



MINISTRY OF TRANSPORTS AND INFRASTRUCTURE
ROMANIAN RAILWAY AUTHORITY - AFER

ROMANIAN RAILWAY INVESTIGATING BODY



INVESTIGATING REPORT

of the railway accident happened in the railway station Aiud,
on the 18th of July 2010



Final edition
the 10th of November 2010

NOTICE

With reference to the railway accident occurred on the **18th of July 2010**, at **8,30** hour, in the **Branch of the Railway County Brasov**, in the railway station Aiud, consisting in the **derailment of the second bogie in the running direction of the wagon no. 84535451255-8** (the 19th after the locomotive) of the **freight train no. 60133-2** (belonging to the railway undertaking SC GRUP TRANSPORT FERROVIAR SA), over the switch no. 6 from the end Y of the railway station, Romanian Railway Investigating Body carried out an investigation, according to the provisions of the Government Decision no. 117/2010. Through the investigation, the information on the respective accident was gathered and analyzed, the conditions were established and the causes determined.

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

Romanian Railway Investigating Body considers necessary that measures be taken corrective in order to improve the railway safety and to prevent the accidents, so it included in the report a series of safety recommendations

Bucharest, the 10th of November 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 accident occurred on the 18th of July 2010, at 8,30 hour, in the Branch of the Railway County Brasov, in the railway station Aiud, consisting in the derailment of the wagon no. 84535451255-8 of the freight train no. 60133-2.

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PREAMBLE

1.1 Introduction

With reference to the railway accident occurred on the **18th of July 2010**, at **8,30** hour, in the **Branch of the Railway County Brasov**, in the railway station Aiud, consisting in the **derailment of the second bogie in the running direction of the wagon no. 84535451255-8** (the 19th after the locomotive) of the **freight train no. 60133-2** (belonging to the railway undertaking SC GRUP TRANSPORT FERROVIAR SA), over the switch no. 6 from the end Y of the railway station, Romanian Railway Investigating Body carried out an investigation, according to the provisions of the Government Decision no. 117/2010. Through the investigation, the information on the respective accident was gathered and analyzed, the conditions were established and the causes determined.

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

1.2 Investigation process

On the 18th of July 2010, General Inspectorate for the Traffic Safety from CNCF “CFR” SA notified Romanian Railway Investigating Body about the railway accident happened on the same day, at 8,30 hour, in the Branch of the Railway County Brasov, in the railway station Aiud, in the running of the freight train no. 60133-2 (belonging to the railway undertaking SC GRUP TRANSPORT FERROVIAR SA), consisting in the derailment of the second bogie in the running direction of the wagon no. 84535451255-8 (the 19th after the locomotive).

Taking into account that, the happened deeds are classified as accidents according to the art.3, letter 1 of the Law 55/2006 on the railway safety and that this accident is relevant for the railway system, in accordance with the art. 19, paragraph (2) of the Law 55/2006 on the railway safety, corroborated with the art. 48, paragraph 1 of the Regulations for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway safety, approved by the Government Decision 117/2010, Romanian Railway Investigating Body decided to start an investigation. So, through the Decision of OIFR director, no. 26 from the 19th of July 2010, was appointed the investigation commission, consisting in:

- Nicolescu Mircea - investigator in charge
- Paul Sever - investigator
- Zama Olimpiu - track section inspector in the County Inspectorate for Traffic Safety Brasov of CNCF “CFR” SA

A. ACCIDENT RESUME

A.1 Brief presentation

On the 18th of July 2010, at 17,15 hour, in the **Branch of the Railway County Brasov**, in the railway station Aiud, in the running of the freight train no 60133-2 (operated by SC GRUP TRANSPORT FERROVIAR SA), at its entry on the direct line III happened the derailment of the second bogie in the running direction of the wagon no. 84535451255-8 (the 19th after the locomotive) over the switch no. 6 from the end Y of the railway station.



Geographical position of the accident

The freight train no. 60133-2 consisted in 33 wagons (from which 30 loaded with pipes, 3 empty), 132 axles, 2073 gross tonnage, 1389 net tonnage, length 525 m and hauled by the locomotive EA 444, with banking locomotive DA 581 (both of them belonging to the railway undertaking SC GRUP TRANSPORT FERROVIAR SA).

The wagons of the freight train no. 60133-2 were dispatched from the railway station Zalau Nord to the railway station Constanta Port.

The last technical inspection (before the accident) of the freight train no. 60133-2 should have been performed in the railway station Campia Turzii, from where it was dispatched at 7,30 hour to Teius. At the entry in the railway station Aiud, at overrunning the switch no. 6, the second bogie of the wagon no. 84535451255-8 (the 19th of the train), in the running direction, derailed.

This accident did not generate any deaths or injuries.

A.2 Direct cause, contributing factors and root causes

A.2.1 The direct cause of the accident is the displacement of the tyre of the wheel no. 6 on the wheel rim, it leading to the derailment of the pair of wheels corresponding to the wheels no. 5-6 of the wagon no. 84535451255-8.

Contributing factors:

Loosening of the tyre of the wheel no. 6 of the wagon no. 84535451255-8, followed by the its turning round the wheel rim and the burnishing of the fastening ring, generated by:

- the decrease in time of the fastening strength between the tyre and the wheel rim (the wheelset is 43 years old);
- the thermic stress on the tyre because of braked running of the wagon up to the wear of the brake shoes on the wearing shoes (where the brake shoe is fitted up) at the wheel no. 6;
- the wear of the tyre in the rolling circle, wear limit close to the limit accepted in operation.

A.2.2 Underlying cause

The underlying cause of the accident is the lack of compliance with the specific regulations in force on the technical inspection performance in the railway station Campia Turzii, as one stipulated in the Working Timetable for the running of the freight trains 2010.

A.2.3 Root cause

The railway undertaking did not meet with the legal requirements on the use in the technical inspection (composition and tranzit) of the railway critical services, that comply with the compulsory specific regulations on the technical authorization by AFER.

