ANNUAL REPORT

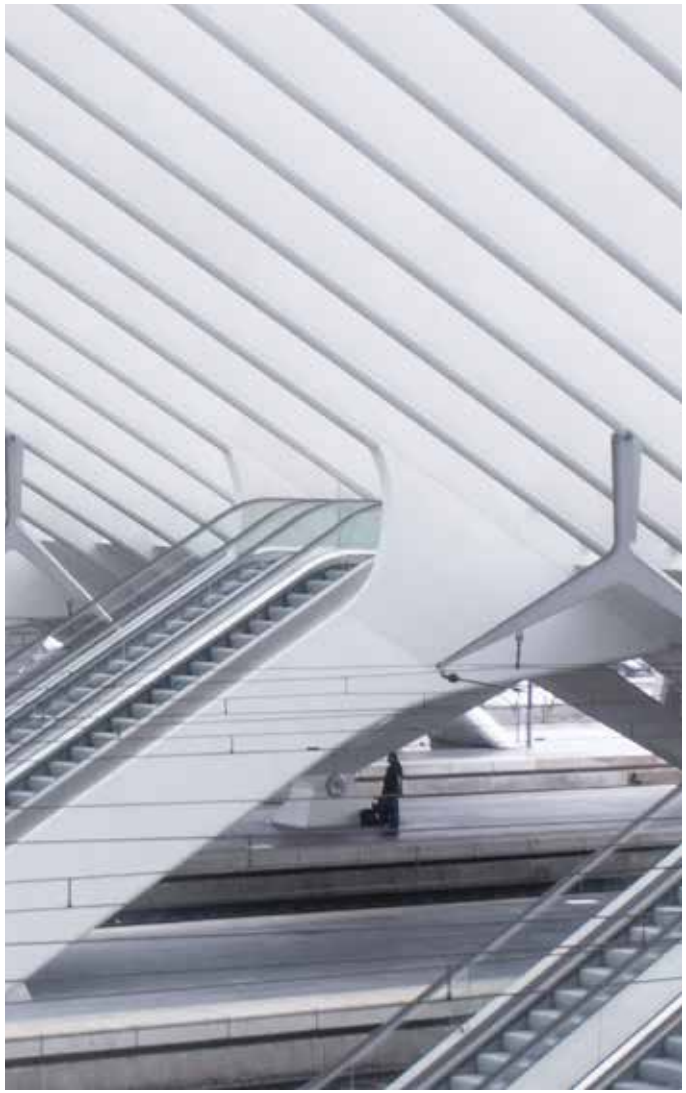
of the Investigation Body for
Railway Accidents and Incidents

2018

Federal Public Service
Mobility and Transport

.be

1. FOREWORD



This annual report relates to the work completed by the Investigation Body (IB) during the course of 2018.

We have closed seven investigation reports and opened four new investigations, none of which concern serious accidents. We reckon that these incidents could have led to serious accidents under slightly different circumstances.

The investigation report may contain safety recommendations for which the goal is to reduce the risk of repeating similar accidents or to reduce the consequences of such accidents.

Promoting safety is heightening awareness among the best-placed people and groups to implement necessary improvements.

Heightening awareness of risks and dangers is practised

- through the selection of specific investigations,
- through face-to-face meetings with actors in the railway sector,
- by means of presentations at conferences, seminars or safety consultation meetings.

The number of level crossing accidents and incidents remains quite high with major material damages and human casualties. We have noticed that road user negligence, distraction... are overwhelmingly the most direct cause.

The report of our investigation on the Morlanwelz level crossing accident published during the course of this year is not only here to remind us that starting to cross at a level crossing without being certain of being able to clear it is not authorised, but also to draw the attention of road users to the risks of traffic jams which can bring movement to a halt on a level crossing. Several initiatives by the infrastructure manager are underway specifically to place warning signs that inform road users about the risks of traffic jams.

The report is available in 2 languages. The summary is available in 4 languages: French, Dutch, German and English.

Faced with an increase in incidents and accidents involving staff external to the infrastructure manager but who work in or along the tracks, we have contacted the Construction Confederation to plan a first seminar. The goal is not to stigmatise but to make construction companies aware of the risks of working along railway tracks. Personnel are not always conscious of entering the track gauge and, consequently, the risk of being struck by or collision with a moving train. The Construction Confederation, Infrabel, TUC RAIL and SNCB/NMBS responded positively to organising this seminar.[1]

1 While drafting this annual report, the seminar was held (on 19 March) and was a great success: http://www.fegc.be/event.asp?id=1798&lng=fr

2. THE INVESTIGATION BODY

LEGAL STATUS

The creation of an independent body responsible for investigating railway accidents and incidents for the improvement of safety is provided for by the European Directive 2004/49. This Directive has been transposed into Belgian law with one law and two implementing decrees.

LAW OF 30 AUGUST 2013 ON THE RAILWAY CODE

The Railway Code is intended to codify and assemble three laws on the railways in a single and coherent text. It finalises the transposition of certain directives and provides for the modifications to railway legislation made necessary by the experience acquired since adoption of the following three laws:

- The Law of 4 December 2006 on the use of railway infrastructure;
- The Law of 19 December 2006 on the safety of railway operations;
- The Law of 26 January 2010 on interoperability of the railway system within the European Community.

ROYAL DECREE OF 16 JANUARY 2007

The Royal Decree of 16 January 2007 has been amended by the Royal Decree of 25 June 2010 setting certain rules for investigations into railway accidents and incidents.

ROYAL DECREE OF 22 JUNE 2011

The Royal Decree of 22 June 2011 designating the investigation body (IB) for railway accidents and incidents and repealing the Royal Decree of 16 January 2007.

It stipulates in Article 4, that the chief investigator and the assistant investigator of the IB may have no link to the Department for Railway Safety and Interoperability (DRSI), or to any railway regulatory body or any authority whose interests could conflict with the investigation.

LAW OF 26 MARCH 2014

The Law of 26 March 2014 regulates all requirements on the operational safety of museum railway lines. A museum railway line has the main function of tourist-passenger transport with historical rolling stock, such as steam trains. These are abandoned railway lines which have remained in place and which are generally operated by a company operating tourist trains.

To be able to operate a museum railway line, the operator must have authorisation, issued by the Safety Authority (DRSI).

This law stipulates that the operator of a museum railway line should immediately inform the IB of the occurrence of a serious accident, according to the means determined by the IB. It also foresees that the IB carries out an investigation following every serious accident occurring on a museum railway line.

ORGANISATION AND RESOURCES

INDEPENDENCE

Since its creation in 2007, the IB has made some major advances.

The various legislative changes made since its creation allow the IB to work completely independently. To keep the public's trust, the IB must be objective, independent and free of any conflict of interest.

The IB is hierarchically independent of the Minister for Mobility, the FPS Mobility and Transport, the Safety Authority, etc.

The hierarchical position of the IB reinforces its independence, to the extent that it is under the direct authority of the Minister for Small Businesses, Self-employment, Small and Medium sized Enterprises, Agriculture and Social Integration, in charge of policy on the railway system and regulations on railway transport and aviation.

Our independence is not only linked to the hierarchical position.

It can be seen in our freedom to decide when to open investigations as well as how to conduct them, and also in the availability of financial resources.

The annual budget is established by the Chief Investigator in collaboration with the department for Budget and Management Control. He has the power to authorise various expenses within the financial limits mentioned, to finalise contracts etc. The Ministerial Decree of 4 October 2011 sets the powers which are delegated to the Lead Investigator in financial matters.

Aside from general expenses (staff, offices, operations, equipment), there are also specific operational expenses foreseen which ensure the IB is able to fulfil its duties: regular external expertise and consulting, individual safety equipment, participation in specialised training and conferences etc.

The Memorandum of Understanding made with the FPS Mobility and Transport allows not only use of its offices but also numerous services: legislative, personnel procedures, etc.

BUDGET

The creation of an organic budgetary fund by Article 4 of the programme act of 23 December 2009 is intended to guarantee the financial independence of the Investigation Body for railway accidents and incidents.

The funds are made up of contributions to the operational costs of the IB by the infrastructure manager and railway undertakings. The King determines, by Decree, the amount of the annual IB budget, after consultation with the Council of Ministers.

TOTAL STAFF

On the 31 December 2018, the IB was made up of:

- a chief investigator,
- three permanent investigators,
- an administrative assistant.

Investigations are led by the permanent investigators with the support of experts chosen according to the skills considered necessary.

To be able to carry out its duties effectively and with the level of quality required while remaining independent in its decision-making, the IB has an appropriate level of technical expertise internally in the railway domain and experience on the ground. Newly-recruited IB personnel generally have engineering skills and specialised knowledge in areas other than the railway.

The IB offers its personnel the opportunity to take regular training courses. The aim is for members of the team to be specialised in various disciplines, and for them to accrue and share experiences through a policy of knowledge transfer within the group.

LOCATION

The offices of the IB are situated in the offices of the Federal Public Service Mobility and Transport, rue du Progrès 56 (5th floor) in Brussels, close to the North station.

THE IB ORGANISATION CHART

3. OUR MAIN DUTIES

INVESTIGATIONS

The main task of the Investigation body (IB) is to investigate operational accidents considered serious, occurring on the Belgian railway network.

As well as serious accidents, the IB is allowed to investigate other accidents and incidents with consequences for railway safety.

The safety investigations carried out aim to determine the circumstances and causes of the event and not with apportioning blame.

They are separate from the legal investigation, which takes place alongside.

They are based on multiple aspects: infrastructure, operations, rolling stock, staff training, regulations, etc.

The results of the investigations are analysed, evaluated and summarised in the investigation report.

The investigation report is not a formal decision. It may contain safety recommendations for authorities, railway undertakings, the infrastructure manager or other publics.

The aim of these recommendations is to reduce the risk of similar accidents re-occurring in the future, but also to reduce the consequences.

The investigations opened and closed in 2018 are briefly described in chapters six and seven.

DATABASES

All the accidents and incidents reported by the infrastructure manager and by railway undertakings are recorded into the IB database daily.

In this database all events are catalogued based on the information provided by the railway undertakings and the infrastructure manager.

The information in the databases is essential for allowing the IB to analyse general safety trends and provide useful information in the context of investigations.

The data is either automatically transferred, or introduced directly in the database via an automatic electronic form by the railway undertakings and the infrastructure manager.

Access is managed by the IB.

The database is made available to the Safety Authority (DRSI) and allows common safety indicators to be determined, as foreseen by European Directives.

The safety, security and environment service of the Directorate-General for Sustainable Mobility and Railway Policy of the FPS Mobility and Transport also has access to the "report" database for accidents and incidents occurring at level crossings.

Automatic alerts have been put in place by the IB to draw the attention of IB investigators to certain types of events: death, derailment, collision, etc.

Since 2017, railway undertakings and the infrastructure manager are able to access the database of the IB when they are involved in an event.

In 2018, monthly statistics were also put at their disposal through the Investigation Body database system. The statistics are provided on a temporary basis as they reflect the data provided by railway undertakings and the infrastructure manager. It often happens after an investigation that the classification of an event is altered.

However, the database is not fixed, it evolves according to the experience gained, the reference points and identified needs.

The Investigation Body wants to delve further into the statistics and establish tendencies for other events besides the Common Safety Indicators (CSI).

Extensive research was conducted over the course of 2018. Various analyses will be available throughout 2019.

There are a plethora of goals and interests in obtaining information, not only for the Investigation Body but also for national safety authorities.

