



MINISTRY OF TRANSPORTS AND INFRASTRUCTURE
ROMANIAN RAILWAY AUTHORITY - AFER

ROMANIAN RAILWAY INVESTIGATING BODY



INVESTIGATING REPORT

on the fire occurred on the 22nd of September 2011 in the Regional centre for railway operation, maintenance and repairs Timișoara, between the railway stations Turdaș and Orăștie Km 457+003, at the locomotive LDH 80-0600-9 (belonging to SNTFC “CFR Călători” SA) hauling the passenger train no. 347-2



Final edition
The 22nd of November 2011

NOTICE

With reference to the accident from the 22nd of September 2011, at 07,58 hour, on the running line I, between the railway stations Turdaş and CF Orăştie, Km 457+003, consisting in a fire at the diesel-hydraulic locomotive LDH 80-0600-9 (belonging to SNTFC “CFR Călători” SA), hauling the passenger train no. 347-2, Romanian Railway Investigating Body carried out an investigation in accordance with the provisions of the Government Decision no. 117/2010.

Through the performed 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.

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

Bucharest 2011

Approved by

Director,
Dragoş FLOROIU

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

Nicu PALANGEANU

This notice is part of the report for the investigation of the railway accident happened on the 22nd of the September 2011, in the Regional centre for railway operation, maintenance and repairs Timişoara, running track Simeria – Orăştie (double electrified line), between the railway stations Turdas – Orăştie , line I, km. 457+003, consisting in a fire at the diesel –hydraulic locomotive LDH 80-0600-9, hauling the passenger train no. 347-2 (belonging to SNTFC “CFR Călători” SA),

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I. PREAMBLE

I.1. Introduction

The accident occurred on the 22nd of September 2011, at 07,58 hour, in the running of the train no. 347-2, consisting in a fire at the hauling locomotive LDH 80-0600-9, was an accident, included in the art. 7, paragraph (1), letter. e) from the *Regulation for the investigation of the accidents and incidents, for the development and improvement of Romanian railway and subway network*, approved by the Government Decision no. 117/2010, hereinafter as **Regulation**.

Taking into account these above mentioned and according to the art. 19, paragraph (2) from the *Law no. 55/2006 on railway safety*, in connection with the art.48, paragraph (1) from the **Regulation**, Romanian Railway Investigating Body established an investigation commission.

Through the performed 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.

I.2. Investigation process

On the 22nd of September 2011, Romanian Railway Investigating Body was notified by the Regional Inspectorate for Traffic Safety from the Regional centre for Railway operation, maintenance and repairs Timișoara, through the territorial railway accident on the running line I between the railway stations Turdaș and Orăștie, at Km 457+003, in the running of the passenger train no. 347-2, at the hauling locomotive LDH 80-0600-9.

After the displacement to the place of the accident were found the following:

- Diesel- hydraulic Locomotive LDH 80-0600-9, hauling in the passenger train no. 347-2, was stopped at km. 457+003 on the line I between railway stations. Turdaș and Orăștie;
- The driver's cab of the locomotive with command and control equipment, electric wirings, automatic stopping devices panel , contactors and cut out panel, laminated PFL elements on the walls and floor destroyed by fire;
- **Long hood** on the right side affected thermic in the right of air filters;
- Partition wall between **long hood** and the driver's cab thermic affected on the upper side and the broken front windows as a result of thermic effect;
- The right side of the driver's cab (in the central zone) between the upper side of the battery case and side windows of the driver's cab with traces of thermal damage;
- The right access door of the driver's cab with traces of thermal damage;
- On the left side of the locomotive in the upper side of the connection between the small hood and the divers' cab with traces of thermal damage;
- The upper side of the battery case on the right side of the locomotive with traces of thermal damage;
- Hydraulic transmission with traces of thermal damages at the upper side under the dynastarter;
- The exterior box of the dynastarter with strong evidence of thermal damage to the top, inspection covers and in front of the and in the right of the terminal plate;

In case of this accident were no fatalities or injures.

At the accident place were present the representatives of:

- Inspectorate for Emergency Situations Hunedoara – Squad Orăștie;
- Operational Department of the Railway Transports Police;
- Romanian Railway Investigating Authority;
- Romanian Railway Safety Authority – Safety Railway Inspectorate Timișoara;
- National Railway Company "CFR" – SA „-Regional center for railway operation, maintenance and repairs Timișoara
- National Society of Passenger Railway Transport „CFR Călători” SA - RTFC Banat-Oltenia.

