



MINISTRY OF
CONSTRUCTION AND TRANSPORT
TRANSPORTATION SAFETY BUREAU

FINAL REPORT (EXTRACTION)



2022-0940-5
(HU-10296)

Railway accident / Derailment
Karcag - Püspökladány, 30th August 2022

Translation

This document is the translation of Points 1, 5 and 6 of Hungarian version of the Final Report. Although efforts have been made to translate the mentioned parts of the Final Report as accurately as possible, discrepancies may occur. In this case, the Hungarian Final Report is the authentic, official version.

Basic principles of the safety investigation

The purpose of the safety investigation fulfilled by Transportation Safety Bureau (TSB) as National Investigation Body of Hungary is to reveal the causes and circumstances of serious railway accidents, railway accidents and railway incidents and propose recommendations in order to prevent similar incidents. The safety investigation is not intended to examine and determine fault, blame or liability in any form.

The findings of the safety investigation are based on an assessment of the evidence available and obtained by TSB in the course of the investigation, taking into account the principles of a fair and impartial procedure. In the Final Report, the persons involved in the occurrence shall be referred to by the positions and duties they had at the time of the occurrence.

The Final Report shall not have binding force and no appeal proceedings may be initiated against it.

This safety investigation has been carried out by TSB pursuant to relevant provisions of

- Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents;
- Commission Implementing Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation reports;
- in the absence of other related regulation of the Act CLXXXIV of 2005, the TSB conducts the investigation in accordance with Act CL of 2016 on General Public Administration Procedures.

Act CLXXXIV of 2005 is to serve compliance with Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety.

The competence of the TSB is based on Government Regulation № 230/2016. (VII.29.) on the assignment of a transportation safety body and on the dissolution of Transportation Safety Bureau with legal succession.

The safety investigation is independent of other investigations, administrative infringement or criminal proceedings, as well as proceedings initiated by employers in connection with the accident or incident.

Copyright Notice

The original Final Report and this extraction of it were issued by:

Transportation Safety Bureau, Ministry of Construction and Transport
2/A. Kőér str. Budapest H-1103, Hungary
www.kbsz.hu
kbszvasut@ekm.gov.hu

The Final Report or any part of thereof may be used in any form, taking into account the exceptions specified by law, provided that consistency of the contents of such parts is maintained and clear references are made to the source.

1. SUMMARY

On 30 August 2022, at 15:05 on railway line 100, between Karcag and Püspökladány stations, the front bogie of the 22nd wagon of the train № 45499-2, travelling on the right track at a speed of 80 km/h, derailed in section 1674+36. The train stopped at 1689+17. Up to the point of stopping, the railway track was severely damaged for about 1.2 km. There were no personal injuries in the accident.

The investigation concluded that there was a track fault at the location of the incident which, taking into account the physically applicable speed (98-103 km/h) at the fault location, calculated on the basis of a lateral acceleration value (1 m/s^2) which is more permissive than the design value (0.65 m/s^2) and which is applicable in practice in special cases, does not explain the derailment from a static point of view. However, the technical failure of the derailed wagon made the vehicle more susceptible to track faults than in its normal technical condition. While other wagons (including the first 21 wagons in the train) “managed” the track defect concerned by using the tolerances allowed for them, this wagon derailed on it.

Accordingly, the reason for the accident was partly that

- the “mushroom” of the friction damper on one of the wheels of the derailed wagon had previously - at an unspecified time - welded to the manganese-inserted friction plate of the axle-box guide, and partly that
- there was a simultaneous directional and surface defect in the track at the site of the incident.

The combined dynamic effects of the track defects increased the risk of derailment at the location, the existing technical defect in the car caused the wheel to lose its suspension, and because the wheelset lost its “off-road” capability, the vehicle derailed when it reached the affected defect location.

A systemic factor identified was that the infrastructure manager’s track inspection system mostly assesses track faults separately, and the procedures for assessing the co-occurrence of faults are rare (mechanical, dynamic measurements) or subjective (line inspection) compared to how quickly the fault develops. However, since the combined assessment of faults can effectively reduce the likelihood of similar occurrences on the track maintenance side, the TSB has drawn the conclusion that, in cases where different faults accumulate at the same location, particular care should be taken to assess them properly, regardless of the method or procedure used.

Given that the exact circumstances of the technical failure of the derailed wagon could not be established, the TSB does not issue a safety recommendation in relation to this incident.

5. CONCLUSIONS

5.1 Summary

5.1.1 Direct causes

Acts, mistakes, events or conditions or a combination thereof the elimination or avoiding of which could probably have prevented the accident or incident:

- a) the “mushroom” of the friction damper on the wheel “1R” of the 22nd wagon in the train got welded to the friction plate of the axle-box guide;
- b) at the incident site, there was a simultaneous 30 mm directional error and 37 mm surface defect at 25 m length in the track.

The combined dynamic effects of the track defects increased the risk of derailment at the location, and the existing technical defect in the wagon, by reducing the suspension and axle-box guard function of the wheel, caused the wheelset to lose its “off-road” and “self-aligning” capabilities, and the vehicle derailed on arrival at the affected track fault location.

5.1.2 Indirect causes

During the investigation, the IC identified no acts, errors, events or conditions which influenced the occurrence by increasing its probability, accelerating the effects or the severity of the consequences, but the elimination of which would not have prevented the occurrence.

5.1.3 Systemic factors

Causal or contributing factors of organisational, management, social or regulatory nature which are likely to have an effect on similar or related occurrences, particularly including regulatory framework conditions, the design and use of the safety management systems, the skills of the personnel, the procedures and maintenance:

- a) the infrastructure manager’s track inspection system usually assesses track faults separately, and in many cases the procedures for assessing the co-occurrence of faults are rare or subjective compared to how quickly the fault develops.

5.2 Actions taken

The IC has not been informed of any measures taken to improve the overall safety of rail transport.

5.3 Additional notes

Risk increasing factors that are unrelated to the occurrence of the incident:

- a) on this type of wagon, the design of the vehicle prevents the wagon inspectors from inspecting the side support springs - therefore no fault was found in this case during the pre-departure train inspection;
- b) the locomotive driver was travelling at about 15% over the speed limit for the train.

5.4 Proven procedures, good practices

The IC identified no factor that helped to reduce the consequences of the occurrence and avoid a more serious outcome.

5.5 Lessons learnt

This event shows, first of all, that the static assessment of track defects is in some cases insufficient to identify the real risk, while the rate of degradation of the line section in operation shows that the probability of accumulation of different defects increases significantly over time, and therefore the combined assessment of such defects should always be treated with particular care, as the probability of similar events occurring can be reduced on the maintenance side.

Furthermore, as regards locomotive drivers, the incident provides lessons that safety-conscious behaviour (e.g. respecting speed limits) could reduce the risk of accidents in general and that the consequences of incidents that have already occurred can be reduced by vigilant working (timely emergency braking).

6. SAFETY RECOMMENDATION

Given that the exact circumstances of the technical failure of the derailed wagon could not be established, the IC did not recommend issuing a safety recommendation in relation to this incident.