COMMUNICATION

The investigation reports are made public and are intended to inform the parties concerned, the industry, regulating bodies, but also the general public. This is why the IB publishes, in four languages (English, French, Dutch and German), summaries giving details of the main elements of an investigation. The report outlines the elements that have allowed conclusions to be drawn.

The reports and summaries by the IB are available via the website of the Federal Public Service (FPS) Mobility and Transport at the following address:

https://mobilit.belgium.be/fr/traficferroviaire/organisme_denquete/les_enquetes.

Contact with the press is via the spokespersons of FPS Mobility and Transport, in accordance with the agreement protocol established between the FPS and the IB.

For further transparency, the website is changed when the Investigation Body decides to open an investigation.

After having brought the primary elements together, the Investigation Body publishes a bulletin of general information pulling information on factual grounds; this is not the analysis that will be published in the investigation report.

4. OTHER ACTIVITIES OF THE IB

NATIONAL INVESTIGATION BODY NETWORK

The IB takes part in the activities of the network of national investigation bodies, which take place under the aegis of the European Union Agency for Railways (ERA). The aim of this network is to allow an exchange of experiences and to work together on European harmonisation of regulations and investigation procedures. This international platform ensures an exchange of good practices between Member countries, as well as the development of guides so as to have a common vision and interpretation of the practical application of European Directives. There is a maximum number of 3 meetings per year with a maximum duration of two days.

The Investigation Body also participates in meetings for the 'German-speaking group'.

Our participation is active, whether this is in presentation of the available elements from investigations or the process of an investigation or in the sharing of results from human and organisational factor investigations carried out with the help of external experts.

As a result of new European directives, we participate with other NIBs and ERA in organising and improving the management of plenary meetings.

TRAININGS

VALENCIENNES – 10 & 11/01 – WORKSHOP ON THE COR

The purpose of the workshop is therefore to support the consultation and to collect views on the Agency's proposal regarding a future COR (Common Occurrence Reporting) safety management data system.

The targeted audience of the workshop are experts from RUs, IMs, ECMs, NSAs, NIBs, and sector organisations who are in charge/have experience of occurrence reporting/data analysis within their organisation.

CRANFIELD – FROM 14/05 TO 01/06

The Cranfield Safety and Accident Investigation Centre (CSAIC) offers an extensive range of short courses, which provide insight and knowledge to support accident investigators.

On successful completion of the course, you will be able to:

- Describe the accident investigation process for a transport accident, including elements of preparation, emergency response, evidence collection and analysis, report writing and safety recommendations.
- Work safely under supervision at an accident site.
- Conduct witness interviews and collect material evidence from a variety of relevant sources.
- Perform an analysis of evidence to develop a no-blame report of what occurred and recommendations for future preventions.
- Critically assess strategies for working alongside interested parties including emergency services, legal services, pathologist, scientific support, news media, families and regulatory authorities.

SEMINARS

PARIS - 14/02 - UIC WORKSHOP ON LEVEL CROSSING

At the last UIC Safety Platform meeting on 15 November 2017 it was proposed when integrating ELCF within the platform to organise a half-a-day workshop on level crossing safety.

The workshop took place on 14 February in the afternoon with about 50 participants of which Safety Directors from our member railways plus speakers/participants from different sectors: railway undertakings, railway infrastructure managers, the French National railway safety authority (EPSF), the Belgian National Investigation Body (NIB), RDW (the Dutch vehicle/mobility authority), Ecole de Conduite Française (ECF – French Driving School), Association Prévention Routière (Road Safety Association), Fédération Nationale des Transports Routiers (National Federation of Road Transport), Academics (Faculty of Transport and Traffic Sciences of Zagreb, IFSTTAR - the French transport research centre, CDV - the Czech transport research centre, IK - the Polish railway research centre).

https://uic.org/com/uic-e-news/585/

5. INVESTIGATIONS

INVESTIGATION PROCEDURE

A. NOTIFICATION

The railway infrastructure manager immediately telephones the investigator on duty to inform him of serious accidents and incidents as well as all collisions and derailments on the main line. The practical formalities for these communications are sent by post to the infrastructure manager.

The Investigation body (IB) can be reached 24 hours a day, 7 days a week. The decision by the IB to open an investigation is communicated to the European Union Agency for Railways, to the Department for Rail Safety and Interoperability, to the railway undertaking and to the infrastructure manager concerned. The actors concerned are consulted from the beginning of the investigation.

B. INVESTIGATION

The first phase of the investigation involves factual data collection by investigators on the site of the accident or incident. This involves looking for and collecting all the information, descriptive as well as explicative, likely to clarify the causes of an unsafe event.

All the information, proof and declarations available and linked to the elements in a situation which have led to the accident or incident, are evaluated, so as to check what can be considered as proof or not. The most probable scenario is then established.

The careful analysis of a safety management system with three dimensions (technical, human and organisational) allows possible failures and/or inadequacies to be revealed. And this at different levels of the system and in particular in the management of risks, with the aim of preventing accidents.

C. RECOMMENDATIONS

The recommendations in the area of safety are proposals that the IB makes in order to improve safety on the railway system. The recommendations are centred around the prevention of accidents. Their role is three-fold: minimising the number of potential accidents, limiting the consequences of an accident and finally to lessen the seriousness of resulting damage. The IB addresses, formally, the National Safety Authority with recommendations resulting from their investigation into the accident. If it turns out to be necessary due to the character of the recommendations, the IB also addresses other Belgian authorities or other Member States of the European Union.

D. INVESTIGATION REPORT

The investigation reports serve as a reminder as well as an archive, but also allow the lessons learned from accidents and/or incidents to be recognised. Their goal is to encourage the circulation of knowledge acquired in the course of different analyses.

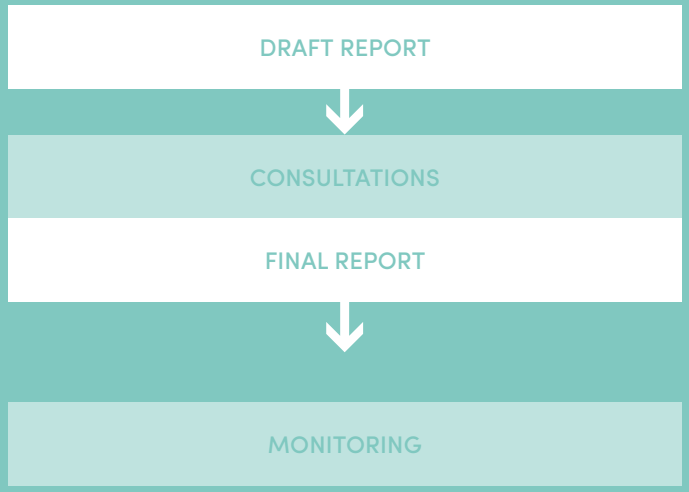
The preliminary reports are generally sent twice to the actors concerned, so as to allow them to get to know the analyses and to provide their comments. The goal is not to alter the content of the report but to add any necessary details. The conclusions and recommendations are a part of the draft final report sent to the actors concerned. The changes accepted by the IB are then incorporated into the reports.

Further investigations are sometimes necessary to remove any ambiguities or to verify new elements made available to the IB.

E. FEEDBACK ABOUT RECOMMENDATION'S APPLICATION

The law specifies that the addressees of the recommendations inform the IB, at least once a year, of the follow-up to the recommendations.

The inspection of the operational follow-up given to recommendations made are not part of the IB duties. The monitoring of this implementation falls to the National Safety Authority for the railways, according to Directive 2004/49/EC.



CASES SUBJECT TO AN INVESTIGATION

An accident is defined as an event which is undesirable, unintentional and unforeseen, or a particular chain of events of this kind, having detrimental effects.

According to Article 111 of the Law of 30 August 2013, the Investigation body (IB) carries out an investigation following every serious accident occurring on the railway system. A serious accident is defined as any train collision or any derailment causing at least one death or at least five serious injuries, or causing major damage to the rolling stock, to the infrastructure or to the environment, as well as any similar accident having obvious consequences for the regulations or the management of railway safety. "Extensive damage" means damage that the investigation body can immediately estimate to a value of at least EUR two million in total.

As well as serious accidents, the IB can carry out investigations into the accidents and incidents which, in slightly different circumstances, could have led to serious accidents, including technical failures at the level of structural subsystems or interoperability constituents of the high speed or conventional railway system.

The IB receives from the infrastructure manager and the railway undertakings:

- reports, within 24 hours, on all incidents and accidents occurring on the Belgian railway network;
- summary reports, within 72 hours, of operating incidents and accidents.

They are put into two separate databases: one with the reports and the other with the summarised reports.

The accidents and incidents are sorted in the database according to the elements provided by the railway undertaking and the infrastructure manager, according to three levels of seriousness: serious, significant and other.

«SERIOUS» ACCIDENT / INCIDENT LEVEL 1 [2]

Any type of accident / incident resulting:

- in the death of at least one person

or

- serious injuries to five or more persons

or

- causing extensive damage to the rolling stock, to the infrastructure or to the environment; "extensive damage" meaning damage that the investigation body can immediately estimate at a value of at least EUR two million in total.

«SIGNIFICANT» ACCIDENT / INCIDENT LEVEL 2

Any type of accident / incident resulting:

- in serious injuries to at least one person

or

- causing damages assessed to be worth at least EUR 150,000

or

- suspension of rail traffic for over two hours.

«OTHER» ACCIDENT / INCIDENT LEVEL 3

Accidents and incidents that do not fall into the other two categories.

The decision to open an investigation is taken by the IB independently on the basis of this information, potentially supplemented by a preliminary enquiry.

2 Article 19 (1) of Directive 2004/49

6. INVESTIGATIONS OPENED IN 2018

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Four investigations were opened in 2018: of these four investigations, none meet the definition of serious accident.

Neufvilles: 8 June 2018

Schaerbeek: 7 February 2018

SIGNIFICANT ACCIDENT: LEVEL 2

NEUFVILLES: 8 JUNE 2018

Derailment of an empty SNCB/NMBS passenger train

Just before 10:30 a.m. on Friday 8 June 2018, the passenger train E15809, an empty train composed of 2 'Desiro' railcars, was heading from Braine-le-Comte to the Mons-Aviation station on line 96.

At Neufvilles-Garage, the E15809 train's route passed along the secondary track via the 08AE and 09AE switching points.

The maximum speed for passing the points is 40 km/h.

At about 10:33 a.m., the train derailed on the siding, causing major damage to infrastructure and rolling stock. The train driver suffered minor injuries (according to the definition by law).

Bulletin of General Information on the IB website (in French)

ACCIDENT: LEVEL 3

SCHAERBEEK: 7 FEBRUARY 2018

Derailment of a Lineas freight train

On 7 February 2018 at 1:08 a.m., train E48810 (Schaerbeek-Formation – Tergnier, WL 28 hg – 562m – 749t, HLE 1312, Lineas train driver) left from Schaerbeek-Formation.

Train E48810 left from Schaerbeek-Formation and needed to respect the 10 km/h maximum speed imposed in the junction. After switching point 27B, the train arrived on line 28. The first signal, signal F-L.8, showed a Green Yellow Horizontal aspect; this means that the maximum authorised speed is 40 km/h before a change in regime (to cross switching points). Just before passing this signal, the train driver acknowledged it in advance to confirm having seen the restrictive aspect. The train accelerated to 36 km/h and derailed a few seconds later while passing through a bend.

The locomotive came to a standstill on the public road and collided with parked road vehicles. The train driver was injured during the derailment. The first two carriages also derailed but remained between tracks A and B.

