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Federal Public Service for
Mobility and Transport



Railway accident and incident investigation unit

Annual report 2009

Belgium

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1 Overview of 2009

This report gives a brief overview of the activities carried out by the railway accident and incident investigation unit between 1 January 2009 and 31 December 2009.

This report has been drawn up in execution of the provision set out in article 54 of the [Belgian] law dated 19 December 2006 concerning railway operating safety, which stipulates that the investigation unit has to draw up an annual report.

In 2009, three new investigations were opened by the unit.

Four reports were closed in the course of the year:

- Two opened in 2007 and
- Two opened in 2008.

Major changes linked to the investigation unit's regulations and personnel were initiated at the end of 2009.

These changes will have numerous repercussions on the investigation unit's operations and activities in 2010.

The main investigator, who had held the position since 2007, retired in October, and he was replaced in November 2009.

Furthermore, in order to take into account the comments made by the Belgian Conseil d'Etat, a bill modifying the law dated 19 December 2006 has been prepared to do away with various royal missions in the safety field, hitherto entrusted to the SNCB Holding (Société nationale des chemins de fer belges [Belgian national railway company])

It was considered that a risk of confusion of interest existed, which had to be brought to an end.

The operational and technical competences of the SNCB Holding were used by the investigation unit until December 2009.

2. Introduction of the investigation unit

2.1 The legal basis

European Directive 2004/49/EC was transposed into:

- The law dated 19 December 2006 and the 2 royal decrees dated 16 January 2007:
- The royal decree dated 16 January 2007 covering creation of a railway accident and incident investigation unit and determining its composition;
- The royal decree dated 16 January 2007 setting out certain rules relative to investigations concerning railway accidents and incidents.

These regulations came into force on 2 February 2007.

2.2 Its role and mission

The investigation unit's main mission is to carry out investigations into serious operating accidents occurring on the Belgian railway network.

A serious accident is a collision, derailment, etc., resulting in:

- At least one fatal casualty
- At least five persons seriously injured
- A total cost of damage caused to the infrastructure, rolling stock and environment estimated at EUR two million or more.

As well as serious accidents, the investigation unit can carry out investigations into accidents and incidents which, under slightly different circumstances, could have led to serious accidents.

The decision is made by the main investigator, taking into account the severity and where applicable, the lack of clarity as to the circumstances under which the events occurred.

The investigations are carried out autonomously in all parts of Belgium, in conformity with the requirements set out in the relevant European Directives.

The investigations are aimed at determining the circumstances and causes of the event and not the responsibilities for them.

They cover many aspects: infrastructure, operation, rolling stock, staff training, regulations, etc.

They are separate from judicial enquiries.

The purpose of the investigations is to set out recommendations in order to minimise the risk that such accidents could occur in the future and reduce their consequences.

The reports drawn up after each investigation are forwarded to the safety authority and to the companies directly concerned.

The national safety authority and the companies concerned provide the investigation unit with feedback as to the conclusions drawn and the actions taken to enhance operating safety levels, at least once a year, in conformity with the regulatory requirements.

The investigators take part in the activities of the network of investigation bodies (NIB¹) that are undertaken under the auspices of the European Railway Agency in order to share the experience gathered by the other investigation bodies and help to enhance European harmonisation of regulations and the investigation procedures in Europe.

¹ NIB= National Investigation Bodies.

2.3 Organisation and resources

The investigation unit, within the SPF Mobilité et Transports (Service Public Fédéral [Federal Public Service for Mobility and Transport]), has independent status and operates autonomously.

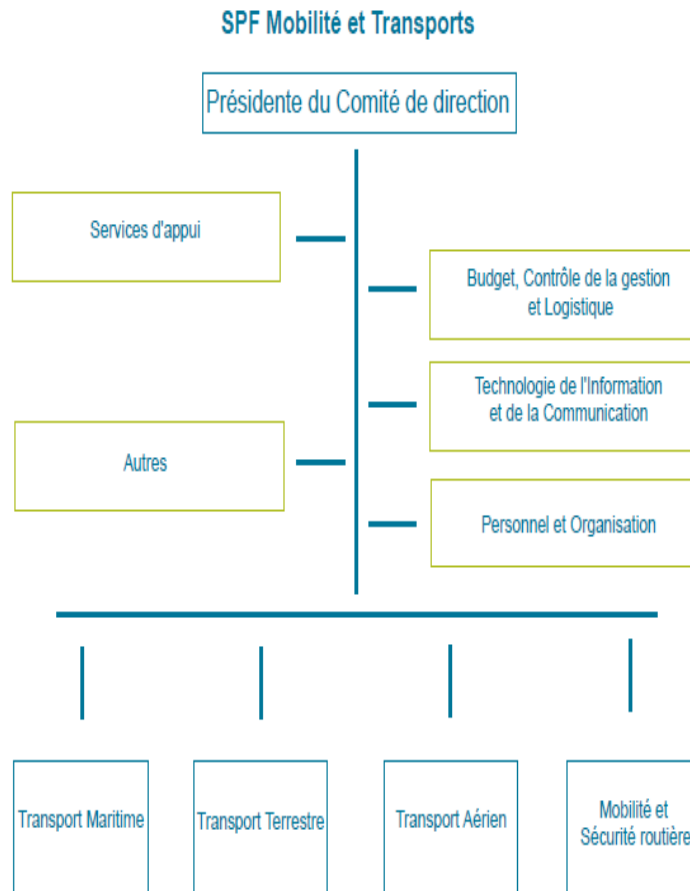
Its operation is financed by the annual fees paid on the one hand by the railway infrastructure operator for its safety approval, and on the other hand by the railway companies for their safety certificates.

