



## INVESTIGATING REPORT

of the railway accident occurred  
on the 5<sup>th</sup> of July 2012 in the railway station I.L. Caragiale



*Final edition  
19th of December 2012*

## NOTICE

Concerning the railway accident occurred on the 5<sup>th</sup> of July 2012, in the Branch of the Regional centre for railway operation, maintenance and repairs Bucuresti, in the railway station I.L. Caragiale, consisting in the hit of a car at the level crossing from the km 0+600, Romanian Railway Investigating Body performed an investigation, 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 the Government Decision no. 117/2010.

Through the performed investigation, the information concerning the occurrence of this accident were gathered and analysed, the conditions were established and the causes determined. The investigation of Romanian Railway Investigating Body did not aim to establish the guilty or the responsibility in this case.

Romanian Railway Investigating Body considers necessary to take corrective measures for the improvement of the railway safety and the prevention of the accidents, accordingly it issued in this report a series of safety recommendations.

Bucharest, the 19<sup>th</sup> of December 2012

**Approved by**

**Director,**  
Nicolae SANDU

*I ascertain the compliance with the  
legal provisions concerning the investigation  
and the drawing up of this investigating report that*  
**I submit for approval**

**Chief investigator**  
Eugen ISPAS

*This notice is part of the Report for the investigation of the railway accident occurred on the 5<sup>th</sup> of July 2012, 1st of July 2012, in the Railway Branch Bucuresti, in the railway station I.L. Caragiale, consisting in the hit of a car at the level crossing from the km 0+600*

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## **I. PREAMBLE**

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

Concerning the railway accident occurred on the 5<sup>th</sup> of July 2012, in the Branch of the “Regional center for railway operation, maintenance and repairs Bucuresti”, in the railway station I.L. Caragiale, consisting in the hit of a car at the level crossing from the km 0+600, Romanian Railway Investigating Body performed an investigation, 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 the Government Decision no. 117/2010, for the prevention of some accidents with similar causes, by the establishment of conditions and causes.

OIFR investigation did not aim to establish the guilty or the responsibility, its objective being the improvement of the railway safety and the prevention of the railway accidents or incidents

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

Taking into account that informative paper of the General Inspectorate for the Traffic Safety and Control from CNCF «CFR» SA from the 6th of July 2012 concerning the happened accident in the railway station I.L. Caragiale, consisting in the hit of a car at the level crossing from the km 0+600 and taking into account that the railway event is defined as accident, according to the provisions of the art. 7(1), point c) *from the Regulation for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety*, , in accordance with the art, 19, paragraph (2) from the Law no. 55/2006 concerning the railway safety, corroborated with the art. 50 (3) from the *Regulation for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety*, approved by Government Decision 117/2010, OIFR director decided to start an investigation

Through the Decision no. 90, from the 9th of July 2012 of OIFR director, the investigation commission was appointed, consisting in:

- |                       |   |                     |
|-----------------------|---|---------------------|
| ▪ Dragos FLOROIU      | - OIFR director   | - main investigator |
| ▪ Eduard STOIAN       | - OIFR department head  | - member            |
| ▪ Mircea NICOLESCU    | - OIFR investigator   | - member            |
| ▪ Stefan MORARU       | - ASFR expert   | - member            |
| ▪ Luigi SPINU         | - Traffic Safety central inspector<br>General Inspectorate of Traffic<br>Safety and Control CNCF „CFR” SA | - member            |
| ▪ Răzvan ALEXANDRESCU | - department head at<br>SNTFM „CFR Marfa” SA  | - member            |
| ▪ Tudor CIOLACU       | - regional inspector Traffic Safety<br>Zonal Freight Centre Bucuresti<br>from SNTFM „CFR Marfa” SA        | - member            |

From objective causes, the commission was changed by the decisions no. 90-I from the 3rd of September 2012 and 90-II from the 24th of September 2012, the main investigator in the investigation commission being appointed Mr. Nicolae SANDU, OIFR director, and Mr. Stefan MORARU being replaced by Mr. Stefan CIOCHINA, OIFR investigator

## A. ACCIDENT BRIEF PRESENTATION

### A.1. Brief presentation

On the 5th of July 2012, at 12,47 hour, the rake of wagons CM2 left the fan of industrial branches Gura Palangii, running to the railway station I.L.Caragiale.

Along this route the rake of wagons CM 2 had 4 stops, the last one of them at the km. 4+000, at 13,57 hour, where the driver tried to remove the technical problem appeared in the operation of the locomotive compresor.

Because he could not remove the failure, the driver asked the foreman shunter to ensure the rake of wagons against the run away by the application of the hand brakes for its keeping stopped and notified at 14,53 hour, by the radio-telephone equipment of the locomotive, the movements inspector from the railway station I.L. Caragiale about the failure at the locomotive, asking for assistance.

Because of the lack of routing of the assistance, the Zonal Freight Center Bucuresti took the decision that the crew of the rake of wagons CM2 (driver, conductor, shunter and store-keeper) be taken with a car at the railway station Targoviste Sud. For the locomotive surveillance, one sent a driver's assistant until the next day, when one was intended to send an assistance.

Shortly after the driver boarding the locomotive, the rake of wagons started to run without order to the railway station I.L. Caragiale.

The driver's assistant actions to stop the rake of wagons by a strong application of locomotive hand brake and of the first wagon hand brake were without result. The rake of wagons continued to run, passing over the fixed derailer, that was on the position „overturned” (its normal position is „on the rail”) and arrived on the level crossing from the km. 0+600 where met and hit a car, that following the impact remained stopped between the locomotive buffers.

With the car blocked between the locomotive buffers, the rake of wagons entered the railway station on the line no. 4, trailed the switch, passed on the avoiding line no. 9, hit and passed over its bufferstop, then the locomotive and the first two wagons stopped in the embankment wall (the right wall in the running direction). The car fell at the basis of the foot bridge from the km. 32+465 (the mile post of the foot bridge is on the line Ploiesti Vest-Targoviste). On it falling a part of those two wagons load and broken stone caught by the derailed rolling stock.

Following this accident, from these four persons from the car, two died and the other two were serious injured.



**Position of the branch line carrying feeder traffic from the track section Ploiesti Vest - Targoviste**

## **A.2 Direct cause, contributing factors and root causes**

**A.2.1 Direct cause** of the accident was the non-ensurance of the braked mass percentage necessary to keep stopped the rake of wagons CM2 being on the branch line carrying feeder traffic I.L. Caragiale – fan of industrial branches Gura Palangii.

### **Contributing factors**

- the shunting gang left the rake of wagons, SNTFM “CFR Marfa” SA did not ensure another shunting gang, taking into account that the shunting of the rake of wagons CM2 was not finished and it was not stabled on one of the lines from the railway station I.L. Caragiale, as it is stipulated in the chapter 3, art. 7 from the Regulations for the operation of the track section I.L. Caragiale-Moreni-Filipestii de Padure-Gura Palangii, approved by AFER and the Ministry of Transports, Constructions and Tourism. The shunting gang leaving endangered the traffic safety on the branch line carrying feeder traffic I.L. Caragiale-Gura Palangii and in the railway station I.L. Caragiale;
- the driver left the locomotive of the rake of wagons CM2, without meeting with the provisions of the art. 12, paragraph 1, letter e from the Instructions for the activity of the locomotive staff no. 201/2007, approved by Order of the Ministry of Transports, Constructions and Tourism no. 2229/23.11.2006;
- delivery of the locomotive by the driver’s assistant for surveillance was made without being sheded on a line especially dedicated in a traction unit or station, as it is stipulated at the art. 9, paragraph 1, letter e and at the art. 30 –(1) from “Instructions for the activity of the of the locomotive staff no. 201/2007, approved by Order of the Ministry of Transports, Constructions and Tourism no. 2229/23.11.2006”;
- service transfer from the locomotive driver of the rake of wagons CM2 to the driver’s assistant , in charge with the surveillance;
- position of the fixed derailer S1 that, at the passing of the rake of wagons CM2, run away from the branch line carrying feeder traffic I.L. Caragiale-Gura Palangii, was “Overturn from the rail”, against the provisions:
  - art. 170, paragraph 2 of the Regulations for railway technical operation no. 002/2000, approved by Order of Ministry of Public Works, Transports and Lodgings 1186/2001;
  - art. 35, paragraph 6, 10<sup>th</sup> section from the Regulations for the running of the trains and of the shunting vehicles no. 005/2005;
  - chapter 3 from the Regulations for the operation of the track section I.L. Caragiale-Moreni-Filipestii de Padure-Gura Palangii, approved by AFER and Ministry of Transports, Constructions and Tourism.

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

None.

### **A.2.3 Root causes**

None

## **A.3. Safety recommendations**

The addressees of the safety recommendations are Romanian Railway Safety Authority, the public railway infrastructure manager CNCF”CFR” SA and the freight undertaking SNTFM “CFR Marfa”SA.

The recommendations aim to settle the next issues:

1. Analysis of the opportunity to achieve the dependence between the position of the fixed derailer S1 and the position of the mechanical barrier from the level crossing km 0+600 with interlocking system in the railway station I.L. Caragiale;
2. Analysis of the opportunity to supplement the provisions of the Regulations for hauling and brake no. 006/2005 where to be mentioned the measures that the driver’s assistant has to take when the driver is not in the locomotive or he is not able and the train, rake of wagons or the light locomotive run away and can not be braked.

3. Updating of the regulation framework concerning the definition of the branch line carrying feeder traffic;
4. Supplement of the instruction for the operation of the interlocking system from the railway station I.L. Caragiale with the provisions concerning the working way when the fixed derailer S1 is out of service.
5. Analysis of the procedures for sending the dispositions and the register way between OPAD of SNTFM headquarters and CLSC Bucuresti in order to remove the ambiguities that can appear in the verbal communication of the dispositions.

This investigation report will be sent to Romanian Railway Safety Authority, the public railway infrastructure manager CNCF"CFR" SA and the freight undertaking SNTFM "CFR Marfa"SA.

## **B. INVESTIGATING REPORT**

### **B.1. Accident presentation**

On the 5th of July 2012, at 9:36 hour, on the direct line II of the railway station I.L. Caragiale, arrived from the railway station Ploiesti Vest the light locomotive DHC 002, belonging to the freight undertaking SNTFM CFR „Marfa” SA.

Between the railway stations Ploiesti Vest and I.L. Caragiale , the light locomotive run on the train path of the freight train no. 97150.

In the railway station I.L. Caragiale this locomotive and the group of the 12 empty wagons type Fals (four-axles self discharging car for coal transportation - belonging to the same undertaking), stopped on the line no. 3, had to form the rake of wagons CM1, that has to be dispatched to the fan of industrial branches Gura Palangii, belonging to the company SC Carbonifera SA-Cariera Margineni (pit Gura Palangii) for their loading. According to the sheet no. 19 from the Technical Plan for the operation of the railway station I.L. Caragiale approved in 2007 (in force), the shunting area no. 5 includes: the signal „Wait”, the derailer S1, the branch line carrying feeder traffic I.L. Caragiale-Filipestii de Padure-Gura Palangii, fan of industrial branches Filipestii de Padure , Moreni, industrial branches and rented lines operated by the fans of industrial branches.

After the forming of the rake of wagons CM1 and performance of the brake test, the foreman shunter went to the movements inspector from the railway station I.L. Caragiale, where, at 9,57 hour, confirmed by writing in „Unified registered of free pass systems, orders and movement with 6 boxes” (herinafter as unified registered of free pass systems, orders and movement) that the rake of wagons can be dispatch to the fan of industrial branches Gura Palangii, in safety conditions.

At 9:58 hour the key of the switch no. 7 from the fan of industrial branches Gura Palangii was handed over, in writing, by the movements inspector from the railway station I.L. Caragiale to the foreman shunter belonging to SNTFM „CFR Marfa” SA, Zonal Freight Centre Bucuresti-railway station Targoviste.

At 9:59 hour, the movements inspector ordered the switch handling station no. 1 from the end X, the exit of the rake of wagons CM1 from the line no. 3, shunting line, to the fan of industrial branches Gura Palangii.

At 10:01 hour, the movements inspector ordered, in writing, to the switch handling station no. 1 to close the barrier

At 10:09 hour the pointsman from the switch handling station no. 1 communicated the exit of the rake of wagons from the railway station.

At 12:19 hour the rake of wagons CM1 arrived in the fan of industrial branches Gura Palangii, where the shunting gang performed the shunting asked by the beneficiary and the operations necessary to form and dispatch the rake of wagons CM2, consisting in the locomotive DHC 002 and 12 loaded wagons, to the railway station I.L. Caragiale.

After the performance of the preparatory operations, at 12:47 hour the rake of wagons CM2 left the fan of industrial branches Gura Palangii to the railway station I.L. Caragiale.

During the run of the rake of wagons CM 2, it had 4 stops on the route according to the Report no. T1/661/13.07.2012 for the interpretation of the records IVMS of the hauling locomotive of the rake of wagons.

During the running between the fan of industrial branches Gura Palangii to the railway station I.L. Caragiale, the driver found out the decrease of the air pressure in the locomotive compressor, because of the unsuitable working of the compressor, for which, at about 13:57 hour (the stop hour according to the records of the speed recorder from the locomotive), he took measures for the braking of the rake of wagons, it stopping at the km 4+000 (in the area of the level crossing km 4+137 - the rake of wagons had a length of 205 m). It is stipulated that the maximum gradient of the branch line carrying feeder traffic is 13,40‰ and in the area where the rake of wagons stopped the gradient was 11,01‰ (gradient in the running direction).

After the rake of wagons stop, the driver talked on the phone with head driver from the depot Bucuresti Triaj and with the operator T from the Zonal Freight Centre Bucuresti, informing them about the problem appeared in the working of the air compressor of the locomotive and about his repeated effort to remove the failure, without succes.

Accordingly, the driver asked the foreman shunter to ensure the rake of wagons against the run away. At 14:53 hour, he notified by radio-telephone equipment from the locomotive the movements inspector from the railway station I.L. Caragiale about the failure at the locomotive and asked for an assistance.

This notification was recorded by the movements inspector from the railway station I.L. Caragiale in the Unified registered for free pass systems , orders and movement under the no. 33.

At 14:53 the movements inspector from the railway station I.L. Caragiale notified the operator of the Traffic Controller Ploiesti from CNCF „CFR” SA about the failure at the locomotive DHC 002, asking for an assistance for the rake of wagons CM2 remained on the branch line carrying feeder traffic I.L. Caragiale-Gura Palangii.

The Zonal Freight Centre Bucuresti , according to the provisions of the Disposition no. 2/2008 of SNTFM general manager, asked for a train path from Traffic Controller Ploiesti, in order to route an assistance to the railway station I.L. Caragiale, that run as train no. 95251.

After the analysis of the Zonal Freight Centre request, the Traffic Controller Ploiesti approved its request, So, at 15:10 the operator of the Traffic Controller Ploiesti, from the Branch of the Regional center for railway operation, maintenance and repairs Bucuresti sent to the movements inspectors from the railway stations Ploiesti Vest and I.L. Caragiale the disposition no. 39 for routing of the additional train no. 37325 (light engine DA 623), in the conditions of the train no. 92111, from the railway station Ploiesti Triaj to the railway station I.L. Caragiale, from where the locomotive was to be routed as assistance for the locomotive DHC 002 of the rake of wagons CM2. The disposition was registered by the movements inspector from the railway station I.L. Caragiale in the Traffic Controller register of dispositions under the no. 10. According to the disposition no. 39 of the operator from the Traffic Controller Ploiesti from Branch of the Regional center for railway operation, maintenance and repairs Bucuresti, the train no. 37325 was to leave the railway station Ploiesti Triaj at 15:15 hour and had to arrive in the railway station I.L. Caragiale at 15:54 hour.

