

Investigation Agency appointed an investigation commission in charge with gathering and analysis of the technical information, establishment of the conditions, including the determination of the causes and, if case, issuing of some safety recommendations for the prevention of some similar accidents and improvement of railway safety.

Presentation of the railway accident

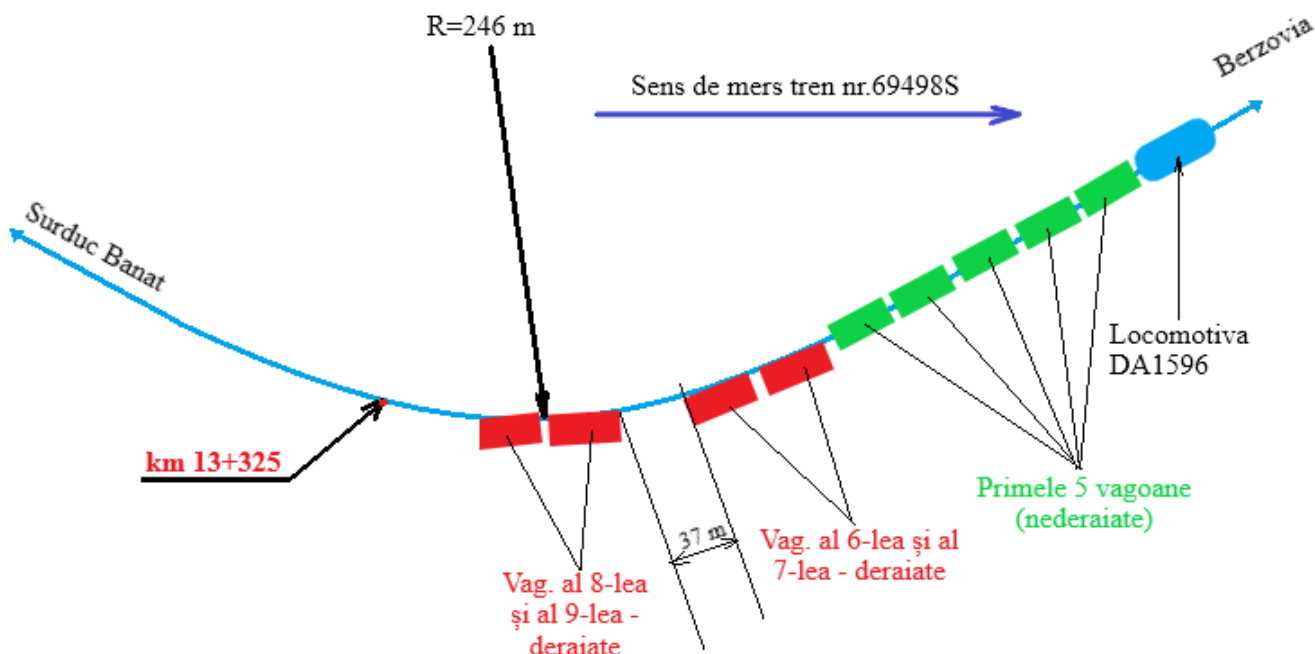
On the 22nd December 2018, the freight train no.69498S, got by the railway undertaking SC TIM RAIL CARGO SRL, was dispatched from the railway station Grădinari Caraș to the railway station Timișoara Nord.

The freight train no.69498S consisted in 9 wagons, type Uagps, loaded with cereals, 36 axles, 684 gross tonnage, necessary/real automatic braked tonnage:376 t/468 t, hand braked tonnage necessary/real:82 t/202 t and length 165 m.

Between the halts Doclin and Tirol, km 13+270, on a constant-radius curve with left deviation, in the running direction, the train speed being about 41 km/h, the wagon no.33539334603-6, the 6th one of the train, derailed, the left wheels falling inside the track, respectively the right ones outside the line.

In its derailment, the wagon led to the derailment of the next three wagons of the train (the 7th, 8th and 9th wagons).

