



INVESTIGATING REPORT

On the railway accident occurred on the 21st of September 2009, on the track section Craiova – Caracal, on the open line between the railway stations Banu Maracine and Malu Mare, at the km 201+149, consisting in the derailment of the locomotive and the first seven wagons of the passenger train no. 1692.



Final edition
The 24th of February 2010

NOTICE

With reference to the railway accident occurred on the 21st of September 2009 on the track section Craiova – Caracal, on the open line II, between the railway stations Banu Maracine and Malu Mare, at the km 201+139, in which was involved the passenger train no. 1692, Romanian Railway Investigating Body performed an investigation in accordance with the provisions of the Law no. 55/2006 on railway safety. Through the investigation, the information on the respective accident was gathered and analyzed, the conditions were established and the causes determined.

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

Romanian Railway Investigating Body considers necessary to take corrective measures in order to improve the railway safety and to prevent the accidents, so making in this report a series of safety recommendations.

Bucharest, the 24th of February 2010

approved by,

Director
Dragos Floroiu

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

Chief Investigator
Sorin Constantinescu

This approval is part of the Report for the investigation of the railway accident occurred on the 21st of September 2009 on the track section Craiova – Caracal, on the open line II between the railway stations Banu Maracine and Malu Mare, at the km 201+139, in which was involved the passenger train no. 1692.

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I. PREAMBLE

I.1. Introduction

Concerning the railway accident from the 21st of September 2009, on the track section Craiova – Caracal, on the open line II, between the railway stations Banu Maracine and Malu Mare, at the km 201+139, in the running of the passenger train no. 1692, Romanian Railway Investigating Body, permanent and independent body of Romanian Railway Authority – AFER, referred to as OIFR, started an investigation in order to prevent some accidents with similar causes, by establishing the conditions, causes and issuing some safety recommendations.

OIFR investigation was performed in accordance with the Law no. 55/2006 on railway safety and did not aim to establish the guilty or the responsibility, its objective being the improvement of the railway safety.

I.2. Investigation

On the 21st of September 2010, OIFR was notified about the occurrence of a railway accident by Romanian Railway Safety Authority, body of Romanian Railway Authority – AFER, it moved to the accident place and found out:

- the derailment of the locomotive hauling the passenger train no. 1692;
- the derailment and serious damage of seven coaches of the passenger train no. 1692;
- damage of the line on 200m;
- damage of the contact line on 100 m and the destruction of 3 pillars for the support of the contact line.

At the accident place were present also the representatives of:

- Prosecuting Magistracy attached to the Court of Appeal Craiova
- Operative department of the Railway Transports Police
- Emergency mobile department for resuscitation and extrication – SMURD
- National Railways Company „CFR” SA
- National Railway Passenger Company „CFR” SA
- Romanian Railway Safety Authority.

The occurred facts were defined as railway accident, so, in accordance with the provisions of art. 19, paragraph (2), letter a of the Law no. 55/2006 on railway safety, OIFR director decided to open an investigation action.

By the decision no. 12 from the 23rd of September 2009 of OIFR manager, was appointed the investigation commission, consisting in:

- | | | |
|------------------------|---|------------------------|
| ▪ Constantinescu Sorin | - | investigator in charge |
| ▪ Stoian Eduard | - | member |
| ▪ Sfarlos Dumitru | - | member |
| ▪ Olaru Mihai | - | member |
| ▪ Popescu Nicolae | - | member |
| ▪ Nicolescu Mircea | - | member |

The activity for the removal of the railway serious accident effects was coordinated by the members of the inquiry commission, appointed in accordance with the provisions of the Instructions for the prevention and inquiry of the railway accidents and events no. 003/2000 and it was performed according to the agreement of the Prosecuting Magistracy attached to the Court of Appeal Craiova.

A. SUMMARY OF THE ACCIDENT

A.1. Brief presentation

On the 21st of September 2009, at 2:23 hour, in the railway county Craiova, on the track section Craiova – Caracal (double line electrified), between the railway stations Banu Maracine and Malu Mare, at the km 201+149, on the open line II, the hauling locomotive and seven coaches of the passenger train no. 1692 derailed.

Before the occurrence of the serious railway accident, on the 21st of September 2009, at 2:12 hour, the passenger train no. 1692 arrived in the railway station Craiova and was parked on the direct line I.

At 2:16 hour the train was dispatched from the railway station Craiova on the line II to the railway station Caracal on the basis of the signal position „train departure”, given by the movements inspector and on the permissive position of the exit signal Y1, having the green light on, without other remarks.

On that date the passenger train no. 1692 consisted in 8 coaches, 32 axles, 386 t, 225 meters, braked 535 t, plus 72 t against the timetable, hauled by the locomotive EA 40-0754-8 (belonging to the locomotive shed Timisoara) and run between the railway stations Timisoara Nord and Bucuresti Nord.

The configuration of the route in the serious railway accident area is in cutting section from km 200+500 to km 201+300, in curve with right deviation, on the direction of train running and 2,53‰ Gradients (down grade to the viaduct Carcea).

A.2. Direct causes, underlying causes and root causes

A.2.1 Direct cause of the accident was the loss of the flange of the wheel guidance on the right side of the first axle in the locomotive running (axle no. 1), at the expansion joint between the right rail of the glued insulated joints panel and the buffer panel from the end of the non-welded track section, it led to the running of the wheel flange on the rail head and the fall of this wheel on the outside of the track. It happened because the voluntary action of an/some unknown person/persons, unidentified up to the end of the investigation, out of the process for the maintenance of the infrastructure parts, respectively the dismantling of the spare parts of the track superstructure, belonging to the right rail (in the train running) of the buffer panel from the non-welded track as follows:

- dismantling of the fish-plates from the right joint that made the passing from the glued insulated joints panel to the panel from the non-welded track section;
- completed dismantling of the vertical fastenings of the rails on the sleepers of the buffer panel on the first 14 sleepers and of the next 4 sleepers only on the right side;
- displacement of the rail ends from the joint because of the vertical dynamic forces generated by the running vehicles.

A.2.2. Underlying causes were not identified

A.2.3. Root causes were not identified

A.3. Severity level

According to the provisions of the art. 3, letter 1 of the Law no. 55/2006 on the railway safety, the event by its consequences, is defined as railway accident.

A.4. Safety recommendations

The addressee of the safety recommendations is National Railways Company “CFR” SA, as administrator of the public railway infrastructure and the railway undertakings.

The recommendations have to settle the next issues:

1. The urgency in the drawing up of a program for the priority implementing of the provisions of the Law no. 289 from the 11th of October 2005 concerning some measures for the prevention and fighting against the infringements in the railway transport.
2. Drawing up of a study by Romanian Railway Authority – AFER and National Railways Company “CFR” SA together with the railway undertakings concerning the analysis of the reliability of the human resource in the present socio-professional and economic conditions.
3. Analysis of the possibility to include the counseling and psychotherapy services in the medical services received by the railway staff, in order to ensure a best physical and mental condition.

This investigation report will be sent to the railway infrastructure administrator/manager, railway undertakings and Romanian Railway Safety Authority.

