


# SUMMARY OF SAFETY REPORT

## COLLISION OF TWO FREIGHT TRAINS AT TINTIGNY ON 4 MAY 2012



On Friday 4 May 2012, the freight train 36282 left Athus with a delay of 4 minutes, travelling on track B of line 165 in the direction of Antwerpen Berendrecht.

A second freight train (E44883) coming from Woippy in the direction of Antwerpen Noord, was travelling on the same track B of the line 165 with a delay of 13 minutes.

Just after passing Meix-devant-Virton, before the tunnel, the driver of the first train (EE36282) began having problems gripping the tracks and was struggling to go up the hill which had an average 15% slope. The circuit-breakers of the locomotive motor were activated several times, producing a loss of power and a rapid slowing down of the train. Coming out of the Lahage tunnel, the train lost its grip several times and could not go forward. The weather was wet and the rails were slippery. These difficult grip conditions combined with the train's technical problems prevented the driver from moving the train forward.

The train was in a section with an automatic block system: the signals were controlled by the detection of trains by track circuits and did not require the intervention of a signal box operator. The signal box in Bertrix can nonetheless see the movement of trains and the operator noted that the train had been in the section for a long time. They made contact with the driver via GSM-R, who informed them of their difficulties in moving up the hillside. The operator informed them that another train was behind them and advised them to declare themselves as broken down if necessary. The driver replied that they would attempt the ascent one more time.

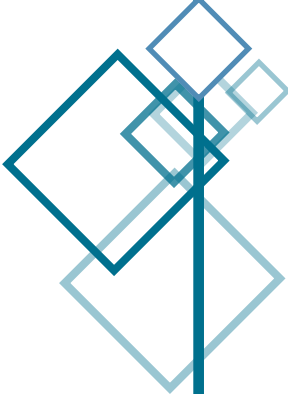
During this time, the driver of the second freight train (EE44883) arrived at the restricted signal, double yellow, informing them that the subsequent signal was probably a signal at danger (red). They then saw the signal at danger and slowed the train down. The signal was a main stop and proceed automatic signal: regulations allow the passing of this type of signal in running at sight as long as the forms in the box with red stripes found on the signal mast have been filled in.

This creates a paradoxical situation in which a driver, without knowing the reason for the signal at danger, can pass a signal and enter a section indicated as occupied in running at sight. The driver of the second train (EE44883) was not informed of their colleague's problems in the first train (EE36282), which was stationary.

The section encountered by the driver of the second train contained a level crossing 140 metres further on from the signal. The driver knew line 165 and had already encountered the stop signal several times due to a problem at this level crossing. They had a mental image of the situation according to the elements at their disposal and their previous experience. According to our analysis, the mental image associated with this situation by the driver was the following: the signal was at danger due to a level crossing failure.

They had not received the information that a train was stopped in the section.

The locomotive being equipped with the MEMOR system, the driver carried out the actions necessary to deactivate the system so as to pass the signal at danger. The train had problems restarting and started sliding on the tracks. The driver accelerated gradually and the speedometer, which was «moving wildly», did not allow the driver to see precisely the speed of the train. After passing the LC, the train accelerated to reach a speed of approximately 28km/h on entering the Lahage tunnel. This tunnel was curved and the driver could not see what was at the other end of the tunnel until they had reached that point.





At the end of the Lahage tunnel, the driver of the second train (EE44883) saw the back of a train. He applied the emergency brake but could not avoid a collision and hit the back of the first stationary train. The driver of the first train was on the phone to the depot in Bertrix: the call was cut off by the GSM-R alarm launched by the driver of the striking train. They indicated that the last axle of the end wagon of the struck train had derailed. The two drivers consulted one other and carried out the necessary steps to ensure the two trains were immobilised. Traffic Control informed the drivers that traffic had been suspended, the signals had been put at danger and the emergency services were on their way..



The second train (EE44883) involved, amongst others, tank wagons containing methyl acrylate (dangerous goods subject to an RID) which had not been degassed. One of the tankers was ripped from its cradle and was shifted approximately 5 metres, to then be crushed on top of the wagon in front, by striking one of the bulldozers being transported. The emptying tubes of the tanker were ripped away, producing a release of gases due to the presence of methyl acrylate in these tubes. The driver of train EE44883 signalled to Traffic Control an odour of gas in the tunnel: it was noticeable for several hours afterwards.