Following the running of the wagons in derailment condition, the fish plates of the coupling equipment between the 7th and the 8th wagons broke, it leading to the discontinuance of the general air pipe of the train, followed by the application of the emergency braking.



Drawing no.2 –position of the rolling stock after the derailment

Distance run by those 4 derailed wagons is about 130 m, from the first to the last derailment mark (between km 13+325 and 13+195).

Accident circumstances

Track superstructure

Following the accident, the superstructure and infrastructure of the running line Surduc Banat – Berzovia were affected on about 130 m.

Railway equipments

None.

Rolling stock

Following this railway accident 4 wagons of the train were damaged.

Interruptions of the railway traffic

The running line Surduc Banat – Berzovia was closed starting with the 22nd December 2018, 02:00 o'clock.

Track superstructure, at the event site, needed serious repairs, the line being re-opened for traffic on the 28th December 2018, at 20:43 o'clock, with the speed restriction of 15 km/h, between the km 13+150 and km 13+350.

Injured persons

None.

Measures taken and works performed for the railway traffic resuming

For the traffic resuming , the specialized wagon with jacks (TIS) and a tractor crane of 150 tf intervened. The re-railing of those 4 wagons derailed was finished on the 24th December 2018, at 21:30 o'clock.

Data found about the rolling stock and the infrastructure

Data about the rolling stock

The last 4 wagons of the freight train no.69498S derailed as follows:

- all axles of the 6th wagon (no.33539334603-6) derailed;



Picture no.3 - wagon no.33539334603-6 (the 6th one)

- all axles of the 7th wagon (no.33539335758-7) derailed, and the last axle in the running direction (corresponding to the wheels 1-2) out from the bogie frame and situated behind the wagon at about 5 m. On the suspension part, being from the suspension of this axle, taken from the accident site, no hit or other marks were identified, excepting those generated by the normal working of this part.



Picture no.4 -wagon no.33539335758-7 (the 7th one)

- all the axles of the 8th wagons derailed (no.33539332142-7) and stopped at about 37 m distance from the front wagon;
- the first bogie of the 9th wagon (no.33539335082-2) derailed in the running direction (the bogie corresponding to the wheels 5-6 and 7-8).



Picture no.5 - wagons no.33539332142-7 (the 8th one) and n.33539335082-2 (the 9th one)

The wagons of the freight train no.69498S were weighted on the 29th December 2018 on the weighing equipment got by SC COLTERM SA (CET Timișoara), the weights resulted being between 73,700 t and 76,000 t, non exceeding those written down in the „train consist form”. Following the weighing no exceeding of the loading limits written on the wagons were found or distributions of the loads not in accordance with

those prescribed by the Annex II of the Regulations for the mutual use of the wagons in the international traffic.

On the 14th February 2019, one performed at SC REVA SIMERIA SA the checking of the technical condition of those four wagons derailed in this railway event (no.33539334603-6, no.33539335758-7, no.33539332142-7 and no.33539335082-2), finding as follow:

- all the wagons had made the last repair planned on the 28th December 2018 (6), at the economic operator identified through the acronym SIM;
- the quotations and dimensions measured at those four wagons were between the limits accepted in operation for the wagons, limits stipulated in the Instructions for the technical inspection and the maintenance of the wagons in operation no.250/2005;
- on the wheels of the wagon no.33539334603-6, the 6th one of the train, one found out the next:
 - at the wheels 2 and 4 (the left wheels of the first two axles, in the running direction), hit and friction hits on the exterior chamfer and in the area of the wear limit channel;
 - at the axle with the wheels 7-8 (the last one in the running direction), on the interior surface of the wheel 7 (right wheel), two close marks of hit, repeating at about 1/3 from the wheel circumference, and at the wheel 8 (left one), on the exterior chamfer, a friction-settlement mark in the same plan with the first ones from the wheel 7.



