



## **INVESTIGATING REPORT**

concerning the railway accident occurred on the 19<sup>th</sup> of August 2013, in the branch of Regional Center for Operation, Maintenance and Repairs – Cluj, traffic section Jibou – Sărmășag, between the railway stations Zalău Nord and Mirșid, consisting in the derailment of the wagon's no. 31530667181-1bogie from the freight train no. 69731, of the railway undertaking  
SC TRANSFEROVIAR GRUP SA Cluj-Napoca



## NOTICE

In the case of the railway accident occurred on the 19<sup>th</sup> of August 2013, in the running of the freight train no. 69731, in the branch of Regional Center for Operation, Maintenance and Repairs – Cluj, traffic section Jibou – Sărmășag, between the railway stations Zalău Nord and Mirșid, consisting in the derailment of a wagon's bogie, Romanian Railway Investigating Body carried out an investigation, according to the provisions of the Government Decision no. 117/2010.

Through the carried out investigation the information concerning the occurrence of this accident were gathered and analyzed, the conditions were established and the causes determined.

The investigation of Romanian Railway Investigating Body does not aim to establish the guilty or the responsibility in this case.

București, 25<sup>th</sup> of September 2012

**I consider positive**

**Director**  
Nicolae SANDU

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

**Chief investigator**  
Eugen ISPAS

***The present notice is part of the Investigating Report of the railway accident occurred on the 19<sup>th</sup> of August 2013, in the running of the freight train no. 69731 belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca, on the traffic section Jibou - Sărmășag, on the branch of the Regional Center for Operation, Maintenance and Repairs – Cluj.***

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## **I. PREAMBLE**

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

Following the railway accident from the 19<sup>th</sup> of August 2012, occurred on the running of the freight train no. 69731 belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca, through the derailment of the first bogie of the wagon no. 31530667181-1 (in the running direction), on the traffic section Jibou – Sărmășag, on the running line, at the km 99+700, between Zalău Nord and Mirșid railway station, in the branch of Regional Centre for Operation, Maintenance and Repairs Cluj, Romanian Railway Investigating Body, started an investigation in order to prevent some accidents with similar causes, by establishing the conditions, determining the causes and issuing safety recommendations.

Through the performed investigating action, the information concerning the accident causes were gathered, the conditions were established and the causes determined.

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

### **I.2. The investigation process**

After the occurrence of the railway accident, Romanian Railway Investigating Body, was notified both verbally and in writing by Romanian Railway Safety Authority, body that operated within Romanian Railway Safety Authority, about the occurrence of the railway accident in which was involved the freight train no. 69731. Therefore, Romanian Railway Investigating Body was notified about the next consequences:

- the freight train no. 69731 was stopped on the line Zalău Nord - Mirșid.
- the wagon no. 31530667181-1, the fifth from the locomotive was derailed by a bogie, with the wheels fallen, (the wheels from the left in the running direction, towards the outside of the curve and those from the right between the track rails.
- the derailed axles ran 2340 m since to the stop km 102+040.

At the accident site were present the representatives of: Romanian Railway Authority - AFER, Railway National Company „CFR” SA and TRANSFEROVIAR GRUP SA Cluj-Napoca.

Through the Decision no. 92 from 20<sup>th</sup> of August 2012 of Romanian Railway Investigating Body's Director, according to the provisions of the article 19, paragraph (2) by the Law no. 55/2006 concerning the railway safety, was appointed the investigation commission composed of:

- |  |                     |
|--|---------------------|
| • Vladimir MĂCICĂȘAN – investigator OIFR                         | - main investigator |
| • Gabriel PASCU – department head of Running Safety - CERIR Cluj | - member            |
| • Traian SZEKELY – regional inspector of wagons – CREIR Cluj     | - member            |
| • Alexandru COTUȚ – regional inspector of line – CREIR Cluj      | - member            |
| • Ioan MORAR – Operation Director – SC TFG SA Cluj-Napoca        | - member            |