The police and emergency services arrived at around 10:42. Following inspection, the disaster and emergency services indicated that there was no leak of dangerous materials but that the level of toxicity in the air was 10 times greater than normal. At 12:10, the commander of the fire fighters at the scene established a safety perimeter of 200 metres and evacuated the scene. Traffic Control contacted the fire service in Solvic who went to the scene at approximately 20:15 and proceeded to ventilate the tunnel. Train traffic was suspended between Virton and St-Vincent-Bellefontaine. Buses were made available to passengers between Florenville and Virton.

The analysis of the dynamics of the accident allowed us to identify the pivotal event as the passing of the permissive signal at danger by the second train.



This is a failure of the command principle that provides for signals ensuring the spacing of trains. The risks of collision in human terms as well as material, environmental and financial need to be avoided as a priority. Signalling is mainly responsible for foreseeing this. The signals should ensure spacing between trains and should therefore guarantee that catching up is avoided.

Passed this critical point, there should be recovery measures which can still prevent an accident. Once the last signal separating the two trains had been crossed, there was no longer a technological element allowing the train to be automatically stopped before the obstacle, or to aide the driver in achieving this. There is no technological means on a train that can help the driver in a similar way to that found, for example, on road vehicles. It is more and more common to encounter road vehicles equipped with devices that brake the vehicle automatically if an obstacle appears suddenly ahead of the vehicle when travelling at a low speed. The driver of the train (EE44883) did not have help from this type of technology.

Our analysis showed that the operator had contacted the first train with GSM-R and not the driver of the second train: there is no obligation for communication in this type of situation. A simple communication would have allowed the driver to have a correct mental image of the situation.



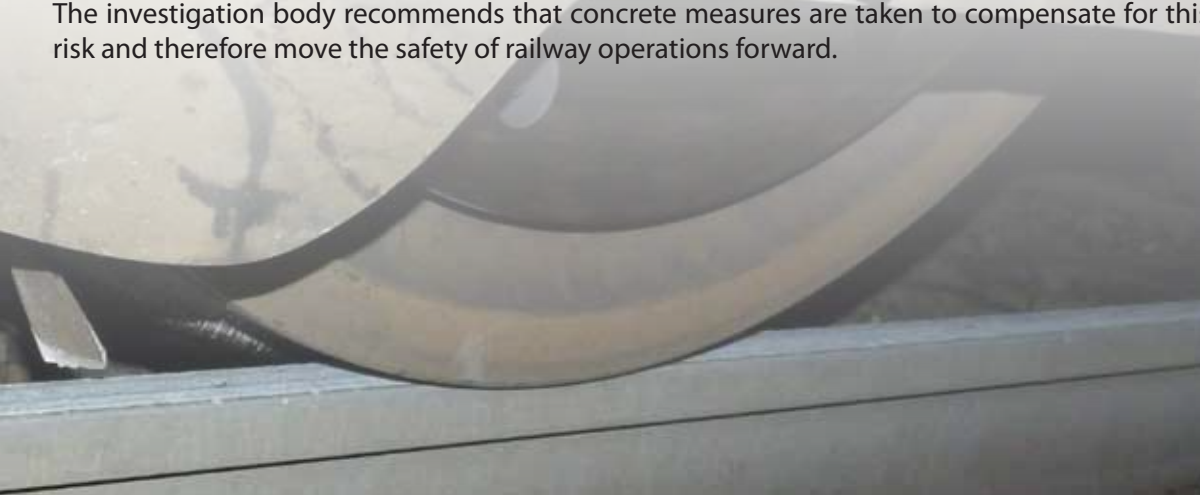


The risk linked to the situation had been poorly evaluated: the curve of the Lahage tunnel and the visibility conditions did not allow the driver of the second train to see the first train sufficiently early to be able to bring their train to a halt. The length of the track that they could see clearly ahead of them was not long enough at this section of the line to be able to safely stop their train.

Mitigation measures allowed the consequences of the accident to be attenuated: the GSM-R alarm, the protections in quick succession put in place by the drivers and the suspension of traffic by Traffic Control allowed further accidents to be avoided.

The risk identified of a collision due to the catching up of a train by another train when in running at sight due to the passing of a permissive signal at danger was under-estimated: there is no longer an element of signalling ensuring the spacing between trains to avoid them catching up with those in front; no contact is foreseen between the signal box and the driver to inform them of the conditions in the occupied section they are entering.

The investigation body recommends that concrete measures are taken to compensate for this risk and therefore move the safety of railway operations forward.





**Investigation Body for Railway Accidents and Incidents**

**<http://www.mobilit.belgium.be>**