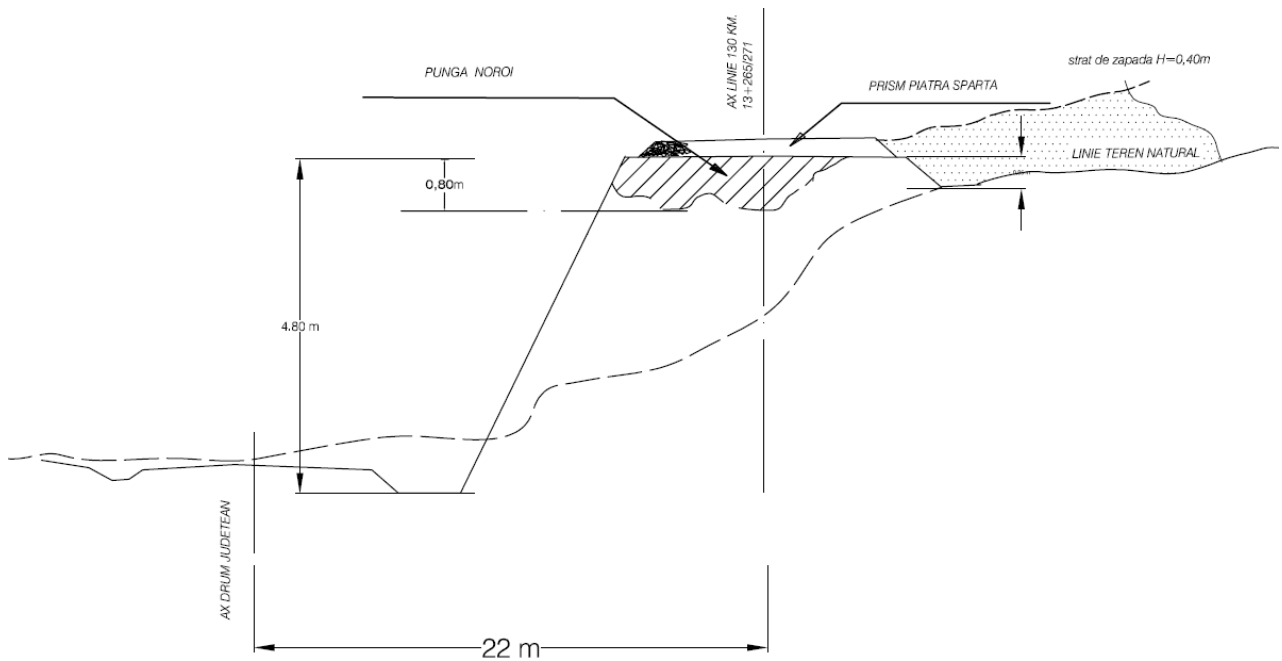
Picture no.6 -marks of hit and friction on the exterior chamfer and in the area of the wear limit channel from the wheel 2.

Taking into account the findings, checking and measurements made at the railway vehicles of the freight train no.69498S, after the accident, one can conclude that the technical condition of the rolling stock did not favoured the derailment occurrence.

Data found at track

The railway accident happened at km13+270, between Surduc Banat and Berzovia railway stations, on the constant-radius curve with left deviation, in the train running direction, with radius $R=246$ m, cant $h=90$ mm, over-widening $s=20$ mm.

