



MINISTRY OF TRANSPORTS AND INFRASTRUCTURE  
ROMANIAN RAILWAY AUTHORITY - AFER

ROMANIAN RAILWAY INVESTIGATING BODY



## INVESTIGATING REPORT

on the railway accident occurred on the 19th of January 2011 on the range of activity of CF Bucharest  
Regional Branch in the railway station CFR Bucharest Triaj



*Final edition  
The 1<sup>st</sup> of March 2011*

## NOTICE

With reference to the railway accident occurred on the **19<sup>th</sup> of January 2011**, around **0:25**, on the range of activity of **CF Bucharest Regional Branch**, in the railway station **CFR Bucharest Triaj – group A2**, consisting of the derailment on the area of the switch no. 45 from the railway station of the first bogie in the running direction of the locomotive EA no. 474-027-4 (belonging to SNTFM “CFR Marfa” SA), towing the freight train no. 24794-1, Romanian Railway Investigating Body carried out an investigation, according to the provisions of the Government Decision no. 117/2010. Through the investigation, the information on the respective accident was gathered and analyzed, the conditions were established and the causes determined.

Romanian Railway Investigating Body investigation did not aim to establish the guilty or the responsibility in this situation.

Bucharest, the 1<sup>st</sup> of March 2011

*Approved by*  
Dragoş FLOROIU  
**Director**

*I agree the compliance with the legal provisions  
on the investigation performance and  
drawing up of this Investigation Report,  
that **I submit for approval***

**Chief Investigator**  
Sorin CONSTANTINESCU

*This approval is part of the Report for the investigation of the accident occurred on the **19<sup>th</sup> of January 2011**, at 0:25, on the range of activity of **CF Bucharest Regional Branch**, in the railway station CFR Bucharest Triaj.*

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## **I. PREAMBLE**

### **I.1. Introduction**

With reference to the railway accident occurred on the **19<sup>th</sup> of January 2011**, around **0:25**, on the range of activity of **CF Bucharest Regional Branch**, in the railway station **CFR Bucharest Triaj – group A2**, consisting of the derailment on the area of the switch no. 45 from the railway station of the first bogie in the running direction of the locomotive EA no. 474-027-4 (belonging to SNTFM “CFR Marfa” SA), towing the freight train no. 24794-1, Romanian Railway Investigating Body carried out an investigation, according to the provisions of the Government Decision no. 117/2010, in order to prevent accidents with similar causes by establishing the conditions and determining the causes.

Romanian Railway Investigating Body investigation did not aim to establish the guilty or the responsibility in this situation, its objective being to improve railway safety and to prevent railway incidents or accidents.

### **I.2. Investigation process**

On the 19<sup>th</sup> of January 2011 the General Inspectorate for Traffic Safety in CNCF “CFR” SA notified the Romanian Railway Investigating Body about the accident occurred on the 19<sup>th</sup> of January 2011 at 00:25, on the range of activity of CF Bucharest Regional Branch, in the railway station CFR Bucharest Triaj, consisting of the derailment on the area of the switch no. 45 from the station of the first bogie in the running direction of the locomotive EA no. 474-027-4 (belonging to SNTFM “CFR Marfa” SA), towing the freight train no. 24794-1.

On the 19<sup>th</sup> of January 2011 Romanian Railway Investigating Body, being notified about the occurrence of a railway accident, went to the place of the accident and found:

- the derailment by the first bogie of the locomotive EA no. 474-027-4 (towing the freight train no. 24794-1) on the area of the switch no. 45 from the railway station CFR Bucharest Triaj;
- the railway installations in the area of the accident were not affected.

At the place of the railway accident were present representatives of:

- National Railway Company “CFR” – SA,
- National Company of Freight Transport “CFR Marfa” – SA,
- Romanian Railway Safety Authority,
- Romanian Railway Investigating Body.

Taking into consideration that the occurrence is defined as accident according to the art. 3 point 1 of the Law 55/2006 on railway safety and that this accident is relevant for the railway system, in accordance with the article 19 paragraph (2) of the Law no. 55/2006 on railway safety, corroborated with the art. 48, paragraph (1) of the Regulations for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety, approved by Government Decision no. 117/2010, Romanian Railway Investigating Body decided to start an investigation. So, through the decision no. 46 from the 20<sup>th</sup> of January 2011, of the OIFR director, the investigation commission was appointed consisting of:

- Burlea Sorin - main investigator
- Cociuban Nicolae - Regional Inspector SC - CF Bucharest  
Regional Branch - member;
- Gheorghe Eduard - Inspector SC - CF Bucharest Regional Branch - member;
- Ciolacu Tudor - Regional Inspector SC - Intermodal Center Bucharest - member.