Bulletin of General Information on the IB website (in French)

Bruxelles-Nord: 24 April 2018

Comblain-La-Tour: 6 September 2018

ACCIDENT: LEVEL 3

BRUXELLES-NORD: 24 APRIL 2018

Drifting of a train

On Tuesday 24 April 2018, following a defect, train E2178 comprised of two AM08 Desiro railcars (08118 + 08564) was declared in distress.

The two defective railcars were towed by three other AM08 Desiro railcars to the Brussels-North railway station.

A train driver was dispatched on-site to direct the two defective railcars to the workshops in Schaerbeek.

To decouple the two railcars from the towing train, the driver took place in the driver's cab of the last of the three railcars which had done the towing.

Once uncoupled, the two railcars began drifting without the driver or on-site staff being able to stop them.

The staff present alerted the signal box, and a GSM-R alarm was raised.

The railcars passed through a switch and continued their route. They collided lightly with the side of train 17907 (a technical train with no passengers), only causing mild damage. The runaway railcars came to a halt around 800 metres from the platforms of Brussels-North.

Bulletin of General Information on the IB website (in French)

ACCIDENT: LEVEL 3

COMBLAIN-LA-TOUR: 6 SEPTEMBER 2018

Signalling failure contrary to security

On 6 September 2018, train E7675 (Rochefort-Jemelle – Liège-Saint-Lambert) travelled on track B of line 43 coming from Hamoir. At 6:47 a.m., it passed signal B249 showing an open aspect (green).

In that moment, freight train Z36410 was located downstream in this section, stopped just in front of signal O-H.45, showing a closed aspect (red).

Train E7675 then made a scheduled stop at the platform in Comblain-la-Tour.

After this stop, the train departed again and found the independent warning signal o-h.45 showing a 'double yellow' aspect around 6:51 a.m. and began reducing speed.

While exiting the tunnel in Comblain, the driver of E7675 noticed the tail of the freight train and applied maximum braking. Train E7675 came to a halt approximately 100 metres from the end of the freight train and the driver alerted Traffic Control.

Bulletin of General Information on the IB website (in French)

7. INVESTIGATIONS CLOSED IN 2018

Seven investigations were closed in 2018

All reports and summaries of closed investigations are available on the IB website.

Neufvilles: 20 November 2017

SIGNIFICANT ACCIDENT: LEVEL 2

NEUFVILLES: 20 NOVEMBER 2017

An Infrabel agent was struck by an SNCB/NMBS-train

At approximately 10:45 a.m. on Monday 20 November 2017, a team of 4 agents from the infrastructure manager (I-AM directorate), having completed their work of lubricating railroad switches and ES inspections, were making their way back to their vehicle, walking in a line along the tracks of line 96, at a short distance of the Neufvilles unmanned stopping point.

At approximately 10:45 a.m., the passenger train E15809, an empty train with two "Desiro" electrically-powered rail cars, was travelling towards its departure station (Mons-Aviation) along line 96.

The route of train E15809 takes the secondary track, through railroad switches 09AE and 09BE.

As the train was proceeding along the secondary track and approaching the agents, the driver initiated an emergency brake procedure. The first agent was within the track gauge and was hit by the train. The driver made an alarm call using the GSM-R.

CONCLUSIONS

Having completed their lubricating and ES inspection work on the switches and crossings of line 96 between Neufvilles and Jurbise, a team of 4 agents of infrastructure manager Infrabel was returning to their service vehicle.

The 4 agents were walking in a line along the "Neufvilles-Garage" secondary track, outside the danger zone. However, in certain sections of the path along this secondary track, vegetation at ground level hinders progress along the path.

At the same moment SNCB/NMBS-train E15809, an empty passenger train, was travelling along line 96 towards its departure station (Mons-Aviation). The train and the team of 4 agents were going in the same direction.

The route of the train takes the "Neufvilles-Garage" secondary track. To prevent rust from developing on the rails, the infrastructure manager must ensure that a train travels on the service tracks once every 72 hours.

The designated route forces the train to take the switches leading to the secondary track at a maximum speed of 40 km/h. The analysis of the data recorded on board the train confirms that the driver reduced the speed of the train down to 38 km/h at the signal in rear of the railroad switch and that he failed to use his horn to warn people walking next to the railroad track he was travelling along. The train continued to decrease its speed when passing the railroad switches.

Going in the same direction as the train, the agents did not see the train travelling down the track next to which they were walking.

The first agent of the line, unaware of the presence of the train, was hit by the train.

The report is available on the IB website

Aubange: 19 May 2017

SERIOUS ACCIDENT: LEVEL 1

AUBANGE: 19 MAY 2017

Derailment of a Lineas freight train

On 19 May 2017, shortly before 3:00 a.m., freight train 40378 owned by Lineas, a railway undertaking, departs from Virton and travels along line 165. It includes a type-13 electric locomotive and 25 wagons.

Around 3:18 a.m., block 23 of Bertrix observes various infrastructure and signalling disruptions in the Halanzy-Aubange section following the passage of train 40378: abnormal occupancies and vacancies of the track circuit detecting the presence of trains in those sections, loss of control of several switches and alarms on level crossings.

Block 23 contacts Traffic Control. The latter sends an alarm via GSM-R and gets in contact with the driver of train 40378 to ask him to stop his train. The driver stops the train at the level of kilometre marker 141200.

The inspection of the train by the driver reveals that the two last wagons of the train have derailed. The infrastructure is severely damaged over a distance of 14 kilometres.

The initial inspections of the rolling stock, of the tracks and of the area surrounding the tracks reveal that one of the wheels of the penultimate wagon n° 3368 4952 072-9 broke some 17 kilometres from the train's stopping point, causing the derailment of the wagon. The wagon remained attached to the train, causing damage to the infrastructure. Four pieces of the broken wheel were found in the tracks.

DIRECT CAUSE

The derailment of the 24th wagon (n°3368 4952 072-9) is the result of the broken right wheel of the 3-3' axle of the wagon, of cracks and thermal splitting which spread in the wheel.

INDIRECT FACTORS

Following major heat increases in the wheel during service:

- significant deterioration of the paint on the plate/rim connection appeared;
- cracks formed on the wheel tread.

The external laboratory expertise concludes that:

- the observed phenomena confirm the significant increase of the rim's temperature during the wagon's operations;
- the heating affected all the wheels of the bogie;
- the heating would be due to overly-intense braking and/or the use of an unsuitable wheel/pad couple, despite the wheel/pad couple being in line with the specifications as presented in the document V-BKS (LL) referring to UIC-leaflet 541-4;
- the issue affecting the broken wheel is not so much a problem of the height of the flange or equivalent conicity value as it is a problem relating to its resistance to thermal stress and to the stress cycles imposed on the wheel.

The report is available on the IB website (In French)

Engis: 31 July 2017

ACCIDENT: LEVEL 3

ENGIS: 31 JULY 2017

Agent hit by a passenger train

On Monday 31 July 2017, at around 1:30 p.m., SNCB/NMBS passenger train 3835 hit an agent who, as he was working along the tracks, found himself within the loading gauge.

Various canalisation works were being conducted on track B of line 125 near Engis.

On 31 July 2017, a team of 4 agents was present in the work area:

- One agent was carrying a concrete saw;
- Three other agents were laying down canalisations.

At around 1:30 p.m., one of the agents leaned forward to pick up a canalisation cover which was outside the safety net and, in doing so, was hit by train E3835 travelling from Liège to Namur.

The agent was employed by the company Hajroski.

The agent was hit at hip level by the train's towing hook. The reference speed of the line is of 120 km/h.

DIRECT CAUSE

The agent who was hit by the train was within the loading gauge to pick up a cover stored on the other side of the protection net.

INDIRECT FACTORS

INDIRECT FACTOR N°1

As his colleague continued to work with the concrete saw, the agent looked from left to right, and, concentrating on his work, did not see the train, nor did he hear the train coming behind him.

INDIRECT FACTOR N°2

The agent is of Bulgarian descent, and was given training and instructions in Serbian.

SYSTEMIC FACTORS

SYSTEMIC FACTOR N°1

The agent did not realise the risk he was taking. The implemented LMRA did not make it possible to detect the presence of a cover within the loading gauge.

SYSTEMIC FACTOR N°2

The subcontractors' safety plans include all the prevention measures concerning the proper storing of materials, the proper storage of materials to prevent risks of falling objects, of injuries, and of various accidents, but it does not explicitly mention risks of encroaching on the loading gauge and of being hit by a moving railway vehicle.

The report is available on the IB website

Leuven: 18 February 2017

SERIOUS ACCIDENT: LEVEL 1

LEUVEN: 18 FEBRUARY 2017

Derailment of an SNCB/NMBS passenger train

On 18 February 2017, after arriving at platform 1 of the station in Leuven at 12:07 p.m., the train driver moved to platform 7 and was relieved by a colleague train driver. While waiting for the start of his next assignment, he took a 40-minute pause in the passenger area of this train.

Ten minutes before departure, the train driver started the train and completed some administrative formalities. At 13:08::30, signal H-K.9 at the end of platform 7 opened, showing a Double Yellow aspect with a chevron 'V'. A primary requirement to leave had been fulfilled, but the train driver still needed to wait for confirmation that all passengers had boarded. While waiting, the Double Yellow signal aspect with a chevron 'V' changed to a Green Yellow Horizontal aspect with a chevron 'V'.

At 13:09::19, the chief conductor operates the Indicator of Operations Ended (IOT). The IOT first displayed red, then a white halo appeared. A second requirement for departure was fulfilled. The train driver set the train in motion. Since the H-K.9 signal opened and he saw the door light come on, and he knew the doors were closed, the train driver could continue as normal. With the touch of a button, the train driver timely acknowledged confirmation that he saw the restrictive Green Yellow Horizontal aspect. At 13:10::12, the train passed signal H-K.9.

The train travelled along various switching points towards track A of line 36, which must be navigated in counter-flow track regime. In advance of the last switching point, the train reached on the right side a permanent yellow with green edge end-of-zone sign with the inscription '9', and below that a marker panel for line 36.

The train then passed signal EZ-H.9, which displayed a green aspect with a white number '4' and a white chevron 'V'. In advance of this signal, the train was redirected towards the normal track regime via two consecutive switching points which create an S-shaped bend and with a maximum travel speed of 40 km/h.

While traversing the switching points, the train derailed. The first carriage turned over and fell on its side with the nose, swung at a 180° angle, facing the departure station in Leuven.

During the derailment, one passenger lost his life, 3 people were seriously injured and 24 suffered minor injuries.

DIRECT CAUSE

According to the retained hypothesis, the direct cause of the derailment is the inappropriate speed of the train during the passage over an S-shaped curve formed by two connecting switches.

LEUVEN: 18 FEBRUARY 2017 *(continued)*

INDIRECT FACTORS

INDIRECT FACTOR N°1 (HUMAN FACTOR)

According to the retained hypothesis, the first indirect factor is the incorrect processing of the signalled information (orders) relating to the speed restrictions that must be observed, due to an incorrect mental perception (cognitive bias).

The day of the accident, a combination of various factors caused the train driver to develop and maintain an incorrect mental perception:

- the presentation of a complex environment without clear landmarks;
- the ambiguous character of the end-of-zone sign "9", allowing for increased speeds, while the signal in rear of the end-of-zone sign imposes a speed restriction of 40 km/h at the base of the signal in advance of the end-of-zone sign (HLT (Belgian railways rule book) regulation);
- the ambiguous character of the reference line indicator signs posted for line 36 in advance of platform 7;
- the incomplete definition in the HLT of reference line indicator sign line 36;
- the combination – on the side of the train driver – of passive line knowledge for departure from platform 7 combined with underdeveloped routine driving habits, on the one hand, and the amount of information to process during and shortly after the departure from platform 7, on the other.