## **A. ACCIDENT SUMMARY**

### **A.1. Short description**

On the 19<sup>th</sup> of August 2012, the freight train no. 69731 belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca, ran from the railway station Valea lui Mihai to Dej Triaj railway station, being composed by 28 empty freight wagons, type Tals, 112 axles, 701 tonnes, automatic braked tonnage after timetable 351 t, actually 750 t, handle braked tonnage after timetable 126 t, actually 574 t, with a length of 403 metres. The train was hauled by the locomotive DA 460, belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca. The locomotive was conducted and operated by engine staff belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

The train no. 69731 stopped in running line, at the km 102+040, between the railway stations Zalău Nord and Mirșid. The wagon no. 31530667181-1, the fifth from locomotive, derailed by the first bogie in the running direction.

The derailment of the wagon no. 31530667181-1 one occurred at the km 99+700 and ran in this condition since to the km 102+040.

At the derailment place and in the area, the line is in curve with right deflection, gradient of 16 ‰, in bank towards the railway station Mirșid.

The area of the railway accident is situated on the traffic section Jibou - Sărmășag, belonging to CNCF „CFR” SA - branch CREÎR CF Cluj.

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

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

**Direct cause** of the accident was the exceeding of the allowed report of the wheel load at the second bogie's axles of the wagon in the running direction (the axles with the wheels no. 1-2, and 3-4), because of the wagon's incomplete unloading (the charge from the diagonal compartment opposed to the trailing wheel no. 8 was not unloaded).

This fact lead at the discharging of the load of the trailing wheel when the bogie entered in the curve, favouring the climbing of the wheel's lip on the head of the rail from the outside curve rail at the km 99+077 and the derailment of the axle with the wheels no. 7-8, followed by the training in derailment of the axle no. 5-6.

#### **A.2.2. Contributing factors**

The running with the decreased speed on a curve whose effective cant of track was of 50 mm, had as effect the load unloading of the wheels from bogie's left in the running direction.

#### **A.2.3. Underlying causes**

Were not.

#### **A.2.4. Root causes**

2.4.1. Were not.

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

According to the provision of the article 3, item 1 from the Law no. 55/2006 concerning the railway safety and of the article 7, paragraph 3, item 1 from the Regulation for the investigation of the accident and incidents, for development and improvement of Romanian railway and subway safety, approved by HG 117/2010, the railway event is classified as a railway accident.

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

Were not.



## B. INVESTIGATING REPORT

### B.1. Accident description

On the 19<sup>th</sup> of August 2012, the freight train no. 69731, belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca, ran from the railway station Valea Lui Mihai at the railway station Dej Triaj, being composed by 28 empty freight wagons, type Tals, 112 axles, 701 tonnes, automatic braked tonnage after timetable 351 t, actually 750 t, handle braked tonnage after timetable 126 t, actually 574 t, with a length of 403 metres. The train was hauled by the locomotive DA 460, belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca. The locomotive was conducted and operated by engine staff belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

On the traffic section Jibou – Sărmășag, the trains running is made after the system „automatic track bloc” (BLA).

At the accident place and in the area, the path is in curve with right deflection, the radius  $R=210$  m, cant of track  $h=50$  mm, overwidening  $s=20$  mm, gradient of ‰, bank towards railway station Mirșid.

The area where the accident one occurred is situated on the traffic section Jibou - Sărmășag, belonging to CNCF „CFR” SA – Branch ”CREÎR CF” Cluj.

As a consequence of the railway accident were destroyed the sleepers from the derailed area and were registered damages at the equipment.

Were not registered fatalities or injuries.





**Foto1 : Geographical position of the accident**



**Foto 2 : Wagon no. 31530667181-1 derailed**

**B.2. Accident circumstances.**

**B.2.1. Involved parties.**

2.1.1. The involved staff belongs to SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

2.1.2. The locomotive and those 28 wagons from the freight train composing are used by SC TRANSFEROVIAR GRUP SA Cluj-Napoca, those repairs and maintenance being insured by authorized agents.