At 15:12 hour, under the no. 37 from the Unified register for free pass systems, orders and movement, the movements inspector from the railway station I.L. Caragiale sent to the pointsmen from the switch handling stations no. 1 and 2 the disposition no. 39 of the Traffic Controller Ploiesti from the Branch of the Regional center for railway operation, maintenance and repairs Bucuresti. This disposition was registered by the pointsmen of the switch handling stations no. 1 and 2 in the order register existing in each station, under the no. 13 and 14. The movements inspector from the railway station I.L. Caragiale notified also, by the radio-telephone equipment, the driver of the locomotive DHC 002, that the assistance for the rake of wagons hauling should arrive.

At 15:08 hour, the disposing station movements inspector from the railway station Ploiesti Triaj received the disposition no.56 from Traffic Controller operator, for the routing of the locomotive DA 623 to the railway station I.L. Caragiale as assistance.

At 15:15 hour, the local movements inspector informed the disposing station movements inspector that he received the verbal disposition from the Traffic Controller operator according that the locomotive DA 623 remained in Ploiesti Triaj, waiting for a new disposition from SNTFM “CFR Marfa” SA.

At 15:40 the movements inspector from the railway station Ploiesti Triaj received the disposition no. 67 from the Traffic Controller operator that the locomotive DA 623 was routed to the railway station Ploiesti Crang as train no. 36225.

Between the hours 15:15 and 15:40, the locomotive DA 623 was not provided to the disposition movements inspector from the railway station Ploiesti Triaj for its routing to the railway station I.L. Caragiale by the Shunting Controller operator belonging to the railway freight station Ploiesti Triaj.

According to the telegram no. 217/23.01.2012 of the Branch of the Regional center for railway operation, maintenance and repairs Bucuresti – Traffic Division, during the night, the traffic in the railway station I.L. Caragiale and on the track section Ploiesti Vest-Targoviste is suspended between the hours 18:00 and 6:30.

Following the discussions between the operator of the Zonal Freight Centre Bucuresti and the Office Program Analysis Dispatching Center-OPAD, Zonal Freight Centre Bucuresti asked OPAD that the locomotive DA 623, that should have run as additional train no. 37325, be routed to the railway station Ploiesti Crang for other activities. OPAD head from SNTFM “CFR Marfa” SA approved as the locomotive DA 623 be routed to the railway station Ploiesti Crang.

In these conditions the assistance for the rake of wagons CM2 was not ensured, for which the Zonal Freight Centre Bucuresti decided (disposition no. 2418/564 from the 5<sup>th</sup> of July 2012, at 15:31 hour), that the shunting gang (driver, conductor, shunter and the store keeper) be taken with a car in the railway station Targoviste Sud. For the locomotive guard, the driver’s assistant was sent to guard up to the next day, when one intended to send the assistance.

In these conditions the Traffic Controller Ploiesti operator from the Branch of the Regional center for railway operation, maintenance and repairs Bucuresti, at 16:40 hour, under the no. 41 from the Traffic Controller disposition register, sent to the railway stations Ploiesti Vest Crangu lui Bot and I.L. Caragiale the cancelation of the disposition for routing the train no. 37325 (assistance).

This disposition was registered by the movements inspector from the railway station I.L. Caragiale in the Traffic Controller disposition register under the no. 11, sent at 16:42 hour, under the no. 40 from the Unified register of free pass systems, orders and movement, to the pointsmen from the switch handling stations no. 1 and 2, registered and confirmed by the pointsmen of the switch handling stations no. 1,2, under the no. 15 and 16.

Following the verbal communication with the operator of the Zonal Freight Centre Bucuresti, the driver’s assistant left at 16:20 the railway station Targoviste Sud by car (owned by SNTFM “CFR Marfa” SA) to the rake of wagons CM2 on the branch line carrying feeder traffic I.L. Caragiale-fan of the industrial branches Gura Palangii, in order to ensure the guard of the locomotive DHC 002.

Arriving close to the building of the former railway station Olari, the car driver stopped and called the foreman shunter in order to identify and establish the place where he was to meet the staff that he had to take. He went then by car about 70-100 m in the indicated direction, until he observed the persons to be taken, then stopped.

The driver’s assistant left the car and went to those persons.

The staff of the rake of wagons, consisting in driver, conductor, and store keeper, went from the rake of wagons to the place where the car was stopped. On this way they met the driver’s assistant. The driver told to the driver’s assistant the details on the technical condition of the locomotive, then they went together a part of the way, back to the locomotive, in order to show him the direction and the way to arrive the locomotive. Then, the driver went back to the locomotive and together with the shunting gang members moved to the railway station I.L. Caragiale.

In the railway station I.L. Caragiale the foreman shunter and the store keeper went off and moved to the movements office, where the foreman shunter handed over the key +7 of the switch no.7 from the fan of industrial branches Gura Palangii, and the store-keeper the documents accompanying the rake of wagons.

After handing over the key of the switch no.7 and the rake of wagons documents, both of them went in the car and moved to the railway station Targoviste Sud (their station) together with the shunter and the driver.

The driver’s assistant, after leaving the driver, went to the locomotive for its guard.

During its going, it started to rain torrentially.

Reaching the locomotive, the driver's assistant went in the cabin and started to change his wet closing. During this time, he observed that the rake of wagons started to run.

In this situation, the driver's assistant checked the locomotive hand brake and get to apply two turns, without effect. Then, he notified by mobile phone the driver about the rake of wagons starting to run, he went on the locomotive floor to the first wagon, where he found out that the hand brake was applied about 2/3 from the thread length and applied it completely. Neither this operation had effect on the speed of the rake of wagons running.

The rake of wagons continued to run, passing the level crossing from the km 0+697, non-guarded, then the fixed derailer on the position "overturn", its normal position had to be "placed on the rail", and at the level crossing between the national road DN 72 and the track from the km 0+600, met and hit a car, that following the impact rested between the locomotive buffers.

The driver's assistant jumped out the locomotive when it passed through the railway station, and the rake of wagons continued to run on the line 4 of the railway station with the car blocked between the locomotive buffers, trailing the double cross-over no. 8/6, passed on the avoiding line no. 9, hit and distrpoied its buffer stop, and after the railway station platform ending:

- the locomotive and two wagons fell on the right side of the embankment;
- the third wagon from the locomotive rested derailed on the upper side of the embankment;
- the car fell at the basis of the foot bridge from the km. 32+465 (the mile post of the foot bridge is on the line Ploiesti Vest-Targoviste), on it falling a part of those two wagons load and broken stone caught by the derailed rolling stock.

At the accident place, the investigation commission found out:

at the locomotive

- the locomotive DHC 02, that hauled the rake of wagons CM2, was fallen on the right side of the embenkment, being with the long hood to the embankment basis, the locomotive plough being in the field where the embankment and the foot bridge from the km 32+465 wer built, covering the acces to the foot bridge;



Photo no. 1

at wagons

- the wagon no. 81536656468-7 (first from the locomotive) was on the wall from the right side of the embankment, parallel with the locomotive;
- the wagon no. 81536650983-5 (second from the locomotive) was on the wall from the right side of the embankment, bias against the first wagon;
- the wagon no. 81536656372-5 (third from the locomotive) was on the upper side of the embankment, reclined to the left side (to the current line I.L. Caragiale-Mija);



Photo no. 2

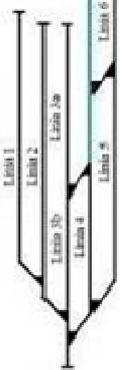
at the line

- the buffer stop of the avoiding line no. 9 was completely destroyed

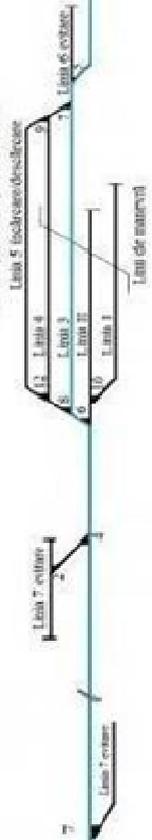
at the railway equipments

- the derailer S1 was in the position „overturn”
- the switch no. 6 from the double cross-over no. 8/6 from the end Y of the railway station I.L. Caragiale was trailed and the support was broken;
- the inductor of 1000/2000 Hz of the exit semaphore F and the catching support were destroyed;
- the lamp of the switch no. 13 was destroyed.

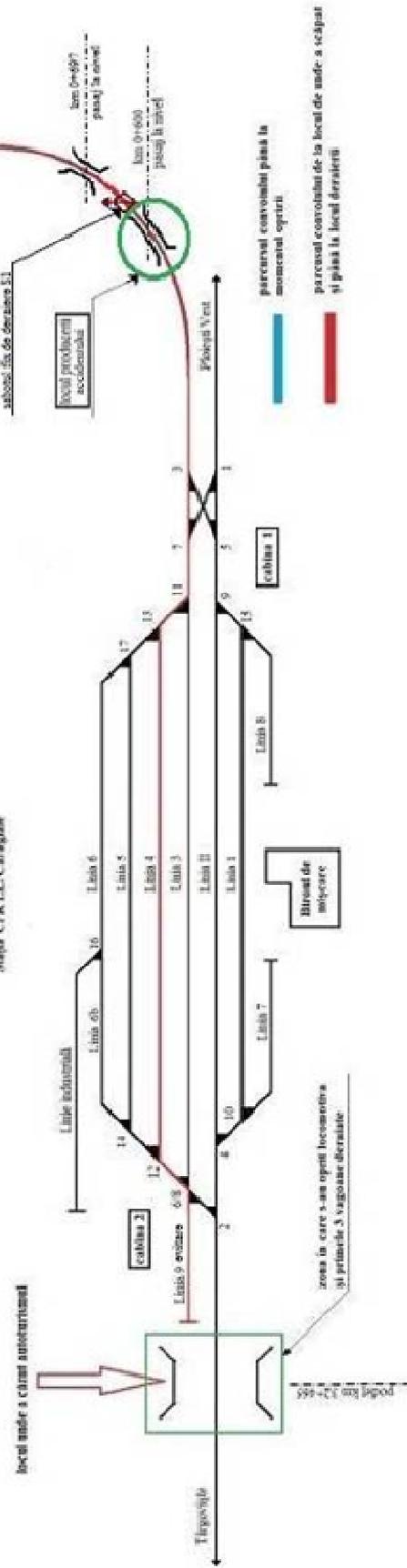
**Antestația Gara Palăngii**



**Antestația Filipești de Pășune**



**Stația CFR 1.L. Caragiale**



parcuarul convoinului piasă la moșceniș opriți  
 parcuarul convoinului de la local de unde a scăpat și piasă la local deraiat

## **B.2. Accident circumstances**

### **B.2.1. Involved parties**

The track section where the railway accident happened is administrated by CNCF “CFR” SA and maintained by its employees.

The infrastructure and superstructure in the railway accident area are administrated by CNCF “CFR” SA, Branch of Regional center for railway operation, maintenance and repairs Bucharest and maintained by the employees of the Track Section L4 Titu, as follows:

- the crossing level and the branch line carrying feeder traffic I.L. Caragiale – Gura Palangii are maintained by the employees of the Pemanent Way District Zalhanaua;
- the lines and switches from the railway station I.L. Caragiale are maintained by the employees of the Permanent Way District 2 Mija.

The interlocking system from the railway station I.L. Caragiale are administrated by CNCF “CFR” SA and maintained by the employees from the Track Section CT 4 Ploiesti - Branch of Regional center for railway operation, maintenance and repairs Bucuresti .

The communication equipment from the railway station I.L. Caragiale is administrated by CNCF “CFR” SA and maintained by the employees of SC TELECOMUNICATII CFR SA Bucuresti.

The locomotive communication equipment is owned by the undertaking SNTFM “CFR Marfa” SA and maintained by its employees

The hauling locomotive of the rake of wagons CM2 and the wagons from its composition are owned by the railway freight undertaking SNTFM “CFR Marfa” SA.

### **B.2.2. Composition and the equipments of the train**

The rake of wagons CM2 consisting in 12 wagons series Fals loaded with coal (belonging to the freight undertaking SNTFM „CFR Marfa” SA), 48 axles, 913 tons, 250 m length was hauled by the locomotive DHC 002 belonging to the same undertaking, The traction staff, driving the hauling locomotive and the staff for the rake of wagons belonged to the same freight undertaking SNTFM „CFR Marfa” SA

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

#### ***Presentation of the railway station I.L. Caragiale***

The railway station I.L. Caragiale is situated on the track section Ploiesti Vest – Targoviste Sud at the km. 33+031, has interlocking system (CEM equipment) and the organization of the train traffic is free pass system one.

#### ***Route presentation***

The line alignment on the branch line carrying feeder traffic between the railway station I.L. Caragiale and the pit Gura Palangii consists in a series of straight tracks and curves, the minimum radius being 200 m. Along it, the sinuous track alignment passes through areas with high embankments and cutting, that is the variable depth and whose walls are covered with a lot of vegetation.

The longitudinal section of this line consists in a series of gradient areas, without areas on the flat between them, the maximum gradient of the route being 13,40‰.

The accident area, the level crossing at the km 0+600, is on a curve with the radius R=300m (right deviation in the running direction of the rake of wagons) and the gradient of 2,37‰ (slope in the running direction of the rake of wagons).

#### ***Superstructure presentation***

The track superstructure consists in rails type 49, fished between them, fitted up both on wooden sleepers and on concrete sleepers T13, indirect fastening type K.

### ***Presentation of the derailed rolling stock***

#### ***The locomotive DHC 002, that hauled the rake of wagons CM2***

The locomotive that hauled the rake of wagons CM2 is a diesell hydraulic one type C of 1250 HP, modernized by SC REMARUL 16 februarie SA Cluj Napoca.



Photo no. 3

#### ***The main constructive characteristics of the locomotive DHC 002***

Length over buffers		13736 mm
Maximum width of the locomotive of the locomotive		3150 mm
Maximum high of the locomotive from the head of the rail		4650 mm
Locomotive wheel-base		7200 mm
Bogie pitch (bogies type Bo - Bo)		2500 mm
Maximum speed	- light	100 km/h
	- high	60 km/h
Operation maximum load (complet fuelled)		70 ±3% t
Maximum traction force at the maximum weight and $\mu = 0,33$		23000 kgf
Minimum radius for curve running, for speed of 30 km/h		100 m
Speed in curve with radius R=150 m		40 km/h
Speed in curve with radius R=550 m		100 km/h

#### ***Modernization of this locomotive, mainly in:***

- replacement of the engine SULZER 6 LDA 28B with the engine Caterpillar 3508B;
- change of the hydraulic transmission TH 2 for the adjustment at the revolution of the new diesel engine;
- fitting up of the spiral compressor, hydrostatically driven;
- replacement of the hydrostatic equipment;
- fitting up of controllers for the control of the diesel engine and locomotive brake and for the train brake;
- replacement of the brake equipments.