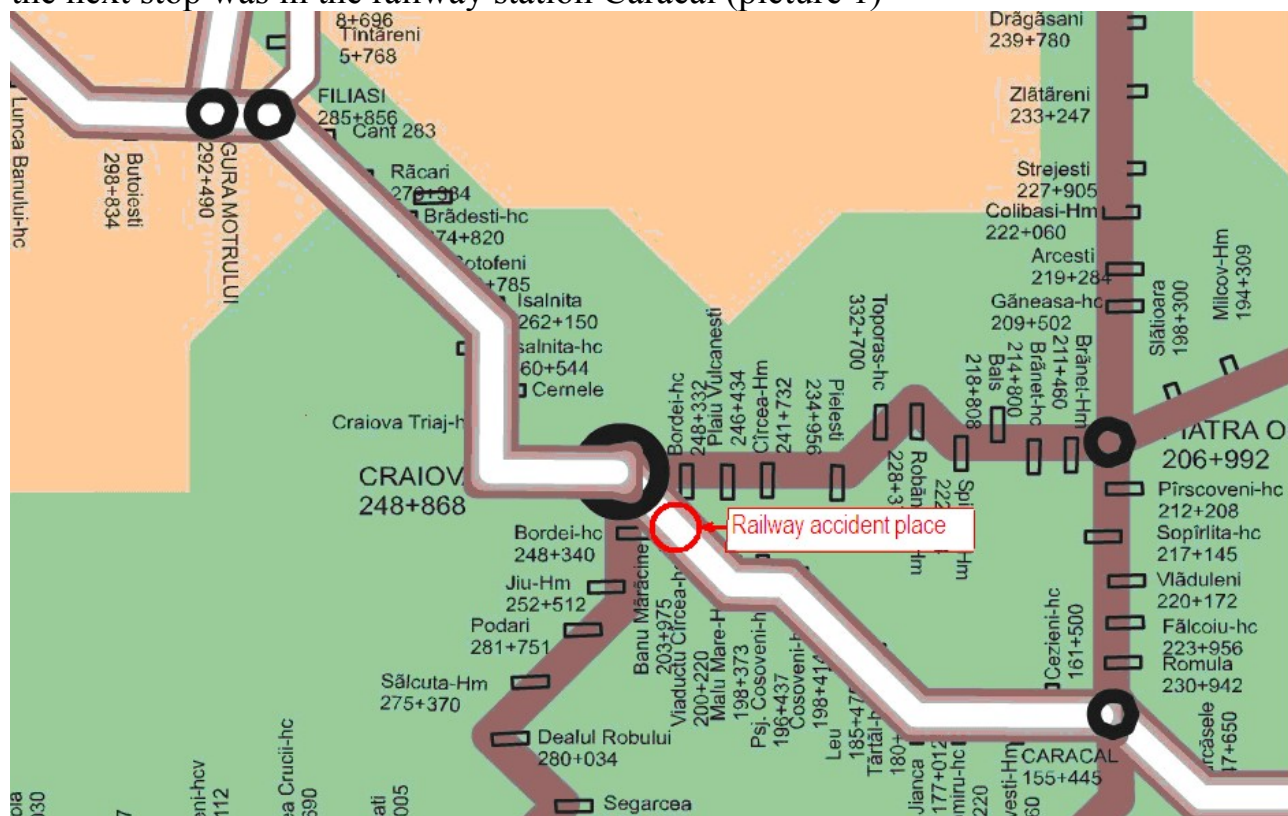
According to the provisions of the Law no. 55/2006 on the railway safety, Romanian Railway Safety Authority will monitor the implementing of these recommendations.

B. INVESTIGATING REPORT

B.1 Accident presentation

On the 21st of September 2009, the train no. 1692, running between Timisoara and Bucuresti Nord, left the railway station Craiova and passed without stop, according to the established path, on the line II between the railway stations Banu Maracine –

Malu Mare. At its passing through all railway stations, the train was visually checked by the movements inspectors (IDM). None of them observed problems in the train running. According to the established path, after leaving the railway station Craiova, the next stop was in the railway station Caracal (picture 1)



railway accident place

picture 1

After passing through the railway station Banu Maracine, the train run on the open line II to the railway station Malu Mare, with speeds between 37 and 117 km/h – according to the working timetable the maximum running speed was 120 km/h. At the caution signal of the railway station Malu Mare, at 2,22 hour, at the passing on the first joint of the buffer panel from the non-welded track section, at the km 201+149 all the axles of the locomotive EA 754 derailed, followed by the derailment of the first 7 coaches, respectively all axles of the coaches no. 50532055092-2, 50432054060-0, 50532055095-5, 50531955009-9, 50532054033-7, 50532054087-3 and 50532055105-2.

B.2. The accident circumstances

B.2.1. Involved parties

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

The track infrastructure and superstructure are administered by CNCF “CFR” SA and maintained by the employees of the Tracks District Banu Maracine from the Track Section L4 Caracal, Railway County Craiova.

The interlocking systems on the line Craiova – Caracal are administered by CNCF “CFR” SA and are maintained by the employees of the Track Section CT 3 Rosiori, railway county Craiova.

The railway telecommunications equipment from the railway stations Banu Maracine and Malu Mare are administered by CNCF “CFR” SA and are maintained by the employees of SC TELECOMUNICATII CFR SA.

The electrical power and traction equipment (IFTE) is administered by CNCF “CFR” SA and is maintained by the employees of SA ELECTRIFICARE CFR SA.

The on-board railway communications equipment is owned by SNTFC “CFR Calatori” SA and is maintained by its employees.

The locomotive and the coaches of the derailed train are owned by SNTFC “CFR Calatori” SA and are maintained and inspected in the route by its employees, and the repairs are performed by the economic agents authorized as railway suppliers.

The investigation commission questioned the employees involved in the railway traffic management, railway equipments and lines maintenance, the driver.

B.2.2. Composition and equipments of the train

The passenger no.1692, consisting in 8 coaches, 32 axles, 386 t, 225m, hauled by the locomotive EA 40-0754-8, belonging to the locomotive shed Timisoara, subunit of SNTFC “CFR Calatori” SA.

Safety and vigilance devices (DSV), the equipment for the punctual control of the speed and self-stop (INDUSI) of the traction vehicles were active and operated according to the instruction and with the handbrake active.

B.2.3. Railway equipments

Route presentation

The railway accident place, between the railway stations Banu Maracine and Malu Mare is part of the cross profile track section type cutting km 200+500-201+350.

The site track, lines I and II, consists in 3 insulated curves in straight line.

At the km 200+306, in straight line, is the viaduct Carcea, whose total length is 168.06 m. Because of the kilometrical position of this viaduct in the track area, for the curve from the km 200+490-200+707 it was not possible to achieve its geometrical elements, corresponding to a maximum speed of the train of 120 km/h, the viaduct from the building point of view being a fixed point, situated in a straight line or on the flat, to which the track on the site must be connected. From this reason it was necessary to restrict the maximum speed of the train at 105 km/h (maximum speed imposed by the geometrical elements of this curve). The restriction of the maximum speed of the trains at a speed level of 105 km/h is made on the total length of this curve, that is in the area of the km 200+490-200+707 and it is signaled in the train according to the provisions of the art. 141 of “Signalling regulations” no. 004/2006.

In the longitudinal section, the track on the site was in gradient of 2,53‰ (gradient), and on the flat the track on the site is in curve with right deviation (in the train running direction), having a radius $R=3775$ m, cant of the track $h=30$ mm and gauge

clearance $s=0$ mm. The derailment point is on the junction parabolic curve between the straight line and the constant radius curve.

Presentation of the track superstructure

Between the railway stations Banu Maracine and Malu Mare, line II, the track superstructure consists in rail type 65, concrete sleepers T17, indirect fastening type K. The open line II is welded, having 3 holds-up, one of these holds-up being at the caution signal PrY of the railway station Malu Mare and consists in (in the train running direction) a glued insulated joints panel and a buffer panel.

The buffer panel between the glued insulated joints panel (JIL) and the track section without is situated from the km 201+149 to the km 201+139 (in the train running direction) and is situated in the junction parabolic curve km 201+119 – km 201+184 of the curve.

The glued insulated joints panel (JIL) is situated in front of the buffer panel and is in a track panel with the length of 12.5 m. In front and behind of both panels are non-welded track sections.

Presentation of the safety equipments for the railway traffic management

The railway station Banu Maracine is endowed with interlocking system type CR3 with automatic block and the railway station Malu Mare is endowed with interlocking system type CR2 with automatic block.

The equipment for the management of the traffic on the line II, between the railway stations Banu Maracine and Malu Mare is type automatic block line (BLA).

Presentation of the equipments for traction and power supply

The contact line, part of the equipment for traction and power supply, consists in catenary suspension and its supporting system on reinforced concrete pillars.