2.1.3. The involved railway infrastructure, is in the administration CN CF „CFR” SA (National Company of Railway Transports) – Branch „CREÎR CF” Cluj and is maintained by the staff of Zalău Line District - Line Section 7 Dej.

2.1.4. The interlocking system of the traffic section Jibou - Sărmășag are in the administration of CNCF „CFR” SA and are maintained by the employees of the Branch „CREÎR CF” Cluj.

2.1.5. The railway communication equipments on the traffic section Jibou – Sărmășag, is in the administration of CNCF „CFR” S.A. and is maintained by the employees of SC TELECOMUNICAȚII CFR S.A.

2.1.6. The railway communication equipment from the locomotive owns to SC TRANSFEROVIAR GRUP SA Cluj-Napoca and is maintained by its employees.

The investigation commission interviewed the locomotive staff and the train crew.

**B.2.2. Train composing and equipments**

The freight train no. 69731 belongs to TRANSFEROVIAR GRUP SA Cluj-Napoca, was composed by 28 empty freight wagons, type Tals, 112 axles, 701 tonnes, automatic braked tonnage after timetable 351 t, actually 750 t, handle braked tonnage after timetable 126 t, actually 574 t,

with a length of 403 metres. The train was hauled by the locomotive DA 460, belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca. The locomotive was conducted and operated by engine staff belonging to SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

Those 28 wagons belong to the railway undertaking SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

The vigilance and safety equipment (DSV), the (INDUSI) equipment of the hauling locomotive were active and the automatic brake was active.

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

#### ***Track description***

2.1.3. The involved railway infrastructure, respectively the track, is in the administration of CN CF „CFR” SA (National Company of Railway Transports) – Branch „CREÎR CF” Cluj and is maintained by Zalău Line District - Line Section 7 Dej.

The path superstructure is made by rail type 49, on the reinforced-concrete sleeper, indirect fastening type K, in active and complete condition, in curve with  $R = 210$  m, overwidening  $S = 20$  mm, cant of track  $h = 50$  mm, gradient 16 ‰ (bank in the train running direction), path with joints. The broken stone bed was complete.

Maximum speed of running is 50 km/h.

The accident occurred within a circular curve with a radius  $R = 210$  m, overwidening  $S = 20$  mm, cant of the track  $h = 50$  mm, gradient of 16 ‰ (bank in the train running direction), path with joints. On the traffic section Jibou – Sărmășag, the running line is single and non-electrified.

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

The connection between the engine driver and station movement inspectors was insured through the radiotelephone equipment.

### **B.2.5. Starting of the emergency plan**

Immediately after the railway accident occurrence, the start of the intervention plan for the removal of damages and restoring the trains circulation was made by the information flow stipulated in the Regulation for the investigation of the accidents and incidents, for development and improvement of Romanian railway and subway safety, approved by Government Decision 117/2010, after which the representatives of the CNCF “CFR” SA- Branch „CREÎR CF” Cluj, of the railway undertaking SC TRANSFEROVIAR GRUP SA and of Romanian Railway Authority.

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

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

Were not.

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

- at the line - 42.606,19 lei;  
- according to the estimate no. 1366/10/2012 of Line Section 7 Dej;
- at the equipments

- 11.135,19 lei

- according to the estimate no. 2510/2012 of the Interlocking Section 3 Oradea;
- **costs of delay minutes** - 1.006,7 lei;
- according to the estimate no 413/4/354/2012 al Serviciului Dispecerat – STFC Cluj;
- **at the rolling stock** - were not;
- **at the environment** - were not;
- Total** - **54.784,08 lei;**

### **B.3.3. The consequences of the accident in the railway traffic**

**Closed lines:** the running line between the railway stations Zalău Nord and Mirșid was closed on the 19<sup>th</sup> of August 2012, from the hour 16<sup>43</sup> to the hour 22<sup>38</sup>.

**Delayed trains:** After the railway accident was registered a number of 11 passenger trains with a delay with 279 minute.

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

On the 19<sup>th</sup> of August 2012, at the accident hour, the visibility was good, clear sky, no wind and the air temperature was +28 °C.