#### ***Wagons of the rake of wagons CM2***

Those 12 loaded wagons from the rake of wagons CM2 are series Fals and the next constructive characteristics:

- type of automatic brake KE;
- bogies type Y25 Cs2;
- wagon wheel base 9,00 m;
- length over the buffers 14,540 m;

Data of the last periodical inspections at those 3 derailed wagons were:

- *the wagon no. 81536656468-7 (first from the locomotive)*

-the last periodical inspection type RP was performed at CTF Bucuresti on the 22nd of January 2009

- *the wagon no. 81536650983-5 (second from the locomotive)*

-the last periodical inspection RP was performed at SC REVA Simeria on the 28th of October 2010

- *the wagon no. 81536656372-5 (third from the locomotive)*

-the last periodical inspection RP was performed at SC REVA Simeria on the 26th of August 2009.

For this type of wagons, the deadline for the periodical inspection is 6 years according to the Railway Norms „Railway vehicles. Planned inspections and repairs”, approved by Order of Minister of Transports no. 364/2008.

#### **B.2.4. Communication means**

From the leaving of the rake of wagons from the fan of industrial branches Gura Palangii, the communication between the driver and the movements inspector from the railway station I.L. Caragiale, as well as between the driver and the train crew was ensured through radio-telephone equipments.

#### **B.2.5. Start of the railway emergency plan**

Soon after the railway accident, the intervention plan for the removal of the damages and for the re-stauration of the traffic was made in accordance with the provisions of the Regulation for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety, approved by the Government Decision no. 117/2010, according which, at the accident place came the representatives :

- District Inspectorate for Emergency Situations Dambovita;
- CNCF “CFR” SA - the railway public infrastructure administrator;
- SNTFM “CFR Marfa” SA – railway freight undertaking;
- Romanian Railway Authority – AFER ;
- Operative Department of the Railway Transports Police

### **B.3. Accident consequences**

#### **B.3.1. Fatalities and injuries**

The railway accident led to the death of 2 persons and other 2 serious injured

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

The cost of the material damages in accordance with the estimations drawn up by the owner of the rolling stock, of the means of intervention and by the railway infrastructure administrator is:

- **at the locomotive DHC 92530841002-4** – the total value of the damages will be established after receiving the agreement from the Prosecutor to unseal it and to find out its technical condition ;
- **at the wagons**  
according to the estimation no. RVR 1060/14.09.2012 from CIRV Section IRV Rosiori
  - at the wagon no. 81536656372-5 **16500,31 lei**
  - at the wagon no. 81536650983-5 **45320,52 lei**
- **at the lines**  
according to the estimation no. 4429/13.12.2012 of the Section L4 Titu **1332,44 lei**
- **at the equipments** **5569,42 lei**  
according to the estimation no. 1/1/970/2012  
of the Section CT4 Ploiesti
- **other damages** – use of the breakdown crane **66172.89 lei**  
with crane EDK 2000/1/250 tf

according to the estimation no. L4/212/2012 of the  
Department Mechanization MR of Branch of Regional center for  
railway operation, maintenance and repairs Bucuresti

**Total value of the damages**

**134895,58 lei**

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

None

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

On the 5<sup>th</sup> of July 2012, between the hours 17,00 and 18,00, the sky was overclouded and torrential rains.

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

#### **B.5.1 Summary of the involved staff testimonies**

**From the written statements of the driver from the hauling locomotive of the rake of wagons CM2 one can retain:**

- after the rake of wagons CM2 started to run, he performed the running air brake test in order to be sure that the train can be braked, then continued to run, following all the time the train behaviour and the line in order to see if the structure clearance is free;
- he signalled acoustically (using the whistle locomotive), each time he passed the whistle boards, that signalled the train approaching the level crossings;
- the foreman shunter ensured the rake of wagons passing at the level crossing, stopping the autos passing;
- it had a stop before the final stop, it wasn't a stop for insurance at the level crossing, it was an accidental braking;
- during the run, passing in front of the former railway station Filipești de Pădure, he observed that the air gauge showed the decrease of the air pressure in the main tank and in the general pipe, under 5 atm. After the operation of the fuse wire from the electric equipment for the air compressor, it started to work, the air pressure starting to increase and the air compressor starting to work;
- at the km 4+000 the air compressor did not work still, the driver taking measure for the rake of wagons stop, operating the automatic brake and ensuring the locomotive against the run away, by the application of brake;
- after this operations, the driver tried to make again the air compressor to work, but because he did not manage, he asked the foreman shunter to ensure the rake of wagons, because he had to declare the locomotive out of order and ask for an assistance;
- using the radio-telephone equipment from the locomotive, the driver notified the movements inspector from the railway station I.L. Caragiale about the locomotive failure and asked for an assistance, receiving soon from him the confirmation of the notification and the request of the assistance registration;
- after these notifications, the driver, using his mobile phone notified:
  - the head driver from the depot București Triaj, informing him about what happened;
  - the operator from the Traffic Controller Point Freight Zonal Centre București, informing him about the need of an assistance in order to start to run;
- the operator from the Traffic Controller Point Freight Zonal Centre București informed him that non having an assistance, the rake of wagons had to stay there during the night;
- after these notifications, the driver using his own mobile phone again informed the head driver from the depot București Triaj that he was to exceed the maximum accepted service;
- the head driver informed him that he was to send, by a car, the driver's assistant from the railway station Targoviste Sud for the locomotive guard;
- the driver's assistant came at the locomotive at about 16:45 hour. Then he reconsidered this statement, mentioning that he was not in the locomotive at the handing-over of the locomotive to the driver's assistant, for the guard service, its handing over making close to the car;

- he admits that the instruction provisions do not allow the locomotive leaving;
- he knew that it is forbidden to leave the working place (locomotive) before the arrival of the employee to whom he had to hand over the locomotive;
- he presented to the driver's assistant the met problems, informing him that the locomotive had the air compressor out of service, its hand brake applied and he sent the shunting gang to ensure the train;
- at about 17,00 hour, he went to the car that brought the driver's assistant. Arriving at the car, he got in and together with the shunting gang and the store-keeper on duty went to the railway station I.L. Caragiale, from there he was to go to the railway station Targoviste Sud;
- when he handed over the locomotive to the driver's assistant, the air from the braking equipment was consumed;
- before the handing over of the locomotive, he disconnected from the locomotive batteries the locomotive power supply;
- he declared the locomotive out of service at about 14:53;
- at the rake of wagons stop, the last two or three wagons stopped the passing over a level crossing;
- from the rake of wagons stop and up to the cut of the locomotive batteries, the rake of wagons did not tend to move and he did not operate the devices for braking system operation;
- the mobile phone from the locomotive ensured the connection with the shift work on duty from the engine shed Bucuresti Triaj, Traction Control Centre of the Zonal Freight Centre Bucuresti and with the direct heads;
- the battery of the mobile phone of the locomotive was discharged;
- he knew that it is forbidden to hand over the locomotive when its is not sheded, but he considered possible it because the locomotive was out of service, he could not perform any order, the driver's assistant having the obligation to ensure its guard;
- he considered that the locomotive situated between the fan of industrial branches Gura Palangii and the railway station I.L. Caragiale could be handed over to the driver's assistant for guard, it not being sheded, because it was out of order, could not be controlled;
- he notified with a delay of about an hour the locomotive failure (at 14,53 hour he made the notification, and the rake of wagons was stopped finally at 13,57 hour), because after the final stop, he called the Depot Bucuresti Triaj and the Traffic Controller Point Freight Zonal Centre Bucuresti to inform them about what happened, he tried to make worke the air compressor, opened the covers, checked visually if the electric contacts are out of order or the pressure pipes broken and he operated the fuses from the electric circuit of the compressor.
- up to declare the locomotive out of order, he tried to make work the diesel engine;
- using his mobile phone, he talked to the head –shift from the depot Bucuresti Triaj, informing him that the diesel engine did not work. He considered, without having the certainty, that the locomotive engine did not work because the locomotive was on curve, having a little fuel in the tank, its strainer could not absorb fuel from the tank;
- he drove through the depot many times the locomotive DHC (locomotive with Caterpillar engine) and some times on the lines from the railway stations;
- he has no licensing LDH with Caterpillar engine;
- the rake of wagons did not move after the locomotive failure;
- after the notification of the movements inspector from the railway station I.L. Caragiale and the head-shift from the depot Bucuresti Triaj abou the failure of the locomotive, he did not know what was the pressure in the general air brake pipe, because when he declared the locomotive out of service and after that he did not look at the manometer;
- between the notification about the failure of the locomotive and up to his leaving in order to meet the driver's assistant, he did not watch the pressure from the locomotive air gauges;
- at the question if it is normal to watch the air pressure indicated by the air gauges, taking into account the rake of wagons stop on an area with high gradient (about 11%), with loaded wagons, strong wind, rain, he answered that from the moment of the notification about the locomotive failure and asking of the assistance, he considered the rake of wagons ensured against the run away by thr shunting gang by the application of the wagons hand brakes;

- he knew that a rake of wagons can not be taken stopped on an area with gradient only with the locomotive brake system;
- at the last stop (km 4+000), the locomotive had air in the general brake pipe at the nominal value, took measures for automatic brake, ensured the locomotive against the movement by the application of the hand brake and he could not understand why the rake of wagons started to run;
- he did not go along the train in order to check the wagons, their checking not being in the drivers tasks;
- before the last stop he observed the decrease of the air pressure under 7 atm. And took measures to settle the situation. After the stop, he operated the air compressor fuse from the locomotive board (fuse marked with the letter „C”) and the air compressor started to work, the general brake pipe of the rake of wagons filled at the at the nominal value, the rake of wagons had started to run. After short time the pointer of the main air tank started to get down and after about one km he stopped the rake of wagons applying the automatic brake.

**From the written statements of the driver’s assistant, appointed for the guard of the locomotive DHC 002, rested out of service during the hauling of the rake of wagons CM2 one can retain:**

- on the 5th of July 2012, around 16,45 hour he arrived in Olari by a car belonging to the Wagons Inspection Targoviste, where on the branch line carrying feeder traffic I.L. Caragiale – fan of industrial branches Gura Palangii was the rake of wagons CM2, with the locomotive DHC 002 out of service and whose he had to ensure the guard;
- during movement by car to the place where the rake of wagons was stationed, it started to rain and wind;
- the taking over of the service for the locomotive guard was not in the locomotive cabin, but on the field, next to the car, because the driver had left the locomotive and had gone to the car;
- the exchange of the locomotive staff was made on the way between thr car and the locomotive in the presence of the shunting gang;
- after the meeting with thr driver, they went together about 20 m to the locomotive, when the driver showed him the direction to the out of service locomotive, said him data about the technical condition of the locomotive and on the quantity of fuel from the locomotive tank;
- during all this time it rained and wind strongly;
- after receiving the information, the driver’s assistant signed the locomotive route sheet got by the driver, confirming the acknowledge of those presented by the driver, then he went to the locomotive;
- when he took over the locomotive, the air pressure from the main tank and in the main brake pipe indicated by the air gauge of the locomotive was 0;
- he had no time to check the correspondence between the fuel quantity from the tank and that communicated by the driver, because after arriving in the locomotive, when he changed the wet clothes, he observed that the locomotive started to run to the ralway station I.L. Caragiale;
- at the taking over of the locomotive for the guard, the locomotive electrical devices were stopped because the main switch had been switch off by the driver;
- his first action was to check if the locomotive hand brake was released; he managed to screw on two leads , without effect, the locomotive continuing to move;
- soon after that action, he informed by his mobile phone the driver from whom he took over the locomotive, that the train run away and he could not stop it;
- after this notification, he left the locomotive cabin, going on the locomotive walkways to the first wagon in order to try to apply its hand brake, applied about 2/3 from the thread length;
- after the maximum application of the hand brake of this wagon, went to the locomotive cabin, getting in;
- the application of the hand brake from the first wagon had no effect on the decrease of the rake of wagons move speed;

- when he arrived at the level crossing with the national road 72 (DN 72), a truck passed and a car followed it, whose back was caught by the locomotive;
- after hitting the car, the rake of wagons entered the railway station I.L. Caragiale where it was directed to the buffer stop of the line 9, hitting and destroying it, then it derailed;
- before the locomotive of the rake of wagons arrive in front of the movements office , he jumped on the track bed, on the right side in the running direction;
- he could not contact by the locomotive radio-telephone equipment the movements inspector from the railway station I.L. Caragiale, because all the fuses and the main switch were off and he was not trained and authorized to use the devices and the equipments from the locomotive;
- he did not know if the mobile phone from the locomotive worked, because he did not use it;
- he knew that he coul not contact by the locomotive mobile phone the movements inspector on duty in the railway station I.L. Caragiale, in order to notify him about the start to move of the rake of wagons, because the locomotive mobile phone works only in the group of the freight undertaking SNTFM “CFR Marfa” SA;
- in order to discuss with the driver he used his phone;
- he wasn’t tested at the taking over of the service, before to begin thr guard of the rake of wagons CM2 locomotive;
- in this situation, with the rake of wagons CM2 on the branch line carrying feeder traffic I.L. Caragiale – Gura Palangii, he did not know where he had to go for the test before the service start, so he has been presented to the engine driver;
- because the locomotive sheet having with him was wet because the rain, he could not fill in it anything;
- on the 5<sup>th</sup> of July 2012 his tasks on the locomotive DHC 002 were only for the locomotive guard;
- when one ensures the guard of the locomotive (stopped, out of service, etc), he is in charge only with the surveillance (the locomotive not by spoiled by malicious persons) and the ensurance of the integrity of the fuel quantity from the locomotive tank;
- he is not trained and authorized to handle and use the equipments and devices from the cabin, excepting the hand brake.