Between the railway stations Banu Maracine and Malu Mare line II the type of the catenary suspension is complete tension-regulated.

On this distance, between the km 202+194 – 202+234 (40 m), is made the separation of the power supply of the contact line through an insulated section (neutral section).

The energy power supply of the contact line between these railway stations is made through two electrical substations:

- substation Cernele – for the area situated between the railway station Filiasi and the insulated section, it including also the railway station Craiova;
- substation Jianca – for the area situated between the railway station Caracal and the insulated section.

The railway accident occurred in an area where the maximum train running speed on the open line II was 120 km/h.

On the 21st of September 2009, nearby the railway accident place one did not perform any works at the lines and railway equipments.

Train composition and equipments

The passenger train no. 1692 consisted in 8 coaches, 32 axles, 386 t, 225 meters, braked 535 t, plus 72 t against the timetable, hauled by the locomotive EA 40-0754-8 (belonging to the locomotive shed Timisoara, subunit of SNTFC „CFR” SA) and run between the railway stations Timisoara Nord and Bucuresti Nord.

The safety and vigilance devices (DSV), the equipment for the punctual control of the speed and self-stop of the traction vehicle were active and operated according to the instruction and with the automatic active brake.

B.2.4. Communication equipments

The communication between the driver and the movements inspectors, as well as between the driver and the train crew was ensured by the radio-telephon equipments.

B.2.5. Starting of the railway emergency plan

Soon after the railway accident occurrence, the starting of the intervention plan for the removal of the damages, victims and restarting of the traffic, had 2 parts:

- notification of the national unique system for emergency calls 112 for fires, accidents, medical emergencies, calamities and other events that involves quick intervention of the specialized services, by the passengers of the train no. 1692, involved in the railway accident, after which at the place of the railway serious accident moved representatives of the Prosecuting Magistracy attached to the Court of Appeal Craiova; Operative department of the Railway Transports Police :Emergency mobile department for resuscitation and extrication – SMURD;
- notification the railway accident through the information circuit stipulated in the annex 2 of the Instructions for the prevention and inquiry of the railway accidents and incidents – no. 003/2000, after which came the representatives of CNCF “CFR” SA / administrator of the railway public infrastructure, of SNTFC “CFR Calatori” SA – railway passenger undertaking and of Romanian Railway Authority – AFER.

At the accident place were guided interventions vehicles in order to remove its effects, that acted after the agreement of the prosecutor entitled by the Prosecuting Magistracy attached to the Court of Appeal Craiova.

In order to retake the running of the derailed rolling stock, one asked and guided the intervention train consisting in the crane EDK 1000/4 of 125 tf and the specialized intervention train with hydraulic jacks and crane EDK 80/3 belonging to SC Interventii Feroviare SA – Craiova district, as well as the intervention train consisting in the crane EDK 1000 of 125 tf, crane EDK 2000 of 250 tf and the specialized intervention train with hydraulic jacks belonging to SC Interventii Feroviare SA – Bucuresti district from the railway station Bucuresti Triaj, to the railway accident place, the intervention trains with cranes type EDK 2000/1 and EDK 750/6, as well as the intervention wagon with hydraulic jacks.

B.3 The consequences of the accidents

B.3.1 Losses and casualties

Following this railway accident 15 passengers were carried to the District Hospital Craiova.

After the physical examination and first medical aid, none of them was hospitalized.

B.3.2 Material damages

The value of the material damages in accordance with the estimations drawn up by the owner of the rolling stock, of the intervention vehicles and by the administrator of the public railway infrastructure is as follows:

- **At the locomotive EA 754**, according to the estimation -
47199.17 lei
no. 7290/09.10.2009, drawn up by the depot Timisoara
- **At the coaches**, according to the estimation -
188974.20 lei
no. 201/368/28.09.2009 drawn up by SC IRV Calatori Titu (for the coaches no. 505320540873 and no. 505320540337);
According to the paper no. 143/1304/18.10.2009 - **648280.00 lei**
of RTFC Bucuresti for the wagon no. 50532055092-2
According to the paper no. 4.1/396/12.10.2009 of - **61824.21 lei**
the Railway Workshops Grivita for the wagon
no. 50532055105-2
According to the paper of Railway Passenger - **30901.37 lei**
County Timisoara no. 331/V/1147/23.10.2009 for the wagon
no. 50531955009-9
According to the paper of Railway Passenger - **6351.81 lei**
County Timisoara no. 331/V/1147/23.10.2009 for the
wagon no. 5053205406-0
According to the paper of Railway Passenger - **3781.02 lei**
County Timisoara no. 331/V/1147/23.10.2009 for the
wagon no. 5053055095-5
- **At the line**
According to the estimation no. 403/8/102/2009 of the - **187922.99 lei**
Track Section L4 Caracal
According to the estimation no. 403/8/103/2009 - **19976.87 lei**
of the Track Section L4 Caracal

According to the estimation no. 403/8/104/2009 of - **9339.89 lei**
the Track Section L4 Caracal
According to the estimation no. 207/53/209/2009 of - **19509.96 lei**
the Track Section L4 Caracal
- **At the equipments**
According to the estimation no. 2/2/2/1/1158/30.09.2009 - **6412.65 lei**

of the Electrification Center Craiova
According to the estimation no. 484/2009 of the
Electrification Center Rosiori - 62858.70 lei
According to the estimation no. 223/1/918/28.09.2009
of the Track Section CT3 Rosiori - 7222.00 lei

- **Cost of the intervention vehicles**

According to the estimation no. L4.2/163/29.09.2009 - 91072.11 lei
of the Branch of Railway County Bucuresti
According to the estimation no. 94/25.09.2009 of - 45618.12 lei
the Track Section L5 Craiova
According to the estimation no. 95/25.09.2009 of - 15203.02 lei
the Track Section L5 Craiova

1. Other damages

According to the estimation no. SRTc - 3502.24 lei
2/3/1/618/2009 of the Telecommunications
County Branch Craiova

- **1.1. Hire of locomotive and the payment of the respective staff**

According to the estimation no. 1866/28.09.2009 - 5198.51 lei
of the Railway Freight Depot Craiova;
According to the estimation no. 1865/28.09.2009 - 7278.12 lei
of the Railway Freight Depot Craiova
According to the estimation no. 1864/2009 - 9626.62 lei
of the Railway Freight Depot Craiova
According to the estimation no. 1863/2009 - 3964.23 lei
of the Railway Freight Depot Craiova
According to the estimation no. 1861/2009 - 16232.05 lei
of the Railway Freight Depot Craiova
According to the estimation no. 1862/2009 - 18806.20 lei
of the Railway Freight Depot Craiova.

- **1.2. Payment of the shunter worked hours**

According to the estimation no. 2B/73/2009 of - 9980.58 lei
the Freight Branch Craiova;

- **1.3. Hauling by a train with crane EDK 125 tf and EDK 250 tf**

According to the estimation no.
T4/512/28.09.2009 of the Railway Freight
Depot Bucuresti Triaj - 5916.75 EUR
to which is added 372,45 lei

- **1.4. Damages at the environment – none**

Total value of the material damages is 5916.75 EUR+1527408.09 lei

B.3.3 Consequences of the accident in the railway traffic

The railway traffic was completely closed on both lines from the 21st of September 2009, 2:30 hour up to the 22nd of September 2009, 18:28 hour, when it was restarting on the line 1.

During this time the running of the freight and passenger trains was transferred on the route Craiova – Piatra Olt – Caracal.

The line II Banu Maracine - Malu Mare was re-opened on the 25th of September 2009, 17:46 hour.

Trains delayed and cancelled:

- 64 passenger trains with a total delay of 1803 minutes;
- 11 freight trains with a total delay of 10072 minutes;
- 25 passenger trains were cancelled.

B.4. External circumstances

On the 21st of September 2009, between the hours 1:00 and 3:00 the visibility was good, temperature was about 16⁰ C.

The visibility of the colour light positions was in accordance with the provisions of the specific regulations in force.