A.3 Severity level

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

A.4 Safety recommendations

1. Romanian Railway Safety Authority suspend the safety certificate part B for the track section „Campia Turzii – Apahida – Dej Calatori – Beclean pe Somes – Salva – Ilva Mica – Floreni and back”, granted to SC Grup Transport Feroviar SA, because of lack of compliance with the specific regulations in force and with the requirements, according which it was granted, especially with the art. 4(1) b) point 6 of the annex II of the Minister of Transports Order 535/2007(that stipulates as compulsory requirement „the ensuring of the technical inspection of the trains in the railway stations, at the inspection in tranzit, at the arrival, with authorized economic agents authorized as railway suppliers by AFER for this type of service or with own staff, if the railway undertaking is authorized by AFER for this type of service”).
2. Romanian Railway Notified Body perform an assessment or technical inspection, if case, in order to check the conditions that were the basis for the granting of the railway technical agreement, for technical inspections at the freight trains, granted to SC Compania de Transport Feroviar Bucuresti SA, especially with the art. 7, point i) of the *Norm on the granting of the railway technical agreements in the railway and subway field, approved by Minister of Transports Order 290/2000 – amended by the Minister of Transports, Construction and Tourism Order 2068/2004*
„(they prove that the manufacturer of the product or the performer of the service has organizational structures, technical endowments, as well as trained and certified staff, if case, that ensure the process for the achievement of the railway critical products and/or services stipulated at the art. 1, paragraph (2) ;letters a), b) and c)”)
 conditions that during the investigation were not complied and the application of the provisions of the art. 11 of the above mentioned norm.

(„if during the monitoring one finds out that one or more conditions that are base for the granting of the railway technical agreement, are not complied, AFER can suspend the granted technical agreement”)

3. Romanian Railway Safety Authority carry out inspections at the railway freight undertakings in order to check the organization of the technical inspection of the freight trains, the ensuring of the authorized staff for the examiner position, according to the commitments assumed by the railway suppliers at the granting of the railway technical agreements for this type of railway critical service.

4. Romanian Railway Safety Authority analyze, together with the economic agents, that repair the rolling stock, and with the railway undertakings the oportunity to complete the Instructions 931/1986 with the compulsoriness to limit the use wheelset with tires.

5. Romanian Railway Notified Body check, during the technical inspections at Compania de Transport Feroviar Bucuresti SA – Bucuresti Working Place, the observance of the provisions of the art. 29 (concerning the marking of the tyre position against the wheel) from the Instruction for the repair of the railway vehicles pair of wheels no. 931/1986, especially at the pair of wheels manufactured before 1986,in the technological flow.

This investigation report will be sent to Romanian Railway Safety Authority , to Romanian Railway Notified Body, to the public railway infrastructure manager CNCF „CFR” SA and to the railway freight undertakings SC Grup Transport Feroviar SA and to Compania de Transport Feroviar Bucuresti SA.

B. INVESTIGATING REPORT

B.1 Accident presentation

On the 17th of July 2011, through the order no. 5022 of the Central Office for the Management of the Railway Traffic, one scheduled for running the freight train no. 60133-2, operated by SC Grup Transport Feroviar SA, that was to run from Zalau Nord to Petrosani, where it was to be re-formed in order to be dispatched to the railway station Constanta Port.

Those 33 wagons of the train 60133 in the railway station Aiud were loaded at SC SILCOTUB SA, being shunted on a group of lines at the entry in the railway station and then in the railway station Zalau Nord in a single wagons group. The wagon no. 84535451255-8 arrived in the railway station Zalau Nord in the train 60141 on the 8th of July 2010, appearing in the wagons list with the brake in operation, it being stated also by the examiner, that performed the technical inspection at the arrival

From the railway Zalau Nord the wagons were dispatched in two trains 69493 and 60133 because of the limitation of the maximum tonnage accepted by the line between the railway stations Zalau and Jibou. The wagon no. 84535451255-8 was the 15th in the train no. 69493.

From the railway station Jibou, those two above mentioned wagon couples re-formed the train 60133-2, consisting in 33 loaded wagons with 132 axles, 24 empty wagons, 22073 tons, 510 m. The train run in these conditions up to the railway station Caseiu where it was stopped according to the Order of the Traffic Controller Dej no. 1, for the change of the running conditions of the train 89810, according to the timetable.

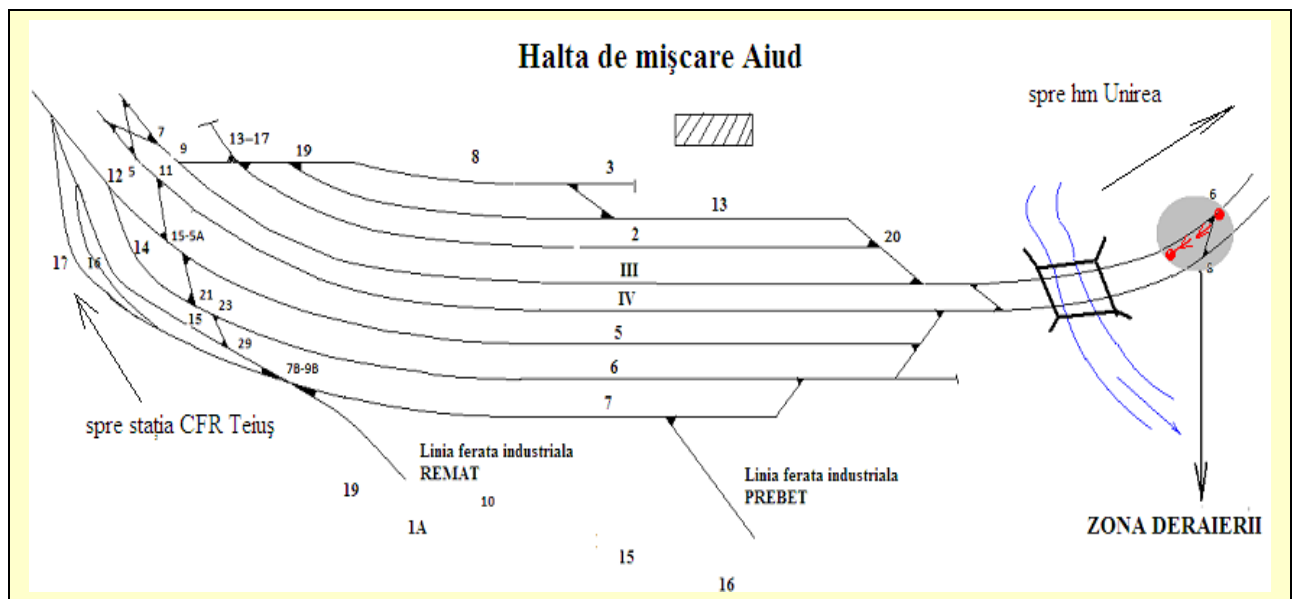
In the railway station Dej Calatori was coupled, in front of the train, the locomotive EA no. 444, the train being dispatched double heading up to the railway station Cojocna, where it was splitted in two wagon couples:

- first wagon couple run in the train 69494, consisting in 10 wagons, hauled by the locomotive DA no. 581, without stop up to the railway station Campia Turzii;
- the second wagon couple run in the train 60133-2, consisting from 23 wagons, hauled by the locomotive EA no. 444, in this composition up to the railway station Campia Turzii.

In the railway station Campia Turzii those two wagon couples re-formed the train 60133, stipulated with technical inspection in transit.

In the unified register of open lines, orders and running of the railway station Campia Turzii, the examiner of the railway undertaking SC Grup Transport Feroviar SA recorded the performance of this type of technical inspection between the hours 6,48 and 7,30, though in the written records supplied to the investigation commission he stipulated that the train 60133-2 from the 18th of July 2010, only the continuity test was performed in the above mentioned railway station.

The train was dispatched from the line 7 of the railway station Campia Turzii and run without stop up to the railway station Aiud, where it had to entry on the direct line III. Over the switch no. 6 from the end Y of the railway station happened the derailment of the second bogie of the wagon no. 84535451255-8 (the 19th after the locomotive), in the running direction. The first derailment trace was found out on the built-up common crossing of the switch no. 6, where the first axle of the derailed bogie (the axle corresponding to the wheels 5-6) run in the wrong direction (on the deflecting section), then over-climbed the right rail in the running direction at about 80 cm. from the joint of the switch end of a turnout. The wagon run derailed about 61 m, stopping at the km. 413+505, because of the emergency braking, generated by the crack of the air general pipe from the derailed wagon



THE SKETCH OF RAILWAY STATION AIUD

At the occurrence place, one found out:

- the second bogie of the wagon no. 84535451255-8, the 19th from the locomotive, was derailed, in the running direction (the bogie corresponding to the axles 3-4), (photo 2);
- at the wheel no. 6 (from the first axle in the running direction of the derailed wagon) one found out that the tyre was axially displaced on the wheel rim and between the tyre and the wheel rim there were important friction traces (metallic luster) (photo 1);



PHOTO 1



PHOTO 2

- also, at the same wheel, the axle guard and the guard connection from the bogie, afferent to the axle journal no. 6 were distorted to the outside of the bogie (photo 4);
- at the wheels no. 1,4,5,6, all the brake shoes were missing and on the brake shoes wearing there were old friction traces, following the direct braking on the brake shoes wearing (photo 3);
- at the wheels no. 2,3 and 8, a brake shoe was missing.



PHOTO 3



PHOTO 4

B.2 Accident circumstances

B.2.1 Involved parties

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

The infrastructure and superstructure are administrated by CNCF “CFR” SA and maintained by the employees of the Track Section 7 Targu Mures, District no. 8 Aiud, Branch of the Railway County Brasov.

The interlocking system from the railway station Aiud are administrated by CNCF “CFR” SA and maintained by the employees of the Section CT 4 Targu Mures, Branch of the Railway County Brasov.

The communication equipment from the locomotive is owned by the railway undertaking SC Grup Transport Feroviar SA and maintained by its employees.

The hauling locomotive EA444 and the banking locomotive DA 581 are owned by the railway undertaking SC Grup Transport Feroviar SA

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The investigation commission questioned the employees involved in the technical inspection during the train forming and in transit, the head of the district no. 8 Aiud, as well as the movements inspectors from the railway stations Zalau and Campia Turzii, where the train 60133-2 had stipulated the technical inspections according to the timetable, the staff in charge with the safety management at the railway undertaking.

B.2.2 Train composition and equipments

The freight train no. 60133-2 consisted in 33 wagons, from which 27 loaded with pipes and 6 empty, 2073 gross tonnage, 1389 net tonnage, length 525 m, automatic braked according to the timetable 1036 tons, effective 1476 tons (plus 440 tons over the timetable) hand braked according to the timetable 207 tons, effective 795 tons (plus 588 tons), hauled by the locomotive EA 444 and banking locomotive DA 581, both of them belonging to the railway undertaking SC Grup Transport Feroviar SA.

The automatic brake was active, the safety and vigilance equipments (DSV), the equipment for the punctual control of the speed and... (INDUSI) of the hauling locomotives were in service and operated according to the instructions, being sealed.

B.2.3 Railway equipments

Route presentation

The switches from the end Y of the railway station Aiud are in a straight line, having the gradient 4‰.

The derailment happened on the switch no. 6, with the next characteristics: rail type 60, radius $R=300$ m, tangent tg 1:9, left deviation, sleepers type T60, indirect fastening type K.

The running speed on the deflecting line over the switches is 30 km/h and on the direct line the established speed of the line.

The track bed was complete, the fastening system of the metallic parts on the sleepers complete and active.

In order to receive the train 60133-2 on the line III, the switch no. 6 was operated on "direct line" position, trailing the point.

Presentation of the safety equipments for the traffic management

The railway station Aiud is endowed with interlocking system type CEM FT, light signals and relay lock instrument.