**From the written statements of the foreman shunter from the railway station Targoviste Sud, that on the 5<sup>th</sup> of July 2012 was in the rake of wagons CM2, one can retain:**

- around 12:00 o’clock, after the performance of the shunting for bringing and coupling of the locomotive at the rake of wagons, going along the rake of wagons, he checked the wagons, the air pressure in the general brake pipe, fastened the couples between the wagons, released the hand brake and performed the continuity brake test. After ending the continuity brake test, he wrote in the route sheet of the locomotive data on the train composition, then he informed by radio-telephone equipment the driver to start the running and pass over the switch no. 7 from the fan of industrial branches Gura Palangii in order to lock it on the position „direct” and take out the key +7, that he had to hand over in the railway station I.L. Caragiale to the movements inspector at the arrival of the rake of wagons in the railway station;
- after locking the switch no. 7, he took out the key +7, got in the locomotive, the rake of wagons started to run to the railway station I.L. Caragiale
- during the running to the railway station I.L. Caragiale, up to the driver notification about the locomotive failure, the rake of wagons had 3 stops:
  - at two unguarded level crossing from Filipestii de Padure to stop the road traffic for the rake of wagons passing;
  - in Filipestii de Padure in order to take drinking water.
- at around 14:00 o’clock the rake of wagons was stopped by the driver, that informed him about the failure of the locomotive air compressor;

- in these conditions he sent the shunter to apply the hand brake at two wagons, then he applied the hand brake from the first wagon after the locomotive, and the driver applied the locomotive hand brake;
- at the rake of wagons stop, because of the locomotive failure, two of three wagons were on the level crossing;
- he called the railway station manager from Targoviste Sud, explaining him that the locomotive is out of service;
- after some time, the railway station manager from Targoviste Sud informed him that a car would come to take them to the railway station Targoviste Sud;
- he considered that he did not leave the working place, he left the rake of wagons according the order of the railway station manager from Targoviste Sud (at around 16,30 – 16,40 o'clock), by this order he was informed that a car would come to take the shunting gang to the railway station they belong, that is the railway station Targoviste Sud;
- he interpreted the order of the rail freight station manager Targoviste Sud concerning the sending of a car to take the shunting gang, store keeper and bring the traction shift as an order to leave the rake of wagons for making the staff exchange in the railway station Targoviste Sud;
- at around 17,00 o'clock, after the shift between the driver and the driver's assistant, he left Olari to the railway station I.L. Caragiale, where together with the shunting gang went to the movements office, where they handed over the key +7 of the switch no. 7 from the fan of industrial branches Gura Palangii, writing it, with number and hour, in the Unified register of free systems with 6 switch stations, as well as remaining on the current line of the rake of wagons CM2;
- after these records, together with the shunting gang got in the same car and went to the railway station Targoviste Sud;
- during this displacement by car, close to the railway station Mija, the driver was called on his mobile phone by the driver's assistant, that informed him about the rake of wagon starting to run;
- he called, using his own mobile phone, the movements inspector on duty in order to send the signalman to close the barrier, then he travelled back by car to the railway station I.L. Caragiale;
- keeping stopped of the rake of wagons is possible by the application of the necessary hand brakes;
- one had to apply five hand brakes to keep stopped the rake of wagons;
- with reference to the rake of wagons CM2, one applied only 3 hand brakes;
- he applied a hand brake from the first wagon, after the locomotive, and the shunter applied 2 hand brakes, that is at the wagons 4 and 5;
- he did not check the hand brakes applied by the shunter;
- he can not explain why the brake shoes from the wagons 4 and 5 from the locomotive, where the shunter stated that he had applied the hand brake, there are no braking traces;
- at the question how one can explain that the driver's assistant stated that he still applied at the first wagon the hand brake about 1/3 from the length of the screw, applied the hand brake of this wagon, but there were 3-4 turn to fasten;
- after the driver notified the locomotive out of service and then asked for an assistance, he considered that the application of three hand brakes from the wagons and from the locomotive were enough to held in place the rake of wagons

**From those recorded in writing by the shunter, that on July 05, 2012 was part of the shunting gang of the rake of wagons CM 2, it can be retained the following:**

- around 12:00 hours he went with the foreman shunter in order to perform the operations necessary to compose the rake of wagons CM 2;
- after performing these operations and the continuity brake test of the train, the foreman shunter contacted the engine driver, requesting him to move the rake of wagons until the switch from the exit of Filipesti de Padure fan industrial branches shall be released, to close the switch and to lift the key, in order to be handed over to the railway station CFR I.L.Caragiale;

- on the route to the railway station CFR I.L. Caragiale, the rake of wagons stopped to Filipești locality before a level crossing where he descended together with the foreman shunter in order to stop the road traffic and to ensure the passing of the rake of wagons through the level crossing, after which the rake of wagons continued to run;
- they proceeded in the same way to the following level crossing, after which the rake of wagons has been stopped one more time to the station of bottling gas station that was located to line no.1 of Filipești de Pădure fan industrial branches in order that the shunting gang personnel to take drinking water;
- around 14:00 hour, in Olari village, the engine driver communicated them that the locomotive compressor has been damaged and isn't possible to run further;
- after this communication, the foreman shunter applied the handbrake to a wagon, telling him to apply handbrakes another two wagons, the shunter not knowing the train's tonnage;
- he passed near the wagons walking on foot through thick vegetation and applied the handbrake to the fourth and the fifth wagon from the locomotive, checking if they are correctly applied;
- he applied the handbrakes from the fourth and the fifth wagon from the locomotive as he knew that he applied them to the Gura Palăngii fan industrial branches and the vegetation where these wagons were located, after the rake of wagons was stopped, was allowing access to them;
- he didn't knew that in order to held in place this rake of wagons it was necessary to apply handbrakes to 5 wagons;
- as the rake of wagons was stabling, he went to a fountain from nearby taking some water, then returning to the train;
- around 16:00 hour, the foreman shunter informed him that a car from CFR Târgoviște Sud railway station will arrive and they will leave by this car to this railway station (CFR Târgoviște Sud railway station was the station from which they belonged to);
- as they were waiting the car's arrival, the sky got cloudy and started to rain;
- he walked by foot near the rake of wagons a distance of approximately 60 meters in the running direction of the rake, in order to get to the car that had come to take them over, after which he walked to the left approximately 30 meters, he passed through the bed of a river and arrived to the border of the village Olari, where he saw the car that waited for them;
- to the car he met the engine driver's assistant;
- around 17:00 hour, together with the foreman shunter, the storekeeper and the engine driver left with that car to CFR I.L. Caragiale railway station;
- he knows that the working program is from 06:30-19:00;
- the foreman shunter communicated him that he received order from the chief of the freight railway station Târgoviște Sud that a car will arrive to take them to CFR Târgoviște Sud railway station. In these conditions, he left the rake of wagons around 16:30-17:00 hour;
- as they arrived to CFR I.L. Caragiale railway station, the foreman shunter and the storekeeper went to the movements inspector department in order to handover the key of the switch, the documents of the rake of wagons and to make known the fact that the rake of wagons remained in open line;
- after this, the foreman shunter and the storekeeper returned to the car and together they left to CFR Târgoviște Sud railway station;
- as they approached to CFR Mija railway station, the engine driver was noticed by phone that the rake of wagons started to move;
- the foreman shunter called the movements inspector of CFR I.L. Caragiale railway station, after which the driver turned the car and headed to I.L. Caragiale railway station;
- when they arrived, the rake of wagons was derailed;
- he cannot explain why on the brake blocks from the two wagons, the fourth and the fifth from the locomotive it weren't found clear signs of friction.

**From those recorded in writing by the storekeeper that on July 5, 2012 he accompanied the rake of wagons CM 2, it can be retained the following:**

- On July 5, 2012, around 12:00 hour, he arrived to Gura Palăngii fan industrial branches, where he found the rake of wagons formed, he passed near every wagon, by noting the data necessary to draw up the document „The list of wagons”;
- After he finished this operation, he got on the locomotive of the rake of wagons in order to calculate the list of the wagons after which he remained on the locomotive;
- On the route from Gura Palăngii fan industrial branches to the spot where the engine driver stopped and informed on the locomotive damaging, the rake of wagons CM 2 had 3 stops (two stops for ensuring the crossing of the rake of wagons through two level crossings and one stop to Filipeștii de Pădure locality in order to take drinking water);
- Around 14:00 hour, the rake of wagons was stopped; he heard the engine driver telling that the locomotive has been damaged and he requested emergency locomotive in order to haul the rake of wagons;
- He received a call from a colleague that communicated the fact that the chief of the freight railway station CFR Târgoviște (belonging to SNTFM „CFR Marfă” SA) told him to leave and that the emergency locomotive shall not be sent;
- Together with the foreman shunter and the shunter, they went by foot to the entrance of Olari village, where the engine driver’s assistant arrived by a car. With the same car they left to CFR I.L. Caragiale railway station in order to handover the documents accompanying the rake of wagons and the key +7 of the switch no.7 from Gura Palăngii fan industrial branches;
- Around 17:00 hour they arrived to CFR station I.L. Caragiale; he descended in order to handover to the movements inspector the documents that were accompanying the rake of wagons CM 2 and the foreman shunter descended to handover, also to the movements inspector the key +7 of the switch no.7 from Gura Palăngii fan industrial branches;
- After completing these actions they got on the same car and they went to CFR Târgoviște railway station;
- On the way to CFR Târgoviște railway station, the engine driver received a call from the engine driver’s assistant that the train ran away;
- The foreman shunter called the movements inspector from I.L. Caragiale railway station in order to close the barrier;
- In that moment, the driver changed the running direction and returned to I.L. Caragiale railway station;
- Around 17:45 hour they arrived to I.L. Caragiale railway station but the railway event had occurred.

**From those recorded in writing by the movements inspector, that at the moment to the railway accident occurrence he was on duty to CFR I.L.Caragiale railway station it can be retained the following:**

- On July 5, 2012, at 06:20 hour to the operation switch point no.1 he performed the following activities:
  - He checked the condition of the interlocking systems and of the telecommunication equipments;
  - He checked the situation of occupation of the lines and of the shunting limit signals;
  - He checked the presence of the personnel and of their condition;
- To the derailer S1 it weren’t found problems. At the moment of performing the inspection, it was put on the rail and the key for its handling was in the cabin of the operation switch point no.1 in its special place;

- On July 5, 2012, following the notification of the storekeeper he dispatched the rake of wagons CM1, composed of 12 wagons to Gura Palăngii fan industrial branches, after which previously he performed the following actions:
  - He draw up the shunting plan;
  - He verified the document „List of wagons” in which was registered the verification of the continuity brake test;
  - He has issued the running order;
  - The foreman shunter registered in the unified register of free pass systems ( unified register of free pass systems) the fact that the rake of wagons can be dispatched in safety running conditions;
  - He gave order to the operation switch point no.1 to perform the route and to close the barrier;
  - He handed over to the foreman shunter the key +7 of the switch no.7 from Filipești de Pădure fan industrial branches;
- At 14:53 hour he was informed by the engine driver by the radiophone station of the locomotive that:
  - At the return of the rake of wagons ( the rake of wagons CM2), the locomotive has damaged in the area of the km 3+000 ( it didn't had air in the compressor);
  - He's requesting emergency locomotive;
- He registered this notice in the unified register of free pass systems, communicating to the engine driver the number with which was registered the notice, after which he noticed the traffic controller;
- The traffic controller ordered for an emergency locomotive, after which he cancelled this order;
- He didn't knew that on the branch line carrying feeder traffic ILCaragiale - Gura Palăngii, the rake of wagons CM2 had no shunting gang;
- He doesn't remember if he asked the foreman shunter on the fact that the shunting gang should stay to the rake of wagons;
- The foreman shunter handed over the key +7 at 17:24 hour and left;
- The foreman shunter should gave the key +7 from the switch no.7 of Gura Palăngii fan industrial branches to the movements inspector department, after stabling the rake of wagons on one of the railway station lines. In this case, the rake of wagons left on the branch line carrying feeder traffic , the foreman shunter handed over the key +7, registering this in the unified register of free pass systems, after which he mentioned that is leaving;
- Around 17:45, when he was with the unit chief in the movements inspector department and the pointsman that had to begin his duty in the night shift heard a strong noise. When he got outside to see what is happening, he saw the rake of wagons that was running on the line no.4, the locomotive of the rake of wagons that was pushing a car;
- He informed the traffic controller on the above mentioned and the railway station manager also called at 112, Emergency Unique Call Department;
- In the documents referring to the technical condition of the equipments there aren't records from which should result that the derailer S1 is defect and didn't knew that the lock of this derailer was defect;
- He knew and has been trained on the Regulation of Operating the section I.L. Caragiale – Moreni – Filipeștii de Pădure – Gura Palăngii;
- He hasn't been asked drag shoes by the foreman shunter for the rake of wagons that was going to leave to Gura Palăngii fan industrial branches;
- He considers that non-ensuring against runaway of a stabled rake of wagons on the branch line carrying feeder traffic is not representing a part of his duties;

- The foreman shunter was informed by mobile phone on the runaway of the rake of wagons but it was too late, the event has occurred.

**From those registered in writing by the signalmen from the cabin no.1 of CFR I.L Caragiale, that was on duty on the moment of the railway event occurrence, it can be retained the following:**

- On July 5, 2012, at 6:30 hour, after he went to the movements inspector department in order that the movements inspector should check his presence when entering into service, he went to the cabin no.1 in order to begin its duty;
- He verified the mechanical barrier, the switches, the signals and the equipments of the cabin no.1, from the point of view of integrity;  
After performing these checks, he called to the movements inspector department informing that the situation is under control, unless the derailer S1 that could not be locked, but he didn't notify – bz written documents the movements inspector about this;
- Around 10:00 hour he received from the movements inspector the dispatching order of the rake of wagons CM1 to Gura Palăngii fan industrial branches;
- The signalmen went to the derailer S1 that he removed it from the rail, he closed the mechanic barrier, registering the number and the hour of the the barrier closing in the register from the cabin;
- After the rake of wagons passed he put the derailer on the rail, but this didn't locked, he opened the mechanic barrier and went to the cabin no.1 in order to report to the movements inspector what he has done;
- Around 14:30 the movements inspector communicated him that the rake of wagons CM 2 that was running from Gura Palăngii fan industrial branches to I.L. Caragiale had a damaged locomotive and that another emergency locomotive shall be sent in order to haul the rake of wagons;
- Around 16:30, the movements inspector transmitted him an order giving a number and an hour from the unified register of free pass systems (unified register of free pass systems with 6 cabins), that the emergency locomotive shall not arrive, the rake of wagons remaining in current line until the next day when an emergency locomotive shall be sent;
- Around 17:30 hour as he was in the cabin no.1, he saw the rake of wagons entering in the railway station having a high speed, quickly descended the stairs and intended to get in a wagon in order to fast the handbrake. He couldn't perform this as the rake of wagons had a high speed;
- The fact that the derailer S1 wasn't put on the track in the moment in which the rake of wagons CM 2 runaway from Gura Palăngii fan industrial branches is the guilt of the persons that weren't well intended and they would have lifted the derailer from the track;
- Due to its location, the position of the derailer S1 cannot be supervised from the cabin no.1
- With the occasion of registration in the order register from the cabin no.1 of handing over/receiving of duty, he broke a file from this register as the registration was made before the personnel appearance, another person being present in place of the one that he must hand over the duty.