These factors cause the driver to develop the mental perception that he is riding on line 36 in normal track regime; in reality, however, he is sent to line 36 while riding in counter-flow track regime.

INDIRECT FACTOR N°2 (DESIGN)

According to the retained hypothesis, the second indirect factor is the train driver – despite the information provided – not managing to correct the inaccurate mental perception as a result of the limited physical and cognitive salience of the lit memory light in his driving cab and of (the panels of) signal EZ-H.9.

INDIRECT FACTOR N°3 (DESIGN)

According to the retained hypothesis, the third indirect factor is the absence of an efficient recovery system.

SYSTEMIC FACTORS

SYSTEMIC FACTOR N°1 (MONITORING)

The railway undertaking neither adequately identifies the danger of failure to observe the imposed speed reduction (in a timely manner) after receiving a Green Yellow Horizontal signal aspect, nor the recurring character of incidents which may indicate that some train drivers do not systematically acquire the expected driving reflexes.

The untimely observance of a speed reduction may be the result of incorrect driving habits, distraction, etc., and must therefore be considered a precursor of accidents.

SYSTEMIC FACTOR N°2 (ORGANISATIONAL LEARNING)

According to the retained hypothesis, the configuration of the tracks and signals in a complex environment, as can be experienced by train drivers when leaving the Leuven station from platform 7, complicates an intuitive decoding of the information transmitted by the available signals.

SYSTEMIC FACTOR N°3 (ORGANISATIONAL LEARNING)

Two specific passages in the internal regulation of the railway undertaking could give rise to drivers developing arbitrary professional actions or making incorrect interpretations.

The option to 'accelerate or not at the end-of-zone sign following a Green Yellow Horizontal signal aspect' is left to the discretion of the train drivers. Even though train drivers have been duly made aware of the danger of forgetting the imposed speed restriction, no effective measures were established to reduce the risk of forgetting.

The incomplete definition of the reference line indicator sign in the HLT can give rise to inaccurate interpretations. In Leuven, this leads to the incorrect interpretation of 'riding on line 36' instead of 'riding to line 36'.

ADDITIONAL OBSERVATIONS

ADDITIONAL OBSERVATION N°1

The potential risk-enhancing character of certain aspects of shift work, in particular the system with so-called backward-rotating early shifts, could result in higher than average fatigue levels. The system with backward-rotating early shifts requires a proper FRA (Fatigue Risk Analysis).

ADDITIONAL OBSERVATION N°2

The communication channels between the Chief of Operations and the Leader Infrabel, on the one hand, and between the Chief of Operations/Leader Infrabel and the various disciplines (SPC (Railway Police)) and other parties (investigators, public prosecutor, etc.), on the other, are too vague and can lead to misconceptions and unsafe situations.

The report is available on the IB website (in French)

Morlanwelz LC: 27 November 2017

SIGNIFICANT ACCIDENT: LEVEL 2

MORLANWELZ LC: 27 NOVEMBER 2017

Collision between a train and a road vehicle on a level crossing

On 27 November 2017, passenger train E928 (Namur-Tournai), comprised of two AM96 railcars each with 3 carriages (AM449 and AM442) travelled towards Tournai. At 7:11 a.m., the train left Charleroi-South station heading to La Louvière-Sud.

At 7:26 a.m., the driver of train E928, travelling along track A, noticed a motor vehicle on level crossing no 1 (= LC1) (active level crossing, kilometre marker 16.841, Rue de Mariemont in Morlanwelz). He applied an emergency brake but struck the motor vehicle and dragged it along for several hundred metres. The train came to a standstill near kilometre marker 17.300 and a GSM-R alarm was sent.

At 7:34 a.m., the chief conductor aboard train E928 informed Traffic Control that the first carriage of AM96 449 was ablaze in the driver's cab. Help was dispatched and arrived on the scene around 7:38 a.m..

After communicating with Traffic Control, the train driver left the driver's cab, and passengers were moved to the second railcar and then evacuated.

Being the sole occupant of the motor vehicle during the occurrence, the driver left his vehicle before the train arrived. No casualties were reported. Two mild injuries were reported among train passengers.

CONCLUSIONS

THE ACCIDENT

On 27 November 2017, a driver drove his vehicle over the level crossing and, as he was doing so, the car stayed stuck on the level crossing. The driver was then unable to remove the vehicle and evacuate the area before the arrival of the train. He therefore left the vehicle, which was then hit by the train.

Given the very short time between the immobilisation of the vehicle and the arrival of the train, he was unable to warn the emergency services of the fact that a vehicle was stuck on the tracks to initiate the process of halting the train.

There is delay of approximately 35 seconds between the moment the bells of the level crossing start ringing and the arrival of the train.

When the train driver saw the car immobilised on the level crossing, he initiated an emergency brake procedure, but was unable to stop the train in time. The train was travelling at a speed of approximately 120 km/h; it hit the vehicle and dragged the car over several hundreds of meters before coming to a stop.

Why?

The main advantage of rail transport resides in the minimal amount of friction between the rails and the wheels (steel-steel contact). Little power is required to ensure the train's motion, but the consequence of this reduced friction is that braking distances are significant.

For example, at 120 km/h the minimum braking distance is of 441 metres for a passenger train to come to a complete halt (according to tests conducted with an AM96 railcar), and approximately double that distance for a freight train.

MORLANWELZ LC: 27 NOVEMBER 2017 *(continued)*

In 2016, a seminar entitled Lessons learned was held following the investigation into the accident of the Pittem level crossing. The braking curves of a train compared with that of a car were shown.

Consequences of the collision with the road vehicle

As a consequence of the impact, a fire started in the road vehicle and spread to the railcar.

The consequences of the collision with the vehicle on the passengers and staff on board the train were limited thanks to the design of the rolling stock and an efficient management of the situation by various services.

The accident did not claim any victims, but caused significant damage to the vehicle, the railcar and the infrastructure.

This accident is considered as a precursor. Indeed, after the collision with the vehicle, the rolling stock had to be "re-railed", which caused another accident with dramatic consequences.

This accident is described in another investigation report.

Crossing a level crossing

Traffic regulations prohibit crossing a level crossing: when the barriers are moving or closed, when the flashing red lights are on, or when the warning bells are ringing.

Furthermore, the driver cannot cross the level crossing when the traffic situation is such that it is likely to cause the immobilisation of the vehicle on the level crossing.

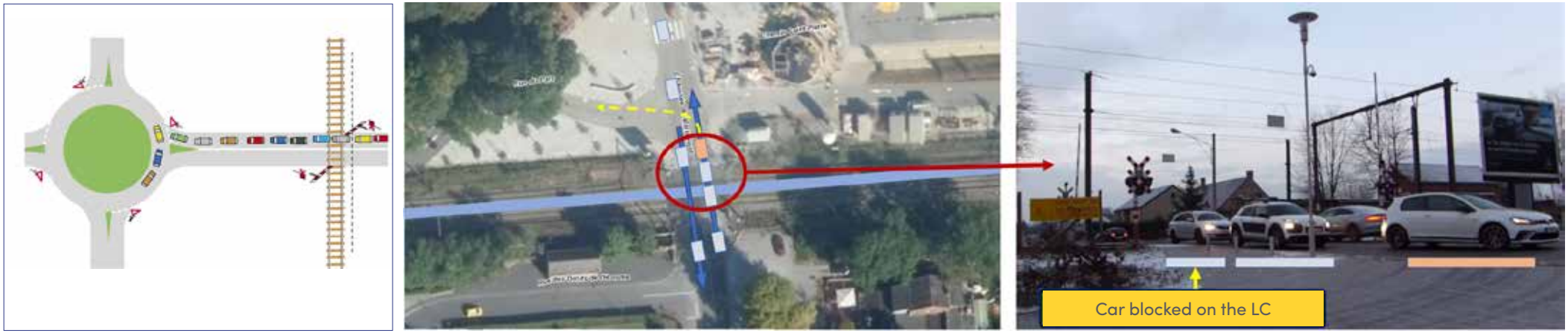
Crossing a level crossing requires the user to manage and process a significant amount of information. During this process, errors can occur. These information handling errors can lead to a mental representation of the level crossing situation that is very different from the real situation. If the situation is subject to an inadequate mental representation and/or personal factors (influence (drugs, alcohol), visibility, tiredness, etc.), the user of the level crossing can find him/ herself in a complicated situation, leading him or her to abort the crossing or, in some cases, to stay immobilised on the level crossing as the barriers are closing due to an approaching train.

For the user, crossing a level crossing therefore includes several steps:

1. the perception of information relating to the level crossing: its visibility (road signs, traffic conditions, etc.) and its readability with respect to its environment. This perception can be flawed if the driver is distracted when he/she approaches a level crossing, which affects his/ her ability to process information;

2. the representation of the situation and decision making: the user processes information relating to the crossing of the level crossing and establishes a mental representation of the situation. Based on this representation, the user will decide whether to proceed with the crossing or not. This decision is influenced by several factors; habits, (poor) knowledge of the regulations, behaviour, experience (or lack thereof), (poor) perception of the information.

3. implementation of the decisions: the user will finally implement the decision he/she made relating to crossing the level crossing.



Morlanwelz LC: 27 November 2017

MORLANWELZ LC: 27 NOVEMBER 2017 *(continued)*

LC1 of line 112 at Morlanwelz

The LC1 of Morlanwelz is an active level crossing, which means:

- the level crossing features adequate road signs providing users with the information they need relating to the level crossing: the road signs inform drivers of the presence of the level crossing ahead through signposts, and of its state through traffic lights;
- the level crossing features an automatic warning system to inform a driver when a train is approaching the level crossing: the automatic warning system notifying of an oncoming train at the level crossing warns users of the level crossing at the opportune moment;

The LC1 of Morlanwelz is equipped with light signals placed on the right and left side of the road, and on either side of the level crossing; it also features bells and semi-barriers.

On 27 November 2017, the level crossing was operating correctly, i.e. the red lights went on, the bells were ringing and the barriers came down.

Furthermore, the LC1 is visible regardless of the direction of approach.

This level crossing is not prone to accidents; the database reveals 1 accident (slalom) and 3 acts of vandalism (broken barriers, etc.) since 2011.

WHY DID THE DRIVER STOP IN THE MIDDLE OF THE LEVEL CROSSING?

In conducting its analysis, the Investigation Body came to the site of the accident to understand the reasons of the immobilisation of the vehicle (in circumstances similar to those of the day of the accident).

This allowed them to understand the influence of the road infrastructure and of traffic conditions on the accident.

The Investigation Body determined that the configuration of the area surrounding the level crossing can lead, in certain conditions, to traffic jams and the immobilisation of vehicles as they are driving over the level crossing.

In this situation, a vehicle (orange) tries to turn left onto the street in advance of the level crossing. Given that the vehicle does not have priority and there is a lot of oncoming traffic, the car is forced to stop.

Vehicles that follow the orange vehicle onto the level crossing are also forced to stop and are unable to clear the area. There is therefore a traffic jam effect that extends all the way to the level crossing.

IS THIS A UNIQUE CASE? NO

The railway network features a significant amount of level crossings: as of the 1st of January, 2018, there were 1737 level crossings (excluding tourist lines and disused lines).

Every year, numerous accidents occur at level crossings, claiming a significant amount of victims (injuries and fatalities). In 2017, the number of accidents that occurred on public level crossings on passenger and/or freight lines (excluding port areas and private level crossings) was of 31, causing 9 deaths, 3 severe injuries and 6 light injuries.