The visibility of the light signals was according to the provisions of the regulations in force.

### **B.5. The Investigation**

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

*Summary of the testimonies of the railway undertaking's staff and of the public railway infrastructure manager*

**The Engine Driver** that hauled the train no. 69731, stated the following:

- The train ran in bank and he putted the handle of the control switchgroup on the locomotive's traction position but he did not observed shocks or an abnormal decrease of the speed
- He saw dust around the track;
- He took measures from the train quick brake;
- After the train stopp one found out that the first bogie of the fifth wagon from the locomotive was derailed in the running direction.

**The engine driver's assistant** of the freight train no. 69731, stated the following:

- He observed dust near the track;
- He took measures from the train quick brake;
- After the train stop one found out that the first bogie of the fifth wagon from the locomotive was derailed in the running direction;
- He took measures from the train keeping stopped.

**The head of the freight train no. 69731**, stated the following:

- During the running of the freight train no. 69731, he was in the driver cab's 2 and had not the possibility to track the train;
- He does not check the empty or load condition of the train's wagons, those condition being checked only on the basis of the documents that were received from the Hungarian part.
- After the train stop one found out that the first bogie of the fifth wagon from the locomotive was derailed in the running direction;
- He took measures from the train keeping stopped.

**The station movement inspector** of Zalău Nord railway station, stated the following:

- At the visual check of the train in movement, he did not observed irregularities;
- The train was complete (it had tail disc).

**The station movement inspector** of Mirșid railway station, stated the following:

- At around 16<sup>25</sup> he communicated through the radiotelephone equipment the entry-passing conditions for the freight train no. 69731. He repeated the condition for about 4 – 5 times but he did not received any answer;
- At around 16<sup>38</sup> the ganger of District Line Zalău arrived at the movement office and communicated to the station movement inspector that at the km 102+040, between Zalău and Mirșid railway station, the wagon no. 31530667181-1 (the fifth from the locomotive) of the freight train no. 69731 derailed from the first bogie (in the running direction).

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

In order to achieve its tasks and responsibilities, the public railway infrastructure manager CNCF “CFR” SA – National Company of Railway Transports „CFR” SA, and the railway undertaking SC TRANSFEROVIAR GRUP SA Cluj-Napoca had implemented their own safety management system.

In this context, CNCF “CFR” SA and SC TRANSFEROVIAR GRUP SA Cluj-Napoca SA ensure the control of the risks associated with the activity of the administrator and undertaking.

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

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

#### norms and regulation

- Regulation for trains running and shunting of the railway vehicles no. 005 approved by Ministry of Transports, Constructions and Tourism’s Order no. 1817 from the 26<sup>th</sup> of October 2005;
- ANNEX II RIV – Load Prescriptions
- Instruction regarding the technical inspection and maintenance of the wagons in operation no. 250 Ministry of Transports, Constructions and Tourism’s Order no. 1817 from the 26<sup>th</sup> of October 2005;
- Instruction of norms and tolerances for the construction and maintenance of the tracks with normal gauge no. 314/1989;
- Dynamics of railway vehicles, Editura tehnică – 1995 (Prof. dr. ing. Ioan Sebeșan).
- Order no. 30/1298/1987 of Infrastructure and Line Division - București

#### Sources and references

- photos taken by the investigation commission members immediately after the accident;
- the results of the measures made immediately after the railway accident at the track superstructure and derailed wagon;
- questioning of the employees involved in the railway accident occurrence;
- the reports and the measurements that were performed after the railway accident by the members of inquiry and investigating comission;
- inspection and interpretation of the technical condition of the items involved in the accident (track and wagon);
- the reports of the speed recorder bands.

## **B.5.4. Operating of the technical equipment, infrastructure or rolling stock**

### **B.5.4.1. Data on line**

#### ***Technical condition of the line before the railway accident***

The derailment one occurred on the line 409, between the railway stations Zalău Nord and Mirșid, on the running line (nonelectrified line), at the km. 99+700.