**From those registered in written by the railway station manager of I.L. Caragiale railway station it can be retained the following:**

- Between the time period 14:45-15:00 when he was to CFR I.L. Caragiale railway station, he was informed by the movements inspector on duty on the fact that the locomotive of the rake of wagons CM2 was damaged, the rake of wagons remaining on the branch line carrying feeder traffic of Gura Palăngii fan industrial branches - I.L. Caragiale;
- From the same movements inspector he found that an assisting locomotive was requested;
- Around 17:20 hour, arrived the shunting gang from the rake of wagons that remained damaged on the branch line carrying feeder traffic. The foreman shunter handed over the

key +7 of the switch no.7 from Gura Palăngii fan industrial branches. In the same time, arrived the pointsman that was going to enter on duty to the cabin no.1 in the night of 5/6 July 2012;

- After he examined the physical condition of the signalman when he entered on duty, the railway station manager talked with him in the movements inspector office, to his discussion being present also the movements inspector on duty;
- During this discussion, the door of the movements inspector office being opened, he saw the rake of wagons passing along the movements inspector office, its locomotive pushing a car;
- Getting out immediately from the office he saw the rake of wagons that arrived in the right of cabin no.2. He called immediately the Unique Service for Emergency Calls 112 in order to inform on the accident and then he informed by phone the chief of Traffic Division within the Branch CREIR CF București after which he went to the place where the rake of wagons stopped;
- When he arrived to the place where the rake of wagons stopped he noticed that the locomotive and the two wagons were overturned on the embankment wall but he couldn't locate the car;
- Then he called to 112 in order to provide the necessary information to the intervention team in order to identify the place of the accident occurrence ;
- The accident occurred between the time period 17:40-17:50 in rain;
- He found out immediately after the accident occurrence on the fact that the derailer didn't lock, with the occasion of checking the lock of this derailer, check performed together with the interlocking body within the Branch CREIR București and in the presence of police representatives;
- The accident occurred between the hours 17:40-17:50 in conditions of heavy rain;
- He found that the derailer S1 isn't locking immediately after the railway accident occurrence, with the occasion of verifying the locking of this derailer, verification performed together with the interlocking body within the branch CREIR București and in the presence of the police representatives;
- He doesn't know the reasons for which the signalman from the cabin no.1 didn't registered in the orders register the fact that the lock of the derailer S1 was damaged;
- With the occasion of performing the daily revision to CFR I.L. Caragiale , that was performed previously to the date of the railway accident, he didn't found any irregularities to the equipments functioning. He visually inspected the derailer S1. When he performed this inspection, the derailer that was located on the rail and its key was on the key board of the cabin no.1;
- Within the time period from the last daily inspection that was performed on the area of the cabin no.1 and to the date of the railway accident occurrence, he wasn't informed by possible damages appeared to the functioning of the equipments;
- On June 21, 2012 he participated to the mixed commission M, L, CT in order to verify the traffic safety equipments , with this occasion being inspected the functioning of the derailer locking S1 by the members of the commission, not being found any irregularities to the equipments functioning;
- He trained all the railway staff on the provisions of the Operational Regulation of the section I.L. Caragiale - Moreni - Filipeștii de Pădure - Gura Palăngii. In the period 2010-2011 he made a revision of the Technical Plan for Operating the railway station I.L. Caragiale;
- He knows that “ the Regulation of Operating the section I.L. Caragiale-Moreni-Filipeștii de Pădure-Gura Palăngii” provides to chapter 3, article no.6 that „ it is forbidden to leave the wagons or groups of wagons on the branch line carrying feeder traffic”;
- He didn't knew about the fact that on the branch line carrying feeder traffic I.L. Caragiale-Gura Palăngii, the rake of wagons CM2 left without shunting gang;

**From those registered in writing by the movements inspector that on July 5, 2012 was on duty to CFR Ploiești Triaj can be retained the following:**

- On July 5, 2012 at 15:12 hours, he received and took note from the local movements inspector concerning the order no.56 of the traffic controller transmitted at 15:08 hour and according to this order the locomotive DA 623 had to be routed as assisting locomotive and was going to run as additional train no.37325 from CFR Ploiești Triaj railway station to CFR I.L. Caragiale railway station; on this, he informed also the shunting operator of Ploiești Triaj freight station in order to put at disposal the locomotive DA 623 as to be routed as assisting locomotive;
- At the hour when he received the order no.56, the locomotive DA 623 was performing shunting operations in order to compose a direct freight train in group B of CFR Ploiești Triaj railway station;
- At the hour 15:15, the local movement inspector of CFR Ploiești Triaj railway station verbally transmitted the disposal (the locomotive DA 623 should not go, as another disposal will be received) to the traffic controller;
- At 15:40 hour, he received the disposal no.67 from the traffic controller by which the locomotive DA 623 was routed from CFR Ploiești Triaj railway station to CFR Ploiești Crâng railway station as additional train no.36225;
- He contacted again the operator from the shunting controller office in order to put at his disposal these locomotive to be routed to CFR Ploiești Crâng railway station;

**From those registered in written by the train preparer that was on duty on July 5, 2012 to the maintenance workshop Târgoviște, we can retain the following:**

- around 16:00 hour he received a written disposal by phone from the dispatcher of the Freight Regional Center of Bucuresti in order to go with the vehicle of the unit and to take the commercial and traction staff from CFR I. L. Caragiale railway station;
- he informed by phone the chief of maintenance workshop Targoviște on the received disposal, receiving its approval for this displacement;
- He was informed by phone from the transit office that he must wait for the shift engine driver that had to be driven by car;
- Around 16:20 hour he left with the shift engine driver, receiving from the foreman shunter details on how to get into the area by car;
- When he arrived in the area of the former station Olari, he was routed by phone by the shunter in order to get to the appointment place. Once arrived, the driver's assistant descended, the commercial and traction staff getting into the car. The foreman shunter was taken to CFR I.L. Caragiale railway station, where he descended in order to solve duty problems;
- He mentioned that from the place where he arrived by car in order to perform the arrangement of shifts the train couldn't be seen and the staff that must have been taken arrived in the same time ( the commercial staff and the traction staff); the staff left after the engine driver and his assistant had a discussion at approximately 2-3 meters from the vehicle;
- Around 17:30 hour he left from CFR I.L. Caragiale railway station to CFR Târgoviște Sud railway station, on heavy rain conditions and when approaching in the area of the recreation basis „ Mija”, the engine driver from the car requested its return as he was informed by phone , by the engine driver ( driver's assistant) that the train „ took it to the valley”;
- As he was going to CFR I.L. Caragiale railway station, in the car he heard that the train overturned and once arrived to the place of the accident he informed his chief on what happened ;
- In the way to Târgoviște railway station, when descending the down grade to I.L. Caragiale locality, he saw the locomotive and the two wagons overturned to the road;
- He doesn't know if the foreman shunter succeeded to contact the movements inspector of CFR I.L. Caragiale railway station;

**From those registered in written by head of the staff in shift to the locomotives depot București Triaj we can retain the following:**

- On July 5, 2012, around 15:00 hour, he was informed by the engine driver that the locomotive DHC 002 is defect and then he was informed by the Dispatching Office within the Regional Freight Center Bucuresti that this locomotive shall remain on the branch line carrying feeder traffic I.L. Caragiale-Gura Palăngii, from which it was going to be hauled the next day;
- He was informed by phone by the engine driver that the locomotive ran out of diesel fuel;
- At the same date, around 16:00 hour he was called by the driver's assistant (that had to ensure the guard of the locomotive DHC 0002 in CFR Târgoviște Sud railway station, according to the duty programme) and was asked if he can go to CFR I.L. Caragiale for the shift (the driver's assistant was knowing that the locomotive DHC 002 was defective and was on the branch line carrying feeder traffic I.L. Caragiale-Gura Palăngii). Following to the phone discussion, the head of the staff in shift of București Triaj locomotives depot gave the verbal approval to the driver's assistant in order to go to I.L. Caragiale railway station, following to receive the written disposal from the operator of local schedule within the Regional Freight Center Bucuresti;
- He was informed by the operator for locomotive branch within the Regional Freight Center Bucuresti that the locomotive was defective, without other mentions;
- In case that is requested the staff shift he has the obligation to search and to inform by phone the operating staff in order to ensure the shift;
- He mentioned that in this situation it wasn't necessary to search operating staff, as within CFR Târgoviște Sud railway station was a shift staff for ensuring the locomotive guard (the driver's assistant), shift that requested by phone the approval to go to CFR I.L. Caragiale railway station;
- At first he stated that the locomotive on current line was shed, after which he stated that the locomotive wasn't shed, this being defective;
- He mentioned that he didn't received a written disposal, but only a verbal disposal, from the local activity operator within the Regional Freight Center Bucuresti, in order to ensure the staff shift, following that the written disposal to be received previously, but due to the precipitance of events, this disposal wasn't sent to the locomotives depot;
- He knew that he wasn't supposed to apply the disposal of the local activity operator within the Regional Freight Center Bucuresti only when this disposal was transmitted in written, but in order to inform the operating staff in time, he didn't waited for the written disposal;
- He mentioned the operations that are performed when shedding the locomotive: to ensure against starting from the spot, disconnecting from the main power source, its locking (the locomotive not being operated by the operating staff);
- He mentioned the operating staff obligations on guarding the goods that they supervise or use, namely : responsibility for the integrity of goods to work throughout the working program and in case of goods theft or destruction the operating staff has the obligation to inform by phone the police and the superiors.

**From those registered in written by the operator I (local activity) of the Regional Freight Center Bucuresti within SNTFM „CFR Marfă” SA it can be retained the following:**

- On July 5, 2012, between the time period 14:00-15:00 hour he called to CFR Târgoviște Sud railway station in order to fiind if the rake of wagons came from Filipeștii de Pădure to CFR I.L. Caragiale railway station;
- The commercial storekeeper that was on duty to CFR Târgoviște railway station communicated him that he cannot contact the commercial storekeeper from the rake of wagons;

- After approximately 10 minutes he received a call from the commercial storekeeper on duty to CFR Târgoviște Sud railway station, that communicated the fact that this rake of wagons remained damaged between Filipeștii de Pădure and I.L. Caragiale;
- After he received this information by phone he contacted the operator for locomotive branch within Regional Freight Center Bucuresti and the traffic controller from Ploiesti traffic controller in order to find if the engine driver of the hauling locomotive of the rake of wagons informed on the locomotive's failure. At that moment, none of them didn't knew on the failure of the locomotive DHC 002;
- After a while, he has informed by phone by the traffic controller Ploiesti on the failure of the locomotive DHC 002. To this phone conversation assisted also the chief of the Logistic Center of Customer Service and the chief of Dispatch Office within the Regional Freight Center Bucuresti that were in the office at the moment of the conversation;
- In that moment, the chief of the Logistic Center of Customer Service took the decision that the freight train no.36005 that was running from CFR Brazi to CFR Ploiesti Triaj railway station when arriving to CFR Ploiești Triaj railway station to be stopped in order to be splitt-up and its locomotive to be routed from railway station Ploiești Triaj to railwaz station I.L. Caragiale;
- The operator I of Regional Freight Center Bucuresti immediately requested to the traffic controller an available path for the running light locomotive from the freight train no.36005 accompanied by the train crew in order to be routed to CFR I.L. Caragiale railway station as assisting locomotive for the rake of wagons CM2;
- Meanwhile, he informed verbally the chief of the Dispatch Analysis Program Office within CFR Marfa in relation to:
  - The failure of the locomotive that was hauling the rake of wagons from Filipeștii de Pădure to CFR I.L. Caragiale railway station;
  - that an available path was requested for the running light locomotive of the freight train no.36005 in order to be routed to CFR I.L. Caragiale railway station with the purpose to haul the rake of wagons CM2;
- the chief of the Dispatch Analysis Program Office within SNTFM communicated him that the locomotive of the freight train no.36005 must unconditionally leave as train no.36225 (a locomotive and a foreign wagon) to CFR Ploiești Crâng railway station and to the defect locomotive of the rake of wagons CM2 being ensured guard;
- he informed by phone the locomotives depot București Triaj on that it was ordered to ensure guard to the defect locomotive of the rake of wagons CM2 to the place where it was, as the operator for locomotives branch stated that the only locomotive available to the Ploiesti Triaj locomotives depot was the locomotive „DHC 418”( actually DHC 412) non-supplied and without crew (engine driver). The locomotive DHC 412 was planned to run as train no.32502 to Bucuresti Triaj locomotives depot for inspection and repair;
- for the commercial staff, for the train crew and the personnel in charge with wagons it was ordered to send a car to CFR I.L. Caragiale to bring them to CFR Târgoviște railway station;
- within the activity, after completing the running program, he transmitted a written disposal to the railway stations and to the locomotives depots, with reference to the train crew and traction personnel (engine drivers and asistants) in order to ensure the established program;
- he requested train crew and traction personnel to the railway stations and to the engine depots in the moment that they exceeded the working program and the train didn't arrived to the destination station;
- he doesn't order if the traction personnel must ensure engine driver or a driver's assistant;
- in case of the rake of wagons he doesn't order to ensure shift staff for the engine driver, the foreman shunter and the shunter;
- for the operating locomotive of Targoviste railway station, by the program is ensured the guard to Targoviste railway station even in the case that the locomotive remained defect on the branch line carrying feeder traffic of I.L Caragiale railway station, station managed by Targoviste railway station;

- with reference to the mention “DHC 002 defect Filipești – ILCaragiale, guard ensured on the shift 05/06.07.2012” of the „ Disposal register+ Handing over the duty” he mentioned that he informed the shift colleague that came to receive its duty, that DHC remained defect on the branch line carrying feeder traffic of I.L Caragiale and, according to the schedule will remain on the branch line carrying feeder traffic (instead of Targoviste railway station) with guard from 19:00-07:00 hours;
- he didn't know on guiding the driver's assistant in order to survey the defect locomotive-DHC 002;
- he hasn't any obligation related to the shunting activity from the branch line carrying feeder traffic ILCaragiale –Gura Palăngii ;

**From those registered in written by the chief of the Logistic Center of Customer Service within the Regional Freight Center of Bucuresti it can be retained the following:**

- On July 5, 2012 around 14:00 hour, he entered in the Dispatching Office to the operators in charge with the local activity and direct trains in order to take information on the activity program that was going to be operated;
- The operator in charge with the local activity was discussing to the operator of the railway station Târgoviște that the locomotive DHC 002 would be defect;
- He ordered that the operator in charge with local activity to contact the operator T and to clarify the respective information;
- The operator T called the driver that operated DHC 002;
- Following the discussion between the operator T and the driver of the locomotive DHC 002, he found that this locomotive was going to be declared defect;
- He analysed the situation of the locomotives available on the shunting area together with the chief of the dispatching office that was managing the running and the shunting activity on the area of the Regional Freight Center Bucuresti and ordered that the locomotive DA 623 to be routed to CFR I.L. Caragiale railway station after which it will arrive to CFR Ploiești Triaj railway station with the rake no.36005 hauled from CFR Brazi railway station;
- He ordered to be requested in the informatic system ATLASRU, an available path for this locomotive that was going to run as running light locomotive ( as assisting locomotive) to I.L. Caragiale railway station in order to help the locomotive of the rake CM2;
- After requesting the available paths on the distance Ploiești Triaj - I.L. Caragiale and I.L. Caragiale - Ploiești Sud - Ploiești Triaj, the operator of scheduling the local trains activity informs that from CFR Marfă –OPAD was indicated that the locomotive DA 623 ( designed as assisting locomotive) will go with one wagon to CFR Ploiești Crâng railway station;
- He ordered that the operator of scheduling the local trains activity must call the management of CFR Marfă-OPAD to inform them on the fact that their request cannot be operated as to Ploiești Crâng is not possible to get because the program of the train crew is performed between the time period 08:00-16:00;
- After the discussion between the operator and the management of CFR Marfă – OPAD, he was informed that the locomotive DA 623 must go to Ploiești Crâng and as assisting locomotive will be sent the locomotive „DHC 418” ( in fact DHC 412) from Ploiesti locomotives depot;
- The chief of the dispatching office stated that the locomotive DHC 412 was going to come in the freight train composition no.32502 to Bucuresti Triaj locomotives depot. This locomotive wasn't supplied, inspected and didn't had traction staff (engine driver) in order to operated it;
- He insisted that the locomotive DA 623 to leave to I.L. Caragiale, but the management of CFR Marfă-OPAD requested him to ask for an available path to Ploiești Crâng, although it was explained the fact that this routing isn't necessary and time will be loss, as on the running section Ploiești Vest - Ploiești Crâng the circulation was going to be suspended starting with 16:00 hour and isn't possible to circulate to CFR Ploiești Crâng railway station in order to haul a wagon;