By Decision no. 70 of 22.09. 2011 of the OIFR Director in accordance with Art. 19, para. (2) of Law no. 55/2006 on railway safety in conjunction with Art. 48, para. (1) of the Regulation, was established an investigation commission consisting of :

- Livius Oltenacu – investigator OIFR - main investigator
- Constantin Fleancu – Department head SC PM AII – RTFC Banat – Oltenia - member
- Sorin Cîrdu – Regional Inspector SC – RTFC Banat – Oltenia - member
- Mircea Zugravu – Regional Inspector SC – RTFC Banat – Oltenia - member
- Daniel Duşa - Regional Inspector SC-CREÎR Timișoara - member
- Călin Dărau – Head of the locomotive Shed Arad - member

A. ACCIDENT BRIEF PRESENTATION

A.1. Brief presentation

On the 22.09.2011 for hauling train 347-2 with diesel traction on section Simeria Călători-Șibot the locomotive LDH 80-0600-9 was allocated from shunting Simeria station.

The train is leaving from Simeria Călători railway station at 07.24, and is running on the line I with speeds between 17-44 km/h.

At 07.50, reaching to km.457+003 the engine driver of the hauling locomotive DHC-600 notifies through RER station belonging to the locomotive, a fire started at the locomotive in front of the dynastarter.

The driving staff of the locomotive LDH 80-0600-9 tried with fire extinguishers equipment of the locomotive and on the locomotive EA-690 (second in the train composition- non hauled the train), the fire burn out. Seeing the fast propagation of the fire, the driver's assistant of the locomotive LDH 80-0600-9 calls with his personal phone the unique emergency number 112 requiring the intervention of the fire-fighters.

The fire was burned out at 08:50.

The Locomotive LDH 80-0600-9, hauling the passenger train no. 347-2, belonging to SNTFC „CFR Călători”SA – RTFC Banat – Oltenia was driven by the driver and his assistant.

The railway accident area is located in the running section Simeria - Șibot belonging to CNCF „CFR”-SA – Regional center for railway operation, maintenance and repairs Timișoara.

The accident occurred in the current line I at km. 457+003 between railway stations Turdaș and Orăștie (straight track and on the flat).

A.2. Accident causes

A.2.1. Direct cause

The fire started in the terminal box of the dynastarter as a result of overheating the contact area between terminal connector blade 1B1 and connection plate in the terminal E2 due to the imperfect contact followed by ignition of the conductor connection insulation of the terminal 1B1 with the pole auxiliary coil from field magnet.

Factors that contributed

The overcharge occurred in the functioning of the dynastarter as a result of using the set of storage batteries with the normal operating capacity exceeded and irregular.

A.2.2. Underlying causes - None

A.2.3. Root causes - None

A.3. Severity level

According to the provisions of the **Regulation**, the event is qualified as railway accident, classified under art. 7. paragraph.(1) point (e) .

A.4 Safety recommendations

It wasn't necessary to issue safety recommendations for this accident.

This investigation report will be sent to Romanian Railway Safety Authority , National Society of Passenger Railway Transport „CFR Călători” SA, National Railway Company „CFR” SA and Locomotive Repair Company „CFR SC RL Braşov”SA.

B. THE INVESTIGATION REPORT

B.1. Accident presentation

On 22.09.2011 around 05.55 a derailment occurred in the contact line between railway stations Orăştie-Aurel Vlaicu at level crossing from km 451+856 through cornering and breaking the contact line on both running lines by a tip lorry. Following the derailment, the line contact was discontinued with electricity from the railway station Aurel Vlaicu km 450+500 to Orăştie km 454+850.

To ease the traffic around 06:55 the Traffic controller disposes hauling trains on section Simeria-Şibot with diesel traction.

The train 347-2 hauled by the locomotive EA-690 arrives in the railway station Simeria on 22.09.2011 at 07:02 and under provision RC Deva, for hauling with diesel traction on the distance Simeria-Şibot is attached in front of the locomotive LDH 80-0600-9 of the shunting point from railway station Simeria.

