Rail Accident and Incident Investigation Unit

Summary
Safety Investigation Report
Derailment of a passenger train
Germoir (Ixelles) - 4 March 2021

be

March 2022

REPORT VERSION TABLE

Version number	Subject of revision	Date
1.0	First version	31/03/2022

Any use of this report with a different aim than of accident prevention - for example in order to attribute liability - individual or collective blame in particular - would be a complete distortion of the aims of this report, the methods used to assemble it, the selection of facts collected, the nature of questions posed and the ideas organising it, to which the notion of liability is unknown. The conclusions which could be deduced from this would therefore be abusive in the literal sense of the term.
In case of contradiction between certain words and terms, it is necessary to refer to the French version.

SUMMARY

On 4 March 2021, at 5:37 pm, passenger train E2189 (Aalst - Mechelen) departs from Aalst station. Shortly after 6 pm, it enters the Brussels-Capital Region and makes commercial stops at various stations.
At 6:29 pm, as train E2189 passes through the Germoir unmanned stopping point (in the municipality of Ixelles), it loses the emergency coupling box located under the rear coach of the train. Both the box itself and its contents are found in the track near the platforms of the Germoir unmanned stopping point.

At 5:52 pm, passenger train E3289 (Leuven – Braine-L'Alleud) departs from Leuven station. Shortly after 6 pm, it enters the Brussels-Capital Region and makes commercial stops at various stations.
At 6:35 pm, as the driver of train E3289 arrives at Germoir station to make his commercial stop, he sees a metal object in the track and applies maximum service braking. Train E3289 cannot avoid the collision with the object and derails from one axle. The low speed of the train at the time of the accident limits the damage.
The driver immediately launches a GSM-R alarm.
As train E3289 already reached the platform of Germoir station before derailing, passengers can safely evacuate the train. Train E3289 is cancelled and does not continue its journey.

At 6:54 pm, after reviewing the CCTV footage, the SOC (Security Operations Center) informs TC that train E2189, which was a few minutes ahead of train E3289 at Germoir station, probably lost a piece of metal in the track.
The Traction Distributor asks the driver of train E2189 to check the condition of his train when it arrives at Vilvoorde station. At 7:12 pm, after inspection of the rolling stock at Vilvoorde station, the driver reports that the motor coach AM 8175, which is the rear coach of his train, lost its emergency coupling box and its contents.

View of the damage underneath AM 8175 (photos taken at the Schaerbeek workshop): box missing, slide bar bent, damaged elements.

Following this accident, the Investigation Unit opens an investigation.

After its investigation, the Investigation Unit concludes that the direct cause of the derailment of passenger train E3289 is the collision of this train with an emergency coupling in the track. The presence in the tracks of the emergency coupling of an AM08 Desiro motor coach is the contributing factor identified by the investigation. This is due to the untimely opening of the coupling box located at the rear (in the direction of movement) of the second AM08 Desiro motor coach making up train E2189 and its impact on the edge of the platform at Germoir unmanned stopping point.

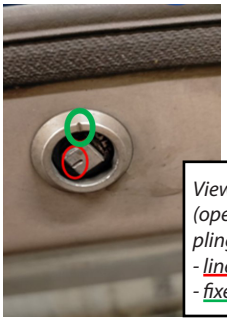
To identify systemic factors, the investigation of the Investigation Unit is directed towards:

- technical aspects: analysis of the closing and locking system of the coupling box;
- the human aspects of the job: the control sheets of the motor coaches for SNCB/NMBS staff;
- organisational aspects: the measures taken by SNCB/NMBS following the various incidents involving emergency coupling boxes of AM08 Desiro motor coaches.

During their inspection of the rolling stock in the workshop, the investigators of the IU find that, in order to effectively close and lock the box, the following operations must be scrupulously followed:

- Push the box as far down as possible,
- Ensure that the centre pawl is correctly positioned in front of the retaining stop,
- Turn the two side locks with a key so that
  - the locking flap of each lock is positioned behind the corresponding retaining stop;
  - the lines on the locks are aligned opposite each other.

Coupling box closed and locked.



View of one of the two locks (open) of the emergency coupling box of an AM08 Desiro:
- line on the lock
- fixed marker line on the box

The maintenance of each traction unit in the workshop ends with a final inspection according to a specific checklist to be followed by the maintenance agent. The inspection of the emergency coupling box locking is included in the maintenance completion list of AM08 Desiro motor coaches.

When a driver takes possession of his train, the procedures specify that the driver must perform a general external inspection of his train. These procedures specifically require the driver to check that his train's boxes, including the box containing the emergency coupling, are properly locked, but do not specify how the driver should carry out this inspection.
The line on each of the locks and the fixed marker line are small, which, in some circumstances, does not make it easy to see whether the box is properly closed and locked during a visual inspection of the train.

The accident of 4 March 2021 is not the first known event involving the emergency coupling box of an AM08 Desiro motor coach on the Belgian railway network.
The various safety incidents with coupling boxes were directly followed by reactive measures by SNCB/NMBS.

After the first incident on 28 November 2014, SNCB/NMBS issues a reminder note distributed among the staff that stresses the importance of closing the lock properly and checking that the boxes are properly locked.
During the exchange meetings planned with SNCB/NMBS to monitor the guarantee, the manufacturer Siemens S.A. is informally informed of the problem. There is not enough evidence after this first incident: the assumption of human error is favoured.

On 19 January 2015, the B-TC.42 Department publishes a Special Work for the workshops involved in the maintenance of AM08 Desiro train sets: the aim is to have the lock of the emergency coupling box checked on all AM08 Desiro motor coaches then in circulation.

After the second and third incidents in March 2017 and May 2018 respectively, all AM08 Desiro motor coaches are recalled to check the possible malfunction of coupling boxes.

At the same time, B-TC.4's research department starts studying and developing an additional safety system for the central lock of the box. On 2 September 2018, a prototype of this new central lock is installed on AM 8094, followed by an operational validation period for the technical solution.

The extra safety system on the lock of the box aims to prevent incomplete locking.

Central latch without extra safety system.

Central latch with extra safety system..

The extra safety system on the central latch allows:

- to make it impossible to lift the retaining latch by vibration, which is prevented by the added locking rod that blocks up the opening of the box,
- to add a visible sealing that confirms that the box has been closed properly and that if the sealing is missing, the box has been opened,
- to reduce the number of times the box is opened and closed during maintenance, and the associated inherent risks: sealing present and sealed = box not opened and emergency coupling not used.

After the development of this extra safety system, SNCB/NMBS carried out a risk assessment which concluded that the overall risk of opening of the box can be considered negligible and therefore acceptable with this extra safety system.

After a fourth incident on 9 January 2021, B-TC.4 issued a Special Work on 29 January 2021 to generalise the modification on the AM08 Desiro motor coaches fleet. It is stressed that this work should be carried out as soon as possible.

Since 28 August 2021, all 305 (i.e., 100%) of the AM08 Desiro train sets have been equipped with the safety system on the lock on the box.

The IU is of the opinion that SNCB/NMBS has put in place a process to develop and implement measures to control the risk of untimely opening of the coupling box, indicating in particular the parties responsible for ensuring that these measures are carried out.
Therefore, the IU does not issue a recommendation.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