## A. BRIEF PRESENTATION OF THE ACCIDENT

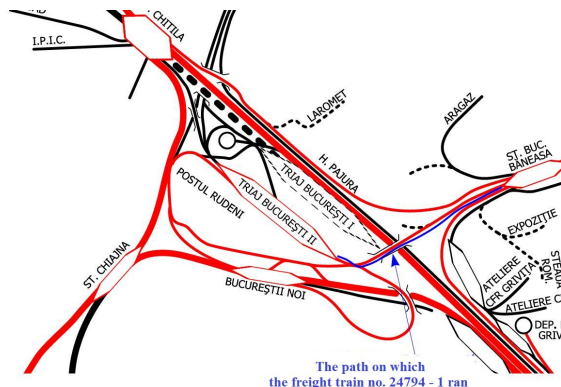
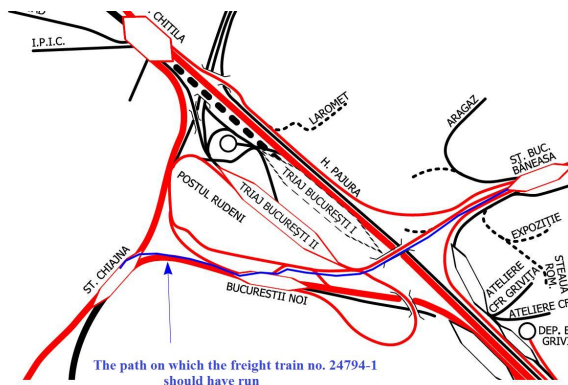
### A.1. Brief presentation

On the 19<sup>th</sup> of January 2011, around 00:25, on the range of activity of **CF Bucharest Regional Branch**, in the railway station **CFR Bucharest Triaj**, occurred the derailment on the area of the switch no. 45 in the railway station of the first bogie in the running direction of the locomotive EA no. 474-027-4 (belonging to SNTFM “CFR Marfa” SA), towing the freight train no. 24794-1.

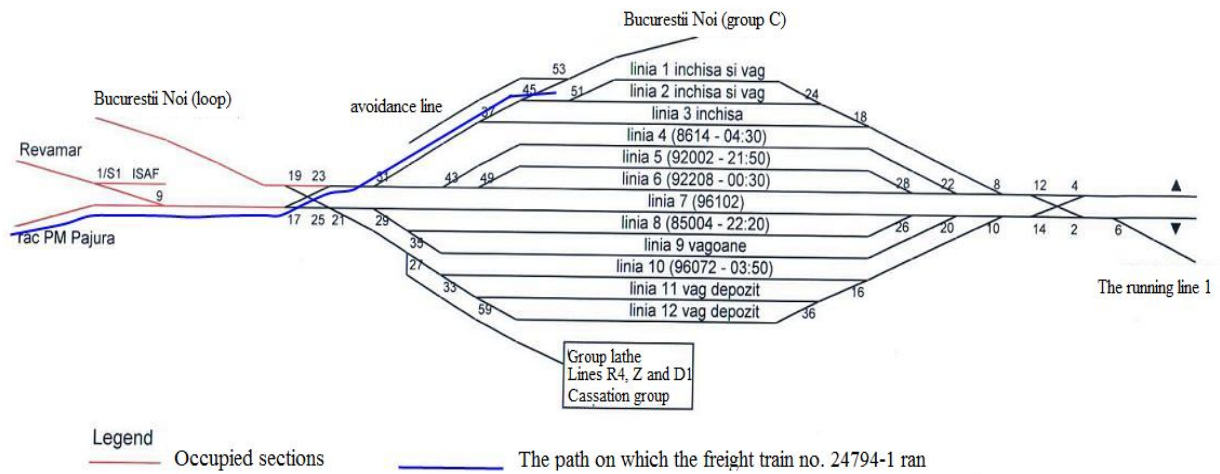
The derailment occurred as consequence of the non-handling of the switch 45/53 for passing path in the direction Connection Pajura towards Bucurestii Noi (group C) through Bucharest Triaj station 17 by the movement inspector provider (from the group A2 of the railway station Bucharest Triaj), having as consequence the entry of the locomotive EA 474-027-4 towards the switch 51 (with access towards the lines 1A2, 2A2 from the technical group of the railway station Bucharest Triaj). Due to the lack of the metallic straps from the heel joint of the switch no. 51 occurred a side threshold which favored the escalation of the rail by the wheels of the first bogie of the locomotive and then their derailment.

The freight train no. 24794 was formed in the railway station Constanta Terminal Ferry Boat and had as destination the railway station CFR Vintu de Jos. The freight train no. 24794 left from the railway station Constanta Terminal Ferry Boat at 4:50 a.m.

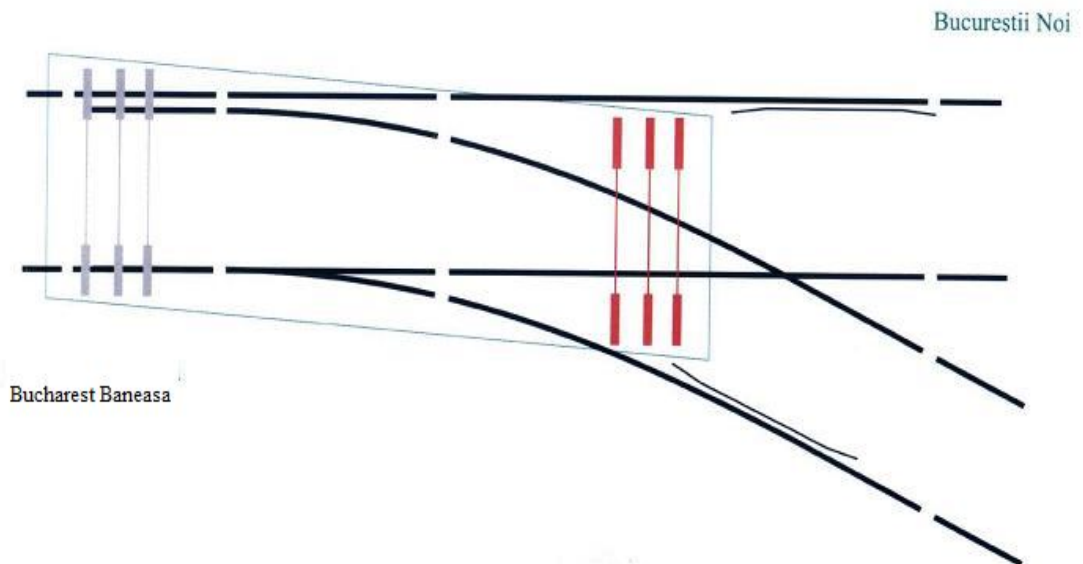
Also, there were no deaths or injuries.