The train departed from railway station Simeria at 07:24 and was running on line I with speeds between 17-44 km/h. At 07.50 reaching la km.457+003 the hauling locomotive driver DHC-600 announced by RER station of locomotive equipment that a fire started in the locomotive in the right of the dynastarter.

The driving staff of the locomotive LDH 80-0600-9 tried with fire extinguishers equipment of the locomotive and on the locomotive EA-690, to burn out the fire. Seeing the fast propagation of the fire, the driver's assistant of the locomotive LDH 80-0600-9 calls with his personal phone the unique emergency number 112 requiring the intervention of the firefighters.

The fire was burned out at 08:50.

As a result of fire were no dead persons or injured.



Fire effects
on driving cab
of the
locomotive



Fire effects on the left side of the terminal box of the dynastarter.

Plan intervention and emergency rescue services

At 07:58 the fire-fighters have been notice belonging to the Inspectorate for Emergency Situations Hunedoara – Orăștie Squad which intervened at 08:09, the fire was burned out at 08:50.

The current line between the railway stations Turdaș and Orăștie was reopened to traffic with electrical traction at 09:30.

B.2. Accident circumstances

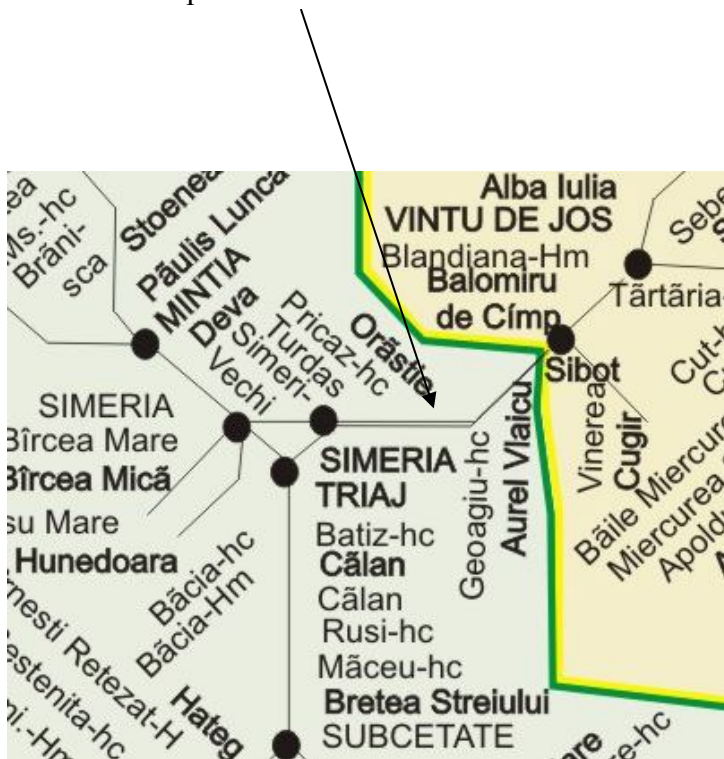
B.2.1. Parties involved

2.1.1 The staff involved belongs to the Engine Locomotive Arad of the National Society of Passenger Railway Transport „CFR Călători” SA - RTFC Banat-Oltenia.

2.1.2 The locomotive LDH 80-0600-9 is property of SNTFC „CFR Călători” – SA, Engine Locomotive Arad and is maintained by the staff of the Repairs Section Arad of „CFR SC RL Brașov” SA.

2.1.3 The railway infrastructure is under the management of CNCF “CFR” SA - Regional center for railway operation, maintenance and repairs Timișoara and is maintained by the staff of Section L5 Deva.

The accident place



2.1.4 The rail communication system on the involved locomotive is the property of SNTFC „CFR Călători” – SA and is maintained by the staff of the Repairs Section Arad of „CFR SC RL Brașov” SA.

The inquiry commission questioned the involved staff in the driving of the involved locomotive and took statements from the train crew of the locomotive EA-690 and from the RC Deva traffic controllers.

B.2.2. Composition and the equipments of the train

The passenger train no.347-2 was composed of 9 wagons, 36 axles, 481 gross tons, automatic braked in line with the timetable - 606 t, manual braked 82 t and real automatic braked - 663 t, manual braked 171 t and and was hauled by the locomotive LDH 80-0600-9 , and the driving was ensured by a complete team composed of a driver and a driver's assistant.