Studies conducted by the infrastructure manager reveal that the main causes of accidents at level crossing (excluding port areas) are negligence (slalom, etc.) in 48% of the cases, and lack of caution (driver blocked on a level crossing) in 36% of the cases (see point 3.6.).

Our analysis delved deeper and revealed that in various cases, the configuration of the area surrounding the level crossing can create a traffic jam effect, i.e. the traffic conditions are such that a jam is created in advance of the level crossing and extends to the level crossing, causing the vehicles to stop.

We have observed several similar situations in various sites across the country.

These level crossings were not selected randomly, but on the basis of their similarities with the configuration of the level crossing of Morlanwelz, or because they result in a high number of accidents, collisions with the barriers or fatalities.

In each case, it was not the functioning of the level crossing that was questioned, but the behaviour of the drivers, namely their lack of vigilance.

Example: Gent LC14 L58 – Loss of priority after the level crossing (traffic lights - crossroads)

Level crossing 14 of line 58 is located on a roadway subject to intense vehicular traffic. The level crossing intersects with several lines and is relatively long (approximately 50 meters). In advance of the level crossing, there is a crossroads with traffic lights (loss of priority). The distance between the beginning and the end of the crossing is significant and causes difficulties in visualising the space available in advance of the level crossing. Furthermore, the level crossing is used by numerous lorries.

The driver drives onto the level crossing without realising that he might be immobilised on the level crossing and is at risk of being hit by a train.

MORLANWELZ LC: 27 NOVEMBER 2017 *(continued)*

WHAT MANAGEMENT MEASURES CAN BE TAKEN TO PREVENT THESE ACCIDENTS?

Road users know and apply the rules governing the use of level crossings

Road users know the rules preventing them from driving onto a level crossing when the road signs indicate that crossing is prohibited, or when the traffic conditions make such a crossing unsafe. They take these prohibitions into account in the thought process leading up to the decision to cross the level crossing or not to.

Similarly, road users take into account outside conditions: the area surrounding the level crossing, the traffic conditions, the state of the road, the weather conditions, etc.

Safety is everyone's concern, and level crossing users contribute to this safety by remaining aware of the rules and not taking inconsiderate risks that can endanger their lives and that of others.

Lack of caution and negligence on the part of the users are the two main causes of accidents at level crossings in Belgium, and awareness-raising campaigns are conducted by the infrastructure manager to remind users of the risks inherent to crossing.

State of the road infrastructure and raising awareness as to the risks of traffic jams around level crossings

In specific traffic situations or conditions, traffic jams extending all the way to a level crossing can occur and represent a potential source of immobilisation of vehicles driving onto a level crossing.

In Belgium, several multidisciplinary LC task forces have been created at the request of the infrastructure manager, involving numerous stakeholders.

Their purpose is to study the various planning possibilities relating to level crossings to draw the attention of road users to the risks.

In conducting our analyses, we were able to determine that the traffic jam phenomenon exists also in other countries (Holland, France...) and that various projects are being examined and tested. In France, for instance, several studies have been conducted relating to the proximity between level crossings and specific road configurations (roundabouts, crossroads, etc.) by the CEREMA. Several systems to enhance the road signage are, in particular, described, their purpose being to warn of the risk of the creation of traffic jams on certain level crossings. These are static signalling (signposts and markings) or dynamic signalling (signposts or traffic lights with systems to detect the creation of traffic jams). These systems therefore relate to road signs. There are also road clearance systems (additional lane to clear the level crossing in the event of a traffic jam) that are also under study.

CONCLUSION

Despite the safety measures implemented, numerous accidents (collisions of road vehicles, collisions with persons, etc.) and incidents (broken barriers, etc.) occur every year around level crossings, causing train delays and human fatalities.

Each year, it has been noted that an increasing number of users illegally cross closed level crossings (to gain a few minutes, to catch a train). Not only are they endangering their own lives, but also the lives of others.

The braking distance of a moving train can be of several hundred meters. Therefore, when a train driver sees a vehicle immobilised on a level crossing, it is often too late to avoid a collision.

Crossing a level crossing is therefore an act that requires special attention on the part of road users. It involves good knowledge and the application of the traffic regulations as well as increased prudence and vigilance, allowing to better analyse the situation and to cross in the best possible safety conditions.

With regard to traffic jams, it is important to analyse the road infrastructure around the level crossings.

The infrastructure manager has an action plan to draw the attention of road users to the risks and to remove level crossings. Numerous studies are being conducted to provide solutions and to improve safety, and these require the participation of everyone, of the authorities, the regions, the municipalities, etc. It also involves the citizens: in the case of the removal of a level crossing, habits need to be changed.

The foreseen increase of railway traffic will involve a higher frequency of trains and therefore a greater number of barrier closings at level crossings, and therefore of traffic interruptions. The risks of traffic jams will therefore also increase.

Let us be proactive, accept the change and prepare a safer future.

The report is available on the IB website (in French)

Bracquegnies / Morlanwelz: 27 November 2017

SERIOUS ACCIDENT: LEVEL 1

BRACQUEGNIES / MORLANWELZ: 27 NOVEMBER 2017

Infrabel agents hit in Morlanwelz, followed by a collision with an SNCB/NMBS-train in Bracquegnies caused by a runaway towed damaged railcar

Following the collision with a road vehicle on level crossing 1 of line 112 by train E928 (comprised of AM449 and AM442) on Monday 27 November 2017 around 7:26 a.m., the train pulled along the road vehicle for several hundred metres.

The motor vehicle caught fire and the fire spread to the driver's cabin of the railcar.

After a rescue services intervention and having contained the fire, the following observations were made:

- the first railcar of the train suffered substantial damage following the fire, specifically in the lead carriage;
- the damaged train needed to evacuated, and this operation would require intervention from a re-railing train;
- the track and the catenaries suffered major damages following the fire, and repairs needed intervention from staff of the infrastructure manager.

The infrastructure manager commandeered a re-railing train from the railway undertaking SNCB/NMBS.

In order to organise and prepare for the towing work of the AM449, a supervisor from a re-railing team (the first foreman) was sent in advance to the accident site.

A second foreman from the re-railing train was charged with assembling an intervention team for Morlanwelz.

The AM442 did not suffer damages. It would be uncoupled from the AM449 and evacuated using its own resources: a driver was sent to Morlanwelz to ensure operation of the AM442. Once on the scene, he repeatedly attempted to put low tension on the AM449: the various attempts were met with failure (triggering circuit breakers), the fire having caused issues in the electric connections of the AM449.

With the help of the first foreman, the driver attempted to uncouple the two railcars: without an electric power supply, a manual uncoupling procedure was undertaken, but they were unable to uncouple the 2 railcars.

Around 1:07 p.m., a technical train ('re-railing train') E97708 comprising 1 diesel locomotive, a 10 ton crane and 2 technical carriages set off from Charleroi. Around 2:13 p.m., the E97708 train arrived from La Louvière-Sud at the 2 railcars of train E928 on track B of line 112.

The crane was detached from the re-railing train for the clearing intervention of the burned road vehicle.

Bracquegnies / Morlanwelz: 27 November 2017

BRACQUEGNIES / MORLANWELZ: 27 NOVEMBER 2017 *(continued)*

The re-railing train continued towards Piéton station and was then via track A taken to the back of E928 (behind AM442). The personnel of the re-railing train placed the salvage hitch between the rescue train and AM442:

- pulling tests were carried out to test the solidity of the couplings;
- feeding the brake line of train E928 was done by the locomotive on the re-railing train, but the brakes on AM449 did not release: re-railing train personnel then isolated the AM449's brakes.

Around 6:45 p.m., the rescue train towing the 2 railcars left Morlanwelz and headed for Piéton station. The crane also departed from track B to reach Piéton station where it would be reincluded in the train.

At the unmanned stopping point of Morlanwelz, the rescue train halted so that personnel from the re-railing train would be able to conduct checks on the towed railcars. The train then resumed its journey towards Piéton.

Just before 7:50 p.m., the guard at level crossing 1 informed the signal box that he had seen a train pass.

Without personnel or the driver of the re-railing train realising, the AM449 disconnected from the convoy during towing to Piéton, and the railcar rolled back down the sloping track towards Morlanwelz.

A few seconds after the announcement from the guard at the level crossing, a message announced that personnel from the infrastructure manager had been struck by the runaway railcar: 2 agents were fatally struck and 4 others were injured.

The railcar continued its drifting and passed by La Louvière-Sud before reaching line 118: the emergency procedures undertaken by the various Infrabel services did not manage to stop the escape.

In Bracquegnies, the runaway railcar collided with train E940: 3 passengers and 2 members of staff aboard train E940 were injured.

DIRECT CAUSE

The unstable position of internal pieces of the AM442's coupling led to a breakaway between AM442 and AM449: AM449, without brakes and at the tail of the convoy on a sloping track, was able to drift and cause two accidents in Morlanwelz and Bracquegnies.

INDIRECT FACTORS

INDIRECT FACTOR N°1 (DESIGN)

The AM96 are electric railcars composed of 3 crates, easily recognisable thanks to the pneumatic diaphragms located at both ends of each unit. While 2 of these railcars are coupled, the diaphragms compress against one another and form a tight seal, whereas the front walls (doors) can fold completely in, making the driver's cabin disappear against the sides of the railcars and allowing movement of passengers and personnel between the 2 railcars.

The presence of these two diaphragms pressed against one another has several consequences, including blocking access to the couplings.

Bracquegnies / Morlanwelz: 27 November 2017

BRACQUEGNIES / MORLANWELZ: 27 NOVEMBER 2017 *(continued)*

It is impossible to directly operate the manual uncoupling handle located on the coupling.

The AM96 are equipped with a system which allows the offset of the manual decoupling override in the adjacent driver's cabin: a hand crank can be used to transmit, by means of a cable and its duct, the force to the decoupling mechanism made inaccessible by the presence of the diaphragms. It is a last-resort procedure that is very rarely used (when there is no electric power supply, among other things).

In the case of AM96, this force must be implemented via the hand crank in the driver's cabin: the procedure requires manoeuvring the hand crank to be done by 2 drivers. Each performing the task in one of the two driver's cabins, this allows them to combine the forces produced.

The day of the accident, this simultaneous manoeuvre was not executed until after a manoeuvre was first executed in the only driver's cabin aboard the AM442.

The presence of the diaphragms pressing against one another led to mechanical tension in the coupling

As for the rolling stock, the automatic decoupling procedure starts with opening a magnetic valve to initiate a slight deflation of the diaphragms. The day of the accident, without an electric power supply, this automated deflation was not available.

The pressure exerted by the diaphragms pressed against one another could result in the simultaneous rotation of the 2 hand cranks not mechanically decoupling the 2 hitches, pushing certain drivers to use their feet to exert more force on the hand crank, which risks damaging the cable jacket.

A sticker next to the crank in the driver's cabin informs that the crank should only be used manually.

The day of the accident, the hand crank in the driver's cabin of AM442 was used with both hands and feet.

The damage caused to the cable sheath is only visible during workshop maintenance operations. Once the "sheath + cable" system is damaged, rotating the crank no longer drives the correct motion of the internal parts of the coupler, bringing them to an intermediary and unstable position.

It is not possible to visually take into account the extent of the 'coupling' or 'decoupling' of the hitches

The AM96 driver's cabin is equipped with indicator lights providing information on the state of the coupling (coupled/decoupled): the day of the accident, with the lack of an electric power supply, personnel were not able to access this information.