### The drawing of the railway station Bucharest Triaj - group A2



### The drawing of the derailment after the accident on the switch 45 railway station Bucharest Triaj, Station 17, on the 19<sup>th</sup> of January 2011



## **A.2. Causes of the event**

### **A.2.1. Direct cause**

The derailment of the locomotive EA no. 474-027-4 occurred as consequence of the non-handling by the movement inspector provider from the group A2 of the railway station CFR Bucharest Triaj of the switches no. 45/53 on appropriate position for the passing of the train 24794-1 towards the railway station CFR Bucurestii Noi – group C, corroborated with the lack of the metallic straps from the heel joint of the crossing core of the switch no. 45 handles with access towards the lines from the group A2 of the railway station.

### **A.2.2. Underlying causes**

None.

### **A.2.3. Root cause**

None.

## **A.3. Severity level**

According to the provisions of the art. 3, letter l of the Law no. 55/2006 on railway safety, corroborated with the provisions of the art. 7, paragraph (1), letter b of the Regulations for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety, approved by Government Decision no. 117/2010, the event is categorized as railway accident.

## **A.4. Safety recommendations**

None.

## **B. INVESTIGATING REPORT**

### **B.1. Description of the accident**

On the 18<sup>th</sup> of January 2011 at 11:53 p.m. the operator RC from RT Constanta sent the provision RC no. 52 on the running of the train between 00:00-06:00 through which he approved the running of the freight train no. 24794. The train was formed in the railway station Constanta Terminal Ferry Boat and had as destination the railway station CFR Vintu de Jos.

The freight train no. 24794:

- was composed of 28 wagons (wagons series RX loaded with empty transcontainers), 112 axles, 585 m, 777 tones, having the mass automatically braked according to the service book 389 t in fact 542 t, hand braked according to the service book 132 t in fact 454 t;
- it was towed with the locomotive EA no. 474-027-4 belonging to Palas locomotives depot, driven and served by locomotive driver and driver assistant belonging to Palas locomotives depot – Fetesti Shed;
- it left from the railway station Constanta Terminal Ferry Boat at 4:50 a.m. and arrived at the railway station CFR Bucharest Baneasa at 11:45 p.m., where was notified through running order on the running conditions provided in the freight trains service book on Bucharest Railway Regional Branch for the train B40a/B40a-1 up to the railway station CFR Chiajna on the distances Bucharest Baneasa - ram. Pajura - Bucharest Triaj station 17 - Bucurestii Noi Gr. C - Chiajna;
- it left from the railway station CFR Bucharest Baneasa at 11:48 p.m. and ran up to 00:10 stopping at the input signal XB of the railway station Bucharest Triaj which was defect on position on stop. Between ram. Pajura and the railway station Bucharest Triaj – Station 17 the freight train no. 24794-1 ran according to the telephone agreement system – free way.

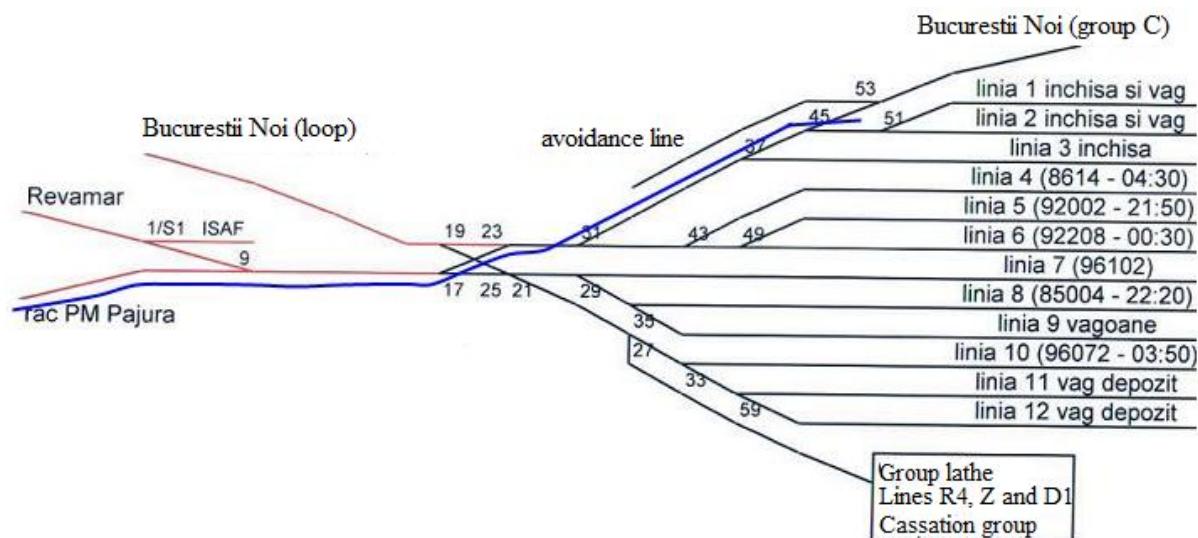
For the running of the freight train no. 24794-1 through the railway station CFR Bucharest Triaj – Station 17 towards the railway station CFR Bucurestii Noi the movement inspector provider from the group A2 of the railway station Bucharest Triaj had to perform the following operations:

- to ask and obtain free way from the railway station Bucurestii Noi for the train 24794-1;
- to send provision to the needles inspector from the Station no. 17 to check on spot the isolated sections (occupied electrically on the control device) placed between the signals XB and M19 (043, 3-5, 7-9, 065, 19-23);
- to send to the needles inspector from the Station no. 17 order to prepare the running order for the passing of the train 24794-1 from the railway station Bucharest Triaj station 17 to the railway station Bucurestii Noi, on the overcome of the signal XB defect on the position on stop;
- to handle the switches 19/25, 17/23, 31, 37 and 45/53 on appropriate position for the passing path of the train;
- to check on the control panel if each switch is on the position asked by the path.

To perform the passing path of the freight train no. 24794-1 through the railway station CFR Bucharest Triaj – Station 17 towards the railway station CFR Bucurestii Noi, the movement inspector provider from the group A2 of the railway station CFR Bucharest Triaj proceeded to the appropriate handling of the switches 19/25, 17/23 (switches placed on isolated path sections which on the lumino-scheme from the control panel of the installation CED were occupied even if on spot these were free), 31 and 37. The switches no. 45/53 were not handled on appropriate



position for the mentioned path, remaining on the position with access towards the lines 1 and 2 from the group A2 of the railway station Bucharest Triaj.



Under the circumstances above mentioned (after obtaining previously the free way from the railway station CFR Bucurestii Noi, the check on spot of the isolated path sections by the needles inspector, the preparing and the giving over of the running order to the locomotive driver and with a passing path towards the railway station Bucurestii Noi incompletely performed) at 00:13 the freight train no. 24794-1 left from the input signal of the railway station Bucharest Triaj and ran until 00:21 (the place of the accident occurrence) with speeds within 2 and 8 km/h.

Before the occurrence of the accident, in front of the switch no. 45 (handles on the position with access towards the switch no. 51 respectively towards the lines 1A2 and 2A2 from the group A2 of the railway station Bucharest Triaj) the speed of the locomotive EA no. 474-027-4 towing the freight train no. 24794-1 had a value within 2 and 4 km/h.

After the entry of the locomotive EA no. 474-027-4 on the switch no. 45 (with access towards the switch no. 51 from the group A2 of the railway station Bucharest Triaj, at the running speed of 4 km/h, occurred the derailment of the first bogie in its running direction.

There were no deaths or injuries.

Going on spot, there were found the following:

- the locomotive EA no. 474-027-4, towing the freight train no. 24794-1, was derailed by the first bogie over the switch no. 45 which was handled on the position with access towards the switch no. 51 respectively towards the lines 1A2 and 2A2 from the group A2 of the railway station Bucharest Triaj;
- on the control panel of the installation CED of the railway station Bucharest Triaj the switches 45/53 were showing control on the position “minus” (the switch 45 with access towards the switch no. 51) having the appropriate handling button with the isolated section occupied with the plumb with the initials PI;

## B.2. Circumstances of the accident

### B.2.1. Involved parties

The place where the railway accident took place, the railway station CFR Bucharest Triaj, is managed by CNCF “CFR” SA – CF Bucharest Regional Branch.

The railway infrastructure and superstructure are managed by CNCF “CFR” S.A. and maintained by the employees of the Lines district no. 4 Bucharest Triaj, Section L2 Bucharest, Bucharest Railway Regional Branch.

The installations of railway communications in the railway station CFR Bucharest Triaj are managed by CNCF “CFR” S.A. and maintained by the employees of SC Telecomunicatii CFR SA.

The installation of railway traffic control in the railway station CFR Bucharest Triaj and the installations signaling, centralization and blocking (SCB) in the railway station CFR Bucharest Triaj are managed by CNCF “CFR” SA and maintained by employees of the District SCB Bucharest Triaj in Section CT 1 Bucharest, CF Bucharest Regional Branch.

The installation of railway communications on the locomotive is the property of SNTFM “CFR Marfa” SA and is maintained by its employees.

The locomotive EA no. 474-027-4, involved in the railway accident is the property of SNTFM “CFR Marfa” SA – Palas Depot and it is maintained and inspected by its employees and the repairs are performed by traders authorized as railway suppliers.

The freight train no. 24794 ran on the public infrastructure managed by CNCF “CFR” SA, CF Constanta Regional Branch (Traffic controller Constanta and Fetesti), respectively CF Bucharest Regional Branch (Traffic controller Bucharest).

The freight train no. 24794 was composed by the railway undertaking belonging to SNTFM “CFR Marfa” SA - Muntenia Dobrogea Branch.

