment, the train stopped at the station. The traffic manager on-duty at Nova Zagora station notified the interested services and persons.

|  |  |  |  |
| --- | --- | --- | --- |
| |  |  | | --- | --- | |  | *Consequences*  As a result, from the train derailment, damages were caused to the railway infrastructure – rail track, railway switches, signalling equipment and catenary. Damages were caused to 10 derailed wagons. The movement of the trains was interrupted through Nova Zagora station from 03:20 a.m. to 08:10 a.m. on 15.05.2020. The damages amounted to BGN 1,304,158. | |  |

*Causes*

DFT № 80561 entered in Nova Zagora station and passed through the first entrance switches. The locomotive and the first five wagons passed through turnout № 20. When passing the sixth wagon № 33 52 0806 001-2, between the first and second bogies there was a spontaneous turning of turnout № 20 in a mechanical way from the position for the straight fourth track to the position for the diversion second track at the station. The first bogie continued its movement on the fourth track, and the second bogie of the wagon was directed on the guardrails and derailed the left wheels of the second bogie, and subsequently the right wheels. The cause for the derailment was an incorrectly adjusted and maintained spring rocker installed on switch № 20, which at the time of derailment was in an equilibrium (intermediate) position, allowing arbitrary vibration and movement of the switchblades.

*Investigation status*

The investigation was completed with a final report and seven safety recommendations on 18.11.2020.

* + 1. Derailment of freight train № 30682 while entering on 3rd track in Kostenets station on 15.07.2020

*Brief description*

On 15.07.2020 at 05:02 a.m. from Karlovo station departed DFT № 30682 of the railway undertaking BDZ-Cargo Ltd. consisting of 42 empty tank wagons, 168 axles, 833 tons, towed by electric locomotive № 46041. The transportation of DFT № 30682 was carried out on the route Burgas - Zimnitsa - Karlovo - Plovdiv - Sofia - Iliyantsi - Pirdop.

The train departed from Septemvri station at 09:12 a.m., passed without stopping through Belovo station at 09:24 a.m. The traffic manager on duty at Kostenets station, after receiving the departure of the train, prepared a route with RRI-MH-70 for receiving DFT № 30682 on the third deviation track.

DFT № 30682 entered in Kostenets station with a regularly open input signal for a third deviation track. The train passed in a deviation through switch № 15 (right) and after it in a curve (left) to the third track with a speed of 25 km/h. The locomotive crew felt strong vibrations and shocks in the cabin of the locomotive, during which it stopped the train. After stopping the train and inspecting the locomotive, it was established that it derailed with the first and second wheel-set on the right in the direction of travel.

*Consequences*

No staff was injured because of the derailment. Due to the low speed and the fast stopping of the train, the damages caused were minimal on the locomotive and the railway infrastructure.

*Causes*

The direct cause of the accident (derailment of the first two wheel-sets of locomotive № 46041 in the curve after switch № 15 on the third receiving-departure track in Kostenets station) is a combination of faults in the locomotive inter-bogie clutch and the additionally occurred lateral horizontal force from the external leading right wheel of the first in the direction of movement wheel-set (sixth of the locomotive), caused by inadmissible alignment differences of the rail track in the left curve with radius R = 188 m.

*Investigation status*

The investigation was completed with a final report and four safety recommendations on 22.12.2020.

* + 1. Fire in electric locomotive № 44094 servicing fast train № 3621 between Chernograd – Aytos stations on 28.09.2020.