Personnel attempted to figure out the 'coupled' or 'decoupled' status of the two couplings, but the presence of the diaphragms pressed against one another prevented them from doing so.

The inspection in the workshop revealed that status difference between the two couplings did not allow the brakes of the AM449 to be released, the pressure in the automatic brake line of this railcar had not reached the required 5 bars.

On the accident site, the presence of the diaphragms pressed against one another cut off all access to the couplings: the personnel of the re-railing train had no way to imagine or know the difference in position of the 2 couplings.

Unable to release the brakes of the AM449 despite pressure in the automatic brake line, personnel took the decision to isolate the brakes on this railcar.

BRACQUEGNIES / MORLANWELZ: 27 NOVEMBER 2017 *(continued)*

INDIRECT FACTOR N°2 (PROCEDURES)

The manual uncoupling procedure is a "last resort" procedure and is not part of the practices generally implemented by drivers who, in most cases, use the automatic procedure.

The manual decoupling procedure is described in the rules and regulations of the railway undertaking and is part of theoretical learning during training for the drivers. How to manipulate the hand crank is described on a sticker in the driver's cabin on the AM96 railcars.

The day of the accident, the manual decoupling manoeuvre was not carried out following the procedure described in the rules and regulations.

SYSTEMIC FACTORS

SYSTEMIC FACTOR N°1 (COMPETENCE MANAGEMENT)

In the past, the SNCB/NMBS identified a problem with the manual uncoupling system of the AM96: damages were detected to the sheath of the cable connecting the lever of the coupler to the crank. The analysis that was then carried out by the SNCB/NMBS rightly concluded that damage appears when drivers use their foot to apply greater force on the crank.

The risks of improper use of the crank have been identified by the railway undertaking and measures had been taken in the workshop during servicing of the rolling stock. However, it seems that the measures taken by the SNCB/NMBS were insufficient to get the driving personnel to use the crank according to the procedures:

- practical exercises on the procedure of manually uncoupling AM96 are not systematically integrated in the drivers' training;
- the sticker placed next to the crank in the driver's cabin reminds that the crank must be used manually, but does not mention the simultaneous manoeuvre in both driver's cabins;
- the SNCB/NMBS documentation did not allow to efficiently draw the attention of the driving personnel on the issue.

SYSTEMIC FACTOR N°2 (RISK ASSESSMENT)

Several cases of runaway railway vehicles are analysed or have already been the subject of a finalised investigation by the IB. Each time, the circumstances are different and the analyses of these different cases allow to detect that the causes reveal both technical aspects and operational, even organisational, aspects.

The risks of a runaway railway vehicle have been analysed, but the measures taken by the railway industry do not appear to be adapted to the present railway situation.

The railway geography, the organisation of the sector, the numerous customisation and modernisation works and the evolution of the rolling stock have brought about important changes with respect to the analyses of the past and it seems right to review these risk analyses, in particular in terms of the elements highlighted in this investigation:

- a train with a non-braked vehicle at the rear of the convoy is authorised to travel to the closest station, although there is no emergency procedure that enables to stop a runaway vehicle for sure should this occur.
- certain measures taken to protect personnel working on the tracks (closing of the signals) do not protect from the risk of being hit by a runaway railway vehicle, whether this vehicle ran away from a "technical train" (re-railing train, work train) travelling by regulation on the obstructed track, or it ran away from a train located at the signals giving access to the obstructed section. In the case of such events of a runaway train, maintaining automatic signals giving access to the obstructed section or track closed does not protect the personnel (of the infrastructure manager and/or of the re-railing train) standing in the tracks.

ADDITIONAL OBSERVATION

Re-railing train personnel has access to documentation in the re-railing carriage, but this documentation is only available in paper format and is to be manually updated by the foremen of the re-railing teams. Electronic documentation could increase efficiency when searching for technical information during re-railing.

The report is available on the IB website (in French)

Oostende: 21 September 2017

SERIOUS ACCIDENT: LEVEL 1

OOSTENDE: 21 SEPTEMBER 2017

Personnel of a contractor was struck by a train

Works have been carried out in the Ostend station for over a year. In September 2017, works were specifically planned on or in the extension of platforms III and IV. Works included laying out tracks and track equipment, including switching point 67K.

On Thursday 21 September 2017, around 7:00 a.m., a site foreman and deputy site foreman from a company specialised in rail works worked along the tracks in the worksite area in Ostend. The construction site foreman was a prevention adviser who accompanied a temporary worker on the construction site and who trained him for the role of deputy site foreman. Together they carried out preparatory measurements as part of the works for placing the 67K switching point (see p. 11). The work was carried out outside of scheduled working hours, and the deputy site foreman ended up in the danger zone of a track in service. Railway traffic was not interrupted, and planned safety procedures were not in effect except after 8:00 a.m.. No other protection measure was taken.

At 7:08 a.m., passenger train E1807 (Oostende / Antwerpen-Centraal) left track VI of the Ostend station. The train was directed from track VI to track A on line 50A via switching points forming an S-shaped bend. In advance of the S bend, the train passed under the Slijkensesteenweg bridge which overlooks the tracks.

During the journey to line 50A, the driver of train E1807 noticed the presence of a person in the danger zone of the tracks. The driver braked but was unable to avoid collision with this person. The person was caught by the train and died on impact.

The accident took place at day break. No fog or haze was reported during the time of the accident.

DIRECT CAUSE

The direct cause of the accident is the performance (outside of the scheduled working hours) of work by the contracting firm's staff on a track in service, without prior authorisation and in the absence of the protection measures provided.

INDIRECT FACTOR

According to the retained hypothesis, the indirect factor causing the accident is the fact that the foreman underestimated the danger posed by a failure to hear and see an approaching train in a timely manner, as well as the danger posed by a failure to be noticed by the train driver of an approaching train in a timely manner.

ADDITIONAL OBSERVATIONS

The danger of a failure to hear and see an approaching train in a timely manner as well as the danger of a failure to be seen by the train driver in a timely manner is discussed in the welcome brochure, training and toolbox meeting of the subcontractor. However, on the day of the accident, it appears to have been insufficient to make the involved employees adequately aware of the risk of working in the danger zone of a track in service when protection measures are not taken.

The assumption that the arrival of a train can be noticed in a timely manner with certainty by individuals performing work, is based on a dangerous illusion. The assumption that train drivers can bring their train to a halt in a timely manner is based on a dangerous illusion as well.

OOSTENDE: 21 SEPTEMBER 2017 *(continued)*

Promote awareness

The Investigating Body advises the subcontractor to continue its efforts to sensitise his staff about the danger posed by moving trains and to reflect on ways to guarantee the unconditional implementation of safety arrangements by his staff.

The Safety & Health plan

The S&H plan of the subcontractor essentially covers generic working conditions. While developing the S&H plan and keeping in mind the dynamic working conditions specific to the construction site, safety principles and measures may be identified, and personnel may also be informed. The infrastructure manager should, for his part, ensure that the S&H plan of his entrepreneurs (subcontractors) be completed in this manner - if necessary.

Last Minute Risk Analysis

The welcome brochure of the subcontractor provides for an LMRA prior to the start of the work. The subcontractor describes the LMRA as a check-up in the form of a reflection moment. However, the LMRA procedure of the subcontractor does not provide for written confirmations and is therefore not traceable.

The correct application of the LMRA reflection, as provided by the subcontractor in the welcome procedure, should undoubtedly have led to the conclusion that the work on 21 September 2017 could not be performed in a safe manner and should therefore not have been performed.

The Investigating Body advises the subcontractor to further sensitise his staff about the importance of the LMRA and to reflect on ways to guarantee the application of the LMRA by his staff.

Effective identification of dangers during an LMRA and the implementation of additional safety measures will not only improve safety, but will also, for example, provide information on the consequences of not following the procedures.

Sound signals

The use of sound signals, such as the train horn, is a safety measure that only needs to be considered in case of extreme emergencies. The use of sound signals (such as the horn) is the lowest priority method to alert people.

However, it must be noted that the use of the horn in various circumstances is not clearly described in the Safety Regulations for the operation of railway infrastructure (RSEIF/VVESI). The HLT Booklet (Rules for train drivers) describes the meaning behind the different tones of the horn.

The report is available on the IB website (in French)

8. STATISTICS

NUMBER OF INVESTIGATIONS

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of investigations opened	6	4	3	2	3	5	3	3	3	4	6	4
Number of investigations closed	6	4	3	2	3	5	3	3	3	3	3	7

NUMBER OF INVESTIGATIONS ON MUSEUM RAILWAY LINES

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of investigations opened	–	–	–	–	–	–	–	–	–	1	0	0
Number of investigations closed	–	–	–	–	–	–	–	–	–	0	1	0

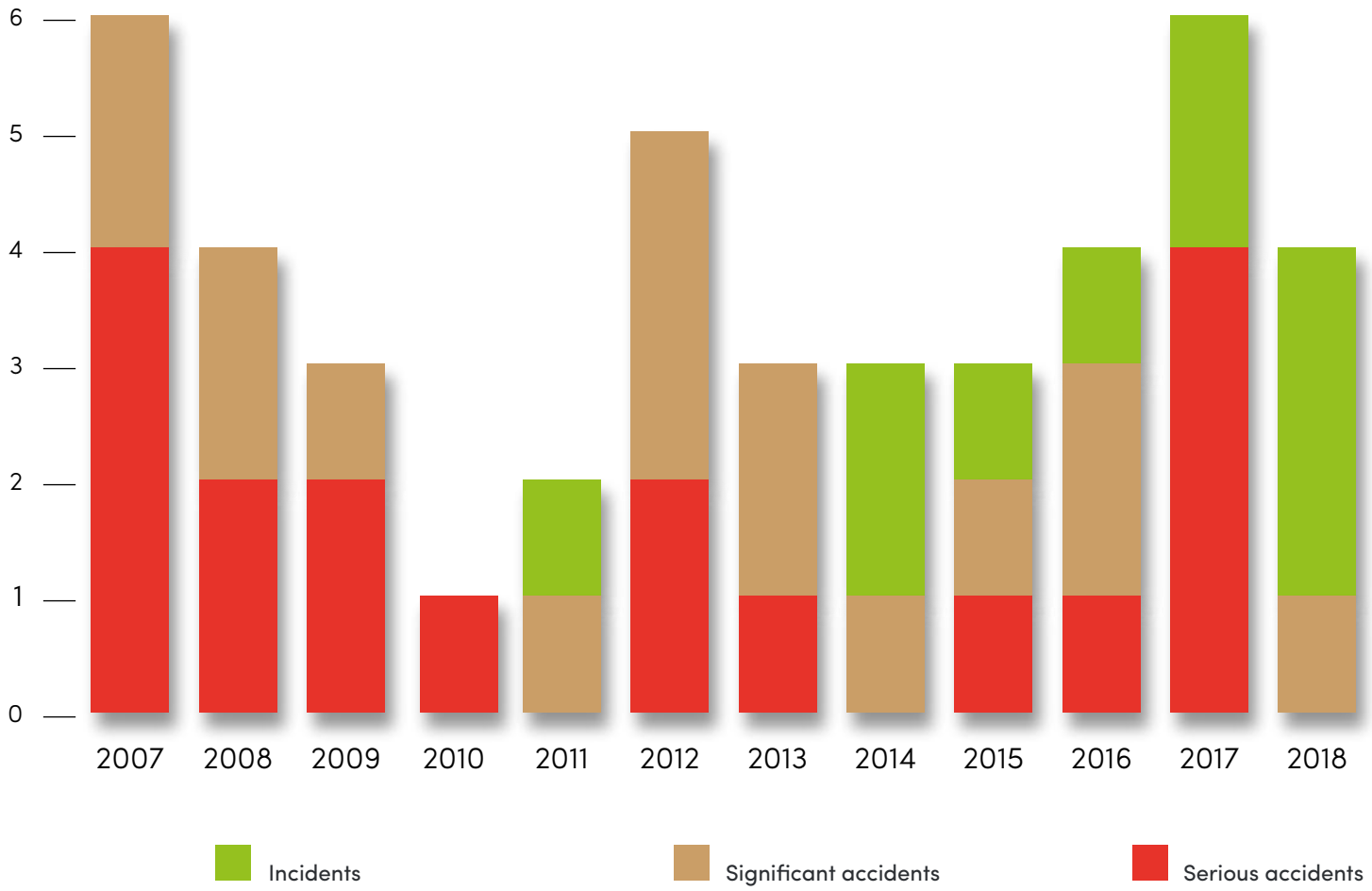
Number of investigations closed per year