The investigation commission questioned the employees involved in coordinating the railway traffic, the locomotive and train staff involved in the occurrence of the accident and also other witnesses as:

- IDM provider on duty from the group A2 of the railway station CFR Bucharest Triaj on the 18<sup>th</sup>/19<sup>th</sup> of January 2011;
- the needles inspector on duty in CFR Bucharest Triaj – Station 17 on the 18<sup>th</sup>/19<sup>th</sup> of January 2011;
- the driver of the locomotive which towed the train 24794-1 (the locomotive EA no. 474-027-4) on the 18<sup>th</sup>/19<sup>th</sup> of January 2011;
- the driver assistant on the locomotive which towed the freight train no. 24794-1, on the 18<sup>th</sup>/19<sup>th</sup> of January 2011;

## **B. 2.2. Forming and equipment of the train**

The freight train no. 24794-1 was composed of 28 wagons, 112 axles, with a length of 585 m, 777 tones, having the mass automatically braked according to the service book 389 t in fact 542 t, by hand according to the service book 132 t in fact 454 t and was towed with the locomotive EA no. 474-027-4 belonging to Palas locomotives depot – Fetesti Shed, subunit of SNTFM “CFR” Marfa SA - Muntenia Dobrogea Branch, driven and served by locomotive driver and driver assistant belonging to Palas locomotives depot – Fetesti Shed.

The safety and vigilance equipments (DSV), the equipment for the point control of the speed and hitchhiking (INDUSI) and the radio-telephone stations in the equipment of the traction means (the

towing locomotive of the freight train no. 24794-1) were active, being sealed and working instructionally. The brake valve type KD2 was on the position of quick braking. The locomotive had inspection type PTA and RAK on the 13<sup>th</sup> of January 2011 at Palas Depot.

The freight train no. 24794 was formed in the railway station Constanta Terminal Ferry Boat and had as destination the railway station CFR Vintu de Jos. The freight train no. 24794 left from the railway station Constanta Terminal Ferry Boat at 4:50 a.m.

### **B.2.3. Railway equipments**

#### ***Description of the railway path***

The railway accident occurred on the switch no. 45 from the railway station Bucharest Triaj.

The switch no. 45:

- type 49, with radius of 190 m, tangent 1/9, right deviation, articulated needles;
- on the position on direct the clamping complete and active and on the position on deviation were missing the straps at the heel joint of the crossing core;
- the prism of broken stone complete and with draining qualities.

#### ***Description of the railway superstructure***

The railway superstructure in the area of the accident is built of rail type 49, wooden sleepers, indirect clamping type K, path with joints.

The railway accident occurred on an area where the maximum running speed of the trains provided in the service book was of 50 km/h.

#### ***Description of the safety installations to control railway traffic***

The railway station CFR Bucharest Triaj is equipped with the following types of SCB installations:

- group A1: installations of mechanical centralization CEM;
- group A2: installations of electrodynamics centralization CED, type CR3 (centralization with relays) with dependence BLA with the railway station Bucurestii Noi - group A and the flag station Pajura and direct dependence with the railway station Bucurestii Noi - group C;
- group B 2: installations of mechanization and automation of sorting humps type CAM/WSSB;
- station 23: shunting tables - MM;
- station Giulesti: installations of electronic centralization - CE

On the date of the accident, due to some faults existing at the installation of centralization (CED) of the railway station CFR Bucharest Triaj and at the dependency links of the automatic line block, the running of the trains between ram. Pajura and the railway station CFR Bucharest Triaj – Station 17 was performed under the following circumstances:

- based on the telephone agreement system – free way;
- with the input signal XB of the railway station Bucharest Triaj defect on the position on stop;
- with the handling of the switches 19/25, 17/23, with occupied section, from the passing path of the trains, according to the instruction for handling the installation, individually and with check on spot regarding their condition of free/occupied.

The weather in the area of the railway accident between 07:00 – 24:00, was providing a horizontal visibility of 1000 m, without precipitations, the air temperature was of -9°C and the wind was calm.

On the 19<sup>th</sup> of January 2011, near the place of the railway accident, were not performed works at the lines or at the railway installations.

#### **B.2.4. Means of communication**

The communication between the locomotive driver and the movement inspectors was provided through the radio-telephone installation.

#### **B.2.5. Triggering the railway emergency plan**

Immediately after the occurrence of the railway accident, triggering the intervention plan to remove damages and restore trains traffic had two components:

- notification of the railway accident according to the provisions of the Regulations for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety approved by HG 117/2010, after which were present representatives of the administrator of the public railway infrastructure (CNCF “CFR” SA - CF Bucharest Regional Branch), of the railway undertaking SNTFM “CFR Marfa” SA, of the Romanian Railway Authority – AFER and of Romanian Railway Investigating Body.

- the operations to restore the train traffic were performed by SC Interventii Feroviare SA.

### **B.3. Consequences of the accident**

#### **B.3.1. Deaths and injuries**

None.

#### **B.3.2. Material damages**

The amount of the material damages, according to the estimates prepared by the owner of the rolling stock and the manager of the public railway infrastructure, is the following:

- **at the line**, according to the estimate no. 242/2011 of CNCF “CFR” SA of Section L2 Bucharest - none;
- **at the locomotive EA no. 474-027-6**, according to the estimate no. BT/85/2011 of “CFR IRLU” – Bucharest Triaj amounted to - 121.14 lei;
- **the charge for the use of the crane EDK 750 of 125 tf.**, according to the document no. SC1/257/2011 of RRSC Bucharest - none;

**Total amount of the material damages** - **121.14 lei**

#### **B.3.3. Consequences of the accident in railway traffic**

The current line between ram. Pajura and the railway station CFR Bucharest Triaj – Station 17 was closed for railway traffic on the 19<sup>th</sup> of January 2011 from 00:30 to 11:10 a.m.