- At the verbal request of CFR Marfă-OPAD, he asked for an available path for the locomotive DA 623 (as a rake in Ploiesti) to CFR Ploiesti Crâng railway station, before being requested by RC Ploiesti within CNCF „CFR” SA, by ATLASRU informatic system, an available path for the same locomotive in order to run as isolated to CFR I.L. Caragiale railway station;
- From CFR Marfă-OPAD was requested that the Regional Freight Center Bucuresti to ask an available path for the rake to Ploiesti Crang, although the Regional Freight Center Bucuresti have transmitted all the information that the rake couldn't circulate. On the analysis made by phone at 09:00 hour, CFR Marfă-OPAD pointed that this rake couldn't circulate as in the program for that day, the running for this rake wasn't foreseen;
- After which the railway station chief called him around 16:00 hour and informed him that employees of the rake CM2 cannot come back from there, he contacted the manager of the Regional Freight Center Bucuresti in order to find if a vehicle can be routed from CFR Târgoviște Sud railway station (Targoviste workshop maintenance wagons) in order to take over those employees at the time of the shift. After this phone conversation he ordered to the operator for foreign wagons (*RVS operator*) in order to route a vehicle from CFR Târgoviște Sud railway station to CFR I.L. Caragiale railway station for the shift of the employees from the rake CM2;
- The operator RVS belonging to the traffic department within CLSC, verbally transmitted to the operator for wagons (*V operator*) of the dispatching department within CLSC the order on the movement of the shunting crew (*MC*), as the vehicle that was going to transport the personnel belonged to the Wagons Maintenance Workshop Targoviste;
- The CLSC chief declares that „by the given order was decided the MC staff shift”;
- The request was sent from the register of orders that was to the *RVS operator*, after which he previously asked the approval of the manager of the Regional Freight Center Bucuresti;
- The fact that the initial order related to the staff shift to CFR I.L. Caragiale railway station and that by the RVS operator was sent the order of „moving” the staff, it's being considered as a misunderstanding of terms by the *RVS operator* on duty;
- He had no knowledge that the personnel will leave the duty before finishing the shift, the personnel moving going to be performed by a vehicle, according to the regulations and their observance;
- The shunting staff works between 07:00-19:00 hour and they shouldn't leave the duty without observing the regulations;
- He doesn't explain why, following the written order transmitted at 15:35 hour by the operator V within the dispatching office of the Regional Freight Center Bucuresti to the Wagons Maintenance Workshop Târgoviște Sud, at 16:20 hour, the vehicle moved from CFR Târgoviște Sud railway station to the place where the rake CM2 was, in order to take the shunting staff as in that respective order it wasn't mentioned the hour at which the personnel must have been taken;
- He doesn't know who ordered to be sent the driver's assistant in order to replace the driver and the shunting personnel;
- As regards the discussions had with the chief of Targoviste railway station, he had a phone conversation with this, by which he requested the routing of the vehicle for the shunting personnel and the following discussion took place around 17:00 hour when he found that the rake ran away from the branch line carrying feeder traffic to CFR I.L. Caragiale railway station;
- He considers that by the order, even verbal, and by the operations done by the operator were taken the measures in order to route the assisting locomotive to CFR I.L. Caragiale railway station;
- He didn't ordered the routing of the locomotive DHC 623 (assisting locomotive) to CFR Ploiești Crâng railway station, the locomotive being routed on the basis of those ordered by CFR Marfă – OPAD that imposed the request of available path for approval, although were informed by the operator in charge with the local activity on all aspects of this routing.

**From those registered in written by the chief of the Freight Station of Targoviste it can be retained the following:**

- On July 5, 2012 before 15:00 hour he was informed by phone by the foreman shunter that was accompanying a rake of 12 wagons (Falstzpe, loaded with coal) and that must arrive to IL Caragiale railway station from the branch line carrying feeder traffic that the shunting locomotive (type diesel hydraulic), belonging to Târgoviște Sud railway station was defect and that the driver declared it as defect on the branch line carrying feeder traffic IL Caragiale - Gura Palăngii fan industrial branches ;
- He mentioned that he contacted the chief of Logistic Center of Customer Service from the Regional Freight Center Bucharest in order to be informed on the assisting locomotive that was going to be routed to IL Caragiale and this, although initially transmitted that is an available path for routing the assisting locomotive, previously transmitted him that he hasn't got an assisting locomotive;
- He also mentioned that he insisted to route the rake of wagons to CFR I.L. Caragiale railway station for the fact that the branch line carrying feeder traffic is in slope and to avoid the theft of the load and of some parts from the wagons, underlying the fact that in those over 25 years of working in this field he never left a damaged rake of wagons on the branch line carrying feeder traffic;
- After 10 minutes, when he contacted again the chief of the Logistic Center of Customer Service from the Regional Freight Center Bucuresti in order to see if he found an assisting locomotive; he found that the assisting locomotive that must come to I.L. Caragiale railway station, was routed with a foreign wagon to Ploiești Crâng railway station and that he hasn't got an assisting locomotive, so it was taken the decision to leave the rake of wagons on the branch line carrying feeder traffic over night, those from the traction branch (Regional Freight Center Bucuresti) taking the measure to send an assisting driver for the locomotive's guard and to replace the driver from the rake of wagons;
- Relating to the MC personnel (shunting crew), it was informed that the chief of the Logistic Center of Customer Service from the Regional Freight Center Bucuresti gave an order to route the vehicle from the Wagon Maintenance Workshop Târgoviște Sud in order to take the MC(shunting crew) and T personnel (engine driver) from CFR I.L. Caragiale railway station to Târgoviște Sud railway station;
- He transmitted to the foreman shunter that a vehicle from the Wagon Maintenance Workshop Târgoviște Sud will come in order to take the personnel that was operating the rake CM2 to CFR Târgoviște Sud railway station, according to the order transmitted from the Regional Freight Center Bucuresti, without mentioning the fact that he could leave earlier the rake;
- He doesn't explain the reason for which the shunting gang left the rake CM2, before the working program ending;
- the operator within Zonal Freight Center București took the decision to replace the foreman shunter or the shunter. To replace the foreman shunter, the Zonal Freight Center București must give an written order. No written disposal in this case.
- he mentioned that at around 17:00 hour was informed at the phone by the foreman shunter that was on duty at Târgoviște Sud railway station that he heard at the mouvement inspector of the Târgoviște Sud railway station that a rake of wagons passed through I.L. Caragiale railway station without having a passing order and that rake of wagons can be the one that was out of service on the branch line carrying feeder traffic;
- immediately he contacted by phone the foremanshunter that confirm to him this information. After that, he transmitted the information to the head of the Customers and Logistic Center from Zonal Freight Center București and then he went with the head of the Târgoviște Wagons Maintenance Workshop at the event site with a car;
- he noted that the requests concerning the staff of the rake of wagons that was out of service were verbal and not in writing.

**From those recorded in writing by the head of the Analyses and Program Organisation Departament, it can be retain the following:**

- according to the current organisation of SNTFM „CFR Marfă”- SA, the local activity service on each regional center is organised by each regional centre in part;
- according to the disposal no. 74/2011, the scheduling and the cancellation of the additional trains is approved by the Analysis and Program Office;
- at the 05<sup>th</sup> of July 2013, at around 15.00 hour, he was noticed by his colleagues from S.C. Rofersped S.A. that the wagon from Ploiești Crâng is not reached at the destination;
- immediately he called the local activity scheduling operator of Zonal Freight Center București to find out what was happening and this told to him that he wants to send the operator locomotive of the Brazi railway station at IL Caragiale railway station; this locomotive was the rake of wagons'hauling locomotive for Ploiești Crâng railway station.
- he communicated to the operator to wait five minutes to get in touch with the head of the Locomotive Operation Department to find another locomotive;
- he discussed with the Locomotives Operation's head that at its turn discussed with the head of the Ploiești Triaj engine shed;
- after ten minutes he was called by the head of the Locomotive Operation Department that communicated to him that he found a locomotive LDH 412 with a capable crew, defering its technical inspection;
- from the office of the Locomotive Operation Department's head, he phoned at local trains operator and communicated to this that there is still a locomotive, preferably to send the locomotive LDH 412;
- after about 35 minutes, at around 16:00 hour, the Locomotive Operation Department's head came and communicated to him that he is waiting a disposal, after which, he phoned at the head of CLSC București and said that locomotive waits an exit order. The head of CLSC București told to him that Zonal Freight Center București decided that the locomotive remains in depot;
- he did not request the cancellation of the assisting's locomotive path at I.L. Caragiale railway station, neighter in writing, neighter verbally and continued to find a locomotive for this path;

**From those recorded in writing by the operator III RVS (foreign wagons) within Zonal Freight Centre București, it can be retain the following:**

- at around 15:20 hour, the head of the Customers and Logistic Center București gave to him a verbal disposal to transmit to the wagons operator that belongs to Zonal Freight Center București to send a car for the transport of the shunting staff from I.L Caragiale railway station at Târgoviște Sud railway station;
- he immediately transmitted the disposal to the wagons operator;

**From those recorded in writing by the wagon operator (V operator) within Zonal Freight Centre București, it can be retain the following:**

- at around 15:20 hour, he was contacted by the RVS operator that transmitted to him that the Customers and Logistic Center București București's head ask him to request a car for the transport of the shunting crew from I.L Caragiale railway station at Târgoviște Sud railway station;
- at around 15:30 hour, he transmitted the phone note no. 2418/564 at the Wagons Maintenance Workshop Târgoviște;
- he mentioned that in the phone note content initially wrote shunting and wagons inspection staff, but at the phone transmitted only shunting staff, because the wagons inspection staff were not in I.L Caragiale railway station;

**From those recorded in writing by the interlocking district inspector within Interlocking District CT4 PLOIEȘTI, it can be retain the following:**

- the last check of the derailer S1 was on the 24<sup>th</sup> of May 2012, according to the note no.4/1e/211/2005 from General Inspectorate of Traffic Safety and found out that its was on service;
- it was not noticed an abnormal operation of the derailer S1, neighter by the railway station's manager, neighter by the station mouvement inspector or by the interlocking electromechanic. It was not drawn up any event report or registation regarding the operation of the derailer S1;
- according to the provisions of the note 4/1e/211/2005, the checking of the derailer S1 consisted in lifting of the key from the switches cab, its unlocking, the overturning from the rail, the rerailling on the rail, its locking and the checking of the locking by pulling the derailer S1 handle. As a result of this checking the derailer does not pick up from the rail, so it was locked;
- in the report that was drawn up on the 24<sup>th</sup> of May 2012 the derailer S1 was not on the list with the equipments that had problems;
- the explanation of the fact that at the checking of the derailer S1, it's lock was out of service, respectively it's bolt (finger) was ripped in the threated area, is argued by the fact that the bolt is made by cast iron and is the only constitutive element that keeps the derailer locked on the rail. Any action manifested by pulling up of the locked derailer is manifested over the bolt (finger). The checking if the derailer is locked is performed by pulling up of it's handle;
- it was informed by the interlocking electromechanic that by objective reasons he could not performe the two-month inspection of the derailer S1. This is a problem of the interlocking electromechanics because they must bear the costs of the displacement at the stations where must to check the equipments;
- he drawn up the acts no.73/02.04.2012 and 125/06.06.2012 through which was noticed the management of Ploiești interlocking systems section regarding the impossibility to perform the equipment's inspection by its staff;

**From those recorded in writing by the interlocking electromechanic II within Interlocking District Ploiești Est, it can be retain the following:**

- the last check of the derailer S1 was performed within the monthly inspection (Technical Operation Regulations) from the 21<sup>th</sup> of June 2012 and the derailer S1 was in good condition, put on rail and locked;
- he was never informed neighter in writing, neighter verbally by the railway movement inspector or by the station manager about any operation problem of the derailer S1;
- the checking of the derailer locked on the rail by the commission from the 21<sup>th</sup> of June 2012, that was composed by movement, lines and interlocking staff, consisting in the raising of the derailer handle but it did not raised because the key was not in the lock. The derailer did not raised because the derailer lock did not permit it's raising then it is locked;
- the checking of the non-centralized derailers it is performed every two months and biannually (every six months) according to the Instruction for the technical maintenance and repair of the intelocking systems no. 351/1988;
- in January 2012 he performed the inspection according to the Instruction for the technical maintenance and repair of the intelocking systems no. 351/1988, the next inspection being in March 2012, but he did not performed this inspection because there are no passenger trains on the distance Ploiești – Târgoviște and the displacement must be done by bus;
- he could not go to performe the inspections because he did not received money for the bus tickets, neighter after 01<sup>th</sup> of January 2012;
- the district head was informed about the displacement problems;

**From those recorded in writing by the assembly fitter power unit and transport within Inspection Station Târgoviște, it can be retain the following:**

- being on duty on the 05<sup>th</sup> of July 2012, around the 15:35 hour, he received the phone note no. 2418/564 from the wagons operator within Zonal Freight Center București, on which he wrote in the register;
- after he received the phone note, he informed the examiner and this also informed the head from Târgoviște wagons maintenance workshop railway station. The latter ordered the displacement of the examiner with the car in order to take over the staff according to the phone note;
- he specifies that in the disposal that was given by the wagons operators, this used the word “taking over the movement and shunting staff”;
- he specifies that by „taking over of the MC+MT staff” means „taking over of the commercial - movement and shunting staff”;

**From those recorded in writing de operator II within Traffic Contoller Ploiești, it can be retain the following:**

- he was on duty at the Pietroșița Traffic Controll, after the issuing of the traffic control disposal concerning the running of the train no. 37325, the light locomotive DA from Ploiești Triaj railway station to IL Caragiale railway station;
- at around 15:00-15:35, he was called by the operator I (for local operations) of the Zonal Freight Center București which told to him that the running light locomotive will not run at the IL Caragiale railway station and the rake of wagons that was out of service will remain on the branch line carrying feeder traffic over the night;
- he communicated this situation to his head which had the same informations from the operator I.

**From those recorded in writing by the head of the staff in shift within Traffic Contoller Ploiești it can be retain the following:**

- the operator I of the Zonal Freight Center București requested a schedule for the running of the running light locomotive DA, from Ploiești Triaj railway station to IL Caragiale railway station, for a rake of wagons that was out of service on the branch line carrying feeder traffic;
- at around 15:30-15:40 hour, the operator I (for local operations) of the Zonal Freight Center București, phoned and ordered that the locomotive DA may no longer be dispatched at IL Caragiale railway station;
- he mentioned that he insisted that the running light locomotive go to IL Caragiale railway station for not having time to reach at Ploiești Crâng railway station, where the service is suspended to 16:00 hour;
- finally the running light locomotive DA was dispatched according to the prior requested at Ploiești Crâng railway station.

**From those recorded in writing by the head of the Dispatching office within Zonal Freight Center București it can be retained the following:**

- when the rake of wagons’locomotive was out of service, initially was disposed the granting of the assisting locomotive and was requested a train schedule in this sense;
- the higher authorities decided that the assisting locomotive to be dispatched for another problems;
- there were no another available assisting locomotives and one decided that on the locomotive DHC 002 to be performed the guard;
- the guard disposal was given verbally by the operator I of the Zonal Freight Center București to the head driver of the Marshalling Yard București;
- the operator I of the Zonal Freight Center București communicated to the driver head that a car will go for the exchange of the mouvement staff;

- he mentioned that the movement staff (shunting gang) is not subordinated to the traffic control office, reason for which the disposal was given by the Traffic Office;
- the exchange of the engine drivers from the local activity, withdrawals of the locomotive in the local activity, the locomotive's from the local activity are in the attributions of the operator I of the Zonal Freight Center București;
- he does not know about the sending of the driver's assistant, he did not dispose the sending of the driver's assistant, the disposal one referred only at the „performing guard on the DHC 002”;
- he does not know about the disposal that was transmitted to maintenance wagons Workshop Târgoviște by RVS operator to the head of the Customers and Logistic Centre;
- the operator I of the Zonal Freight Center București dispose the exchange of the engine drivers ;
- he did not issue any disposal regarding the rake of wagons CM2.

**From those recorded in writing by the direct train's operator II within Zonal Freight Center București it can be retained the following:**

- he has direct tasks about programming and monitoring the direct trains, granting of the assisting locomotives and establishment of the program with the neighboring Zonal Freight Centres. The rake of wagons CM2 from the 05<sup>th</sup> of July 2013 does not fall within the activity of the direct train's operator.