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of investigations closed	6	4	3	2	3	5	3	3	3	3	3	7

REPORT TYPES OPENED BY THE IB

Serious accidents level 1	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Collision	1	1	0	1	0	1	0	0	0	1	1	0	6
Derailment	0	0	1	0	0	0	1	0	0	0	2	0	4
Accident at level crossing	0	0	0	0	0	0	0	0	1	0	0	0	1
Accident involving a person caused by rolling stock	3	1	1	0	0	1	0	0	0	0	1	0	7
Fire in rolling stock	0	0	0	0	0	0	0	0	0	0	0	0	0
	4	2	2	1	0	2	1	0	1	1	4	0	**18**
Significant accidents level 2	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
Collision	1	1	0	0	1	1	1	1	0	1	0	0	7
Derailment	1	0	0	0	0	2	1	0	1	0	0	1	6
Accident at level crossing	0	1	0	0	0	0	0	0	0	0	0	0	1
Accident involving a person caused by rolling stock	0	0	1	0	0	0	0	0	0	1	0	0	2
Fire in rolling stock	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	2	1	0	1	3	2	1	1	2	0	1	**16**
Incidents level 3	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
Collision	0	0	0	0	0	0	0	0	0	0	0	0	0
Derailment	0	0	0	0	0	0	0	0	0	0	0	1	1
Accident at level crossing	0	0	0	0	0	0	0	0	0	0	0	0	0
Accident involving a person caused by rolling stock	0	0	0	0	0	0	0	0	0	0	2	0	2
Fire in rolling stock	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	1	7
SPAD	0	0	0	0	1	0	0	1	1	1	0	0	
Incident signalling	0	0	0	0	0	0	0	1	0	0	0	1	
	0	0	0	0	1	0	0	2	1	1	2	3	**10**
Museum railway lines Other	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
	0	0	0	0	0	0	0	0	0	1	0	0	

REPORT TYPES OPENED BY THE IB



9. RECOMMENDATIONS

The recommendations in the area of safety are proposals that the IB makes in order to improve safety on the railway system. The recommendations are centred around the prevention of accidents.

The recommendations in the area of safety are proposals that the IB makes in order to improve safety on the railway system. The recommendations are centred around the prevention of accidents.

A recommendation is an approach and not a solution. It is intentionally not written SMART.

It is up to the infrastructure manager and railway undertakings to evaluate, within their organisations and according to their internal procedures, the identified risk and take measures to avoid or limit the recurrence of said risk.

Recommendations are not obligatory. The choice to implement them and of the actions to respond to those risks remains the responsibility of the stakeholders involved. It is therefore difficult to set any deadlines.

Recommendations are discussed during meetings with the stakeholders involved. They are included in the draft investigation report sent for feedback.

The recommendations follow-up is carried out by the National Safety Authority, the DRSI. According to procedures defined by the DRSI, the actors concerned are responsible for providing an action plan after the publication of the IB investigation report.

The follow-up in the annex mentions the recommendations from investigation reports concluded in 2017 and 2018.

Recommendations from investigation reports concluded in previous years are either currently being implemented following established planning or concluded.

LIEU DE L'ÉVÉNEMENT : **BUIZINGEN** **DATE DE PUBLICATION DU RAPPORT** : **02/2017**

N° RECOMMANDATION : **2** **TYPE** : **CAUSE DIRECTE-INDIRECTE** **ADRESSÉE À** : **SSICF/DVIS** **EXÉCUTION PAR** : **EFS / SO'S**

CONSTAT - ANALYSE

RECOMMANDATION

L'OE recommande que l'entreprise ferroviaire identifie des règles de bonnes pratiques à mettre en oeuvre dans la gestion des congés et des retours de congé.

ACTION DE L'EF

La SNCB gère actuellement les congés selon les règles ARPS en vigueur (541, 542).
Il est préférable de commencer le service suffisamment tôt après de longues périodes d'absence pour avoir le temps de s'informer des carnets de commandes et autres nouveautés.

Différents sujets liés à la prévention de la fatigue ou de la vigilance réduite chez le personnel roulant ont été inclus dans les « requirements » et les « business rules » de l'APS (liste disponible).

Le nouveau programme de planification APS (« Advanced Planning System ») :
premier GoLive prévu pour le 15/05/2018, déploiement en 7 phases, dernier GoLive le 03/03/2021 (voir les diapositives meeting cadre KK du 05/10/2017).

La mise en oeuvre se déroule comme prévu. Date limite : mars 2022.

LIEU DE L'ÉVÉNEMENT : **BUIZINGEN**

DATE DE PUBLICATION DU RAPPORT : **02/2017**

N° RECOMMANDATION : **4**

TYPE : **CAUSE DIRECTE-INDIRECTE**

ADRESSÉE À : **SSICF/DVIS**

EXÉCUTION PAR : **GI / IB**

CONSTAT - ANALYSE

RECOMMANDATION

L'OE recommande que le gestionnaire d'infrastructure passe en revue sa gestion actuelle des risques afin d'établir si de nouveaux éléments en corrélation avec l'accident analysé ne nécessitent pas une adaptation de cette gestion des risques.

ACTION DU GI

Infrabel vérifie si les analyses de risque relatives aux annonces de réduction de vitesse sont à jour.

Le système est opérationnel. Un nouveau manuel pour les chefs de service et les planificateurs est appliqué en cas de détection d'un conflit.

Compte tenu de ce qui précède, nous proposons à l'Organisme d'enquête de clôturer cette recommandation.

LIEU DE L'ÉVÉNEMENT : HERMALLE-SOUS-HUY **DATE DE PUBLICATION DU RAPPORT : 12/2017**

N° RECOMMANDATION : 1 **TYPE : CAUSE DIRECTE-INDIRECTE** **ADRESSÉE À : SSICF/DVIS** **EXÉCUTION PAR : EF / SO**

CONSTAT - ANALYSE

L'attention du conducteur n'était probablement pas optimale au moment de l'accident. De nombreuses études en psychologie ont montré depuis longtemps que l'attention est un processus limité en ressources et dans le temps (James, W. 1890). De ce fait, l'attention ne peut être soutenue durant toute une journée de travail (Coblentz et col. 1993 ; Edkins 1997 ; Stroh 1971) et les conducteurs de train, comme tout opérateur, sont soumis à des déficits d'attention plus ou moins longs. L'oubli, la confusion, distraction, le stress ou la fatigue sont des facteurs suffisants à générer une catastrophe. Dans le cas présent, selon l'étude des facteurs humains, l'oubli, la confusion et la fatigue peuvent probablement être éliminés.

Au passage d'un signal vert ou d'un signal restrictif, il est demandé au conducteur de réaliser un geste métier c'est-à-dire réaliser l'acquittement en appuyant sur un bouton. Le conducteur a bien acquitté le signal D.11 mais de façon tardive. Le déficit d'attention, la distraction pourraient expliquer le pointage tardif du conducteur.

La conséquence d'un pointage tardif est que le signal n'est plus visible au moment du pointage, pouvant réduire l'impact de l'aspect restrictif présenté par le signal. Le caractère monotone du trajet ainsi que les habitudes et les attentes du conducteur sont des facteurs de risques pour que l'attention du conducteur ne se porte pas sur l'aspect des signaux mais que ces facteurs, au contraire, conditionnent le schéma mental du conducteur et influencent son interprétation des signaux rencontrés.

Selon les témoignages recueillis par les experts auprès de conducteurs pratiquant la ligne concernée, le signal B222, grand signal d'arrêt non desservi, présente de façon générale un aspect vert à cette heure tardive. Les vérifications du GSM-R et du GSM de service effectuées permettent de conclure que le conducteur ne les utilisait pas au moment de l'accident. Le GSM privé du conducteur a été saisi par la Justice. Il n'a pas été possible pour l'OE d'opérer des vérifications sur cet appareil privé. Il n'a pas été possible de localiser avec précision le GSM au moment de l'accident. Actuellement, aucun élément ne permet de conclure que le conducteur était ou non distrait par un appareil multimédia. Mais de façon générale, ces appareils multimédia constituent une source potentielle de distraction pas seulement au niveau ferroviaire mais également au niveau routier. De nombreuses campagnes publicitaires rappellent les risques liés à l'envoi de SMS, à l'utilisation du GSM au volant. Les distractions liées à l'utilisation d'appareil multimédia sont sources de nombreux accidents routiers. L'entreprise ferroviaire SNCB interdit l'utilisation de GSM et appareils multimédia privés durant la conduite. Il ressort des interviews réalisés par la société d'expertise externe que cette règle n'est pas toujours respectée.

Des contrôles sont effectués par l'entreprise ferroviaire sur le terrain mais l'entreprise est rapidement limitée par le respect de la vie privée des conducteurs de train. Une solution technique est recherchée par l'entreprise ferroviaire mais la mise en place d'un brouilleur de GSM n'est pas envisageable : le conducteur doit pourvoir continuer d'utiliser le GSM de travail et le GSM-R en cas de nécessité. La prévention par la responsabilisation du personnel de conduite joue donc un rôle prépondérant. Lors des dernières réunions de concertation, l'autorité nationale de sécurité sensibilise les entreprises ferroviaires aux risques de l'utilisation des GSM.

RECOMMANDATION

L'OE recommande à l'entreprise ferroviaire de poursuivre ses investigations et contrôles pour éviter les distractions lors de la conduite.

LIEU DE L'ÉVÉNEMENT : HERMALLE-SOUS-HUY **DATE DE PUBLICATION DU RAPPORT : 12/2017**

N° RECOMMANDATION : 1 **TYPE : CAUSE DIRECTE-INDIRECTE** **ADRESSÉE À : SSICF/DVIS** **EXÉCUTION PAR : EF / SO**

ACTION DE L'EF

Phase de suivi 1 :

E-mail interne de la SNCB à tous les services opérationnels (daté du 13/06/2016), précisant qu'à partir du 01/07/2016, les trains de marchandises ne peuvent plus circuler en avance sur les heures, sauf pour les manœuvres.

D'autres mesures ont encore été prises :

- L'équipement ETCS pour les AM96 sur la ligne 130
- La décision d'installer TBL1+ NG sur le matériel roulant
- Test en cours au CPS pour détecter les comportements à risque parmi le personnel (en collaboration avec l'Université de Louvain) ==> cette information sera utilisée dans le cadre de la réintégration interne du personnel, lors du recrutement, en cas de doute, après un incident, ...
- Gestion interne et suivi des compétences du personnel en réexamen
- Amélioration du suivi des résultats de l'analyse des enregistrements de trajet avec détection d'anomalies liées à de plus grandes divergences

L'application AMELIE recueillera tous les enregistrements de parcours et les analysera à la recherche d'erreurs.
Les premiers tests sont prévus en mai 2019. Livraison : fin 2019.