B.2.4 Communication means

The communication between the driver and the movements inspectors 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-start of the train traffic was made in accordance with 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 Government Decision 117/2010.

Following of these, at the accident place came the representatives of the railway public infrastructure administrator CNCF „CFR” SA – branch of the Railway County Brasov, of the involved railway undertaking SC Grup Transport Feroviar SA, of Romanian Railway Authority – AFER.

In order to re-rail the derailed rolling-stock, one asked for the routing of the specialized sequence of operations endowed with hydraulic jacks belonging to SC Interventii Feroviare SA – District Brasov.

B.3 Accident consequences

B.3.1 Deaths and injuries

None

B.3.2 Material damages

The value of the material damages, according to the estimations drawn up by the owner of the rolling stock, intervention equipments and public railway infrastructure manager, is:

- | | |
|---|-------------|
| •at the locomotives | none; |
| •at the wagons according to the estimation
no. 237/23.07.2010 of SC CTF SA UMERVA
working point | 6932,3 lei; |
| •at the lines according to the estimation
no. 207/20.07.2010 of the Track Section L7 Mures | 27627 lei; |
| •at the equipments | none; |
| •with the intervention equipments
according to the estimation no. 230/1/135/2010 of
the Tracks Division | 36737 lei; |

Total value of the damages	71926,3 lei
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B.3.3 Accident consequences for the railway traffic

The railway accident from the railway station Aiud did not generate train delays.

B.4 External circumstances

On the 18th of July 2010, at the moment of the accident, the visibility was good, cloudless sky, the temperature was about 25^oC.

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

B.5 Investigation course

B.5.1 Summary of the involved staff testimonies

The wagons examiner of the train in the cabin no. 2 of the hauling locomotive EA no. 444, employee of SC GTF SA stated:

- he perform the brake continuity test in the railway stations Dej, Jibou, Cojocna and Campia Turzii;
- he did not find out leakage of air over the accepted limit for the train wagons;
- in the railway station Campia Turzii he did not perform the technical inspection in transit at the train 60133-2, because he did not know the provisions of the services sheet concerning the performance of this type of technical inspection, being his first manning on this route;
- he did not see either the brake shoes and the brake shoes wearing/bracket with wear at the wagon no. 84535451255-8 or double marking because he did not carry out any type of technical inspection at the train;
- by his answers he proved that he did not know the provisions of the *Instructions for the technical inspection and maintenance of the wagons in operation no. 250/2005*, concerning the failures at the pair of wheels and the treatment – table 1 point 10 – loosen tyre, that is he considers that a tyre is loosen when he has at least an additional sign besides the control marks displaced on the tyre and the wheel;
- he did not perform the technical inspection in transit at the train 60133-2 in the railway station Campia Turzii, because he did not have any time, though from the

existing records of the railway station Campia Turzii results that the train was available for technical inspection in transit 42 minutes.

The wagons examiner, who performed the technical inspection during the composition of the trains 60133-2 and 69493 in the railway station Zalau Nord, employee of SNTFM “CFR Marfa” SA, stated:

- he had no labor contract either with SC Grup Transport Feroviar SA or with SC Compania de Transport Feroviar SA from the end of 2008;
- he performed the technical inspection during the forming of the train 69493 in the railway station Zalau Nord, the train belonging to the railway undertaking SC Grup Transport Feroviar SA, though the labor contract with this railway undertaking ended in October 2008;
- he did not observe any problems at the wagon 84535451255-8, wagon that he observed with isolated brake in the train, and during the visual inspection he did not see any failure at this wagon;
- he performed the train technical inspection in good weather conditions, daylight and he knew the signs of loosen tyre according to the Instructions on the technical inspection and maintenance of the wagons in operation no. 250/2005;
- usually, the wagons with brake type Hik, in the trains consisting in wagons endowed mainly with automatic brake type KE, he isolated them so they did not run braked because of the different times of releasing of those two braking equipments.

The wagons examiner, who performed the technical inspection at the arrival of the train 60141 (that he manned up to the railway station Zalau Nord the wagon no. 84535451255-8 on the 8th of July 2010) employee of SC Compania de Transport Feroviar SA stated:

- he examined the wagon no. 84535451255-8 of the train 60141, at its arrival, without founding out any failures;
- the wagon run with the automatic brake in service and it had no signs of braked running;
- he did not observe either the control marks displaced between the tyre and the wheel rim or the existence of two series of control marks at 30°
- he did not isolated brake of the wagon at its arrival.

The driver of the hauling locomotive EA 444, hauling the train no. 60133-2 stated:

- he took the train 60133-2 from the railway station Dej Calatori on the 18th of July 2010, at 02,00 hour;
- he had no complaints from the movements staff during the route, concerning the unsuitable running of the wagon or other problems that lead to the performance of some brake tests during the route;
- he entered the railway station Aiud with the yellow position of the entry signal and decreased the speed under 20 km/h because of a speed limitation of 15 km/h, at that moment the speed decreased suddenly because of the decrease of the pressure in the general pipe and the train stopped;
- he asked the driver assistant and the examiner for the checking of the train, they notifying him about the derailment of a bogie of the wagon.

The driver assistant of the hauling locomotive EA 444, hauling the train no. 60133-2 stated:

- he took the train 60133-2 from the railway station Dej Calatori on the 18th of July 2010, at 02,00 hour;
- he was not notified about any failures at the wagon, that could be observed during the visual inspection;
- at the entrance in the railway station Aiud the train was emergency braked;
- at the driver request, he went together with the examiner in order to check the train and found out that the 19th wagon derailed.

The driver of the second locomotive, who was also guard (the banking locomotive DA no. 581) stated:

- he hauled with the locomotive DA those two wagon couples that run as trains no. 69493 and no. 61033-2 between the railway stations Zalau Nord and Jibou;
- in the railway station Zalau Nord, an authorized examiner, that is not employee of SC Compania de Transport Feroviar SA or SC Grup Transport Feroviar SA performed at those two above mentioned wagon couples the complete test for each of them.
- continuity tests were also performed in the railway stations Jibou, Dej Calatori, Cojocna and Campia Turzii;
- he did not know if in the railway station Campia Turzii, the examiner performed the technical inspection in transit or only the brake test, though he admitted that he had to do it, because he did not check the performance of the technical inspection in transit, because he held simultaneous two jobs.
- he did not observed technical problems at the train up to the railway station Aiud.