In the area where happened the railway accident the line is curved with right deviation (in the train running) and gradient with the grade of 2:53 ‰.

B.5. The investigation course

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

Driver of the locomotive EA 754, that hauled the passenger train no. 1692 stated as follows:

- after passing the insulated section between Banu Maracine and Malu Mare, at the caution signal PrY of the railway station Malu Mare the locomotive derailed, followed by the coaches;
- before the derailment he did not observe and feel any obstacles and did not hit any strange body
- after stopping the locomotive he observed that the train lagged behind with about 100 m;
- going out of the locomotive he observed all its axles derailed.

The train master of the passenger train 1692 stated as follows:

- after passing the railway station Banu Maracine, he observed strong and noisy vibrations following the train derailment;
- he could not pull the emergency signal because the wagon was reclined to the right and he lost the stability;
- after the train stop, he called 112;
- he contacted the driver and informed him about the derailment of 7 coaches;
- he assured the last un-derailed wagon against the runaway and signaled the derailment area on the next line;

- up to the arrival of the intervention teams he helped the passengers to go out of the wagons.

The ticket collector of the passenger train no. 1692 stated as follows:

- after passing the railway station Banu Maracine, he was in the first wagon after the locomotive together with the guard and the control team from the Railway Passenger County Craiova;
- he felt strong vibrations specific to the derailment;
- after stopping the train he went out of wagon through the window together with the guard;
- the guard asked him to signal the derailment area on the line I up to the arrival of the intervention teams and he helped the passengers to go out the wagons.

The service official on duty at the moment of the event occurrence in the railway station Banu Maracine stated as follows:

- after receiving the departure notification for the train 1692 from the movements inspector from the railway station Craiova, he notified the driver that that he could pass on the open line V and then he made a visual inspection of the train;
- after the train passing, he notified the driver that there was no technical problem at the visual inspection of the train, the train being signaled in accordance with the instruction, and the driver confirmed the reception of this notification;
- he sent the notification about passing through the railway station Banu Maracine to the movements inspector from the railway station Malu Mare;
- he notified the traffic controller operator about the train passing and entered data in the computer;
- after about 2 minutes the track section 1AD on the line Banu Maracine – Malu Mare was occupied;
- he contacted the movements inspector from the railway station Malu Mare who informed him about the derailment of the train 1692.

The service official on duty at the moment of the event occurrence in the railway station Malu Mare stated as follows:

- after receiving the notification about the departure of the train 1692 from the railway station Banu Maracine he did the passing route on the direct line 3;
- after about 2 minutes the track section 1AD from the line I Banu Maracine – Malu Mare was occupied;
- the driver of the train 1692 notified him by station that the train is derailed;
- he notified the traffic controller operator that the train 1692 is derailed;
- he notified the head of the railway station and the head of the railway transports police.

The ganger belonging to the District L5 Banu Maracine, who performs the periodical technical inspection of the track between the railway stations Banu Maracine and Malu Mare stated as follows:

- on the 21st of September 2009 he performed, according to the inspection schedule, the periodical technical inspection of the track between the km 194+000 and the km 201+500;
- on the buffer panel, at the km 201+139-201+149 the train passed at about 11,00 hour;
- the fastening of the rails on the metallic plates was properly ensured, being no fastening systems with missing parts or with loosened fastening elements;
- on the whole distance for inspection there were no area where the metallic parts for the fastening of the rails on the metallic plates were lubricated with lubrication material;
- he was never administratively punished for the non-compliance with the job tasks.

The gang foreman for lines belonging to the District 5 Banu Maracine stated as follows:

- the last track infrastructure works at the km 201+139-201+149 were performed in August 2009 and consisted in the rectification of cross alignment by manual tamping one after another and the fastening of the vertical bolts on the non-welded track;

The district inspector for lines no. 5 Banu Maracine in the track section L4 Caracal stated as follows:

- the last work consisting in the detachment of the rail from the sleepers at the km 201+139-201+149, on the line II Banu Maracine – Malu Mare was performed in 2004, in March and represented the stress relief of both rails;
- the last inspection on the line II Banu Maracine – Malu Mare, before the railway serious accident, was performed together with the gang foreman during the second fortnightly inspection in September 2009. During this inspection he did not find out loosening of the metallic fastenings that ensured the fastening of the rail on sleepers. One also did not find out joints with loosened metallic fastenings.

B.5.2. Safety management system

At the moment of the railway accident, CNCF “CFR” SA, as manager of the railway infrastructure, was at the end of the process for the implementing of the own system for the management of the railway safety, in accordance with the provisions of Directive 2004/49/EC concerning the safety on the community railways, of the Law no. 55/2006 concerning the railway safety and of the Minister of Transports’ Order no. 101/2008 concerning the granting of the safety authorization to the administrator/manager of the Romanian railway infrastructure, respectively for getting :

- safety authorization – part A – through Romanian Railway Safety Authority from AFER acknowledge the acceptance of the system for the safety management of the railway infrastructure manager;
- safety authorization – part B – through Romanian Railway Safety Authority from AFER acknowledge the acceptance of the disposals taken by the railway infrastructure manager in order to comply with the specific requirements necessary for the guarantee of the railway infrastructure safety, in the design, maintenance and operation, including, if case, the maintenance and operation of the system for the traffic control and signaling.

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

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

Norms and regulations

- Technical Regulations for Railway Operation no. 002, approved by Minister of Public Works, Transports and Lodging's Order no. 1186 from the 29th of August 2001;
- Instruction on establishment of the schedule and order for the track inspections no. 305, approved by Minister of Transports' Order no. 71 from the 17th of February 1997
- Instruction for the district chief permanent way inspector in charge with the track maintenance no. 323/1965;
- Instruction for the activity of the gang foreman in charge with the track maintenance no. 322/1972;
- Instruction for the lengthmen and gangers or dangerous points no. 321/1972;
- Regulations for signaling no. 004/2006;
- Instruction of norms and tolerances for track construction and maintenance - lines with standard gauge no. 314/1989;
- Instruction for the construction, maintenance and surveillance of the non-welded track no. 341/1980;
- Instruction for the technical maintenance and repair of the interlocking system (SCB) no. 351/1988, approved by Order of the Deputy of the Minister of Transports and Telecommunications no. 1749 from the 23rd of September 1988, previously amended;

Sources and references

- copies of the documents enclosed to the investigation file drawn up by the inquiry commission appointed by Decision of the Branch of the Railway County Craiova no. 42/1/1242/2009 from the 15th October 2009;
- photos made soon after the railway accident by the members of the inquiry commission and by the members of the investigation commission;
- documents concerning the maintenance of the railway lines and equipments, submitted by the persons in charge with their maintenance;

- documents concerning the management and control of the trains traffic;
- results of the measurements performed soon after the railway accident at the electric locomotive that hauled the coaches of the train involved in the accident;
- control and interpretation of the technical situation of the elements involved in the accident: infrastructure, railway equipments and train;
- questioning of the employees involved in the railway accident.