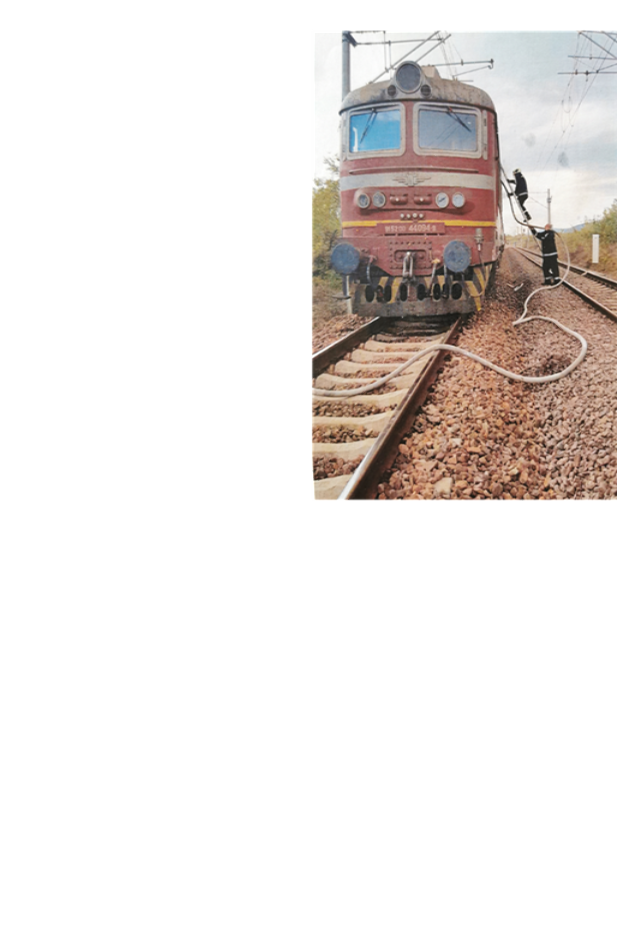
*Brief description*

On 28.09.2020 at 06:55 a.m. departed from Sofia station FT № 3621. The train consisted of: 4 wagons, 16 axles, 162 tons. The train was serviced with electric locomotive № 44094.8 at the Plovdiv Locomotive Depot, with locomotive driver and assistant locomotive driver from Sofia Locomotive Depot. Transport crew head of train and conductor from the Transport Service of Burgas to the PPP - Plovdiv. The railway undertaking “BDZ-Passenger Services” Ltd. carries out the transport and servicing of the train with vehicles and personnel.

FT № 3621 arrived in Karnobat station at 12:53 p.m. and departed at 12:55 p.m. During the movement between the stations Chernograd - Aytos on track № 1, the locomotive crew sensed smoke coming from the engine compartment. The locomotive driver stopped the train at 13:07 p.m., switched off the battery and activated the fire-fighting system from the two cabins of the locomotive, but it did not start. With the portable fire extinguishers, the locomotive crew tried to put out the fire, but due to the thick smoke, they failed. The locomotive driver called 112 for help from the fire services.

After the train stopping, the Head of the train saw that smoke was coming out of the locomotive and together with the conductor, they evacuated the passengers from the first cars to the last car of the train, total 35 passengers.

At 13:30 p.m. a fire truck arrived on the spot with employees of RS FSaCP - Aytos. The catenary voltage was switched off and the locomotive was switched off at 15:20 p.m.



*Consequences*

No passengers or staff were injured in the fire. There were no damages caused to the railway infrastructure and structures. The locomotive was damaged.

Because of the fire in the locomotive, the caused damages amounted to BGN 76,938.

*Causes*

The direct cause for ignition of the locomotive is the increase in temperature in the rectifier unit of the first group due to poor cooling followed by a sharp decrease in voltage in the catenary, which led to increased currents and further increase in heat load. The capacitors did not withstand the high temperature, they burst and the catalyst from them ignited the insulation of the wires and the whole rectifier cabinet.

*Investigation status*

The investigation was completed with a final report and three safety recommendations on 20.04.2021.

# **Investigations, started in 2020, and continued in 2021**

Table 3: Investigations, started in 2019, and continued in 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Date of event** | **Visit card of the investigation** | **Legal base** | **Uncompleted** |
| 28.09.2020 | Railway accident – fire in electric locomotive № 44094 in motion, servicing FT № 3621 between Chernograd – Aytos stations on 28.09.2020 | Directive 2016/798/EP, art. 20, par. 2/а, art. 115i, par. 2 of RTA, art. 76, par. 2 of Ordinance № 59 | 20.04.2021 |

# **Investigated accidents and incidents**

Table 4: Investigated accidents and incidents in the period 2012÷2020

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Investigated events** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **Total** |
| Train collision with railway vehicle | - | **-** | **-** | 1 | **-** | **-** | **-** | 1 |  | **2** |
| Collision with obstacle | - | **-** | **-** | - | **-** | **-** | **-** | - | **-** | **0** |
| Train derailment | - | 1 | 2 | 1 | 4 | 5 | **-** | 2 | 2 | **17** |
| Level crossing accident | - | - | 2 | **-** | - | **-** | **-** | 1 | **-** | **3** |
| Accident with person caused by RRS in motion | - | **-** | **-** | **-** | - | **-** | **-** | - | **-** | **0** |
| Fire in rolling stock | 1 | 2 | 2 | 1 | 4 | 1 | 2 | 2 | 1 | **16** |
| Accident related to dangerous goods | - | **-** | - | **-** | 1 | **-** | **-** | - | **-** | **1** |
| Incidents | - | **-** | - | **-** | - | **-** | **-** | **-** | **-** | **0** |
| **Total:** | **1** | **3** | **6** | **3** | **9** | **6** | **2** | **6** | **-** | **39** |

**Chart of investigated accidents and incidents in the period 2012÷2020**

Total

Incidents

Accidents with dangerous goods

Fire in RRS

Accident with person caused by RRS in motion

Level crossing accident

Train derailment

Collision with obstacle

# SAFETY RECOMMENDATIONS

The safety recommendations given by the National Railway Accident Investigation Board (NRAIB) are aimed at improving safety and preventing other accidents of similar nature. The recommendations are addressed to the National Safety Authority (RAEA), the Railway Infrastructure Manager (NRIC), railway undertakings and other persons related to the maintenance of rolling stock to take measures and actions to improve the safety in railway transport.