The involved locomotive LDH 80-0600-9 belongs to SNTFC „CFR Călători” – SA being in operation with Locomotive Shed Arad from RTFC Banat – Oltenia.

The safety and vigilance devices (DSV), the punctual control installation of the speed and INDUSI belonging to the locomotive were burned out in the fire.

B.2.3. Railway equipments

2.1.4 The railway infrastructure is under the management of CNCF “CFR” SA - Regional center for railway operation, maintenance and repairs Timișoara and is maintained by the staff of Section L5 Deva.

The current line I at km. 457+003 between railway stations Turdaș and Orăștie is electrified, in a straight line and on the flat build with rail type 60 on concrete sleepers T17.

B.2.4. Communication facilities

Connection between the engine driver and the movements inspectors was ensured through the radiophone installation.

B.3. Accident consequences

B.3.1. Fatalities and injuries - None

B.3.2. Material damages

As a result of the fire, the value of material damages and costs was of **59694,97**, detailed as follows:

- To the locomotive – according to the estimate no. 2T/3809/2011 of the Engine Shed Arad-59230,20 lei;
- Train delays – according to the estimate no. 3645/2011 of R.C. Deva –308,09 lei;
- To the lines - according to the estimate no.2963/2011 al Secției L5 Deva – none;
- To the equipment- according to the estimate no.2/2/3/4/606/2011 – 156,68 lei;
- To the environment – none;

B.3.3. Consequences of the railway accident on the railway traffic

The running track between Turdaș railway station and Orăștie railway station was closed for the railway from 07:58 to 09:30.

Delayed trains:

Due to the railway accident occurrence a passenger train had a total delay of 103 minutes.

B.4. External circumstances

On 22.09.2011, at the hour of the occurrence, the visibility was good, clear sky but the temperature was of approximately +22°C.

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

The accident occurred in electrified current line I at km. 457+003 between railway stations Turdaș and Orăștie in a straight line and on the flat build with rail type 60 on concrete sleepers T17.

B.5. Investigation course

B.5.1. Brief presentation of the involved staff testimonies

B.5.1.1. Summary of the undertaking staff testimonies

The engine driver, who drove the locomotive LDH 80-0600-9, on 22.09.2011, stated the following:

- After hauling the train 2042 on route Săvârșin-Simeria received the operator disposal RCT Deva to drive the locomotive DHC-600 in hauling the train 347-2 on route Simeria-Șibot;
- When receiving the locomotive in station Simeria he realizes that the hydraulic transmission is working only on the “breakdown” mode, the driver who was driving the locomotive as a driver’s assistant confirming verbally this fault;
- notifies the RCT operator about the fault on hydraulic transmission but the hauling train 347-2 is disposed with this fault because of the lack of other locomotives;
- is running with reduced speed with the control switchgroup in position 7 following the indications of the surveillance equipment, and after passing the intermediate signal of the Orăștie station together with the driver’s assistant he feels the smell of burnt insulation;

- train stops and the driver with the driver's assistant open the visitors doors from the dynastarter observing flame and smoke to the left of dynastarter;
- stops the diesel engine , he cuts the power supply from the control panel and the control rod from the batteries and together with the driver's assistant tries to locate and burn out the fire with extinguishers from the locomotive;
- extinguishers are required and the locomotive EA-690 but fire spreads rapidly therefore the driver's assistant calls by mobile to 112 for firefighters intervention;
- on the route from Simeria station to the place of the fire no faults were detected to the locomotive (short circuit, temperature or abnormal noises);
- didn't find flames under the locomotive, these were only in the area of dynastarter;

The driver who drove the locomotive LDH 80-0600-9, as a driver's assistant on 22.09.2011, stated the following:

- received the disposal from the head driver of Simeria Shed for driving the locomotive DHC-600 as a driver's assistant in hauling train 347-2 on route Simeria- Sibot being authorized as a shunting driver;
- when receiving the locomotive DHC-600 in Simeria station the technical condition was good except the hydraulic transmission which was operating for a while only on the switcher in position "breakdown" so only on the power converter ;
- informs the RCT operator from Deva traffic controller head that the locomotive DHC-600 is not suitable for hauling train 347-2 because of the defect TH but of the lack of diesel locomotive it dispose that locomotive to haul the train on route Simeria- Sibot.
- The locomotive was not restricted for hauling passenger trains no mention being made in the locomotive cab or on the board register;
- The locomotive DHC-600 behave well in hauling the train 347-2, the indicators equipment without presenting failure, temperatures and oil diesel engine and hydraulic transmission pressures being normal. Due to the operation on "breakdown" the locomotive was running with limited speeds to diesel engine running speed being between 30-40 km/h;
- On route he made a inspection by opening the dynastarter doors observing a normal function of the assembly;
- After passing the caution signal in Orăștie station he feels smell of burnt insulation and before the entry signal he demands the driver to stop the train. When the dynastarter doors open he detects choking smoke and flame to the left of dynastarter;
- Intervenes for burning out the fire with the extinguishers from the locomotive and with those from the cold locomotive but he can't locate and burn out the fire who spreads rapidly in the locomotive cab so he calls 112 for firefighters intervention;

Shift head of the Deva Traffic Controller Head on duty on 22.09.2011 , stated the following:

- In the contact line without power supply on the both line between Aurel Vlaicu-Orăștie, is decided by the disposal RCR 684 hauling train 347-2 with the diesel locomotive DHC-600 from shunting station Simeria;
- RC Deva at 06.41 sends to RCR Timișoara the disturbance occurred at contact line and hauling with diesel traction of the trains on section Simeria-Șibot;

B.5.2 Safety management system

The infrastructure manager CNCF „CFR” SA, and the railway operator SNTFC „C.F.R. Călători” SA drawn up and implement their own safety management system ensuring the control of the risks associated with the railway operator activity.

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

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

- Minutes concluded on site about the condition of the rolling stock, line and installations;
- photos taken by the investigation commission members immediately after the accident;

- photos taken on subassemblies of the locomotive in the Arad Shed;
- railway normative "Railway vehicles. Inspections and planned repairs" no. 67-005/2008 approved by OMT no. 364/2008;
- statements and questionnaires of the driving staff and of the RC operator Deva;
- minutes prepared by the investigation commission members immediately after the accident;
- documents concerning the maintenance and repair of the locomotive, provided by those responsible for their maintenance;
- examination and interpreting the technical condition the elements involved;
- documents for train running.

B.5.4. Functioning of rolling stock

B.5.4.1. Data found out concerning the locomotive LDH 80-0600-9:

B.5.4.1.1. Resulted data from the checks made by the investigation commission on 26-28.09.2011 and the maintenance and repair staff of the Section Repairs Arad and recorded in a minute (part on the investigation file) and photos (performed by the investigation commission)

1. External appearance (post 1 with the small hood in the front) :

- Big hood on the front side and on the left without thermal damage;
- On the right the big hood shows signs of thermal damage on the right of air filters ;
- Partition wall between the big hood and the driver's cab is thermal damaged on the upper side and the broken front windows as a result of thermal damage effect;
- The right side of the driver's cab (in central area) between the upper side of the battery case and side windows of the driver's cab with traces of thermal damage;
- the right access door of the driver's cab with traces of thermal damage;
- The inspection covers of the battery case on the left and right side, has no traces of thermal damage;
- the small hood of the locomotive has no thermal damage;
- On the left side of the locomotive in the upper side of the connection between the small hood and the drivers' cab with traces of thermal damage;
- The broken windows of the locomotive as a result of thermal damage and the firefighters intervention.

2. The lower part of locomotive has no traces of thermal damage.

3. Fuel tanks have no traces of thermal damage.

4. Batteries:

- The batteries on the left case of the locomotive have no traces of thermal damage. The upper side on the battery case with traces of thermal damage;
- The batteries on the right case of the locomotive have no traces of thermal damage. The upper side on the battery case with traces of thermal damage, the cable connection between the cases with the insulation thermal damage. Were not found any specific electrical short circuit traces.
- The batteries set consisting of batteries of different series disposed heterogeneous on the locomotive, with the normal operation exceeded as follows:
 - case no.1 series 516/2005
 - case no.2 series 388/2005
 - case no.3 series 290/2007
 - case no.4 series 498/2003
 - case no.5 series FS/2003
 - case no.6 and 7 FS/2005
 - case no.8 series 388/2005

5. Main condition of aggregates on the locomotive:

- The diesel engine of the locomotive has no thermal damage and no traces of signs of leaking fuel and Lubricants;
- On the axels trailing 1-4 and on the reversing gear there were no traces of thermal damage. On their external sides were found dust and oil products;
- The hydraulic transmission has traces of thermal damage in the upper right side and dust and oil products;
- compressor, the transfer pump and lubricating pump, aggregate GAT08S2, in normal condition, with no thermal damage;
- the external case of the dynastarter has traces of thermal damage in the upper side;
- **the dynastarter has the terminal connection and inspection covers with severe thermal damage ;**

Were not found traces of replacement or a recent intervention to the locomotive aggregates and subassembly respectively.