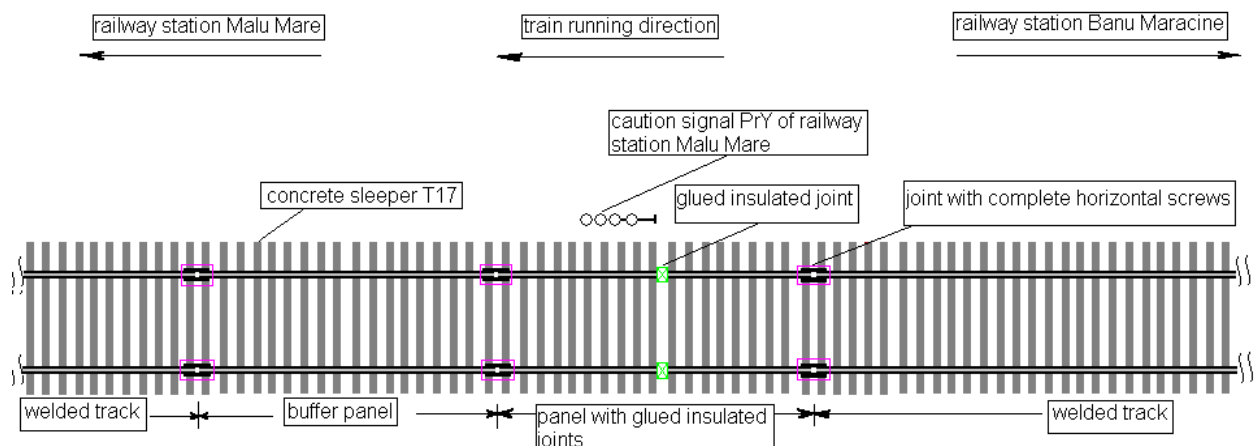
B.5.4. Operation of the technical equipments, infrastructure and rolling stock

B.5.4.1. Data found out on the track

The technical condition of the line before the accident

The superstructure of the line between the railway stations Banu Maracine and Malu Mare consists before in rail type 65, concrete sleepers T17 non-welded track, in which there are 3 holds-up, made from buffer panels.

One of these holds-up of the non-welded track was situated in the area of the railway accident and presented as follows:



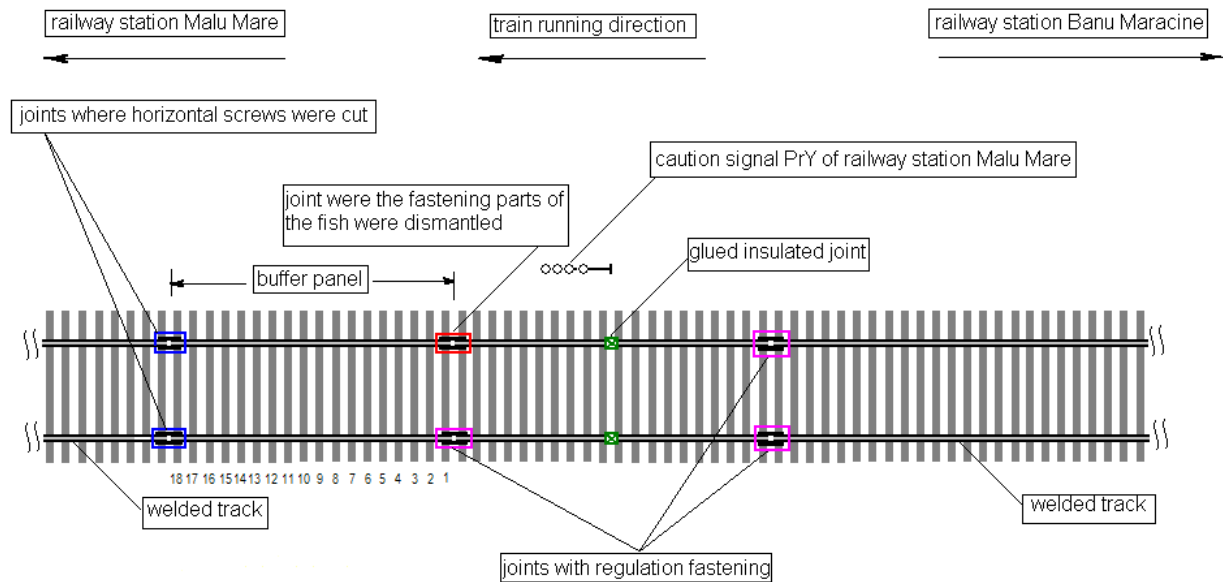
drawing of the achievement of the breack in the welded track

drawing no.1

- the glued insulated joints are type 65 with 12.5 m length;
- the buffer panel from rails type 65 fitted on 18 concrete sleepers T17.

Note: Use in operation of a single buffer panel for protection on a non-welded track with rail type 65 next to a panel with glued insulated joints instead 2 buffer panels for protection , is not in accordance with the provisions of annex 3, point 4, letter a) from the Instruction for the building, maintenance and surveillance of the non-welded track no. 341/1980 (re-published 1997), but it does not influence the normal functioning of the non-welded joints, the role of those two panels being to reduce the streching efforts in the insulation of the glued insulated joint at lower temperatures than the fastening temperatures of the non-welded joints.

On spot, after the derailment, there were found out



the technical situation of the joint after the accident

drawing no. 2

The right rail (in the direction of the train running)

- at the metallic for the fastening of the parts of the base of rail on the metallic plates, it presented recent spots of lubrication material;



traces of lubrication material on the base of the rail

picture 2

- this type of rail was under the 7th derailed wagon, on the concrete sleepers being discovered overturned between the lines with the base of the rail orientated to the left rail (in the direction of the train running) of the line II and it was about in the same position as in operation;



position of the overturned rail picture 3

-on the right lateral surface of this rail, starting from about 2 m from the detached joint, on the upper surface of the base of the rail and on the connection area of the base of the rail with the web of the rail there were found out continuous traces generated by the derailed wheels of the rolling stock;



traces left by the rolling stock on the base of rail picture 4

-the rail with the detached fastenings and found out between the lines is distorted (curved) on the track flat on the first 3 – 4 m from the end of the detached joint;



*distorted rail following the push lateral forces
generate by the derailed rolling stock*

picture 5

-the joint that connects the rail section and the glued insulated joint was detached, the plane crews, the spring rings and the nuts being found out between the sleepers and the broken stone track bed. The left fish-plate (at the centre of the track) of this joint was found out inside the track;



dismantled joint

picture 6

-the metallic plate from the first sleeper of the detached joint had traces made by the stresses induced by the rail movement and the wheels running as well as by its shoulders distorted by pressing, the most probably because of the movement of the base of the rail to inside of the track, hypothesis supported by the traces on the base of the rail;



metallic plate on the right side in the direction of the train running

picture 7



traces on the base of the rail

picture 8

- on the sleepers numbered from 1 to 14 (photo 2) the metallic elements for the fastening of the base of the rail on the metallic plates were completely detached, these were found where they had to be on the flat;
- on the sleepers numbered from 15 to 18 from the same drawing, the metallic elements for the fastening of the base of the rail on the metallic plates were detached only on the right side of the rail, and those from the left side of the rail were between the rails of the line II, having fitted on them spring rings and nuts;
- the right joint, to the end of the non-welded track section, had the horizontal screws bent and broken, but with the spring rings and nuts un-detached. The left fish plate was between the rails of the line II, at about 0,90m after the joint position. The left fish plate of this joint was found in the rich vegetation from the right side of the cutting wall;
- the vertical fastening of the rail on sleepers was as follows: on the left side of the rail section from the right in the running direction, the nuts for the tightening of the vertical screws was completely detached with traces of un-threading starting with the last sleeper from JIL up to the sleeper no. 14 of the

rail section, and on the right side of the rail section, the nuts for the tightening of the vertical screws were completely detached and had recent traces of unthreading with recent spots of oil, starting with the last sleeper from JIL and on all length of the rail section;

- the end of the rail from the glued insulated joint had a trace of frontal impact, having the metallic material detached from the rail head and on the running surface of the rail head, starting from the centre of the rail head to the right lateral face there was a trace specific to the running of the flange of wheel, followed by the derailment;



metallic material detached from the rail head and the trace of running of the wheel flange picture 9

The left rail (in the train running direction)

- ensemble „joint” between the glued insulated joint and the rail from the buffer panel was fitted according the instruction, with all the components active. This joint was not affected by the derailment;
- ensemble „joint” between the rail of the buffer panel and the non-welded track section, had the horizontal screws bent and broken, and those two fish plates were thrown on the track bed, following their impacts with the derailed railway vehicles.
- at both joints the bondings, that ensure continuity of the current for the signals, were not cut.



joint from the left side of the running direction between the buffer panel and the non-welded track picture 10

- on the right side of the line II, in the running direction, at about 6 m from the caution signal PrY of the railway station Malu Mare and at about 2,5 m from the clearance was found a plastic box of 1l with label PETROM and inscription „Motor Oil Bike 2T” with liquid (about 250 ml). Also, next to the box, at about 20 cm, was found a metallic tube of 1 m of square section and traces of impact to outside;



the metallic tub of square section and the box with the label „Motor oil bike2T” picture 11

- parallel with the line, at about 1,6 m and at 8 m from the signal PrY, was found a metallic tube type construction scaffold of about 2 m.



metallic tube type construction scaffold picture 12

The maintenance on the line II between the railway station Banu Maracine and Malu Mare before the railway serious accident.