LIEU DE L'ÉVÉNEMENT : HERMALLE-SOUS-HUY **DATE DE PUBLICATION DU RAPPORT : 12/2017**

N° RECOMMANDATION : 2 **TYPE : CAUSE DIRECTE-INDIRECTE** **ADRESSÉE À : SSICF/DVIS** **EXÉCUTION PAR : EF / SO**

CONSTAT - ANALYSE

Malgré que le respect de la signalisation soit une règle martelée au cours de la formation et lors du suivi des conducteurs, les habitudes de réaction d'un conducteur face à un signal restrictif peuvent subir des déviations par rapport à la règle et aux bonnes pratiques : certains conducteurs adoptent une conduite plus réactive, et vigilent régulièrement de façon tardive. Lors des interviews avec des conducteurs, les experts de l'entreprise externe ont mentionné que les habitudes de conduite de certains conducteurs plus récemment entrés en service ne sont pas similaires à celles de conducteurs ayant roulé sur d'autres systèmes (Memor, Gong-Sifflet) : ils auraient tendance à s'appuyer davantage sur le rappel de certains aspects de la signalisation par le système TBL1+ à bord des trains. Ceci constitue une déviation par rapport aux prescriptions : tout conducteur doit observer la signalisation latérale et respecter les règles définies par l'entre-prise et reprises dans le HLT. Le système TBL1+ est un système d'aide à la conduite, et non un système automatique de contrôle des trains.Des contrôles via l'analyse des bandes d'enregistrement sont effectués par l'entreprise ferroviaire. Cependant, il n'est pas possible de contrôler l'ensemble des trajets journaliers effectués.

RECOMMANDATION

L'OE recommande à l'entreprise ferroviaire de poursuivre la sensibilisation et responsa-bilisation des conducteurs de trains quant aux risques engendrés par le non-respect des règles de conduite

ACTION DE L'EF

Idem R1

LIEU DE L'ÉVÉNEMENT : HERMALLE-SOUS-HUY **DATE DE PUBLICATION DU RAPPORT : 12/2017**

N° RECOMMANDATION : 3 **TYPE : AUTRES** **ADRESSÉE À : SSICF/DVIS** **EXÉCUTION PAR : GI / IB**

CONSTAT - ANALYSE

Durant l'enquête, le carnet S427 du technicien «signalisation» n'a pas été retrouvé : les procédures de conservation des carnets S427 ne semblent pas claires. Le registre des déplombages S425 et le carnet de bloc E934 n'avaient pas été complétés des inscriptions tel que prévu par les procédures internes d'Infrabel.

RECOMMANDATION

L'OE recommande au SSICF de veiller à ce que le gestionnaire d'infrastructure sensibilise les membres du personnel sur le suivi correct des procédures internes.

ACTION DU GI

Compte tenu de la date de publication de la recommandation (voir ci-dessus), Infrabel analysera cette recommandation et présentera ses conclusions au SSICF en 2018.

Il a été rappelé au personnel qu'il est tenu de respecter les procédures. En outre, le regroupement des cabines de signalisation et leur intégration dans le système PLP mettront définitivement un terme à l'utilisation de ces procédures avec livrets papier d'ici fin 2022 dans les zones concernées.

Lieu de l'événement : **Leuven** **Date de publication du rapport** : **09/2018**

N° recommandation : **1** **Type** : **cause directe-indirecte** **Adressée à** : **DVIS-SSICF** **Exécution par** : **GI - EF / IB - SO**

Constat - Analyse

Selon l'hypothèse retenue, le premier facteur indirect est le traitement incorrect des informations (commandes) données par la signalisation concernant les limitations de vitesse à respecter, ayant permis une représentation mentale erronée (biais d'ordre cognitif).
Le jour de l'accident, une combinaison de différents facteurs a occasionné chez le conducteur une représentation mentale erronée, qui s'est maintenue par la suite :

- un environnement complexe sans marques d'identification claires ;
- le caractère ambigu du panneau de fin de zone « 9 », qui permet une augmentation de la vitesse alors que le signal en amont du panneau de fin de zone impose une limitation de la vitesse à 40 km/h au pied du signal en aval du panneau de fin de zone (règlement HLT) ;
- le caractère ambigu des panneaux de ligne de la L.36, placés en aval de la voie 7 ;
- la définition incomplète dans le HLT du panneau de ligne de la L.36 ;
- la combinaison – pour le conducteur de train – de la connaissance passive de la ligne pour le départ de la voie 7 et du développement insuffisant des habitudes de conduite fixes, d'une part, et de la quantité d'informations à traiter pendant et peu après le départ de la voie 7, d'autre part.

Ces facteurs occasionnent chez le conducteur une représentation mentale pouvant laisser croire au conducteur qu'il roule en voie normale sur la L.36 alors qu'il est dirigé vers la L.36 en contrevoie.

Recommandation

L'Organisme d'Enquête recommande au gestionnaire d'infrastructure et à l'entreprise ferroviaire de vérifier si des constatations similaires peuvent avoir une influence sur leur fonctionnement à d'autres endroits et, si c'était le cas, d'établir des plans d'action appropriés à cet effet.

Action du GI

Compte tenu de la date de publication de la recommandation (voir ci-dessus), Infrabel analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

Action de l'EF

Compte tenu de la date de publication de la recommandation (voir ci-dessus), la SNCB analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

LIEU DE L'ÉVÉNEMENT : LEUVEN **DATE DE PUBLICATION DU RAPPORT : 09/2018**

N° RECOMMANDATION : 2 **TYPE : CAUSE DIRECTE-INDIRECTE** **ADRESSÉE À : DVIS-SSICF** **EXÉCUTION PAR : GI - EF / IB - SO**

CONSTAT - ANALYSE

Deux passages spécifiques de la réglementation interne de l'entreprise ferroviaire peuvent mener au développement des gestes-métier arbitraires ou à une mauvaise interprétation.

Le choix "d'accélérer ou non au panneau de fin de zone après le passage à un signal VJH" est laissé à l'appréciation des conducteurs de train. On rappelle à juste titre aux conducteurs le danger que représente l'oubli d'une limitation de vitesse, mais aucune mesure efficace n'est mise en place pour réduire ce risque d'oubli.

La définition incomplète du panneau de ligne dans le HLT peut donner lieu à des interprétations erronées. A Louvain, cela mène à l'interprétation incorrecte : "conduite sur la L.36" au lieu de "conduite vers la L.36".

RECOMMANDATION

L'Organisme d'Enquête recommande au gestionnaire d'infrastructure et à l'entreprise ferroviaire de vérifier que le secteur évalue la réglementation relative à l'accélération aux panneaux de fin de zone et relative à la définition des panneaux de ligne.

ACTION DU GI

Compte tenu de la date de publication de la recommandation (voir ci-dessus), Infrabel analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

ACTION DE L'EF

Compte tenu de la date de publication de la recommandation (voir ci-dessus), la SNCB analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

Lieu de l'événement : **Morlanwelz / Bracquegnies** **Date de publication du rapport** : **11/2018**

N° recommandation : **1** **Type** : **cause directe-indirecte** **Adressée à** : **DVIS-SSICF** **Exécution par** : **SO / EF**

Constat - Analyse

Dans le passé, la SNCB avait identifié un problème sur le système de désaccouplement manuel des AM96 : des dégâts avaient été détectés à la gaine du câble reliant le levier du coupleur à la manivelle. L'analyse alors réalisée par la SNCB avait conclu à juste titre que les dégâts apparaissaient lorsque les conducteurs utilisent le pied pour exercer une force plus importante sur la manivelle.

Le risque d'une mauvaise utilisation de la manivelle avait été identifié par l'entreprise ferroviaire, et des mesures avaient été prises en atelier lors des entretiens du matériel roulant, mais il semble que les mesures prises par la SNCB n'aient pas été suffisantes pour amener le personnel de la conduite à utiliser la manivelle selon les procédures :

- la formation des conducteurs n'intègre pas d'exercice pratique de la procédure manuelle de désaccouplement des AM96;
- l'autocollant disposé à côté de la manivelle dans la cabine de conduite rappelle que la manivelle doit être utilisée à la main mais ne mentionne pas la manœuvre simultanée dans les deux cabines de conduite;
- la documentation de la SNCB n'a pas permis d'attirer efficacement l'attention du personnel de la conduite sur la problématique.

Recommandation

L'OE recommande à la SNCB, au vu de ces éléments, d'analyser la procédure de formations afin de sensibiliser l'ensemble du personnel concerné aux risques identifiés

Action de l'EF

Compte tenu de la date de publication de la recommandation (voir ci-dessus), la SNCB analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

Lieu de l'événement : **Morlanwelz / Bracquegnies** **Date de publication du rapport** : **11/2018**

N° recommandation : **2** **Type** : **cause directe-indirecte** **Adressée à** : **DVIS-SSICF** **Exécution par** : **GI - EF / IB - SO**

Constat - Analyse

Divers cas de figures d'échappement de véhicule ferroviaire sont en cours d'analyse ou ont déjà fait l'objet d'une enquête clôturée par l'OE. Les circonstances sont à chaque fois différentes et les analyses de ces différents cas permettent de déceler que les causes relèvent à la fois d'aspects techniques et d'aspects opérationnels, voire organisationnels.
Les risques d'échappement de véhicule ferroviaire ont été analysés depuis de nombreuses années/décennies par le secteur ferroviaire, mais il semble que les mesures prises par ce secteur ne soient pas ou plus adaptées à la situation actuelle.
La géographie ferroviaire, l'organisation du secteur, les nombreux travaux d'aménagement et de modernisation et l'évolution du matériel roulant ont entraîné des changements importants par rapport aux analyses du passé, et il semble justifié de revoir ces analyses de risque, notamment au regard des éléments mis en lumière dans le cadre de la présente enquête :

- le mouvement d'un train avec un véhicule non freiné en queue de convoi est autorisé jusqu'à la gare la plus proche, alors qu'il n'existe pas de mesure d'urgence pouvant enrayer de façon certaine l'échappement s'il survient.
- certaines mesures prises pour protéger le personnel au travail sur les voies (fermeture des signaux) ne protègent pas contre le risque d'être heurté par un véhicule ferroviaire échappé, que ce véhicule soit échappé d'un "train technique" (train de relevage, train de travaux) évoluant réglementairement sur la voie obstruée, ou qu'il soit échappé d'un train se trouvant aux abords des signaux donnant accès au tronçon obstrué. En cas de tels échappements, le maintien à l'arrêt des signaux desservis donnant accès à la section ou au tronçon de voie obstrué n'apporte aucune protection au personnel (personnel du GI et/ou personnel du train de relevage) se trouvant sur la voie.

Recommandation

L'OE recommande que les entreprises ferroviaires et le gestionnaire de l'infrastructure vérifient conjointement les analyses de risques et les mesures techniques, réglementaires et procédurales afin d'apporter une réponse adéquate au risque d'échappement de véhicules.

Action du GI

Compte tenu de la date de publication de la recommandation (voir ci-dessus), Infrabel analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

Action de l'EF

Compte tenu de la date de publication de la recommandation (voir ci-dessus), la SNCB analysera cette recommandation et présentera ses conclusions au SSICF en 2019.

Investigation Body for Railway Accidents and Incidents

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