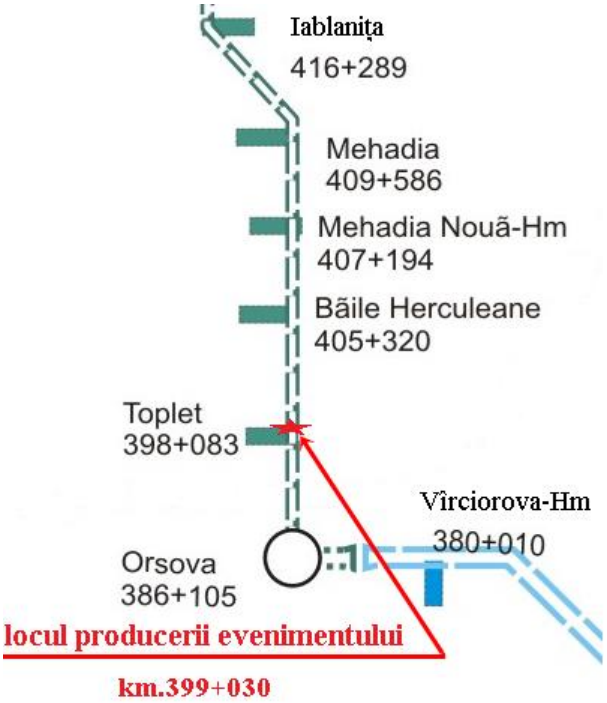
NOTE

on the fall of 4 brake shoes and their keys from the wagon no.33530823236-2, the 20th wagon of the freight train no.30626-1, these parts generated the derailment of the second axle from the first bogie (in the running direction)

On the **25th October 2018**, at about 02:05 o'clock, in **the railway county Timișoara**, track section Orșova - Caransebeș, electrified single-track line, in Topleț railway station, end Y, km.399+030, in the running of the freight train no.30626-1, got by the railway undertaking Deutsche Bahn Cargo România, the second axle of the first bogie (in the running direction) of the wagon no.33530823236-2 derailed, following the fall of 4 brake shoes and of their keys.

The incident was notified on the 25th October 2018, at about 11:30 o'clock, being preliminarily classified, by the Regional Traffic Safety Inspectorate from the Railway County Timișoara, at art.8.3.12 from *Regulations for the accidents and incident investigation, for the development and improvement of Romanian railway and metro safety*, approved by the Government Decision no.117/2010 (hereinafter referred to as *Investigation Regulations*).



Picture no.1 – incident site

On the 25th October 2018, at about 11:30 o'clock, during the track inspection made in Topleț railway station, the ganger found hits on the ends of the vertical screws from the fastening system of the rails on the sleepers, starting with km 399+030, area of the connection rails on the switch no.2 and up to the level crossing from km 400+190, hits specific to the running of the derailed rolling stock (outside the left rail and between the rails, close to the right rail having as reference the km increase direction). Also,

close to the first derailment mark, one found at 0,8 m, respectively 3,5 m, a key of a brake shoe and a brake shoe from a wagon, on the left side of the line.

Following the disposal of the Regional Traffic Safety Inspectorate Timișoara, one stopped, for checking, the freight trains running in the area with derailment marks.

Following the checking on the field, one identified in Remetea Mare railway station, the wagon no.33530823236-2, the 20th one of the freight train no.30626-1, with marks of metallic hits on the running surface of the wheels of the second axle from the first bogie, in the train running direction and the lack, from the same bogie, of 4 brake shoes and their keys.

The marks left by the derailed wheels, identified in Topleț railway station, the brake shoes and their keys found at the derailment site, put in connection with the marks of derailed running (metallic hits) identified on the running surface of the wheels from the second axle from the first bogie, in the running direction, from the wagon no.33530823236-2, in the composition of the freight train no.30626-1, as well as the missing brake parts (4 braking shoes and their keys) from this wagon, indicate that it was the wagon, whose derailment marks, respectively fallen parts were identified in Topleț railway station.