Walking inspection of the track

From the track walking inspection point of view, the lines I and II between the railway stations Malu Mare – Banu Maracine, it is performed in the inspection no. 15 of the Track Maintenance District Banu Maracine of the Track Section L4 Caracal.

The last walking inspection of the line II of this open track section was performed by the ganger on the 20th of September 2009, according to the provisions of the art. 1, sheet no. 2 of the Instruction for the establishment of the terms and order in which the track inspections have to be performed, no. 305/1997 and of the inspection schedule drawn up by the Management of the Track Section L4 Craiova and approved by the Management of the Track Division Craiova.

Works performed at the railway infrastructure before the railway serious accident

On the 4th of August 2009 was performed a work for the tightening of the vertical bolts on non-welded track. According to the records in the sheet of the non-welded track, the last intervention on the line II, in the railway serious accident area, was performed on the 31st of March 2004 for making safety the non-welded track. The work consisted in stress relief of the left side and of that from the right side of the

non-welded track km 201+000-201+325 and reestablishment of these at the temperature +28⁰ C.

The last non-destructive inspection of the rails with the ultrasonic fault detector was performed on the 20th of August 2009, on this section being not found any rails out of order.

The last but one inspection of the track condition on the line II was performed on the 22nd of March 2009 with the track measuring wagon, being not found any track failure in this area.

On the 18th of September 2009 was performed the inspection of the track condition on the line II with the track measuring motorised train. According to the records of the different checked parameters, there were no failures at the line or track bed. Also, following the analysis of the video records made with the equipment of the track measuring motorised train on the line II, the vertical fastenings on all rail length from the right side of the buffer panel (in the train running direction) were normal, tightened and had no traces of lubrication (according CD with video records).

Also, the measured values of the gauge and cross level did not exceed the tolerances accepted and the values of the gradients maximum accepted by the provisions of art. 7, point B, of art. 1, point 14, of art. 7, point 4 Instruction of norms and tolerances for the construction and maintenance of the track – line with standard gauge no. 314/1989, the line matching with the maximum running speeds.

B.5.4.2 Data found out on the operation of the rolling stock and its technical equipments

The train no. 1692 hauled by the locomotive EA 754 run according to the instruction up to the km 201+149, where happened the derailment of the locomotive EA 784 and of the next 7 coaches.

The locomotive EA 754 had the equipment for the punctual control of the speed “INDUSI” in operation and sealed, the safety and vigilance equipment “DSV” in operation and sealed, the equipment for records and measurement of the speed was in operation and sealed. In the machines room the devices blocks (S1 – S8) were sealed, the automatic brake equipment of the locomotive was in operation and the brake cock type KD2 were on quick brake.

The measurements made during the inspection type R2 on the 24th of September 2009 by SC CFR SCRL Brasov – Section for the Locomotive Repairs, unit to which was routed the locomotive for repair, are recorded in the measurement sheets enclosed to the factual reports – piece of the investigation file. From the analysis of the values measured at the tyres from the locomotive axles resulted that these are in the limits accepted by the Regulations for Railway Technical Operation no. 002/2001.

The last measurements and the adjustment of the loads distribution on the axle of the locomotive EA 754 were performed on the 25th of August 2009 without any other interventions, up to the railway accident. According to the records from the measurement sheet, the values were between the instruction operation limits.

Following the interpretation of the records of the equipment IVMS on the locomotive EA 754, that hauled the passenger train no. 1692 and the measurements made on spot resulted:

The passenger train no. 1692 consisted in 8 coaches, 32 axles, 386 t, 225 m, braked 535 t, plus 72 t against the timetable, hauled by the locomotive EA 40-0754-8 (belonging to the locomotive shed Timisoara) and run from the railway station Timisoara Nord to the railway station Bucuresti Nord.

The passenger train no. 1692 arrived in the railway station Craiova on the 21st of September 2009, at 2:12 hour, stabling on the open line I.

From the railway station Craiova, at 2,16 hour, the train was dispatched on the line II to the railway station Caracal according to the permissive position of the exit signal Y1, having the green position on, and of the signal “train departure” given by the movements inspector without any other remarks.

After running 454 m with a speed of 50 km/h, the driver checked the effectiveness of the brake on 227 m, operating the braking system of the locomotive and decreasing the running speed of the train from 50 km/h to 37 km/h. After checking the effectiveness of the brake, the driver took measures for increasing the speed in order to achieve the maximum running speed stipulated in the timetable, that is 120 km/h. Running in this way at 2:18':27" hour, after 1703 m, the train passed through the railway station Bordei with a speed of 76 km/h.

Then the train speed increased to 116 km/h after 3292 m, the train passing with this speed on the open line V of the railway station Banu Maracine, at 2:20':19" hour.

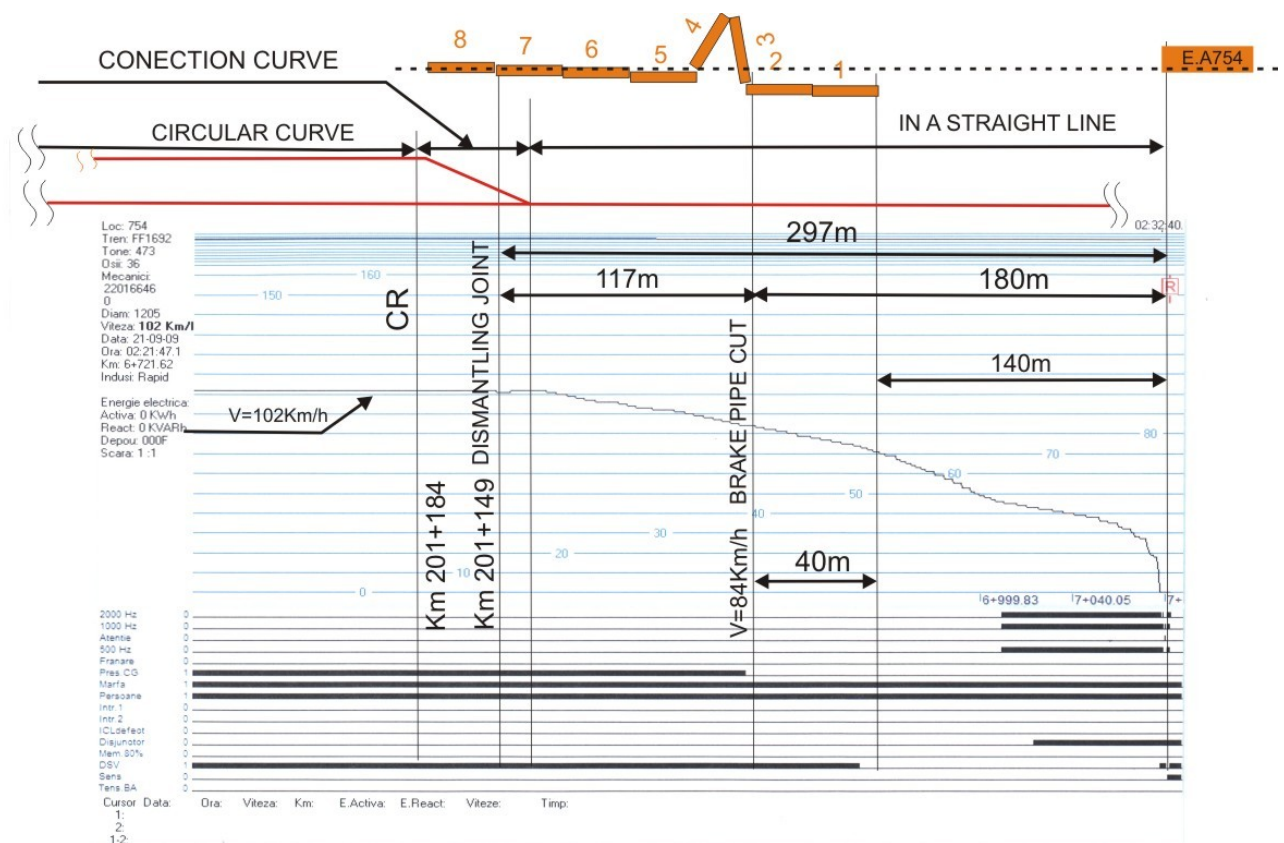
The train running speed increased to 117 km/h, then the driver had to take instruction measures specific to the passing through an insulated section, because in the continuity of the power supply of the contact line there is an interruption (insulated section) So, at 2:21':08" hour, he disconnected the automatic circuit breaker of the locomotive, passing the insulated section with the speed of 112 km/h.