# **Brief summary of the safety recommendations issued by the NRAIB**

#### Table 5: Issued and implemented recommendations in the period 2012÷2020

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Given recommendations** | **Status of recommendations implementation** | | |
| **Implemented** | **In process of implementation** | **Accepted and non-implemented** |
| 2012 | 7 | 2 | 1 | 4 |
| 2013 | 16 | 8 | 6 | 2 |
| 2014 | 16 | 7 | 4 | 5 |
| 2015 | 10 | 8 | 2 | 0 |
| 2016 | 27 | 19 | 5 | 3 |
| 2017 | 28 | 17 | 5 | 6 |
| 2018 | 11 | 11 | 0 | 0 |
| 2019 | 23 | 20 | 2 | 1 |
| 2020 | 15 | 8 | 2 | 4 |
| **Total** | **153** | **100** | **27** | **25** |

**Chart of issued and implemented recommendations in the period 2012 ÷ 2020**

Given recommendations Implemented

In process of implementation Accepted and non-implemented

# **Safety recommendations, issued in 2020**

|  |
| --- |
| * + 1. **Derailment of freight train № 80561 in Nova Zagora station on 15.05.2020**   Safety recommendations: (18.11.2020)  1. Recommendation 1 proposes to conduct an extraordinary briefing of the personnel related to the safety of transport in DB Cargo Bulgaria EOOD and SE NRIC in order to be acquainted with the content of the final report.  2. Recommendation 2 proposes to SE NRIC to re-equip the platform scales in the main bulk cargo operation points in order to accurately and precisely measure the loaded wagons both on axles and on wheels.  3. Recommendation 3 proposes that SE NRIC together with Voestalpine Railway Systems Bulgaria Ltd. amend and supplement the “Manual for installation, operation and maintenance of a spring rocker with two arms”, to write down the parametric data for repair and maintenance in compliance with the norms for safe operation of railway switches.  4. Recommendation 4 proposes that SE NRIC allocate to the Rail Track and Structures Division and the Signalling and Telecommunications Division responsible for the maintenance of UIC 60 switches equipped with a 550-B turnout, Spherolock locking system and spring rocker with two arms, the manipulations to perform together the repair and maintenance of the electrical and mechanical part.  5. Recommendation 5 proposes in order to improve the safety of the railway infrastructure, that SE NRIC should assign the maintenance of certain stations equipped with UIC 60 switches to Voestalpine Railway Systems Bulgaria Ltd., which should be responsible for their technical condition in accordance with the norms for safe operation.  6. Recommendation 6 proposes SE NRIC to update the instructions for work with the rolling stock control system in the section Sofia - Plovdiv in the part minimum speed for measuring and registering the parameters of passing rolling stock, in order to accurately and completely register the data.  7. Recommendation 7 proposes that DB Cargo Bulgaria EOOD conduct training of the locomotive personnel in an accredited institution for acquiring professional qualification for the respective series of locomotives in accordance with the requirements of Art. 18, item 6 of the Vocational Education and Training Act and Art. 44, para. 1, item 1 of Ordinance № 56 of 14.02.2003.  *Undertaken measures*  Five recommendations are implemented.  Two are in process of implementation. |
| * + 1. **Derailment of locomotive № 46041 of direct freight train № 30682 while entering in Kostenets station on 15.07.2020 г.**   *Safety recommendations:*(22.12.2020)  With recommendation № 1 it is proposed that the staff in operation of SE NRIC and Bulmarket Rail Cargo EOOD get acquainted with the content of the report;  With recommendation № 2 it is proposed to SE NRIC to undertake an amendment to Art. 94 of the "Rules for the train operation and shunting activity in railway transport" (RTOSART).  Recommendation № 3 proposes that SE NRIC undertake non-destructive testing of railway switches, in accordance with the category of railway lines.  Recommendation № 4 proposes that the Railway Administration Executive Agency take control measures in connection with the violations established during the investigation of the normative acts related to the safety of railway transport by Bulmarket Rail Cargo EOOD and SE NRIC.  *Undertaken measures*  The given recommendations are implemented. |
| * + 1. **Fire in electric locomotive № 44094.8, occurred while servicing fast train №3621 between Chernograd – Aytos stations on 28.09.2020**   *Safety recommendations:*(20.04.2021)  Recommendation № 1 proposes to acquaint the personnel in operation (locomotive and transport crews) with the content of the report;  With recommendation № 2 it is proposed to the renewed locomotives in BDZ Konchar AD, when performing a major periodic repair (PRP) of the compressor unit to replace the oil separator, oil filter, air filter and belts;  Recommendation № 3 proposes to replace the existing combustible sound insulation, installed on the inside of the walls of the compressor unit, with one of non-combustible material of the renewed locomotives of BDZ Konchar AD;  With recommendation №4, it is proposed to install a thermal sensor in the cooling chamber of the compressor, which will be connected to the fire alarm system of the locomotive.  *Undertaken measures*  The given recommendations are implemented. |

Pursuant to Art. 26 (3) of Directive (EU) 2016/798/EP and of the Council and of Art. 94, para. 4 of Ordinance № 59 of 05.12.2006 on safety management in railway transport, the addressees of recommendations regularly report to the Head of the National Railway Transport Accidents Investigation Board on the measures taken or planned for implementation.

**Dr. Eng. Boycho Skrobanski**

*Deputy President of the NAMRTAIB AB*