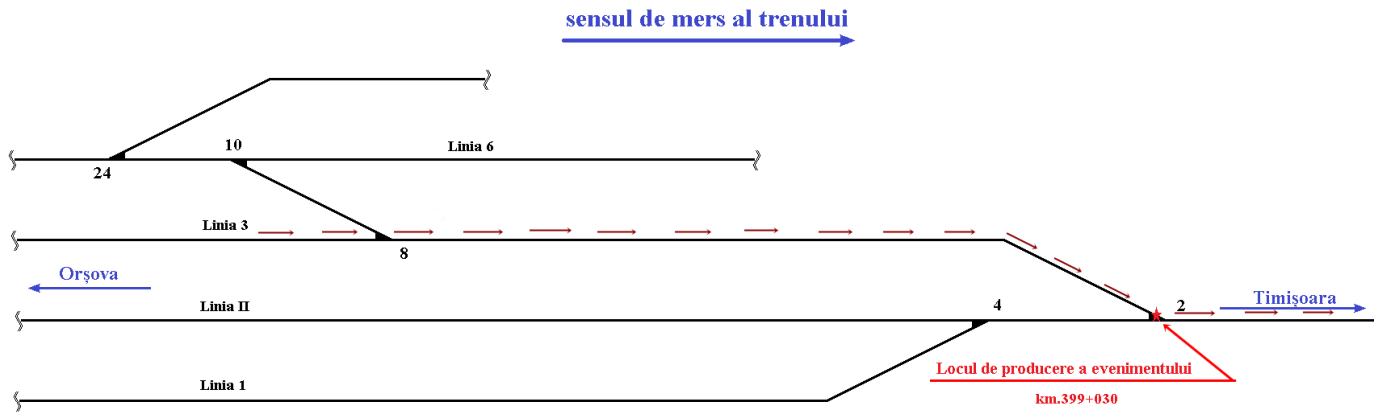
Taking into account these above mentioned, according to the art.19, paragraph (1) from *Law no.55/2006 for the railway safety*, corroborated with art.49 from *Investigation regulations for the accidents and incident investigation, for the development and improvement of Romanian railway and metro safety*, approved by the Government Decision no.117/2010, Romanian Railway Investigation Agency appointed the investigation commission for analysis of the technical information, set up of the conditions, including the determination of causes and, if case, issuing of safety recommendations for the prevention of similar accidents and improvement of railway safety.

From the analysis of the running of the freight train no.30626-1 resulted that the train got by the railway undertaking SC Deutsche Bahn Cargo România SRL, consisting in 30 wagons empty, hauled by the locomotive EA 023, was dispatched on the 23rd October 2018, at 23:40 o'clock, from the railway station Constanța Port B Zone to the railway station Orțișoara.

On the 25th October 2018, at 01:41 o'clock, the freight train no.30626-1 stopped in the railway station Topleț, on the line no.3, in order to allow the passing of the passenger train IR no.1696, from the reverse.

At 02:05 o'clock, the freight train no.30626-1 was dispatched from the line 3, railway station Topleț, having assured the exit route on the running line „deflecting one", on the switch no.2, passed on trailing.

The first derailment mark was found at km.399+030, on the connection rails, on the deflecting section of the switch no.2, at 15 m from the tip joint of the switch. The derailment happened following the simultaneous fall of the wheels of the second axle, of the first bogie, in the running direction, from the 20th wagon of the train. The left wheel of the derailed axle fell outside the line and the right one inside the line. One did not identify marks of overclimbing of the rails, being visible only a mark left wheel running down on field side of the left rail, in the train running direction (on 9 cm), then one noticed (in the same track section), hits on the ends of the vertical screws of the fastening system of the rails on the sleepers, following the wheel fall.



Drawing no.2 – route of the freight train no.30626-1 in the railway station Topleț

The wagon no.33530823236-2 ran derailed about 1150 m, then it hit the concrete slabs of the level crossing from km 400+188 and climbed on the rails. The freight train no.30626-1 continued to run, having the wagon no.33530823236-2 derailed, up to the railway station Remetea Mare, where the train was kept for checking.

During the checking of the area affected by the derailment, one identified three brake shoes and their keys. Close to the derailment site, on the left side in the train running direction, one identified a brake shoe key at km 399+030,8 and a brake shoe at km 399+033,5. Along the route the wagon no.33530823236-2 ran derailed, one also identified two brake shoes, each one having near also its key (km.399+410, respectively km 400+092).

At the incident site, the line was a single track one, interoperable and electrified and the track superstructure welded one, rail type 65 fitted up on concrete sleepers with indirect fastening type K. The derailment site, the connection rails of the switch no.2, from Topleț railway station, that is a switch type 65, tg 1/9, R = 300 m, flexible points, left deviation, fitted up on wooden sleepers with indirect fastening type K.

After the derailment, on the 25th October 2018, one checked in detail the parts of the railway infrastructure/superstructure and made specific measurements at the railway superstructure. From the analysis of the values measured and of the findings at the characteristic elements of the line and of the track geometry, one can conclude that the railway infrastructure/superstructure did not contribute at the derailment occurrence.