Because forwards there was a running speed limitation at 105 km/h at the km 200+490-200+707, the speed limitation signaled in train according to the provisions of the art. 141 of the Signaling Regulations no. 4/2006, the driver took measures to decrease the running speed, so in about 875 m the train speed decreased from 112 km/h to 102 km/h.

From the speed level of 102 km/h, the train speed started to decrease up to the train stop, after running 297 m.

During the running of 297 m, the series of the events recorded by the equipment IVMS on-board was:

- the train speed decreased from 102 km/h to 84 km/h on 117 m;
- at 2:21':53'' hour the continuity of the air general pipe cut at 84 km/h speed;
- at 2:21':56'' hour, after 50 m started to function the equipment DSV of the locomotive – broken of the locomotive inductor, the train speed decreasing at 74 km/h;
- at 2:22':01'' hour the equipment IVMS recorded the disconnection of the automatic circuit breaker and the train speed decreased at 43 km/h on 14 m – catenary breaking;
- at 2:22':09'' hour the train stopped after 54 m;
- the distance between the breaking of the train and the interruption of the general air pipe up to the stop of the derailed locomotive is 180 m.



the diagram of the records of the equipment IVMS on which overlapped the position of the locomotive EA 754 and of the coaches after the derailment

picture 13

According to the measurements made on the site:

- the distance from the first derailed coach stopped up to the derailed and stopped locomotive is 140 m;
- the distance between the first derailed coach stopped and the km where happened the interruption of the locomotive air pipe was 40 m, corresponding to the length of the first two coaches of the derailed train;

- the distance from the detached joint at the end of the first derailed coach is 157 m, corresponding to those 7 derailed coaches.

Following the checking on spot of the consequences of the derailment on the rolling stock and on the track was found out:

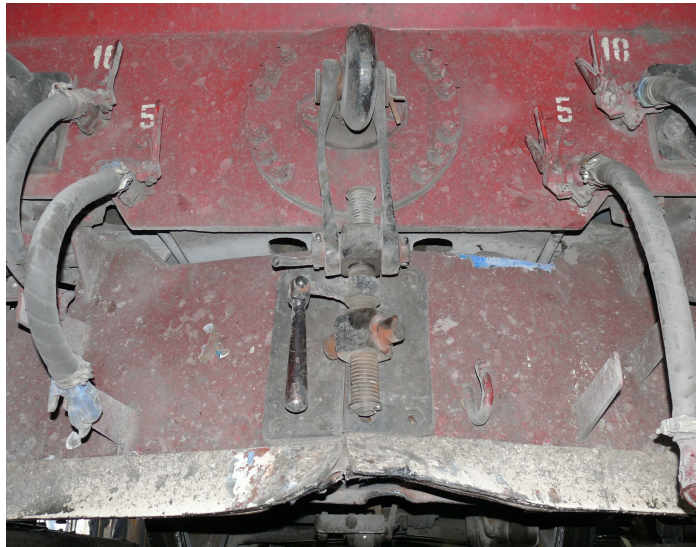
- the locomotive EA 40-0754-8 was detached from the train and with all the axle derailed, with the left wheels (in the running direction) between the rails of the line and was at 140 m from the first coach;



derailed locomotive

picture 14

- the traction coupler had the binding chain broken;
- the left fish plate of the traction coupler distorted because of the displacement to the right of the running direction of the locomotive trajectory against the coaches trajectory;
- the animal anti-impact in the middle section was vertically distorted because of the contact with the rail from the right of the track in the running direction, achieved in the running of the derailed locomotive.



animal anti-impact distorted picture 15

- the locomotive run with the left wheels, in the running direction, on the track centre, the traces on the sleepers being visible from the panel detached to the locomotive stopped and derailed;



traces left by the locomotive, left flange wheels of the locomotive picture 16



the sleeper damaged by the flange picture 17

of the left weels on the left side of the locomotive

- the coach no. 50532055092-2, first of the train, derailed and reclined on right side of the running direction, its front being at 2.5 m from the rail of the right side in the running direction and its back being at 2.2 m from the rail of the right side of the running direction. The first bogie of the coach was between the coach and the line II;



first coach of the train

picture 18

- the coach 50532054060-0, the second of the train, derailed and overturned on the right side of the running direction, its front being at 0.7 m from the rail of the right side of the running direction and its back being at 7.9 m from the rail of the right side in the running direction. The second bogie of the second coach



II;

and those 2 bogies of the third coach were between the coaches 2 and the line

the second coach of the train

picture 19

- the coach no. 50532055095-5, the third of the derailed train, reclined to the left and placed in an angle of 60° to the right, on both lines of the track.



the third coach of the train

picture 20

- The coach no. 50531955009-9 the fourth of the derailed train and place in an angle of 30° to the left on those 2 lines of the track;



the fourth coach of the train

picture 21

- The coach no. 50532054033-7 the fifth of the derailed train and reclined to the right, with the right wheels on the track bed and the left wheels hung above the rail from the outside of the line II;



the fifth coach of the train

picture 22

At this coach, at the wheel from the right side of the axle no. 1 of the bogie no. 1, in the running direction, was found out a distorsion of the flange of wheel following the impact of the rail section end corresponding to the buffer panel with the detached fastenings.



the fifth coach after the locomotive – distortion of the wheel flange from the right side of the axle no. 1 of the bogie no. 1 in the running direction picture 23

- the coach no. 50532054087-3, the sixth of the derailed train and reclined to the right, with the right wheels on the track bed and the left wheels hung above the rail from the outside of the line II;



the sixth coach of the train picture 24

- the coach no. 50532055105-2 the seventh of the derailed train with the first bogie at a distance of 0.83 m from the rail head and the bogie 2 next to the rail head;



the seventh coach of the train

picture 25

- the wagon 61534431039-1, the eighth of the train (the last) remained on the line un-derailed;



the eighth of the train

picture 26

- the line Banu Maracine – Malu Mare was deteriorated on about 200 m;
- 3 concrete pillars for the contact line support were deteriorated.

B.6. Analysis and conclusions

B.6.1. Analysis of the train derailment occurrence

Causes

- By detaching the horizontal fastenings and disassembling the fish plates from the first joint on the right side, in the running direction of the locomotive, the continuity of the guidance system of the right wheel of the locomotive first axle was interrupted (photo 24). Under the dynamic loads action induced by the railway vehicles appeared the possibility of a vertical threshold and one lateral between the running surface of the rail of the buffer panel and the running surface of the rail from the panel from the glued insulated joints panel.
- At the des-assembled joint, the rounded broken and whitish stone existing round the right end (in the running direction) of the first sleeper from the buffer panel, indicates that it permits vertical displacements of the frame rail – sleeper. It permitted the increase of the vertical displacement of the rail end detached under the action of the vertical efforts generated by the running rolling stock.