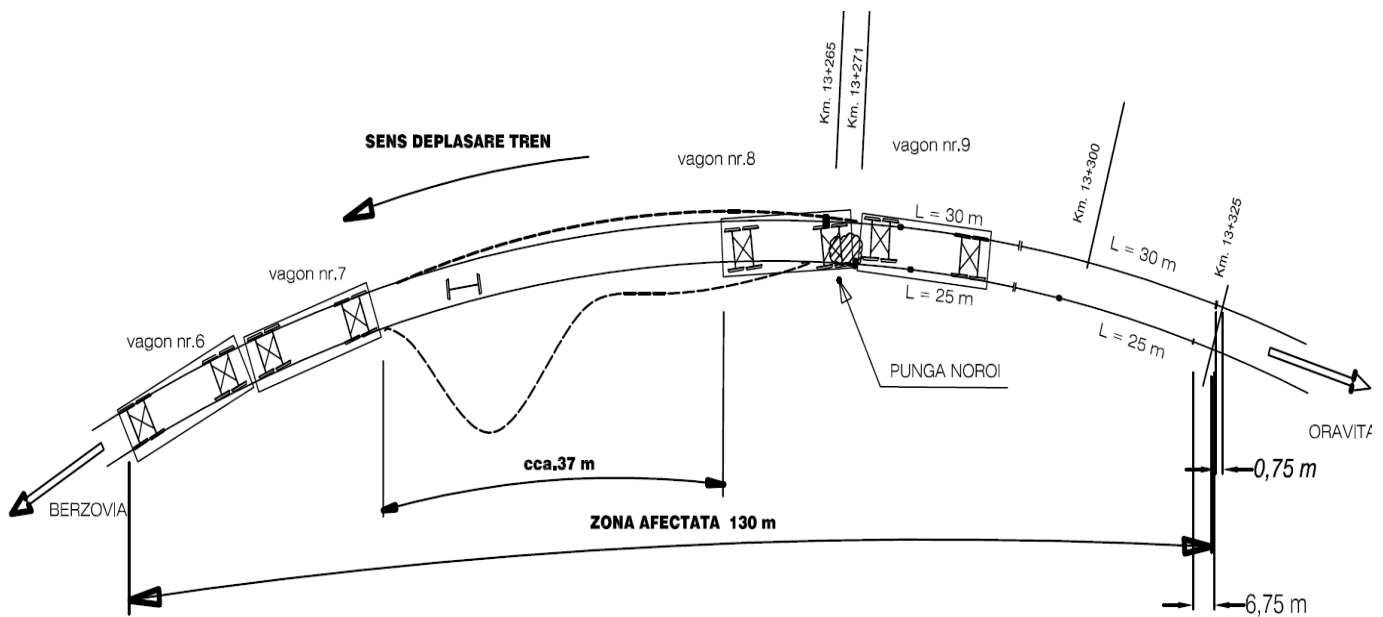
The track superstructure at the accident site consists in rail type 49, non-welded track, wooden sleepers, indirect fastening. The track bed is type embankment, with variable height from 5,20 m to 1,20 m on the right side, respectively from 0,40 m to 0,80 m on the left side, in the km direction.



Drawing no.7 –track transversal level

The maximum running speed of the trains (both passenger and freight ones), where the accident happened, was established at 50 km/h.

Having like reference the train running direction, the first running marks of the flange of wheel on the upper surface of the rails and then of derailment were identified at km.13+325. From the analysis of the findings from the accident site (marks left by the running of the wheels of the derailed wagons, wagon position after their stop, etc), of the track geometry and technical condition, as well as of the findings at the wagons involved in the event, the investigation commission concluded that the identified marks at km.13+325 are generated by the wheels of the wagon no. 33539335082-2, the 9th wagon of the train, following the shocks induced by the derailment of the wagon no.33539334603-6, being the 6th one in the train composition.