**B.5.2. Safety management system**

At the time of the railway accident, CNCF „CFR” SA as railway infrastructure manager, had implemented their own railway safety management according to the provisions of the Law no. 55/2006 concerning the railway safety and the provisions of the Ministry of Transport's Order no. 101/2008 concerning the granting of the safety authorization to the administrator/manager of the Romanian railway infrastructure, being in the possession of the:

- Safety Authorization – Part A with the identification no. ASA09002 – by which the Romanian Safety Authority within the Romanian Railway Authority confirms the acceptance of the safety management system of the railway infrastructure manager;
- Safety Authorization - Part B with the identification no. ASB9007 – by which the Romanian Safety Authority within the Romanian Railway Authority confirms the acceptance of the safety management system of the railway infrastructure manager for meeting of the specific requirements necessary for ensure the railway infrastructure safety;

At the time of the railway accident occurrence, SNTFM „CFR Marfă”- SA as railway undertaking had implemented their own railway safety management according to the provisions of the Law no. 55/2006 concerning the railway safety and the provisions of the Ministry of Transport Order 535/2007 concerning the approval of granting of the railway transport license and of the safety certificates in order to perform the railway transport services on the Romanian railway network owned:

- Safety Authorization – Part A with the identification no. RO1120090021 by which the Romanian Safety Authority within the Romanian Railway Authority confirms the acceptance of the safety management system of the railway undertaking according to the national legislation;
- Safety Authorization - Part B with the identification no. RO1220090187 by which the Romanian Safety Authority within the Romanian Railway Authority confirms the acceptance of the provisions adopted by the railway undertaking for safe operation according to the national legislation;

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

At the railway accident investigation were taken into account the following:

## Norms and regulations

- Operation Regulations of the Section I.L. Caragiale – Moreni – Filipeștii de Pădure – Gura Palângii;
- Regulations for the train traffic and the shunting of the railway vehicles – no. 005/2005 approved by Public Works, Transport and Housing Ministry's Order No. 1186 from 26th of October 2001;
- Instructions for the driving staff activity in the railway transport approved by Order of the Ministry of Transports, Constructions and Tourism no. 2229 from the 23th of November 2006;
- Regulations of hauling and braking no. 006/2005 approved by the Public Works, Transport and Housing Ministry's Order No.1816/26th of October 2005;
- Operation Technical Plan of IL Caragiale railway station.

## sources and references

- the locomotive's route sheet and the interpretation report of the speed recorder equipment;
- the reports ended for each speciality in part by the members of the investigation commission;
- copies of the movement documents filed as annexes at the investigation file;
- photos taken by the investigation commission members immediately after the accident;
- documents regarding the construction of the branch line carrying feeder traffic I.L. Caragiale – fan of industrial branches Gura Palângii, made available by the responsible with their maintenance;
- written statements and questionnaires of the interviewed staff;
- the service sheets of the involved staff;

### **B.5.4. Functioning of the technical equipments, infrastructure and rolling stock**

#### **B.5.4.1. Data on locomotive**

##### At the locomotive's cab

- the driver's automatic brake valve KD2 from the driver's cab A was in full braking position and the direct braking driver's automatic brake valve FD1 was in the position „non-braking”;
- the driver's automatic brake valve KD2 from the driver's cab B was in third position and the direct braking driver's automatic brake valve FD1 was in the position „non-braking”;
- the handbrake was tight;
- the speed recorder equipments were not sealed;
- no lip at the control box of the „Indusi” equipment;
- the reversing gear and the controller from was in the position „0”;

##### at the locomotive's outside

- running gear was damaged and contorted;
- the brake rigging was warped;
- from the axle no.4 (the small hood) the right side was missing the brake ;
- control box DSV was not sealed, the isolating valve being in the open position;
- the brake shoes of the axle 4 had changed the colour because of the overheating;
- the lip of the electrical terminals of the air brake compressor's governor was open (it was not fastened with screws).

#### **B.5.4.2. Data on wagons**

- wagon no. 81536651447-0
- the automatic brake was active, the hand brake in good condition, the freight passenger changeover device was manipulated in the „Passenger” position, the empty loaded changeover device was manipulated in the corresponding position;

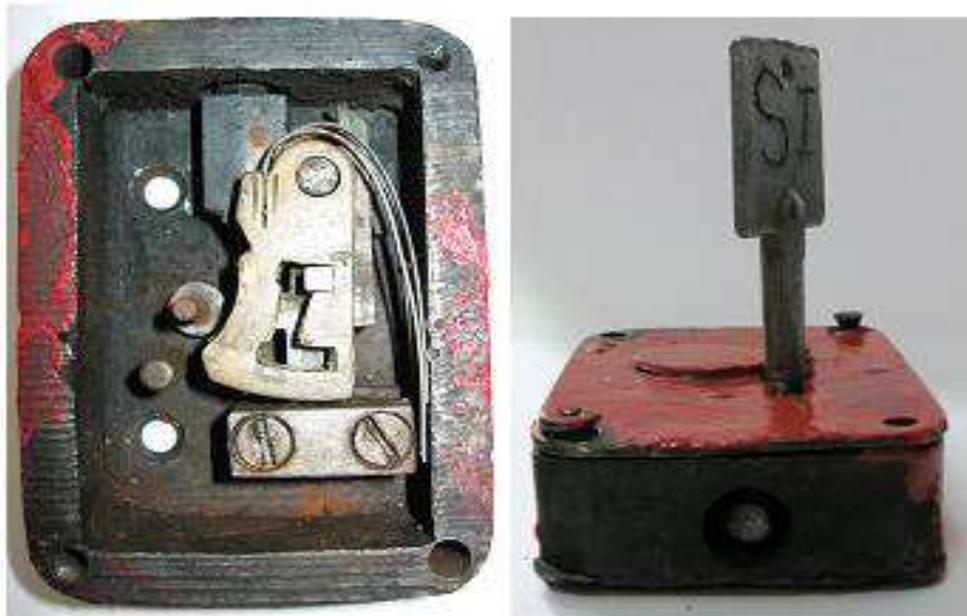
- wagon no. 82536653869-2
  - the automatic brake was active, the hand brake was out of service, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536654891-6
  - the automatic brake was active, the hand brake was out of service, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 82536650483-6
  - the automatic brake was active, the hand brake was out of service, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- corresponding position; wagon no. 82536651332-3
  - the automatic brake was active, the hand brake was out of service, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536652816-4
  - the automatic brake was active, the hand brake was out in good condition, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536651521-2
  - the automatic brake was active, the hand brake was out in good condition, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536652908-9 (the fifth from the locomotive)
  - the automatic brake was active, the hand brake was out in good condition, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536654374-2 (the fourth from the locomotive)
  - the automatic brake was active, the hand brake was out in good condition, the freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
- wagon no. 81536656372-5 (the third from the locomotive)
  - derailed and titled towards the running direction;
  - the automatic brake was isolated and the hand brake with a complete brake rigging;
  - freight passenger changeover device and the the empty loaded changeover device were manipulated in the corresponding position;
  - the angle cocks A.K. and the chain coupler were ripped- from the end of station towards Târgoviște railway station;
- wagon no. 81536650983-5 (the second from the locomotive)
  - derailed and positioned on the wall from the right side of the embankment;
  - two buffers were ripped;
- wagon no. 81536656468-7 (the first from the locomotive)
  - derailed and positioned on the wall from the right side of the embankment (against the rake of wagon's running direction);
  - two buffers were ripped;
  - one chain coupler was ripped;
  - side wall and the front wall ripped;
  - two chain coupler, the angle cocks A.K. and the coupled hoses were ripped;
  - the wagon's headstock was ripped;
  - the platform of hand brake and the hand- rail were ripped;
  - the main air brake pipe was ripped between the second and the third wagon from the locomotive. The last ten wagons from the rake of wagons (the wagons 3-12 from the locomotive) were not presented wheel flats or deposition of metals on the rail surface and had automatic brake

released. The first and the second wagon from the locomotive could not be checked because were overturned.

At the wagons no. 82536652908-9 (the fifth from the locomotive) and no.82536654374-2 (the fourth from the locomotive) one found that at every bogie the shoes colour was easily changed, without having traces of molten material and thermic distorsion of the hand shoes.

#### **B.5.4.3. Data regarding the derailer S1**

- the lock cover was fixed on the body lock by means of 2 screws provided in this purpose;
- the protection cover of the key hole was blocked on “open” position because the outside surface of the lock cover, painted;
- the lower lip of the key hole is painted in red and has traces of dry paint detachment;
- the finger of the lock bolt was ripped from the threaded area, it's external part missing;
- the ripped surface had not the characteristic of a new ripped;
- the mechanism from the lock inside had slightly traces of lubrications mixed with dust and rust traces;



*photo no.4*

## **B.6. Interfaces human – machine - organisation**

The railway accident occurred on the 05<sup>th</sup> of July 2012, on the railway branch „Regional Centre of Tracks Operation, Maintenance and Repairs - Bucharest, in the I.L. Caragiale railway station, by hitting of a car at the level crossing from the km 0+600, was due to a chain of human errors, favored by the organizational changes that were not accompanied by an appropriate regulatory framework to clearly define how to deploy the activity in this conditions.

The organizational changes refer to reducing the workload, automatically leading at the reducing of the staff and of it's activity schedule, as well as at uncertainties regarding the necessity to have and use authorizations, in order to operate same equipments and performe same operations.

The starting point of the causal chain was the non-ensuring of the rake of wagon's braked weight percentaje CM2 by the shunting gang. The rake of wagons CM2 was stabled on the branch line carrying feeder traffic I.L. Caragiale - Gura Palăngii.

This error is an human error by actional type, performed at a level based on rules.

The leaving of the rake of wagons on the branch line carrying feeder traffic was a new element in the activity of the staff that was involved in the managing of the shunting activity, fact that led to a chain of wrong decision.

Sending of the car for taking over the mouvement-commercial-traction staff before the end of the schedule activity created a confusion and the all staff went when the car was coming. In addition, none of the decision-makers did not foresee this situation and have not taken measures to replace the shunting staff.

Systemic analysis of the extensive conjuncture in which occurred the railway accident emphasizes a series of deficiencies in:

- the updating of the regulatory framework in order to introduce the definition of the branch line carrying feeder traffic and the activity of the staff that accompanied a rake of wagons on a branch line carrying feeder traffic;
- the organization, operating and regulating of the activity within Zonal Freight Centre București;
- 

## **B.7. Analisys and Conclusions**

### **B.7.1. Conclusions regarding the technical condition of the track superstructure**

Technical condition of the line superstructure and of the switches could not influence the accident occurrence.

### **B.7.2. Conclusions regarding the locomotive technical condition**

The out of service of the locomotive compressor could not influence the uncontrolled running of the rake of wagons, after previously this has been stopped by operating the automatic brake and should have been insured against running by tightening the necessary number of hand brakes from the wagons.

### **B.7.3. Conclusions regarding the technical condition of the wagons from the rake of wagons composing**

At the nine wagons that din not derailed were performed checks regarding the hand brakes condition and one found out 5 wagons with hand brake in good condition and four wagons with out of service hand brakes.

At the other 3 derailed wagons, the hand brakes were in good condition and at the wagon no. 81536650468-7 (first from the locomotive) one found that the hand brake was tightening, the brake shoes was slightly changed in „red”, braking on the tyre, without wheel flats or deposition of metals on the wheels.

At the wagons no.82536652908-9 (the fifth from the locomotive) and no.82536654374-2 (the fourth from the locomotive) one found that at every bogie the colour of the brake shoes was slightly changed, without traces of molten material and thermic distorsion of the brake shoes.

The slightly changed colour of the brake shoes from the fourth and fifth wagons from the locomotive is not a sufficient indication that lead to the conclusion that the hand brake of this wagon was corresponding tightened.

#### **B.7.4. Analysis and conclusions regarding the occurrence of the accident**

From the analysis that were performed at the railway accident site and from the findings that were made at the place where occurred the rake of wagon's escape, at the technical condition of the locomotive and at the wagons from the rake of wagon's consist, of the photos performed as well as at the testimonies of the involved staff, it may be concluded that the hitting of the car by the rake of wagon's locomotive at the level crossing one occurred in the following conditions:

- In its running from fan of industrial branches Gura Palăngii I.L. Caragiale railway station, the rake of wagons CM2 was braked and stopped by the engine driver at the km 4+000, at the 13:57 hour due to a technical problem of the locomotive's compressor. After the stopping of the locomotive and the rake of wagons, the engine driver performed the following actions:
  - he took measures for apply and insurance of the locomotive's hand brake;
  - he turn off the electric energy of the locomotive's equipments;
  - he ordered the shunting gang to insure the rake of wagons against runaway;
- he tried to put back into service the locomotive's compressor.
- At about one hour from the locomotive stopping (at 14:53 hour), the engine driver noticed the station movement inspector from I.L. Caragiale railway station (through the radiotelephone equipment from the locomotive) and requested an assisting locomotive.
- The branch line carrying feeder between fan of industrial branches Gura Palăngii and I.L. Caragiale railway station, on which was running the rake of wagons CM2, has a maximum gradient of 13,40‰, and, in the area where the rake of wagons was stopped at 13:57 hour, the gradient was 11,01‰ (slope in the running direction).
- According to the provisions of the Anexx no.6 from the *Regulations for trains running and railway shunting no.005/2005* approved by Public Works, Transport and Housing Ministry's Order No. 1186/23<sup>th</sup> of October 2005 the braked weight percentaje to keep on spot and for the ruling gradient of this line is of 10%, so the necessary braked tonnage is of 10% x 913 tonnes =91,3 rounded up at 92 tonnes.
- According to the provision of the *Regulations for hauling and braking no. 006/2005* approved by Public Works, Transport and Housing Ministry's Order No. 1186/23<sup>th</sup> of October 2005 and taking into account the braked weight of the wagon type Fals, in the case of using the hand brake - 20,8 tone (the value stated on this type of wagon) for insuring the rake of wagons against to runaway, should be applied the hand brakes of 5 wagons from the rake of wagons consist.
- According with the provisions of the Cap.I art. 1.1 from the *Operation Regulations of the traffic section I.L. Caragiale - Moreni - Filipeștii de Pădure - Gura Palăngii*, the shunting gang should be insure the the rake of wagons against to runaway by applying the hand brakes of 5 wagons from the train consist.
- At 15:35 hour from Zonal Freight Centre București one transmitted the phone note no. 2418 to the Workshop for wagons maintenance Targoviste for the displacement of the shunting staff from I.L. Caragiale railway station to Târgoviște railway station. The phone note no.564 was mentioned the overtaking of the mouvement-commercial-traction staff from I.L. Caragiale railway station to Târgoviște railway station.
- At the 15:10 hour the traffic controller of Ploiești Centre approved and transmitted with the no.39, the schedule for the additional train no. 37325 (running light locomotive DA 623) from Ploiești Triaj railway station to I.L. Caragiale railway station. From I.L. Caragiale railway station the locomotive DA 623 must to hauling the rake of wagons stabled on the branch line carrying feeder I.L. Caragiale - Gura Palăngii.
- Tha station movement inspector from I.L. Caragiale railway station transmitted the disposal no.10 to the switches cabs no. 1 and 2. The disposal was confirmed with the no. 13 and 14.
- At the 16:40 hour, the traffic controller from Ploiești Centre, transmitted to the Ploiești Triaj

and I.L. Caragiale railway stations, the disposal no. 41 through which requested the cancellation of the additional train no.37325 (the assisting locomotive).