The movements inspector on duty in the railway station Campia Turzii on the 17th/18th of July 2010 stated:

- on the 18th of July 2010 the technical inspection was performed in transit at the train 60133-2, as it results also from RUCLCM;
- he had no complaints from the examiner concerning the lack of necessary time to perform the technical inspection in transit.

The movements inspector on duty on the 17th of July in the railway station Zalau Nord stated:

- on that date, the freight train no. 69493 was put at the disposal of the railway undertaking SC Compania de Transport Feroviar SA Bucuresti for the technical inspection in forming;
- at that train came the examiner, who presented himself as employee of the railway undertaking SC Compania de Transport Feroviar SA ; (his name is also in the document "Nominal list with the own staff used for the technical inspection of the rolling stock" from the 15th of July 2008, signed by the representatives SC Compania de Transport Feroviar SA and that was at the disposal of the movements staff from the railway station Zalau Nord);
- the person who came performed before technical inspections at the trains of the same railway undertakings, he being employee of another railway undertaking, that is SNTFM "CFR Marfa" SA.

The movements inspector on duty on the 17th/18th of July in the railway station Zalau Nord stated:

- on that date, the train no. 60133-2 was put at the disposal of the railway undertaking SC CTF SA, it was to leave at 20,30 hour, for the performance of the technical inspection in forming;
- person who came at the train was the examiner that has been performed before this type of works for the same railway undertaking for one year, he knows this person and identified him with the same name as the movements inspector on duty on the 17th of July 2010.

The operator on duty on the 17th of July 2010 of SC CTF SA stated:

- on the 17th of July 2010, around 08,00hour, he contacted the loader representative, that informed him that around 12,00 hour a train with 33 wagons would be shunted in the railway station Zalau Nord (27 loaded – 6 empty);
- he informed the same representative that the examiner who had to perform the technical inspection during the forming would arrived late in the railway station Zalau and he manifested the availability to send an authorized examiner in order to perform the technical inspection at that train;
- it's first time when an examiner of other economic operator is used;
- he did not know if there was a labour agreement in this respect with that economic operator, if there were special regulations if an examiner employee of CTF SA can
- he did not call the examiner that performed the technical inspection in forming.

Instructor for wagons examiner, employee of the railway undertaking SC GTF SA stated:

- he knows the organization of the technical inspection of the trains in the railway station Zalau Nord, this works being performed by the staff of SC CTF SA, between these two railway undertaking there were a contract;
- he didn't know how another examiner performed the technical inspection of the trains in the railway station Zalau Nord;
- in SC GTF SA records, this wagon did not appear as out of order.

The person in charge with the safety management, employee of SC Grup Transport Feroviar SA and with cooperation agreement with the railway undertaking SC Compania de Transport Feroviar SA, stated as follows:

- on the 17th of July 2010 the technical inspection of the trains in the railway station Zalau ought to be made by the staff of SC Compania de Transport Feroviar SA, according to the contract between these two railway undertakings, according to PG 024, identically in the railway station Campia Turzii;
- for the trains having in their composition the wagon involved in the accident, one did not comply with the procedure PG 024, that stipulated the performance of the train technical inspection in the railway stations Campia Turzii and Zalau, that is the examiner did not performed the visual inspection on the trains in moving;
- he had no information concerning the place of the railway station Zalau Nord where was ensured the examiner, but he knows that the examiner that performed the technical inspection during the forming of the trains 60133-2 and 69493 was nor employee of SC Compania de Transport SA on the 10th of March 2009;
- the list of the staff in charge with the technical inspection at the trains of SC Compania de Transport Feroviar SA, provided by the infrastructure manager has not been updated from the 10th of March 2009.

The movements inspector from the railway station Calarasi Turda, the last one that inspected visually the train 60133-2 in moving before the accident stated as follows:

- he did not observed braked wheels, curious bounces at the train wagons, fired axle boxes or loading problems

B.5.2 Safety management system

At the moment of the accident, CNCF “CFR” SA, as manager of the railway infrastructure, had implemented its own railway safety management, according to the provisions of the Directive 2004/49/CE on the community railways safety, of the Law no. 55/2006 on the railway safety and of the Minister of Transports Order no. 101/2008 on the granting of the safety authorization to Romanian railway infrastructure administrator/manager, got:

- Safety Authorization – Part A, identification number ASA 09002 – by which Romanian Railway Safety Authority, from Romanian Railway Authority – AFER agrees the acceptance of the safety management of the railway infrastructure manager;
- Safety Authorization – Part B, identification number ASB 9007 – by which Romanian Railway Safety Authority, from Romanian Railway Authority – AFER agrees the acceptance of the dispositions taken by railway infrastructure manager in order to comply with the specific requirements necessary to assure the railway infrastructure safety, in the designing, maintenance and operation, including if case, maintenance and operation of the system for the traffic control and signalling.

At the moment of the accident, SC Grup Transport Feroviar SA, as railway undertaking had implemented its own railway safety management, according to the provisions of the Directive 2004/49/EC on the community railways safety, of the Law no. 55/2006 on the railway safety and of the Minister of Transports Order no. 535/2007 on the granting of the safety certificate in order to perform railway transport on Romanian railways.

On the 18th of July 2010 the railway undertaking took possession the next documents concerning its own railway safety management system:

- Safety Certificate – Part A, identification number CSA 0012 – by which Romanian Railway Safety Authority, from Romanian Railway Authority – AFER agrees the acceptance of safety management system of the railway undertaking;
- Safety Certificate – Part B, identification number CSB 0096 – by which Romanian Railway Safety Authority, from Romanian Railway Authority – AFER agrees the acceptance of the dispositions taken by the railway company in order to comply with the specific requirements necessary for the safety operation on the relevant network, in accordance with the Directive 2004/49/EC and with the applicable national legislation.