The line is made by rail type 49, timber sleepers, indirect fastening type k, in active and complete condition, in curve with radiant  $R = 210$  m, overwidening  $S = 20$  mm, cant of the track  $h = 50$  mm, track deflection  $f = 60$  mm, in bank (in the running direction) with gradient of 16 ‰, track joint, the broken stone bed is complete.

The maximum speed of the line running provided in the working timetable is 50 km/h.

#### ***Findings and measurements performed at the line, after the derailment and wagon's lifting.***

The derailment occurred through the rail climbing by the left wheel of the wagon first's bogie, at the km 99+700, established as being the point "0" (the place where the left wheel climbed the rail) .

Starting from the derailment point were performed checks of the gauge (E) and of the track cross level (N) in static condition, with the gauge measure, in 6 points before the point "0" and in 3 points after this ( the points having an equidistance of 2,5 m). Also, in order to determine the track position in plan were performed measurements at the track deflection in 3 points before the point "0" and in 1 point after this, having the equidistance of 5 m. For determining the vertical and lateral wear of the rails were performed checks with slide gauge in the points where one measured the gauge and the level.

The train running direction was from the point "-6" towards the point "3".

#### ***Din interpretarea valorilor măsurate au rezultat următoarele:***

a) In the verified points the gauge measurements were according to the provisions of the article 1, item 13 from the instruction no. 314/1989. Also, the values of the track cross level were according to the provisions of the article 2, item 2 of the same instructions.

b) According to the provisions of the article 1, point 14, paragraph 1, item c from the Instructions of norms and tolerances for construction and maintenance of the track with normal gauge no. 314/1989, the tolerances at the gauge towards 1435 + overwidening had a value of -3 mm and +10 mm. The corresponded values for the geometrical elements of the curve with a gauge within 1452 – 1465 mm. In the point „0” and in the points located before it, at the distances of 2,5 m and 12,5 m, the measured values of the gauge were 1467 mm, 1466 and 1469 mm, values that are according to the provisions of the article 1, point 13, from the instructions no. 314/1989 (“ the limits of the track gauge must be between the values 1470 mm - 1432 mm”).

c) The variation of the deflections at the gauge is according to the value of 2mm, provided in the instructions no. 314/1989, article 1, point 14, item c, paragraph 2, between all the measurement points, excepting the line section between the measurement points located at the distance of 12,5 m, respectively 15 m before the measurement point “0”, where this is of 2,8 mm/m.

d) On the analysed line section, in the verified points, the tolerances of the track cross level is according with the value of 10 mm, provided in the instruction no. 314/1989, article 7, item A, point 1.

e) The value of the track twisting is 10 mm, provided for speeds of  $(30 < V \leq 50 \text{ km/h})$ , provided in the instructions no. 314/1989, article 7, item A, point 4, paragraph 6, is respected between the verified points, excepting the line section between the measurement points located at the distance of 12,5 m respectively 15 m before the point "0", where the value of the track twisting is of 11 mm.

f) In the verified points the tolerances between the neighboring track deflections is according to the value of 12 mm, provided in the instructions no. 314/1989, article 7, item B, point 1.

g) Concerning the analysis of the rail wear dates, one found out that the vertical and lateral wear of the rail is within the limits that are allowed in the instructions no. 314/1989, the tables 24, 25 and in the provisions of «Technical Prescription regarding the measuring of the vertical and lateral wear of the rails» approved by the Order no. 30/1298/1987 of Infrastructure and Line Division București.

After the wagon derailment, the train ran in this conditions a distance of 2340 m and then one stopped.

We mention that the deficiencies found at the line due to the interpretation of the static measurements, are local faults that could not influence the derailment.

#### **B.5.4.2. Data regarding the rolling stock's operation and it's technical equipments**

##### **B.5.4.2.1. At the locomotive:**

###### **Locomotive DA 460:**

The automatic brake was active.

The vigilance and safety equipment and the (INDUSI) equipment from the locomotive were active and sealed.

The time to onset in action of the direct brake is 7 seconds.

The air equipment was airtight and active.

Driver's automatic brake valve KD2 from the both driver's cab operated normally.