6. The locomotive cab:

- floors, walls paneling and ceiling burned;
- to the electrical equipment control and protection was found burning wiring insulation and terminal board;
- equipments and installations subassemblies of safety and vigilance, INDUSI, speed records, from the driver's cab, degraded as a result of thermal damage;
- to the entire electrical equipment from the driver's cab no specific traces of short-circuiting were found;
- as a result to the thermal damage of the fuse elements (of plastic, epoxy) of the fuses composition, to the switches from the driver's cab, they couldn't find their positions appropriate for plugging in or to trigger them a result of intervention staff or due to a possible short circuiting;
- the changer from the driver's cab presents fuse elements of burned component;
- the appropriate area of the main switch of the locomotive has traces of thermal damage;
- at the control valves of the hydraulic transmission was no thermal damage in terminal boards , at coils and conductors related to pipes of air from the set pneumatic tubes that connect the valves Argus S4-S8;

7. Bogies have no traces of thermal damage.

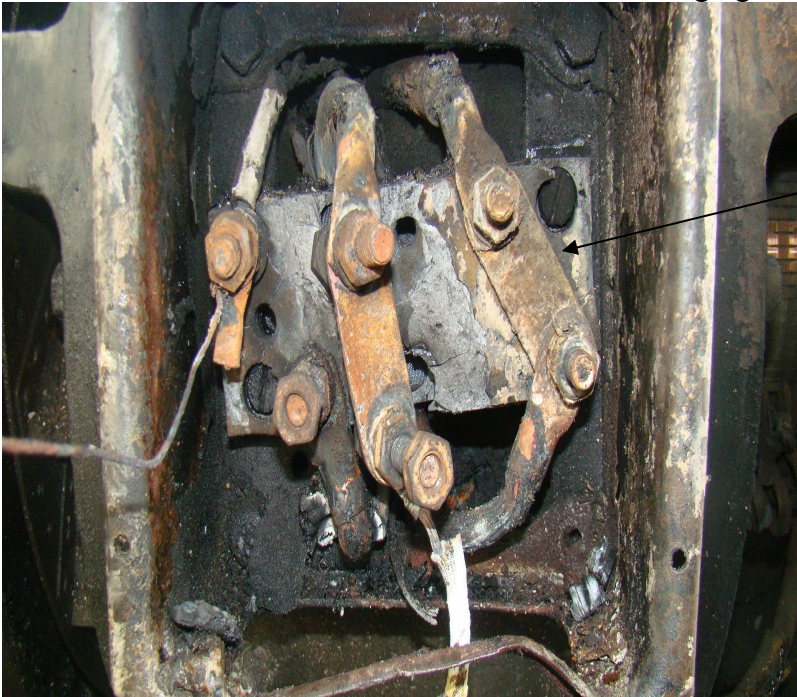
Tires have no traces of overheating.

In the presence of the commission the aggregates were removed of the locomotive (assembly TH - RI – dynastarter).

After the disassembly of dynastarter they have found that;

- Terminal box with thermal damage;
- The floor 1B1 – E2 (in the middle of the terminal box) overcharged as a result of the thermal effect of the power.
- The end winding the auxiliary pole to dynastarter (cable near blade connector) overcharged having the insulation burned from the terminal box until in the interior of dynastarter;
- Terminal connection E2 (conductor bypass) charged with melted insulation;
- The dynastarter case at the exterior affected by the fire at the top;
- Cables between motors poles with burned insulation;
- Main and auxiliary pole near the terminal box with strong traces of burning;
- Brushgear assembly free of breakthrough, carbon brushes untouched, pressing mechanism brush at the top damaged with no tension spring due to the thermal effect of heat;
- The armature has no traces of short circuiting;