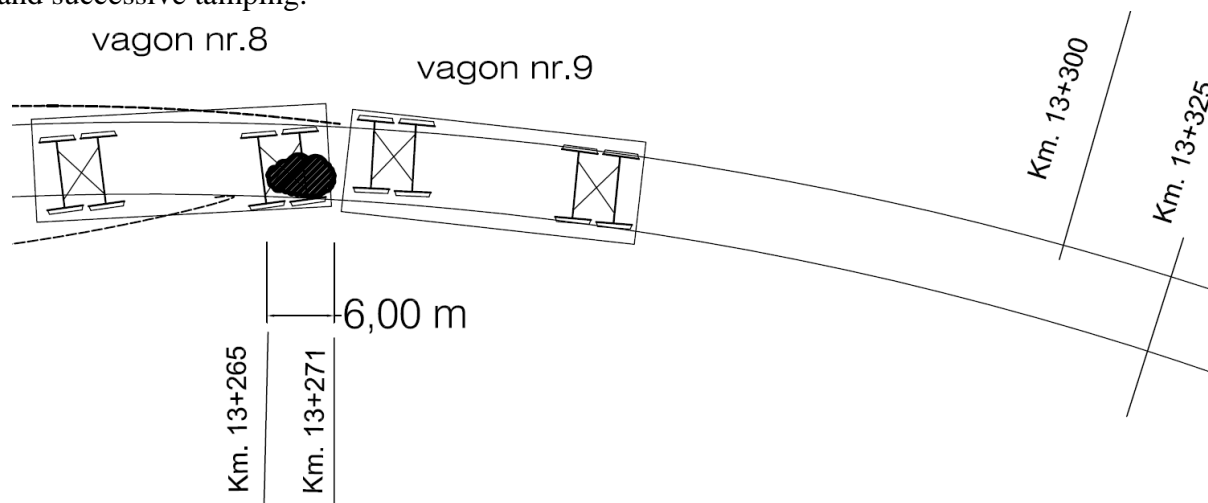


Drawing no.8 – derailment site

In order to restore the track embankment at the event site, the staff of the railway county Timișoara performed mechanical works in order to remake the embankment in its upper part. Through the paper

no.3/3/6/85/11.02.2019, of the railway county Timișoara, AGIFER was informed that, during the works, one found out that at km 13+265÷13+271, there were some horizontal mud pockets unstable, sizes of about 6x4 m, thickness of about 0,80 m, situated on the right side against the track centre, having like reference the direction of km increase. This mud pocket led to the ducking of the vehicle wheels (Colmar), used for work, up to the cabin.

The area where this mud pocket was, against he derailed wagons, was under the 8th train wagon. In this area the whole part was pickled in order to remove the mud and the embankment was remade filling with ballast and successive tamping.



Drawing no.9 – mud pocket position

The appearance of these mud pocket happened following the natural land configuration, layout of materials the embankment is made off, the abundant snow falls before the event, together with the sudden melting of a part of the snow level existing in that area.



Picture no.10 – derailment area



Picture no.11 – aspect of the track after the derailment

Following the finding of the mud pockets at km 13+265÷13+271, the railway county Timișoara took a series of measures for the prevention of similar situations, respectively:

- resuming of the traffic with speed restriction of 15 km/h, between km 13+150 and km 13+350;
- between km 13+150÷13+300 periodical inspections and measurements shall be performed at the transversal and longitudinal level;
- the measurements made shall be reported fortnightly at the technical office of the Track Section L1 Caransebeș by the local district line inspector;
- monthly the technical staff of the track section L1 Caransebes shall perform measurements at the longitudinal level;
- according to the values of the measured geometric parameters of the track, one shall take measures for: limitation of the train traffic, inclusion of the area in the evidence of the dangerous points and the proposal for the performance of some works for consolidation or rehabilitation of the line in the respective area.

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Taking into account these above mentioned, the investigation commission considers that, the **derailment of those 4 wagons** (no.33539334603-6, no.33539335758-7, no.33539332142-7 and no.33539335082-2) **was generated by natural causes**, following the change of the track geometry, under the dynamic load of the train, generated by an unstable mud pocket existing in the embankment body and by big water quantities accumulated in the track embankment, previously the fact happened.

Following the conclusions above presented, **we propose the closing of the investigation** opened through the Decision no.287 from the 27th December 2018 and **the re-classification of this railway**

accident according to the provisions of the *Investigation Regulations*, at art.9, paragraph.a) - ” *There are not classified as accidents or incidents the situations or facts that led to accidental railway traffic closing, following the next causes:*

a) natural, respectively floods, landslides, snow drifting, falls of stones, of trees or other obstacles non-anticipated, earthquakes, fires of vegetation”.

București, 20th February 2019

Investigator in charge

Mitu-Costel AFANASE