The brake rigging was in good condition.

The wheels tyres were in good condition.

Due to the interpretation of the recorders from the locomotive's DA 460 recoder equipment, resulted that between Zalău Nord and Mirșid railway stations, the freight trains no. 69731 ran in normal conditions, with speeds between 35 km/h and 15 km/h, until to the derailment moment that occurred at a speed of 26 km/h.

##### **B.5.4.2.2. At the involved staff:**

###### **The wagon no. 31530667181-1:**

The wagon no. 31530667181-1 derailed by the wheels no. 5, 6, 7, 8 (axle no. 3 and no. 4 the bogie no. II) used by SC TRANSFEROVIAR GRUP SA Cluj-Napoca:

- Wagon series: Tals
- Construction year: 1960

- Wagon tare: 23.800 kg
- Wagon length: 11.50 m
- Wagon pitch: 6.10m
- Bogies: tip ORE
- wheelsets: monobloc
- Automatic brake: KE - GP
- RP- last scheduled service: 06.04.2011 - SCS
- RR+RIF- next breaking scheduled service: 04.14

#### B.5.4.2.2.1. Findings performed at involved wagon after the accident

After the railway accident, at the involved freight wagon were performed dimensional checks at the profile of the derailed bogie's wheels and one measured the height of the buffers centres against the top of the rail.

The values that resulted from chekings were properly, excepting the high of the buffer from the wheel no. 8 area (first wheel).

When the wagon was verified at repairs line Jibou, one found out the following:

- One compartment from those four, was loaded with salt; this compartment corresponding to the wheels no. 1-3.
- after discharging and weighting resulted a salt amount of 11.530 kg.



**Foto 3:** *The rear compartment, the right part of the running direction, remained unloaded at the first bogie (in the running direction)*

Corroborating the findings with the charging prescription provided in the Annex II RIV, result the following:

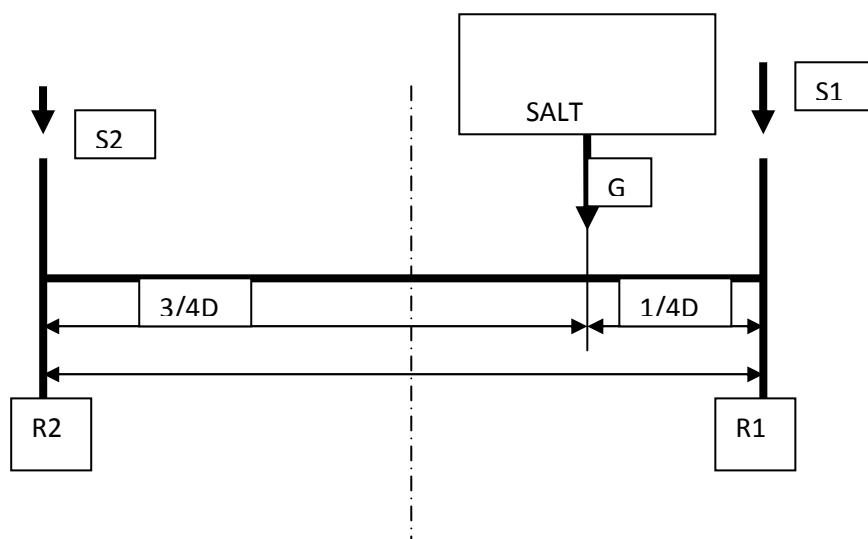
- taking into account that the wagon tare is of  $T=23800$  kg, result that every axle-journal was requested a load equal with  $T/8=2975$  kg.
- the unloaded salt (11530 kg) from the compartment that is opposite to the trailing wheel, charges the axles of the second bogie ( in the running direction) with a additional load  $11350:2=5765$ kg.
- considering that the weight of salt mass  $G$  acts focused in the weight centre of the respective compartment, according to the below model we can write the following relations:  

$$S1 \times l_1 / 4D = S2 \times l_3 / 4D$$

$$S1 + S2 = G$$



Performing the calculations we obtain  $S1=4256\text{kg}$  and  $S2=1418\text{kg}$ .