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

In the investigation of the railway accident were considered :

norms and regulations

- Instructions on the technical inspection and the maintenance of the wagons in operation no. 250, approved by Minister of Transports, Constructions and Tourism Order no. 1817 from the 26th of October 2005;
- Instruction for the repair of the wheelsets no. 931/1986;
- Instruction of norms and tolerances for the construction and maintenance of the track – lines with standard gauge no. 314/1989;
- Minister of Transports Order no. 535/2007 on the approval of the norms for the granting of the licence for the railway traffic and of the safety certificates for the performance of the railway transports on Romanian railways;
- Minister of Transports Order no. 290/2000 on the technical acceptance of the products and/or services used in the construction, modernization, maintenance and repair of the railway infrastructure and rolling stock , for the railway and subway transport.

sources and references

- copies of the documents enclosed to the investigation file;
- photos taken soon after the railway accident by the members of the investigation commission;
- photos of the wheelset that generated the derailment, taken by the members of the investigation commission;
- results of the measurements made after the accident at the superstructure;
- inspection and interpretation of the technical condition of the involved elements in the accident: infrastructure, railway equipments and train;

- questioning of the employees involved in the railway accident.

B.5.4 Operation of the rolling stock and technical equipments

B.5.4.1 Data found out on the lines

Technical condition of the line before the railway accident

The superstructure at the entrance in the railway station Aiud, end Y consists in rail type 60 and 65, indirect fastening type SKL and K, wooden and concrete sleepers.

The switches from the end Y of the railway station Aiud are fitted with gradient 4‰.

The switch no. 6, where happened the derailment, had the next characteristics: rail type 60, radius R=300 m, tangent tg 1:9, left deviation, sleepers T60, indirect fastening type SKL.

The switch was fitted up on the 27th of November 2008, in new condition.

During the last fortnightly inspection, performed before the accident, that is on the 23rd of June 2010, one did not found out any problem at the switch.

Also, during inspection of the hidden parts, performed at the switch on the 30th of March 2010, one did not replace any out of order part and did not find out any problem.

On the 31st of May 2010, one performed tamping works on this switch, then one performed also measurements according to the regulations in force, without finding out any problem. The maximum running speed accepted on the deflecting section on this switch was 30 km/h.

Findings and measurements at the line, after the wagon derailment and lifting

The switch no. 6 had no wear on the metallic parts, the wooden sleepers were in proper condition, the track bed clean and complete.

Following the derailment one found out 21 sleepers with the screw bent and damaged and 15 vertical bolts hit and destroyed.

a) measurements at the lines

- following the checking of the track gauge and cross level with the ruler, in the characteristic points of the switch, one found out that the measurement values were between the maximum accepted limits from the Instruction of norms and tolerances for track construction and maintenance – lines with standard gauge no. 314/1989, corresponding to the maximum speed accepted in the derailment area;
- also, one checked the sizes of grooves from the built up crossing and from the stock rail of the switch no. 6 and found out that these are between the limits accepted by the specific regulations in force;

The measured values were:

	First joint	Point of switch tip	Stock rail direct line	Heel of points	Crossing fog direct line
Gauge	5	5	3	2	2
Crossing level	4	3	1	1	0

B.5.4.2 Findings on the equipments condition

During the checking performed soon after the railway accident one found out:

- the track circuits 4-6 and 036 occupied on the control desk;
- the isolated section 14-20 and the stabling line III locked;

- point machines from the ends X and Y of the railway station with control on the control desk;
- the seals of the buttons of the control desk intact,
- the seals in the relays hall and the sealed key on the control desk intact;
- there were no problems in the operation of interlocking system equipments.

B.5.4.3 Data found out on the operation of the rolling stock and its technical equipment.

Elements resulted from the documents

Findings on the wagons in the railway station Aiud

Exchanger devices „Freight – Passenger” and „Empty – Loaded” were on the positions proper to the wagons condition, that is on „Freight” and „Loaded”.

The train consisted in 5 wagons with brake „off”, respectively the wagons no. 84535488824-8, 88535451079-2, 84535451255-8, 84535487544-3 and 88535451271-2, being the 1st, 16th, 19th, 26th and 30th in the train.

At the wagon no. 84535451255-8 (derailed wagon):

Wagon characteristics:

- the wagon type Eacs had brake type Hik-GP;
- bogie type ORE

Findings at the wagon

- Automatic brake „off”;
- exchanger empty-loaded was on loaded;
- on the end wall of the wagon was writing down DA 19.01.09 Compania de Transport Feroviar Bucuresti – repair type accidental failure at Compania de Transport Feroviar Bucuresti;
- at the wheels 1,4,5,6 were not the brake shoes and the shoe wearings/brackets had wears, following their run directly on the tyre during the brake – old brake traces;
- at the wheels 2,3 and 8 were not one brake shoe;
- the connection of the axle guard of the wheel no. 6 distorted;
- lack of each flexible brake half-coupling at each end of the wagon;
- the general air pipe with crack in a welding point, over the front box of the bogie from the wheels 7-8;
- the tyre of the wheel no. 6 displaced on the wheel rim.

During the checking by weighing the load, one found out that it exceeded the maximum load on axle and the total load for this type of wagon.