After the occurrence of the accident the wagons in the composition of the freight train no. 24794 were retires in the railway station CFR Bucharest Baneasa and the train continued the running on an alternative route (Bucharest Baneasa – Ram. Pajura – Flag Station Pajura – Chitila – Ram. Rudeni – Chiajna) with a delay of 1395 minutes.

Due to the occurrence of the accident 6 freight trains were delayed with a total of 2185 minutes.

#### **B.4. External circumstances**

On the 19<sup>th</sup> of January 2011, between 07:00 – 24:00, the weather was providing a horizontal visibility of 1000 m, without precipitations, the air temperature was of -9°C and the wind was calm.

The visibility of the light signals was in accordance with the specific regulations in force, the signal XB having the permissive indication.

In the railway station CFR Bucharest Triaj, group A2, at the time of the accident, the occupancy condition of the lines of receiving-sending and of the running distances with the neighbor railway stations was as follows:

- lines of receiving – sending
  - line 1 – closed and occupied with wagons;
  - line 2 - closed and occupied with wagons;
  - line 3 - closed;
  - line 4 - occupied with the freight train no. 86114 from 4:30 a.m.;
  - line 5 - occupied with the freight train no. 92002 from 9:50 p.m.;
  - line 6 - occupied with the freight train no. 92002 from 00:30;
  - line 7 - occupied with the freight train no. 96102;
  - line 8 - occupied with the freight train no. 85004 from 10:20 p.m.;
  - line 9 - occupied with wagons;
  - line 10 - occupied with the freight train no. 96072 from 3:50 a.m.;
  - line 11 - occupied with wagons;
  - line 12 - occupied with wagons.
- Running distances:
  - The current line Ram. Pajura – Bucharest Triaj Station 17 closed between 00:30 – 11:10 a.m.;

#### **B.5. Investigation course**

##### **B.5.1. The summary of the involved staff statements**

**The movement inspector** provider from the group A2 of the railway station CFR Bucharest Triaj (employee of CNCF “CFR” SA - CF Brasov Regional Branch) on duty on the 18<sup>th</sup>/19<sup>th</sup> of January 2011, stated as follows:

- he took over the movement service “at CED” at 6:00 p.m. and the movement service “block” at 6:10 p.m.;
- at 11:53 p.m. the railway station R. Pajura asked free way for the train 24794-1 and he received it;
- at 11:54 p.m. he asked and received from the railway station Bucurestii Noi free way for the train 24794-1;
- at 11:55 p.m. he gave order to the needles inspector from Station no. 17 to check on spot the isolated sections (occupied electrically on the control panel) placed between the signal XB and M19 (043, 3-5, 7-9, 065, 19-23);
- until the report of the check of the sections by the needles inspector, he was asked by the operator RM to perform shunting path in Y end group A2 and in “variants”:
- the needles inspector reported the check of the isolated sections (occupied electrically on the control panel) at 00:15;
- he performed and checked the passing path for the train 24794-1;

- he checked on the control panel if each switch was in the position asked by the path and with the fixing button pushed;
- he checked the path condition by pushing the button BKST and he did not find anything special;
- from the beginning of his shift he did not have to perform any running or shunting path over the switch no. 45;
- he considers that the reason of the entry of the train towards the line 2 A2, over the switch no. 45 is its position;
- at 00:16 he gave order to be prepared the running and sending order for the train 24794-1 (ram. Pajura - P 17 – Bucurestii Noi gr. C);
- after he commanded the running order he contacted the operator RC to “take the running of the trains from 0-6”;
- while he was receiving the running of the trains he was asked through the installation RTF by the driver of the train 24794-1 who announced him that he had derailed by the first bogie;
- he notified the operator RC and the head of station.
- he states that they work with a single movement inspector on both stations in the railway station; due to the stealing in the railway station the installation has been working in fault regime for 2-3 months; the input signals in all the directions are off; they are asked to give information on the trains running through the railway station Bucharest Triaj;

**The needles inspector** on duty in the railway station CFR Bucharest Triaj – Station 17 (employee of CNCF “CFR” SA - CF Brasov Regional Branch) on the 18<sup>th</sup>/19<sup>th</sup> of January 2011, stated as follows:

- the last order received from the movement inspector provider before the occurrence of the accident was at 8:45 p.m. to check the isolated sections 073, 19/23 placed between the signals XF and M19 to receive the train 96072 at the line 10;
- before receiving the order no. 116 from 8:51 p.m. on the filling of the running order for the train 96072, at 8:50 p.m. he transmitted from the Station 17 to the movement office that the checked sections were free;
- at 11:55 p.m. he received the order no. 120, from the IDM provider to check on spot the sections 19-23, 065, 7-9, 3-5, 043 placed between the signals M 19 and XB, for the passing of the train 24794 from rac pm Pajura - P 17 – Bucurestii Noi gr. C;
- at 00:15 he transmitted the check of these sections;
- checking the sections on spot he could not notice the position of the switch no. 45, this being at about 300 m from the checked sections;
- he prepared and gave over the running order for the train 24794-1;
- he did not find anything special at its scrolling (the first 7-8 wagons).