Resulted that the charge condition of the wheels axle-journals no. 1-4 was according to the below tabel:

| R1                                     | R2                        | R3                                 | R4                        |
|--|---------------------------|------------------------------------|---------------------------|
| $2975+4256=7231\text{kg}$              | $2975+1418=4393\text{kg}$ | $2975+4256=7231\text{kg}$          | $2975+1418=4393\text{kg}$ |
| $R1/R2=7231/4393=1,64 > \mathbf{1,25}$ |                           | $R3/R4=R1/R2=1,64 > \mathbf{1,25}$ |                           |

In conclusion, the report of the load on wheel between the wheels 1-2, respectively 3-4 exceeded the allowed report of 1,25.

## B.6. Analysis and conclusions

### B.6.1. Conclusions regarding the technical condition of the track superstructure

1. According to the report nr.42/A3/713/2012, the measurements that were performed after the wagon derailment, show us, the following:

- At the derailment site, the gauge tolerances, the tolerances at the track cross level, are according to the prescription of the Instruction no. 314/1989.

- The vertical wear " $U_v$ " and the lateral wear " $U_L$ " of the rail are according to the allowed limits of the Instruction no. 314/1989, tabels 24, 25 and of the provisions « Technical Prescriptions regarding the measuring of the rail's vertical and lateral wears approved by București Infrastructure and Line Division's Order no. 30/1298/1987.

- In the measured points, the values that were obtained between the neighboring track deflections, are according to the tolerance of 12mm, provided in the Instruction no. 314/1989, at the article 7, ítem B, point 1.

## **B.6.2. Conclusions regarding the technical condition of the wagon from the train composing**

### ***Findings performed at the wagons from the train composing:***

- the exchangers “Goods – Persons“ and „Empty – Load” were according to the load condition of the wagons, respectively on the positions „Goods” and „ Empty”.
- the coupling of the wagon was properly carried out;
- the active couple of the draft gear was properly tightened for freight trains;
- there were not found out unassured pieces that jeopardize the traffic safety.

## **B.6.3. Conclusions**

1. One did not observe the provisions of the article no. 88 – (1) item t) from the Regulation for train running and shunting of the railway vehicle no. 005/2005, that forbidden the introduction in the trains and keeping in the running of the wagons that were not incomplete unloaded or with the load on a part.
2. Following the measures that were performed at the line, resulted that the obtained values are in the limits of the regulation in force.
3. Following the measures that were performed at the wagon, resulted that the obtained values are in the limits of the regulation in force.

## **B.7. Accident causes**

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

**Direct cause** of the accident was the exceeding of the allowed report of the wheel load at the second bogie’s axles of the wagon in the running direction (the axles with the wheels no. 1-2, and 3-4), because of the wagon’s incomplete unloading (the charge from the diagonal compartment opposed to the trailing wheel no. 8 was not unloaded).

This fact lead at the discharging of the load of the trailing wheel when the bogie entered in the curve, favouring the climbing of the wheel’s lip on the head of the rail from the outside curve rail at the km 99+077 and the derailment of the axle with the wheels no. 7-8, followed by the training in derailment of the axle no. 5-6.

### **B.7.2. Contributing factors:**

The running with the decreased speed on a curve whose effective cant of track was of 50 mm, had as effect the load unloading of the wheels from bogie’s left in the running direction.

### **B.7.3. Underlying causes**

None.

#### **B.7.4. Root causes**

None.

#### **C. Safety recommendations**

None.

The Investigating Report will be submitted to Romanian Railway Safety Authority, National Company of Railway Transports „CFR” SA and to the railway undertaking SC TRANSFEROVIAR GRUP SA Cluj-Napoca.

#### **Membres of the investigation commission:**

- Vladimir MĂCICĂȘAN                      - main investigator                      .....
- Gabriel PASCU                              - membre                                      .....
- Traian SZEKELY                           - membre                                      .....
- Alexandru COTUȚ                         - membre                                      .....
- Ioan MORAR                                - membre                                      .....