

Summary

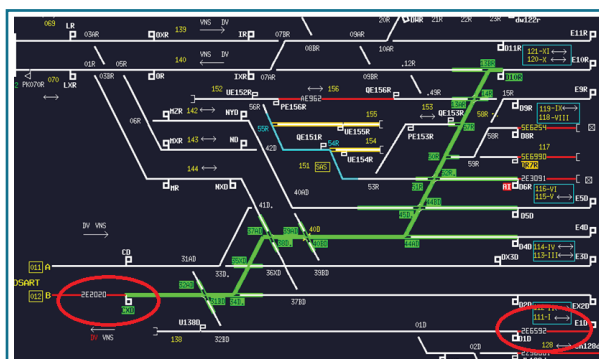
Safety report

SIGNALISATION INCIDENT

OTTIGNIES - 28 JULY 2014

SUMMARY

On Monday 28/07/2014 at around 21:21, a train (E2020) is travelling according to a pre-set route which crosses multiple points on the grid of Ottignies station.



As the train has completed its route and leaves the Ottignies grid, the signal box operator notices that the train's route is not released. At around 21:22'24", in accordance with procedures in the Regulations, the operator applies an NT function in the EBP system in order to release the route.

At 21:22'45", another route is automatically set by the Automatic Route Setting (ARS) system for a second train (E6592). The ARS system gives the

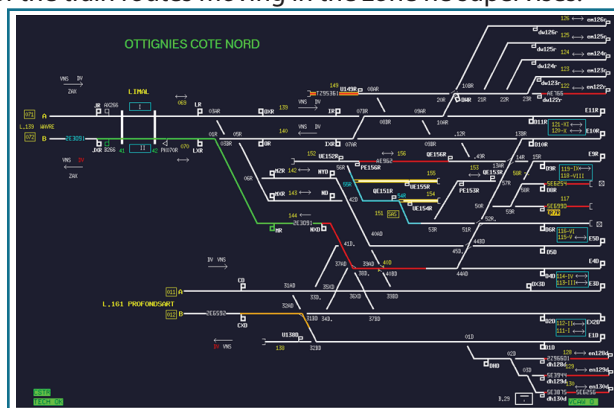
command for the signal to open and the train start to travel the route. While it has completed the first section of the route, the second section is released.

The operator can follow, on his screen, the path of the train routes moving in the zone he supervises.

When a route has been interlocked, i.e. confirmed for a train, these zones change colour to green. According to the movement of the train, the zones occupied by the train change to red. If a train is occupying a non-interlocked route, occupation is described as unauthorised and the image of the corresponding section turns brown/orange, a message appears on the screen and the EBP system automatically engages certain protection measures: this is what the operator sees for the train E6592 following release of the second part of its route.

On the ground, nothing allows the driver to see that the zone he is in is not interlocked and he therefore continues his route. The train leaves the Ottignies grid.

There is no danger, which is why the operator let the train continue its course.



The irregular overrunning by a train of a non automatic signal protecting a non-interlocked zone is detected by the system as an anomaly known as DOBMI (detection of an unauthorised train movement) and is recorded by the computer system in the signal box.

According to procedures in place within Infrabel, these recordings are subject to an analysis to determine the causes (SPAD, failure of a detection component in the track, etc.).

The analysis of the anomaly which occurred at Ottignies has revealed the particular conditions which produced the release of the route of the second train when it had already been travelled.

This incident is not a serious accident and < not be reported directly to the Investigating Body. Based on the information contained in the report on the event automatically sent by the Infrastructure Manager, the Investigating Body has decided to open an investigation so as to determine the direct, indirect and underlying causes leading to this incident, and to verify the measures taken by Infrabel.

The signal box in Ottignies controls signalling in the Ottignies grid: its role consists, in total safety, of placing the points in the right position and opening the signals ahead of trains so as to direct them towards the tracks they should use.



The signal box ensures this management at 2 levels: the "control" level and the "interlocking" level. The control level is assured by the EBP system as developed by Siemens. It receives requests by signal operators and transmits them to the "interlocking" level which deals with these requests safely.

In Ottignies, the interlocking level is assured by an electronic/computer interlocking of a SmartLock type: it is in this computer system that the safety rules and manoeuvring incompatibilities are programmed.

Management of the interface between the two subsystems, EBP and SmartLock, allowed the simultaneous sending of normal commands and emergency commands: this management of the interface between the EBP system and the SmartLock system is one of the indirect causes of the incident.

The analyses carried out by Infrabel following the incident in Ottignies have shown that this method of management allowed route setting commands to interfere with safety commands resulting from the NT function initiated by the signal operator. This interference of route setting commands and safety commands caused the automatic release of the second train's route when that route had already been travelled.

Interlocking systems of a SmartLock type replace another type of computer interlocking, the Solid State Interlocking (SSI) system. The analyses carried out by Infrabel for this replacement had not revealed the existence of a potential problem following the introduction of this new protocol between the EBP system and the interlocking system: the management of interfaces between the SSI interlocking and the EBP system does not allow the sending of normal commands as long as the emergency commands have not all been carried out, this was not the case for the SmartLock interlocking.



Illustration of a SmartLock system

Infrabel has put in place a change management system which foresees the carrying out of analyses in case of major change with an impact on the safety of railway traffic. These analyses carried out during the change in the interlocking system type have not allowed the identification of the potential problem created by the differences of the protocols in the management of interfaces.

The presence of recovery loops allowed the dysfunctionning to be identified, which could only appear in very rare cases and under particular conditions.

The conditions for appearance of the problem encountered in Ottignies are exceptional; however, in any railway safety system, it is necessary to rapidly make a correction to an identified dysfunctionning. The study carried out jointly by Siemens and Infrabel has confirmed the need to adapt the EBP programming to avoid the interlocking system dealing with safety commands interfering with the route setting commands.

This programming has been modified, tested and implemented at a local level and extended to the whole network. The measure taken by the infrastructure manager prevents the identified problem being repeated.

The analysis of these measures, of the management system for incidents and the management system for corrective actions concludes that the incident has been dealt with in a professional, justified and reproducible manner and does not lead to any recommendations.