**The locomotive driver** who drove the freight train no. 24794-1, on the 18<sup>th</sup>/19<sup>th</sup> of January 2011 (employee of SNTFM “CFR Marfa” SA – Fetesti Shed), stated as follows:

- he left with the train 24794 from the railway station CFR Ciulnita at 4:25 p.m.;
- he ran in SC conditions up to the signal XB of the railway station Bucharest Triaj – Station 17;
- at the signal XB of the railway station Bucharest Triaj – Station 17 he stopped and received running order;
- through the running order was mentioned that he was going to run at the railway station Bucurestii Noi based on the telephonic agreement, going to pass by the signal XB on the position on stop and to run with the speed of max. 20km/h up to the next signal with permissive indication;
- he put the locomotive into motion and after about 250 m he felt a shock at the locomotive and he heard an abnormal noise. He took actions to emergently braking.
- The braking was performed at the speed of about 4km/h;

- he found that the locomotive was derailed by the first bogie in the running direction.

**The driver assistant on the locomotive** towing the freight train no. 24794-1, on the 18<sup>th</sup>/19<sup>th</sup> of January 2011 (employee of SNTFM “CFR Marfa” SA – Fetesti Shed), stated as follows:

- he left with the train 24794 from the railway station CFR Ciulnita, at 4:25 p.m.;
- he ran in normal conditions SC up to the signal XB of the railway station Bucharest Triaj – Station 17;
- at the signal XB of the railway station Bucharest Triaj – Station 17 he stopped and received running order;
- through the running order was mentioned that he was going to run at the railway station Bucurestii Noi based on the telephonic agreement, going to pass by the signal XB on the position on stop and to run with the speed of max. 20km/h up to the next signal with permissive indication;
- after the put into motion and after about 250 m he felt a shock at the locomotive and he heard an abnormal noise. The driver of the train performed a quick braking;
- he found that the locomotive was derailed by the first bogie in the running direction.

### **B.5.2. Safety management system**

In carrying out its responsibilities and duties, the manager of the public railway infrastructure – National Railway Company “CFR” SA and the railway undertaking the National Company of Freight Railway Transport “CFR Marfa” SA had implemented their own safety management system.

In this context, CNCF “CFR” SA and SNTFM “CFR Marfa” SA insure the control of risks associated to the activity of manager, respectively railway undertaking.

### **B.5.3. Norms and regulations. Sources and references for the investigation**

In the investigation of the railway accident one took into account the following:

#### norms and regulations

- Technical Regulation of Rail Operation no. 002 approved by the Order of the Minister of Transport, Constructions and Tourism no. 1186 on the 29<sup>th</sup> of August 2001;
- Instructions for the activity of locomotive staff in railway transport no. 201/2007, approved by the Order of the Minister of Transport, Constructions and Tourism no. 2229 on the 23<sup>rd</sup> of November 2006;
- Regulation for trains running and shunting of the railway vehicles – no. 005/2005 approved by the Order of the Minister of Transport, Constructions and Tourism no. 1816 on the 26<sup>th</sup> of October 2005;
- Regulation for towing and braking – no. 006 approved by the Order of the Minister of Transport, Constructions and Tourism no. 1815 on the 26<sup>th</sup> of October 2005.
- Job descriptions of the employees involved in the accident;
- Extracts from the technical plan of operation of the railway station CFR Bucharest Triaj;
- Extracts from the instruction for handling the installation CED of the railway station CFR Bucharest Triaj.

#### sources and references

- photos taken immediately after the occurrence of the accident by the members of the investigation commission;
- minutes of reading the speedometer bands of the locomotive involved in the accident and of the towing locomotive of the freight train no. 24794;

- the board records of the locomotive, provided by the responsible with its maintenance;
- documents on the driving and regulation of the running of the trains;
- inspection and interpretation of the technical condition of the locomotive and of the train involved in the accident;
- questioning of the staff involved in the control of the railway traffic, of the locomotive and train staff involved in the occurrence of the accident and also of other witnesses;
- minutes concluded after the findings performed at the locomotive involved in the accident;
- the roadmap of the train locomotive;
- documents of transport of the train;
- records of movement from the railway station CFR Bucharest Triaj;
- documents on the maintenance of the running lines and of the installations provided by the responsible with their maintenance;
- documents on the technical condition of the lines and of the installation in the railway station CFR Bucharest Triaj.

#### **B.5.4. Work of the technical installations, of the infrastructure and of the rolling stock**

##### **B.5.4.1. Data found on the installations**

The railway station CFR Bucharest Triaj is equipped with the following types of SCB installations:

- group A1: installations of mechanical centralization CEM;
  - group A2: installations of electrodynamics centralization CED, type CR3 (centralization with relays) with dependence BLA with the railway station Bucurestii Noi - group A and the flag station Pajura and direct dependence with the railway station Bucurestii Noi - group C;
  - group B 2: installations of mechanization and automation of sorting humps type CAM/WSSB;
  - station 23: shunting tables - MM;
- station Giulesti: installations of electronic centralization - CE

On the date of the accident, the situation of the SCB installation in the railway station CFR Bucharest Triaj in Group A2 and corresponding to the path of the freight train 24794 from ram. Pajura to the railway station Bucharest Triaj was as follows:

- the path circuits 041, 043, 3-5, 7-9, 1-S1, 065, 19-23, 073 – occupied electrically – out of operation;
- BLA Bucharest Triaj - h.m. Pajura : LCO on, the isolated path section 1AD(041) occupied electrically – out of operation;
- the signals XB, XF, XPN: indicators red light off (signals out of operation)
- all the switches with control.