- This disposal was registered by the station movement inspector from I.L. Caragiale railway station in the Register of Traffic Controller Disposals with the no.11. At the 16:42 hour, he transmitted this disposal with the no. 40 to the signaller from the cabs no. 1 and 2. At their turn the signaller confirmed with the no.15 and 16 from the switches cab's registers.
- Because the additional train no. 37325 (the assisting locomotive DA 623) was cancelled, the rake of wagons had to stay on the branch line carrying feeder since the next day.
- In this conditions the head driver from the engine depot București Triaj noticed by phone the driver's assistant that had to oversee the locomotive DHC 002 that, according to established schedule it had to be stabled on Târgoviște Sud railway station after the leaving of the rake of wagons CM2 in I.L. Caragiale railway station.
- The driver's assistant one presented at Târgoviște Sud railway station, from where was overtaking by the car that was made available according to the phone note no. 564/05<sup>th</sup> of July 2012.
- At 16:20 hour, the car went at the place where the rake of wagon's locomotive was out of service, on the branch line carrying feeder I.L. Caragiale - Gura Palângii, for oversee this locomotive.
- The shunting gang applied the hand brakes of 3 wagons from the rake of wagon's consist, in the condition in which, for the train keeping on the place, was necessary applying the hand brake of 5 wagons.
- At around 16:45 hour, the driver's assistant has taken over the oversee of the locomotive DHC 002.
- When he arrived on the locomotive, observed that the pressure from the main air brake pipe and from the auxiliary reservoir was 0 atm.
- The engine driver and the shunting gang went at the I.L. Caragiale railway station where the foreman shunter gave the key +7 from the switch no.7 of Gura Palângii railway station to the station movement inspector of the I.L. Caragiale railway station and mentioned this in the unified register of the free ways, orders and movement. At his turn, the storekeeper gave the rake of wagon's documents. After then, all of them went at Târgoviște Sud railway station.
- After the engine driver's assistant arrived on the locomotive, the rake of wagon's started to move. The first reaction was to actuate for a harder tightening the locomotive's hand brake and called the rake of wagon's engine driver to inform him about this situation. Immediately, he went on the locomotive's platform, towards the first wagon where, according to his statement, actuate for a harder tightening the hand brake of this wagon. Following this action, the rake of wagon's did not stop.
- The rake of wagon's continued its running and met the derailer S1, overturned from the rail, passed through the level crossing (the arms of the longitudinal barrier being in open position where met a car, on which the rake of wagon's locomotive hit from rear).
- after hitting the car, the rake of wagons entered to the railway station I.L. Caragiale, its locomotive being with the car blocked between the buffers, run on the line 4, trailed the double-slip points (TJD) no. 8/6, then it continued to run on the siding no. 9, passing over its buffer stop ;
- before the rake of wagons locomotive arrived in front of the movements inspector office, the driver's assistant jumped out of the locomotive on the track bed, on the right side in the running direction;
- the traffic railway station manager from the office called soon the Unique Emergency Service 112 in order to inform about the accident, then called for information the head of Traffic Division from the Branch of Regional center for railway operation, maintenance and repairs Bucuresti.

### Conclusion

- the rake of wagons started to run because:

- the shunting gang did not ensure, by applying minimum 5 hand brakes, necessary to keep stopped the rake of wagons for the ruling gradient of the line and its tonnage;
- the automatic brakes released, within about 2 hours after the rake of wagons stop at the level crossing from the km 4+000.
- the driver's assistant (that at the moment of the train run away performed the locomotive surveillance):
  - he took the measures in his charge in order to brake the rake of wagons, meeting with the provisions of the art. 81, paragraph 1 from the Regulations for the running of the trains and the shunting of the railway vehicles no. 005/2005;
  - he did not operate the locomotive principal switch that supply current to radio-telephone equipment of the locomotive, in order to inform the movements inspector on duty in the railway station I.L. Caragiale about the rake of wagons run away, not meeting with the provisions of the art. 81, paragraph 2 from the *Regulations for the running of the trains and the shunting of the railway vehicles* no. 005/2005;
- the rake of wagons running away to the railway station I.L. Caragiale should, according to the regulations in force, to meet the fixed derailer S1 in the position „put on the rail”, so the rake of wagons run away be derailed and not be able to enter the station;
- the movements inspector on duty in the railway station I.L. Caragiale was not informed about the rolling stock run away from the branch line carrying feeder traffic I.L. Caragiale – Gura Palangii, so he did not order to the signaller from the no. 1 switches cab station to close the barrier at the level crossing of this line with the national road DN 72.

#### **Other problems found out during the investigation:**

##### *the engine driver*

- the notification about the locomotive failure was made at about one hour after the last braking (at 14:53), using the radio-telephone equipment of the locomotive. The request for the assistance was made at about one hour, against the art 47(2) from the *Instruction for the activity of the locomotive staff* no. 201/2007, approved by Order of Minister of Transport, Constructions and Tourism no. 2229/23.11.2006, that stipulates that when the engine driver can not remove the problems appeared in the locomotive operation within 15 minutes from their finding out, he asks an assistance, from the nearest station, then he can continue the failures removal;
- handing over-reception of the locomotive was not made in the place where the rake of wagons was;
- he has no license for the locomotive LDH with engine “CATERPILLAR”. From the performed checking resulted that the driver, before the accident, drove this type of locomotive (locomotive DHC 002 of the rake of wagons CM2 is type LDH with engine “CATERPILLAR”). This noncompliance is a railway incident, included at the art. 8, group C point 4, 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 the Government Decision no. 117/2010.

##### *driver's assistant*

- he did not come in the railway station I.L. Caragiale in order to be checked before the service beginning, did not meet with the provisions of the art. 24(3) from the *Instruction for the activity of the locomotive staff* no. 201/2007, that impose that the coming for the reception of the service be made in the railway station at the movements inspector;
- the reception of the service was made on the route, not at the locomotive that he had to guard;

##### *foreman shunter*

- he has no authorization to perform the test of the automatic brake. This noncompliance is a railway incident, included at the art. 8, group C point 4, 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 the Government Decision no. 117/2010;

- he handed over the key +7 of the switch no. 7 from the fan of industrial branches Gura Palangii though the rake of wagons was not stabled in the railway station I.L. Caragiale. According to the provisions of the chapter 3, art. 7 from the Regulations for the Operation of the track section I.L. Caragiale – Moreni – Filipestii de Padure – Gura Palangii, handing over of the key +7, on signature, recording the hour in the Unified Register of free pass systems, orders and movement is one of the operations that is performed by the foreman shunter after the rake of the wagons stabling in the railway station;

*disposing station movements inspector*

- he handed over the key +7 to the shunting foreman according to his verbal request before the dispatching of the rake of wagons CM1 on the branch line carrying feeder traffic I.L. Caragiale – Gura Palangii, and not in accordance with the written request of the foreman shunter, against the provisions of the chapter 3 art. 6 from the *Regulations for the Operation of the track section I.L. Caragiale – Moreni – Filipestii de Padure – Gura Palangii*;
- he took the key +7 from the foreman shunter before the stabling of the rake of wagons in the railway station, against the provisions of the chapter 3 art. 7 from the *Regulations for the Operation of the track section I.L. Caragiale – Moreni – Filipestii de Padure – Gura Palangii*;

*signallman from the no. 1 switches cab of the railway station I.L. Caragiale*

- on the 5<sup>th</sup> of July 2012, at the start of the service, the signallman from the no. 1 switches cab did not record in the orders register that the lock of the derailer S1 was out of service and did not inform, in written, the disposing station movements inspector about this failure, against the provisions of the art. 22 of the *Regulations for the running of the trains and the shunting of the railway vehicles* no. 005/2005;
- the statement according that he informed verbally the movements inspector on duty that the fixed derailer S1 can be locked, is not confirmed by the movements inspector on duty;
- the handing over of the service at the no. 1 switches cab was not made in accordance with the instruction, therefore he broke a sheet of paper from the register of orders from the no. 1 switches cab where he had recorded the handing over/reception of the service before the coming to the switches station of the staff that had to start the service.

*interlocking system electromechanic*

- unsuitable maintenance of the fixed derailer S1, one found out at the accident moment that the lock bar was broken from the threaded area (at 3 fillet from screw), the its outside part missed and the broken area had no characteristics of a new breakage;

*skilled worker (LMAET) from the inspection station Targoviste*

- between the order sent by the wagon operator from the Zonal Freight Centre Bucuresti and received by the *skilled worker* (LMAET) from the workshop wagons maintenance Targoviste is a incongruity that is the first sent “route the car to the railway station I.L. Caragiale in order to transport the staff MC+RTV from the railway station I.L. Caragiale to the railway station Targoviste” and the second one wrote “route the car to take the staff MC+MT from the railway station I.L. Caragiale to the railway station Targoviste”
- the abbreviation RTV from the written phone note of the wagon operator is train preparer, that is it was cancelled;

*head of the staff in shift from the depot Bucuresti Triaj*

- he routed to the railway station I.L. Caragiale the driver’s assistant that was to perform the guard in the railway station Targoviste Sud for the locomotive DHC 002 according a verbal order. Without having a written order from the operator of the Zonal Freight centre Bucuresti;

*operator I (local activity) of the Zonal Freight Centre Bucuresti from SNTFM “CFR Marfa” SA*

- between the department OPAD and Zonal Freight Centre Bucuresti there are no records of the orders given for the running and assurance of the assistance. All the orders were verbally;
- at the interface between the head of staff in shift from the depot Bucuresti Triaj there were a series of communication noncompliances, so the assistance was not routed for the rake of wagons CM2;

*head of the Logistics Centre for the Clients from the Zonal Freight Centre Bucuresti*

- he did not meet with the provisions from the job sheet, that is he did not coordinate, route and monitor properly the activity of the staff from the subordinated structures, that is he did not take clear measures concerning the drivers exchange, the locomotive DHC 002 not being shedded, he had to order the forwarding of a driver for the staf exchange, not the forwarding of a driver’s assistant for surveillance;
- he did not take cleare measures for the sunting staff exchange, that is:
  - he did not order the manager of the railway freight station Targoviste Sud to take measures for forwarding the shunting staff for the exchange of that one who was to take over the rake of wagons CM2 (after 19,00 o’clock the railway freight station Targoviste Sud has no sunting staff, consequently the manager of the railway station had to receive written order to ensure the staff for shift for the rake of wagons CM2);
  - the order sent by the the wagon operator by the RVS operator and then sent in written to the Inspection Station for Wagons Targoviste did not contain:
    - the hour to which the staff had to be taken over;
    - if the staff, that had to be taken over, was to be replaced by other staff.

## **B.8 Accident causes**

**B.8.1 Direct cause** of the accident was the non-ensurance of the braked mass percentage necessary to keep stopped the rake of wagons CM2 being on the branch line carrying feeder traffic I.L. Caragiale – fan of industrial branches Gura Palangii.

### **Contributing factors**

- the shunting gang left the rake of wagons, SNTFM “CFR Marfa” SA did nor ensure another shunting gang, taking into account that the shunting of the rake of wagons CM2 was not finished and it was not stabled on one of the lines from the railway station I.L. Caragiale, as it is stipulated in the chapter 3, art. 7 from the Regulations for the operation of the track section I.L.Caragiale-Moreni-Filipestii de Padure-Gura Palangii, approved by AFER and the Ministry of Transports, Constructions and Touris. The shunting gang leaving endangered the traffic safety on the branch line carrying feeder traffic I.L. Caragiale-Gura Palangii and in the railway station I.L. Caragiale;
- the driver left the locomotive of the rake of wagons CM2, without meeting with the provisions of the art. 12, paragraph 1, letter e from the Instructions for the activity of the locomotive staff no. 201/2007, approved by Order of the Ministry of Transports, Constructions and Tourism no. 2229/23.11.2006;
- delivery of the locomotive by the driver’s assistant for surveillance was made without being shedded on a line especially dedicated in a traction unit or station, as it is stipulated at the art. 9, paragraph 1, letter e and at the art. 30 –(1) from “Instructions for the activity of the of the locomotive staff no. 201/2007, approved by Order of the Ministry of Transports, Constructions and Tourism no. 2229/23.11.2006”;
- service transfer from the locomotive driver of the rake of wagons CM2 to the driver’s assistant , in charge with the surveillance;
- position of the fixed derailer S1 that, at the passing of the rake of wagons CM2, run away from the branch line carrying feeder traffic I.L. Caragiale-Gura Palangii, was “Overturn from the rail”, against the provisions:
  - art. 170, paragraph 2 of the Regulations for railway technical operation no. 002/2000, approved by Order of Ministry of Public Works, Transports and Lodgings 1186/2001;

- art. 35, paragraph 6, 10<sup>th</sup> section from the Regulations for the running of the trains and of the shunting vehicles no. 005/2005;
- chapter 3 from the Regulations for the operation of the track section I.L. Caragiale-Moreni-Filipeştii de Padure-Gura Palangii, approved by AFER and Ministry of Transports, Constructions and Tourism.

### **B.8.2 Underlying causes**

None.

### **B.8.3 Root causes**

None

### **C. Safety recommendations**

The addressees of the safety recommendations are Romanian Railway Safety Authority, the public railway infrastructure manager CNCF"CFR" SA and the freight undertaking SNTFM "CFR Marfa"SA.

The recommendations aim to settle the next issues:

1. Analysis of the opportunity to achieve the dependence between the position of the fixed derailer S1 and the position of the mechanical barrier from the level crossing km 0+600 with interlocking system in the railway station I.L. Caragiale;
2. Analysis of the opportunity to supplement the provisions of the Regulations for hauling and brake no. 006/2005 where to be mentioned the measures that the driver's assistant has to take when the driver is not in the locomotive or he is not able and the train, rake of wagons or the light locomotive run away and can not be braked.
3. Updating of the regulation framework concerning the definition of the branch line carrying feeder traffic;
4. Supplement of the instruction for the operation of the interlocking system from the railway station I.L. Caragiale with the provisions concerning the working way when the fixed derailer S1 is out of service.
5. Analysis of the procedures for sending the dispositions and the register way between OPAD of SNTFM headquarters and CLSC Bucuresti in order to remove the ambiguities that can appear in the verbal communication of the dispositions.

This investigation report will be sent to Romanian Railway Safety Authority, the public railway infrastructure manager CNCF"CFR" SA and the freight undertaking SNTFM "CFR Marfa"SA.

### **Members of investigation commission**

- |                       |                                     |                     |
|-----------------------|-------------------------------------|---------------------|
| ▪ Nicolae SANDU       | - OIFR director                     | - main investigator |
| ▪ Eduard STOIAN       | - OIFR department head              | - member            |
| ▪ Mircea NICOLESCU    | - OIFR investigator                 | - member            |
| ▪ Stefan CIOCHINA     | - OIFR investigator                 | - member            |
| ▪ Luigi SPINU         | - Traffic Safety central inspector  | - member            |
|                       | General Inspectorate of Traffic     |                     |
|                       | Safety and Control CNCF „CFR” SA    |                     |
| ▪ Răzvan ALEXANDRESCU | - department head at                | - member            |
|                       | SNTFM „CFR Marfa” SA                |                     |
| ▪ Tudor CIOLACU       | - regional inspector Traffic Safety | - member            |
|                       | Zonal Freight Centre Bucuresti      |                     |
|                       | from SNTFM „CFR Marfa” SA           |                     |

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