In the railway station Remetea Mare, where the freight no.30626-1 train was stopped for checking, one checked the application of the automatic brake from the wagon no.33530823236-2, finding the fitting up and fastening of the brake shoes on the running surface of the wheels and bringing close the brake shoe holder (where the brake shoes were missing) on the running surface of the wheels up to their contact.

On the 1st of November 2018, at SIRV Caransebeș, one performed the checking of the technical condition of the wagon no.33530823236-2, finding the next:

- date of the last planned repair: - 14.03.15 (6), performed at the economic operator identified by the acronym MRB;
- date of the repairs type RR, RIF: - 03.2018, performed at the economic operator identified by the acronym STM;
- quotas and dimensions measured at the wheelsets of the first bogie, in the running direction, were between the limits accepted in operation for the wagons through the Instruction no.250/2005;

One checked the fitting up of those 12 brake shoes existing at the wagon, finding:

- all the keys of the brake shoes were put through the fitting point of the key, ensuring the fastening of the brake shoe at the brake shoe holder;
- the keys of the brake shoes were fitted with the key nose on the upper side of the brake shoe holder, at 6 keys their nose being distanced by the limiter splint, existing at the upper side of the brake shoe holder, with distances between 2,5 – 7,5 cm;
- at none of the keys for the fastening of the brake shoes is fitted the split pin in the whole from the lower side of the brake shoe holder, opposite the nose;
- all the brake shoes had minimum wears, excepting that from the wheel no.5 (back in the train running direction), with wear at about half from the initial dimension and beaked crosswise at middle of the lower part (crack happened during the running of this axle derailed).

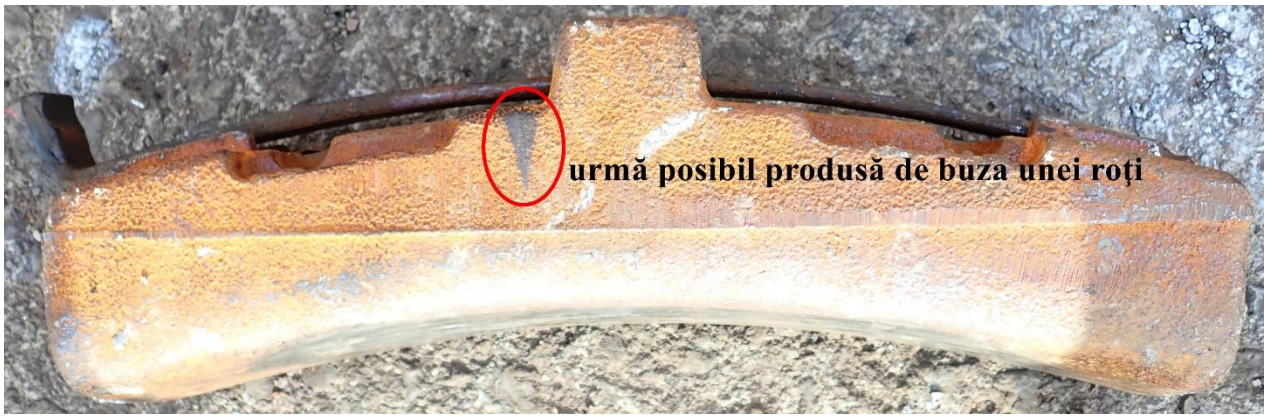
One performed the checking of the compatibility of the brake shoe holders (from which the brake shoes came out) with the brake shoes and the keys found on site, finding:

- the depth of the brake shoe holder case, where the hold for the brake shoe fitting enters, of about 2,5 cm;
- height of the case for the fastening of the brake shoe, measured at those three brake shoes recovered from the field, about 2,5 cm;
- brake shoes recovered from the field, type P10 (S2) had wear generated by the friction with the running surface of the wheels just in the center area (recently fitted up);
- the keys recovered from the field, type S2, in normal condition without distortions;
- the brake shoe holders, found without brake shoes, had the split pin limiter fitted on their upper side, distorted recently (metallic luster), the distortion corresponding to the shape of the brake shoe holder hangers, with corresponding contract marks;
- those four brake shoe holders had light marks of material deposits, happened after the brake shoe dislocation, through the friction with the running surface of the wheels.

One checked at an ensemble brake shoe – brake shoe holder (from those 12 rested at the wagon), the possibility of accidental exit of the key, finding that for its removal it is necessary to use an important force from down to up, following the existing frictions in this ensemble. One checked the possibility to fit up the key through the brake shoe holder, behind the case for the fastening of the brake shoe, finding that although the key does not assure the brake shoe against the fall, the key cannot fall from the wagon because its nose.