- Burned inside inspection covers ;
- Dynastarterul has suitable roller bearings, free of friction between armature and field magnet , between fan and case;
- Suitable metalastic coupling (discul HARDY) free thermal damage;
- Textolite board completely burned in the middle (terminals 1B1 – E2) having extremities less damaged;
- **On terminal B1 was found the inappropriate fixation between cable lug B1 and metal plate of the rectifier bridge (the imperfect contact exists, relative motion between them) with strong traces of overcharging ;**
- The rectifier bridge B2 – D2 with properly fixed screws;
- The cables on terminals E1 si B1 free of overcharging traces , with properly fixed shoes ;



Terminal B1 with imperfect contact between blade connector and connection plate with terminal E2



Area field magnet from behind the terminal box



Detail with connection cables of the field magnet in terminal box



Connection 1B1 for switching the auxiliary pole to terminal box

B.5.4.1.2. Resulted data from the document analysis required by the railway operator

Locomotive DHC 600 performed a repair type RR la „SC REMARUL-16 Februarie” Cluj Napoca on 21.07.2006 for running a number of 148.078 km. **Is due to RG on july 2009.**

Last planned repair type RT was on 08.09.2011, and the last PTh3 was performed on 15.09.2011 at Simeria Shed with the staff belonging to SC CFR SCRL Braşov SA – Locomotive Repair Section Arad.

According to the minute no.190/2057/30.08.2011 of a Lomotive Shed Arad, with the locomotive fleet with the hauling possibility on September 2011, locomotive DHC 600 is restricted for hauling the trains at maximum speed =70 Km/h. due to the axle peeling no.4 on the right and distributed to the shunting service in railway station Simeria.

In the working unified command no.184/A/08.09.2011 prepared to carry out the technical inspection type RT at point .c (electric part) are not specified defects in electrical system of the locomotive.

The working command in section „Received” is not signed by the Head of the Repair Workshop and by the delegate recipient (locomotive examiner) and is not certified by the Head of the Repair Section. Due to the burning of the driver’s cab, all the accompanying documents and records of the equipment IVMS were destroyed by burning.

B.6. Analysis and conclusions

B.6.1. Analysis of the way of accident occurrence

- The fire initiation was produced by the increase of the contact resistance due to imperfect contact of B1 corresponding to the terminal box of the dynastarter;
- The imperfect contact between the cable blade between the auxiliary pole and the connection plate with terminal E2 leads to overheating ground contact and melt the cable insulation followed by its ignition;
- During the dynastarter operation the air currents favored the burning of insulation cables of the field magnet. The Dynastarter being self ventilated, the fire spread inside it, particularly affecting the terminal box and upper side;
- When stopping the diesel engine and hence the dynastarter by the driver, the flame went out through the inspection covers of the dynastarter, ignited combustible deposits of the lower dynastarter and transmission extending the fire in the air filters and under the locomotive cab floor;

B.7. Accident causes

B.7.1. Direct cause

The fire started in the terminal box of the dynastarter as a result of overheating the contact area between terminal connection blade 1B1 and connection plate in the terminal E2 due to the imperfect contact followed by ignition of the conductor connection insulation of the terminal 1B1 with the pole auxiliary coil from field magnet.

Factors that contributed

The overcharge occurred in the functioning of the dynastarter as a result of using the set of storage batteries with the normal operating capacity exceeded and irregular.

B.7.2 There weren’t identified underlying or direct causes

B.7.3. Root cause - None

C. Safety recommendations

It was not necessary to issue safety recommendations for this accident.

The present Investigating Report will be transmitted to the Romanian Railway Safety Authority, National Society of Passenger Railway Transport „CFR Călători” SA, National Railway Company „CFR” SA and Locomotive Repair Company „CFR SC RL Braşov”SA.

Investigation commission members:

- Livius Oltenacu – investigator OIFR main investigator
-
- Constantin Fleancu – Head department SC PM AII – RTFC Banat – Oltenia - member

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- Sorin Cîrdu – regional inspector SC – RTFC Banat – Oltenia - member
-
- Mircea Zugravu – regional inspector SC – RTFC Banat – Oltenia - member
-
- Daniel Duşa - regional inspector SC-CREÎR Timișoara - member
-
- Călin Dărau – Head of the locomotive Shed Arad - member