Findings at wheels with the wheels 5-6 of the wagon no. 84535451255-8:

- the seals were at both covers of the axle boxes;
- at the end corresponding to the wheel no. 5 of the wagon one found out the plate with the identification series of the pair of wheelset, on which one could observe the next figures”2747”, corresponding to the axle series at the end of the periodical repair of the wagon, that is series 362747;
- the wheelset was manufactured in 1967, and after the periodical repair had the next dimensions:
 - the rolling circle diameter of both axle journals 920 mm – the minimum accepted value 920 mm;
 - the thickness of tyre in the rolling circle of both axle journals 39 mm – the minimum accepted value 35 mm;
- the tyre of the wheel no. 5 – M 36904 4 12 66 CSR, where:
 - M is the steel type;
 - 36904 – charge;
 - 4 number of the lot;

- 1266 – December 1966, manufacturing date;
 - CSR – Steel Works Resita.
- Mark of the tyre of the wheel no. 5 – M 36904 4 12 66 CSR, where:
 - M is the steel type;
 - 36904 – charge;
 - 4 number of the lot;
 - 1266 – December 1966, manufacturing date;
 - CSR – Steel Works Resita.
- Mark on the wheel rim no. 5 – M 12 66 CSR 2 36862, where:
 - M is the steel type;
 - 1266 – December 1966, manufacturing date;
 - CSR – Steel Works Resita.
 - 2 number of the lot;
- Mark of the tyre of the wheel no. 6 – M 36904 4 12 66 CSR, having the similar mean as the mark presented before;
- Mark on the wheel rim no. 5 – M 12 66 CSR1 68898, having the similar mean as the mark presented before.

One performed measurements of the wheel no. 5 tyre profile with the next values:

- flange width – 28,5 mm;
- flange height – 31,5 mm;
- flange gradient qR – 10mm;
- thickness of the tyre – 41 mm.

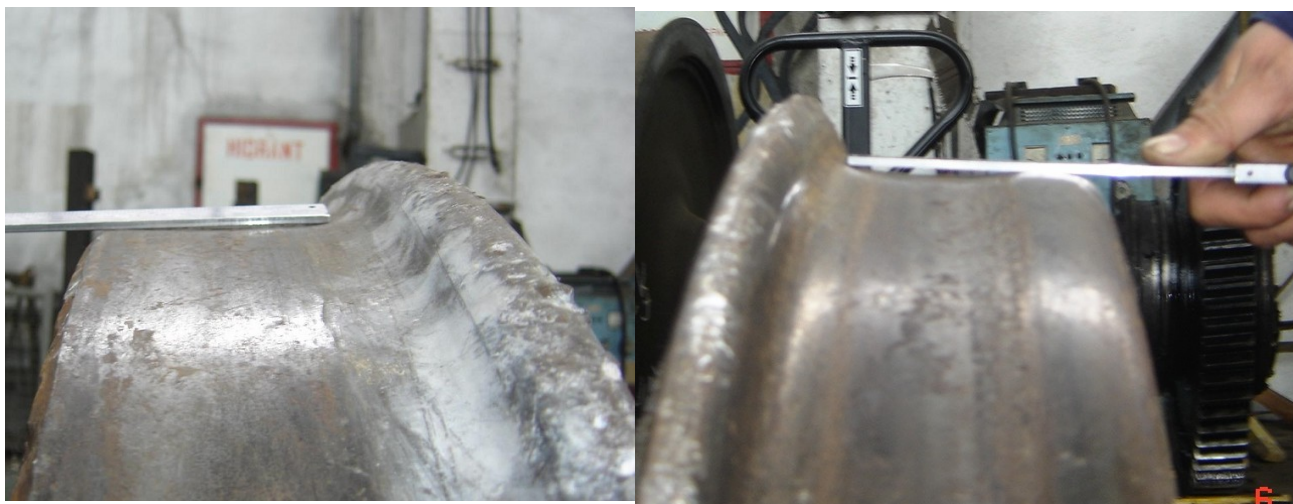
All measured values are between the limits stipulated in the Instructions for the technical inspection and maintenance of the wagons in operation no. 250/2005.



- Marking of the tyre position against the wheel:
 - at both wheels one can not observe the marks made with the mandrel either on the lateral surfaces of the wheel rim and tyre or on the cylindrical part of the stop flange;
 - at the wheel no. 5, on the outside one can observe the paint mark both on the wheel rim and on the tyre, but on the tyre can be observed that the mark was made twice on two areas situated at about 250 (photo 5 unbound axle, photo 6 from the 19th of July 2010 in the railway station Aiud – the axle was under the wagon);
- The rolling circle diameter of the wheel no. 5 – 919,5 mm;

- One can not measure the rolling circle diameter of the wheel no. 6 with the special device, because the tyre was displaced axially on the wheel rim and did not allow to put this device at 70 mm from the inner surface of the wheel rim.

The measurement was empirically made with the sliding calipers, getting a wear of about 6-8 mm in diameter, in the rolling circle diameter, visible wear and from photo 7.



B.6 Analysis and conclusions

B.6.1 Conclusions on the technical condition of the track superstructure

From the findings at the wagon from the 18th of July 2010 results that the wagon had the automatic brake isolated, the brake shoes from the wheels 1,4,5,6 had wears that lead to the conclusion that the respective wagon run braked for a long time, before the accident (one can not mention the period or the date) and from this reason the automatic brake was sealed.

From the checking at wheelset, after its detachment from the wagon, one found out a wear of about 6-8 mm as diameter, in the rolling circle diameter and small exfoliations at the tyre of the wheel 6, these elements corroborated with those above mentioned lead to the conclusion that the wagon run with the automatic brake in operation and after the wear beyond the accepted limit for the brake shoes at this wheel, the brake was directly on the brake shoe (made from a harder material than that of the brake shoe).

The thickness of the tyre in the rolling circle diameter close to the minimum value stipulated in the Instructions no. 250/2005 on the technical inspection and maintenance of the wagons in operation, corroborated with the braked running, operation time of the pair of wheels (43 years) lead to the de-pressure of the tyre from the wheel rim.

The existence of the paint mark in two different places, situated at 30° one from another, at the wheels 5 and 6 and the lack of mechanical marks on the wheel rim and on the tyre are inconsistent both with the Instructions on the technical inspection and maintenance of the wagons in operation no. 250/2005, at art. 87, tabel 1, point 20 and with the Instruction no. 931/1986 for the repair of the pair of wheels art. 29.

If both the mechanical mark and the paint one of the wheel rim against the tyre were correctly made, one could observed the tyre turning round and its displacement on the wheel rim and implicitly its detachment could be prevented.