*round whitish broken stone at right end of the first sleeper
from the buffer panel*

foto27

Presentation of the derailment occurrence

The right wheel in the running of the axle no. 1 of the first bogie derailed at the rail-joint gap, whose fish plates were detached, derailed outside the track in the right side of running, because of aggregation of the causes above presented. After the derailment , the right wheel in the running direction fell on the superior surface of the rail section base whose fastenings were detached on those 18 sleepers and run guided by the shoulders of the metallic plates from the concrete sleepers.

The running of the right wheels of the locomotive on the superior surface of the rail section base is proved by the first two sleepers from the joint of the buffer panel that had no impacts or degradations resulted from the wheels impacts.

The first left wheel of the axle no. 1 of the locomotive fell inside the track at the third sleeper from the joint, running on the concrete sleepers.

Because of the running of the derailed wheels of the axle 1 the horizontal screws for the fastening of the fish plates, binding those two rails of the buffer panel from the track section CFJ.

The derailed wagons 1, 2, 3 run in the same conditions as the locomotive, having the same trajectory.

At the derailment of the coach no. 4, the axle 1 of the bogie no. 2, in the running direction, hit the rail section from the right side (according to the impact identified on the wheel flange) at the end, generating the taking out of the rail from the metallic plate shoulder from the first sleeper of the panel.



*the fourth coche - the impact trace of the right rail by the
first axle of the second bogie*

foto 28

The axle no. 1 of the first bogie of the coach no. 5 from the right side of the running direction hit frontally with the wheel flange the end of the rail section taken out from the metallic plates shoulder, generating the displacement of the rail section to the track center and its overturning by turning round the longitudinal center of the rail.



rail taken out from the metallic plates shoulder foto 29

The impact generated by hitting the end of the rail section together with the resistance to forward motion following the derailment of first 4 coaches led to the breakage of the traction coupling chain of the locomotive, ending by the cutting of the continuity of the train general air pipe.

The air pipe was cut at 117 m from the detached joint, this distance checks with the run distance (in derailed condition of the coaches) equal with the length of 4 coaches up to the axle no. 1 of the bogie no. 1 of the coach 5.

After cutting the air pipe and the detachment of the locomotive from the coaches happened:

- the locomotive run in derailed condition 180 m, before stop;
- the coach no. 1, followed by the other coaches run 40 m, before stop;
- the coaches 1 and 2 run 40 m with the left wheels on the track bench and then on the track longitudinal ditch, it led to the coaches overturning on the right side and hitting of an electrification pillar with the buffer pad (left side of the running direction) and the coach stairs, leading to its destruction.

Analysis of the track circuit operation

The continuity of the track circuit from a rail to another in the area of a butt joint is made through metallic constructive elements of the joint and through continuity connections consisting in 2 wires of 4 mm diameter fixed with each end in the webs of the two rail by connection pins.

The cutting of the rail continuity that should have been seized by the track circuit afferent to the track section controlled from the electric point of view between the signals PrY and Y (track section 1AD). It was not possible to be seized by the track circuit, when the joint plates were dismantled, because the continuity connections were cut (by cutting or taken out of the connection pins).

The lack of signaling on the control panel of the joint dismantling was generated by the same causes above mentioned.

Taken into account that these continuity connections were not dismantled or broken, one can conclude the existence of some knowledge in the field of track circuit.

Analysis of the dismantling of the right rail (in the train running) from the buffer panel

The previous lubrication with lubricating material of the nuts and vertical screws, whose role was to fix the base of the rail on the metallic plates, indicated that the action was premeditated both concerning the early preparation or concerning the preparation for the decrease of the action time.

At 00:53 hour (according to the records made by the movements inspector on duty in the unified registry for line clear, orders and movements of the railway station Banu Mare) with 88 minutes before the passenger train no. 1692, on the line II Banu Maracine – Malu Mare passed the freight train no. 20964.

A number of 32 nuts, that ensured the tightening of the vertical fastenings, and 4 nuts from the joints, that ensured the fastening of the fish plates on the rail web.

The complete hand dismantling of nuts of the vertical screws can be made in two ways:

- a) using a key with tube head and vertical rod (similar to that from the endowment of a maintenance team);
- b) using a hand screw key.

In the first situation the un-threading of the nuts of the vertical screws using a key with tube head supposes the simultaneous action of 2 persons.

In the second situation, using a hand screw key supposes the action of a person, but in this situation, compared with the previous situation, the physical effort and the time necessary to un-thread the same number of nuts is higher.

The horizontal screws from the joint can be taken out by a single person, without change the threaded area of the bolt rod, because the shape of the fishes of plate holes and their sizes are not the same with those from the rail web that are circular and with constant diameter. From this remark results that there were two persons, because the thread from the rods of the horizontal bolts were not deteriorated.

That the metallic parts were completely dismantled without any impact or deterioration traces of the threaded bods of the bolts lead to the hypothesis that one used proper tools and there was not only a person.

The metallic material dismantled and left on spot indicates that the motive of its dismantling was not the theft, especially as in the interval between these two lines was put a rail of about same length as that affected.

On has to analyze that it happened in the night, and the place is situated in an area with cross section type cutting, the dark in this area being increased by this cross section of the track.

If one takes into account that the time between the passing of those two trains was 88 minutes and the leaving of the action place had to be done so the he can be seen by the driver of the train no. 1692, and also results that there was no an only person.

That at the last 4 sleepers of the buffer panel the nuts of the vertical screws from the left side (to the centre of the track) are not detached and the right joint that ensures the passing from the rail of the buffer panel to the rail of the non welded track section, indicates there was no necessary time to do it, leaving the action place in a hurry. It is proved that in the action place one found those 2 tubes and the box with lubrication material. If there were more than 2 persons with proper tools then it was the necessary time for their complete dismantling.

B.7 Accident causes

B.7.1 The direct cause of the accident was the lost of the guidance of the wheel from the right side of the first axle in the locomotive running direction (axle no. 1) at the expansion joint between the right rail of the glued insulated joints panel and the buffer panel from the end of the non-welded track section, it led to the running of the flange of the wheel on the rail head and the fall of this wheel outside the track. It was generated by the deliberate action of some (one) persons/person unknown and unidentified up to the end of the investigation, out of the maintenance of the railway infrastructure elements, respectively dismantling of the constructive elements of the track superstructure, afferent to the right rail (in the train running direction) from the buffer panel from the non-weldd track, namely:

- dismantling of the right fish plates that made the passing from the panel with glued insulated joints to the buffer panel from the non-welded track section;
- complete dismantling of the vertical fastenings of the rail on the sleepers from the buffer panel on the first 14 sleepers and on the next 4 sleepers only on the right side;
- displacement of the ends of the rails from the joint under the action vertical and lateral dinamic loads indused by the running railway vehicles.

B.7.2. Underlying causes were ont identified

B.7.3. Root causes were not identified.

C. SAFETY RECOMMENDATIONS

The addressees of the safety recommendations are National Railways Company „CFR” SA, as administrator of the public railway infrastructure and the railway undertakings.

The recommendations have to settle the next issues:

1. The urgency in the drawing up of a program for the priority implementing of the provisions of the Law no. 289 from the 11th of October 2005 concerning some measures for the prevention and fighting against the infringements in the railway transport.
2. Drawing up of a study by Romanian Railway Authority – AFER and National Railways Company “CFR” SA together with the railway undertakings concerning the analysis of the reliability of the human resource in the present socio-professional and economic conditions.
3. Analysis of the possibility to include the counseling and psychotherapy services in the medical services received by the railway staff, in order to ensure a best physical and mental condition.

This investigation report will be sent to the railway infrastructure administrator/manager, railway undertakings and Romanian Railway Safety Authority.

According to the provisions of the Law no. 55/2006 on the railway safety, Romanian Railway Safety Authority will monitor the implementing of these recommendations.

Members of the investigation commission

Sorin CONSTANTINESCU - investigator in charge

Eduard STOIAN - member

Dumitru SFÂRLOS - member

Mihai OLARU - member

Nicolae POPESCU - member

Mircea NICOLESCU - member