Under the circumstances mentioned above, due to some faults existing at the installation of centralization (CED) of the railway station CFR Bucharest Triaj and at the dependency links of the automatic line block, the running of the trains between ram. Pajura and the railway station CFR Bucharest Triaj – Station 17 was performed under the following circumstances:

- based on the telephone agreement system – free way;
- with the input signal XB of the railway station Bucharest Triaj defect on the position on stop;
- with the handling of the switches 19/25, 17/23, with occupied section, from the passing path of the trains, according to the instruction for handling the installation, individually and with check on spot regarding their condition of free/occupied.

##### **B.5.4.2. Data found on the lines**



The railway accident occurred on the switch no. 45 in the railway station Bucharest Triaj.

The switch no. 45:

- type 49, with radius of 190 m, tangent 1/9, right deviation, articulated needles;
- on the position on direct the clamping complete and active and on the position on deviation were missing the metallic straps at the heel joint of the crossing core;
- the prism of broken stone complete and with draining qualities.

The railway accident occurred on an area where the maximum running speed of the trains provided in the service book was of 50 km/h.

The weather in the area of the railway accident between 07:00 – 24:00, was providing a horizontal visibility of 1000 m, without precipitations, the air temperature was of -9°C and the wind was calm.

#### **B.5.4.3. Data found on the work of the rolling stock and of its technical installations**

The locomotive EA no. 474-027-4 had the installation “INDUSI” in operation and sealed, the safety and vigilance equipment (DSV) in operation and sealed, the installation of speedometer sealed, the brake installation of the locomotive was in operation and sealed, the handle of the valve FD1 of the direct brake was on the braking position and the brake valve type KD2 was on the position quick braking.

The speed of the locomotive EA no. 474-027-4 on the switch no. 45 (with access towards the switch no. 51 from the group A2 of the railway station Bucharest Triaj), at the moment of the derailment was of 4 km/h.

### **B.6. Analysis and conclusions**

From the material evidences and the parts provided in the investigation file resulted the following:

#### **B.6.1. Findings on the condition of the railway infrastructure**

- in 2001 was closed the traffic over the switch no. 45 on the position on deviation (with access towards the switch no. 51), as consequence of a railway event occurred over the switch no. 51 Station 17 Bucharest Triaj. The cause of the event was the inappropriate construction position of the switch no. 51 which gives access at the lines 1A2 and 2A2 from the group A2 of the railway station Bucharest Triaj.
- in 2007 were stolen by non-identified persons component parts of the switches no. 45 and 51;
- because the switch no. 45 (on the position on direct) insures the path on the section Bucharest Baneasa – Bucurestii Noi there was taken the action of completing the metallic parts missing on this direction;
- because of the lack of railway fines (straps) was not insured anymore the continuity of the line at the heel joint of the switch no. 45 on the position on deviation.



### **B.6.2. Findings on the SCB installations from the railway station Bucharest Triaj – Station 17**

- the path circuits 041, 043, 3-5, 7-9, 1-S1, 065, 19-23, 073 were out of operation because of the cuts and of the stealing by non-identified persons of the cables 121, 152, 155 from the 27<sup>th</sup> of December 2010;
- the automatic line block Bucharest Triaj – HM Pajura: LCO on, the isolated section 1AD(041) occupied electrically out of operation from the 27<sup>th</sup> of December 2010;
- the signals XB, XF, XPN: red fire indicators off (the signals out of operation because of the cut and stealing by non-identified persons of the cables 152, 151, 154 from the 27<sup>th</sup> of December 2010);

### **B.6.3. Incomplete performance of the passing path of the freight train no. 24794 from the ram. Pajura towards the railway station CFR Bucurestii Noi – group C**

The incomplete performance of the passing path of the freight train no. 24794, with the switch no. 45 remained on the position with access towards the switch no. 51 (towards the lines 1 and 2 from the group A2 of the railway station Bucharest Triaj) is based on a human error in the activity of operating the SCB installation as follows:

- the inappropriate handling of the switch no. 45 for the passing path of the freight train no. 24794-1;

## **B.7. Causes of the accident**

### **B.7.1. Direct cause**

The derailment of the locomotive EA no. 474-027-4 occurred as consequence of the non-handling by the movement inspector provider from the group A2 of the railway station CFR Bucharest Triaj of the switches no. 45/53 on appropriate position for the passing of the train 24794-1 towards the railway station CFR Bucurestii Noi – group C, corroborated with the lack of the metallic straps from the heel joint of the crossing core of the switch no. 45 handles with access towards the lines from the group A2 of the railway station.

### **B.7.2. Underlying causes**

None.

### **B.7.3. Root cause**

None.

### **C. Safety recommendations**

None.

This Investigation Report will be sent to the Romanian Railway Safety Authority, to the manager of the public railway infrastructure the National Railway Company “CFR” S.A and to the freight railway undertaking SNTFM “CFR Marfa” SA.

Members of the investigation commission:

BURLEA Sorin – main investigator

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COCIUBAN Nicolae - Regional Inspector SC

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GHEORGHE Eduard - Inspector SC

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