B.6.2 Conclusions on the elements that contributed to the accident, following the lack of compliance with the specific regulations in force on the technical inspection of the trains by the railway undertaking

The train has stipulated technical inspection in transit in the railway station Campia Turzii – inspection that, according to the Instructions on the technical inspection and maintenance of the wagons in operation no. 250/2005, art 10, point(4), e), has to include the fastening of the

tyre on wheel rim, visually and by hammer hitting. This technical inspection type was not made, it being stated by the examiner of the train in the railway station Campia Turzii, though he recorded in the movements inspector register the performance of the technical inspection in transit.

B.6.3 Other non-conformities found out during the investigation

The technical inspection during the forming in the railway station Zalau Nord was made by an examiner with any labor contract either with the railway undertaking SC GTF SA or with the SC CTF SA, with whom this railway undertaking had contract for the performance of the technical inspections in this railway station. SC Grup Feroviar SA did not meet with the Order of Minister of Transports 535/2007, that stipulated as mandatory requirements „ to ensure the technical inspection of the trains in the railway stations, during the forming in transit, with economic operators authorized as railway suppliers by AFER for this type of service or with own staff, if the railway undertaking is authorized by AFER for this type of service”.

The technical inspection in transit for the train 60133-2, in the railway station Campia Turzii, was recorded in the movements inspector register as performed by the examiner employed by SC GTF SA, on the 18th of July 2010 this railway undertaking had no railway technical agreement for the performance of technical inspection at the freight trains.

The driver assistant of the locomotive DA 581 was simultaneously driver assistant and conductor of the train 60133-2.

B.7 Direct cause, contributing factors and root causes

B.7.1 The direct cause of the accident is the displacement of the tyre of the wheel no. 6 on the wheel rim, it leading to the derailment of the pair of wheels corresponding to the wheels no. 5-6 of the wagon no. 84535451255-8.

Contributing factors:

Loosening of the tyre of the wheel no. 6 of the wagon no. 84535451255-8, followed by the its turning round the wheel rim and the burnishing of the fastening ring, generated by:

- the decrease in time of the fastening strength between the tyre and the wheel rim (the wheelset is 43 years old);
- the thermic stress on the tyre because of braked running of the wagon up to the wear of the brake shoes on the wearing shoes (where the brake shoe is fitted up) at the wheel no. 6;
- the wear of the tyre in the rolling circle, wear limit close to the limit accepted in operation.

B.7.2 Underlying cause

The underlying cause of the accident is the lack of compliance with the specific regulations in force on the technical inspection performance in the railway station Campia Turzii, as one stipulated in the Working Timetable for the running of the freight trains 2010.

B.7.3 Root cause

The railway undertaking did not meet with the legal requirements on the use in the technical inspection (composition and tranzit) of the railway critical services, that comply with the compulsory specific regulations on the technical authorization by AFER.

C. SAFETY RECOMMENDATIONS

1. Romanian Railway Safety Authority suspend the safety certificate part B for the track section „Campia Turzii – Apahida – Dej Calatori – Beclean pe Somes – Salva – Ilva Mica – Floreni and back”, granted to SC Grup Transport Feroviar SA, because of lack of compliance with the specific regulations in force and with the requirements, according which it was granted, especially with the art. 4(1) b) point 6 of the annex II of the Minister of Transports Order 535/2007(that stipulates as compulsory requirement „the ensuring of the technical inspection of the trains in the railway stations, at the inspection in tranzit, at the arrival, with authorized economic agents authorized as railway suppliers by AFER for this type of service or with own staff, if the railway undertaking is authorized by AFER for this type of service”).

2. Romanian Railway Notified Body perform an assessment or technical inspection, if case, in order to check the conditions that were the basis for the granting of the railway technical agreement, for technical inspections at the freight trains, granted to SC Compania de Transport Feroviar Bucuresti SA, especially with the art. 7, point i) of the *Norm on the granting of the railway technical agreements in the railway and subway field, approved by Minister of Transports Order 290/2000 – amended by the Minister of Transports, Construction and Tourism Order 2068/2004*

„(they prove that the manufacturer of the product or the performer of the service has organizational structures, technical endowments, as well as trained and certified staff, if case, that ensure the process for the achievement of the railway critical products and/or services stipulated at the art. 1, paragraph (2) ;letters a), b) and c)”)

conditions that during the investigation were not complied and the application of the provisions of the art. 11 of the above mentioned norm.

(„if during the monitoring one finds out that one or more conditions that are base for the granting of the railway technical agreement, are not complied, AFER can suspend the granted technical agreement”).

3. Romanian Railway Safety Authority carry out inspections at the railway freight undertakings in order to check the organization of the technical inspection of the freight trains, the ensuring of the authorized staff for the examiner position, according to the commitments assumed by the railway suppliers at the granting of the railway technical agreements for this type of railway critical service.

4. Romanian Railway Safety Authority analyze, together with the economic agents, that repair the rolling stock, and with the railway undertakings the opportunity to complete the Instructions 931/1986 with the compulsoriness to limit the use wheelset with tires.

5. Romanian Railway Notified Body check, during the technical inspections at Compania de Transport Feroviar Bucuresti SA – Bucuresti Working Place, the observance of the provisions of the art. 29 (concerning the marking of the tyre position against the wheel) from the Instruction for the repair of the railway vehicles pair of wheels no. 931/1986, especially at the pair of wheels manufactured before 1986, in the technological flow.

This investigation report will be sent to Romanian Railway Safety Authority , to Romanian Railway Notified Body, to the public railway infrastructure manager CNCF „CFR” SA and to the railway freight undertakings SC Grup Transport Feroviar SA and to Compania de Transport Feroviar Bucuresti SA.

Members of the investigation commission:

- Nicolescu Mircea - investigator in charge
- Paul Sever - investigator
- Zama Olimpiu - track section inspector in the County Inspect-
orate for Traffic Safety Brasov of CNCF “CFR” SA