One checked the brake shoe found at the first derailment mark , being identified a series of new marks (metallic luster), as follows:

- on one of the lateral sides, starting from the edge up to close the central area, a mark possible generated by the flange of wheel;



Picture no.1 – the brake shoe found at the first derailment mark

- on the site opposite the first presented mark, on one of the lateral edge, one identified a circular mark generated by hit;

- at the lower part of one from the pins for the fastening and guiding of the key, from the back of the brake shoe, a mark of metallic luster, this mark having correspondence on the brake shoe holder of the wheel no.7 front (left side in the running direction).

Picture no.2 – mark of hit on the pin for fastening and guiding of the brake shoe identified at the derailment site

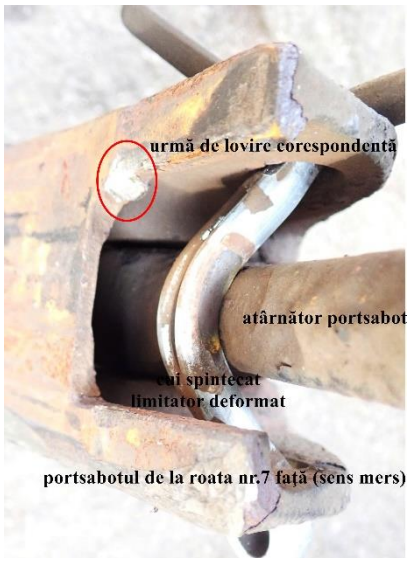


Foto nr.3 – hit mark on the brake shoe holder of the corresponding wheel nr. 7

One checked the ensemble consisting in the brake shoe and key, found at the first derailment mark, with the brake shoe holder of the wheel no.7 front (running direction), finding:

- the key put in the brake shoe holder (without the brake shoe) could not fall because the nose, neither in the presence of the split pin limiter fitted up at the upper part, nor without it;

Taking into account that those three brake shoes identified on the field had close to them the keys, more simulations were made in order to identify the way this simultaneous fall was possible. Following these simulations, one concluded that the single possibility that could generate a simultaneous fall was that with the key put in the brake shoe and its holder, it helping the easier removal of the brake shoe from its holder, favouring the fall of the brake shoe.

The keys of the brake shoe holders could reach a such position only following the intervention of some non-identified persons which, for their removal, maybe for the theft of those brake shoes, they took out the keys from the normal position, trying their use like lever through their introduction between the brake shoe and their holder, in order to remove the brake shoes from their holders and the brake shoe dislocation. During these operations, when the train was stopped, the automatic brake was applied, the brake shoes being pressed between the running surfaces of the wheels and the brake shoe holders, so the brake shoes could not be removed, it being possible only after the release of the train automatic brake, this operation being performed before the train start from Topleț railway station .

Picture no.4 – ensemble brake shoe – brake shoe holder having the key put between those two elements

The way the first derailment mark was identified (just the mark of wheel fall) and the simultaneous fall of both wheels from the same axle, on the same track section, shows that the wheel derailment happened following a mechanic shock generated by a hard object interposed between the running surface of the wheel and the rail head. Taking into account the identification of a brake shoe and its key, close to the derailment point, one can conclude that the derailment was generated by the fall of the brake shoe from the wagon no.33530823236-2, that falling interposed between the running surface of the wheel and the rail head.

Taking into account these presented, the investigation commission considers that the derailment of the wagon no.33530823236-2 was generated by the fall of a brake shoe from the wagon, in its falling it interposed between the running surface of the wheel and the rail head. The fall of the brake shoe, in the same time with its key happened following the intervention of some non-identified persons, that during the stop of the train no.30626-1 in the railway station Topleț, maybe with the intention to steal the brake shoes, they took out the keys trying to use them to remove the brake shoes from their holders. It could not be finished because the train automatic brake was applied during the stop. This external intervention generated the possibility of fall, during the train running, of the improperly fitted and implicitly of their keys left between the brake shoes and their holders.

Following the conclusions above mentioned, **we propose the closing down of the investigation started following the decision no.279 from the 26th October 2018 and the re-classification of that railway incident** according to the provisions of the *Investigation Regulation*, at art.10 - *"Facts of third, individuals or legal persons, that endangered the railway safety, leading to the railway traffic interruptions, damage and/or theft of parts or materials from the railway vehicles… ."*.

București, *06 noiembrie 2018*

Investigator in Charge