In March, a second investigator was added to the team to provide a staffing level of two permanent investigators.

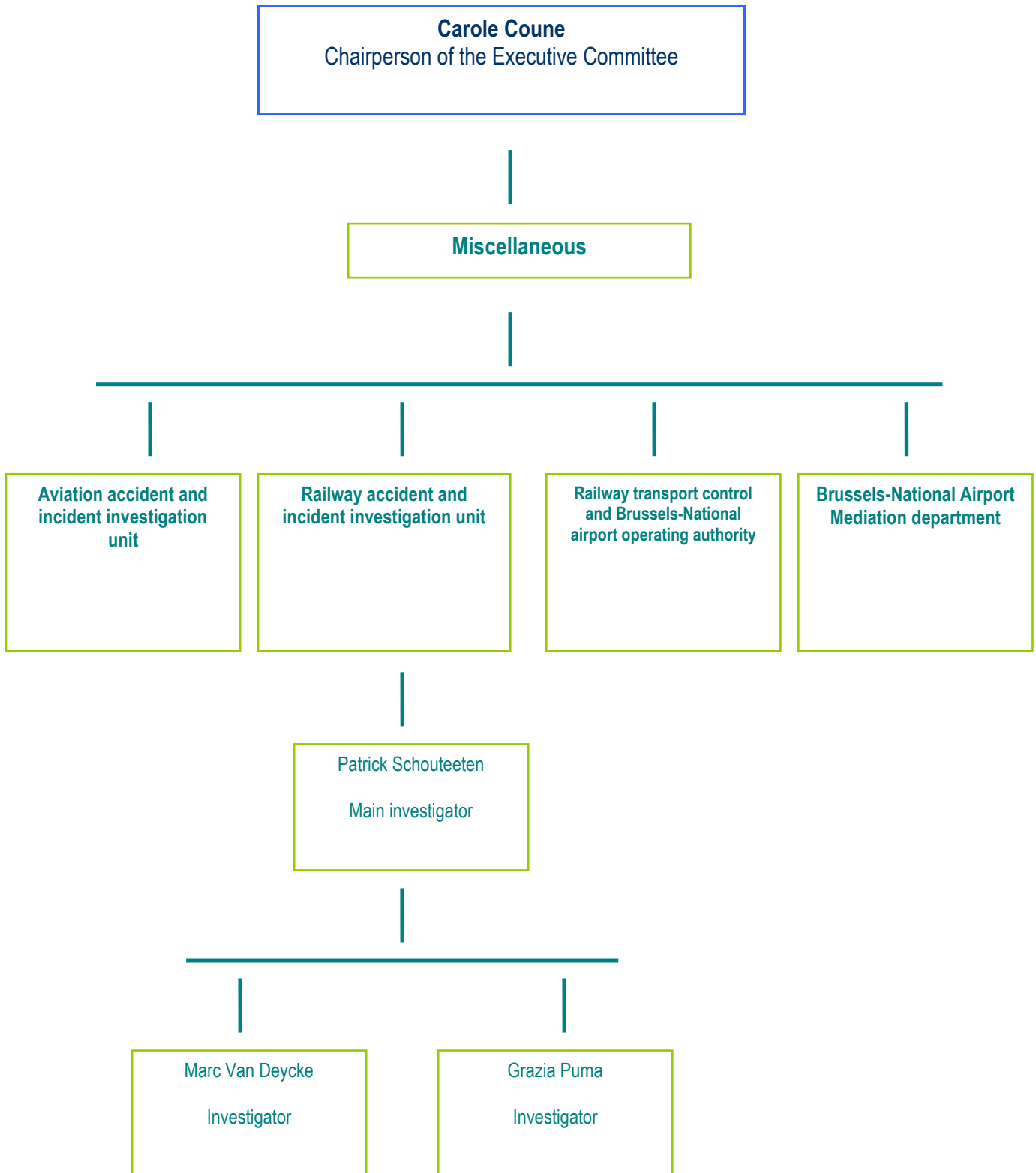
Under the royal decree dated 16 January 2007 it is possible to consult such technical experts as may be necessary to carry out the investigations.

In practice, the investigation unit calls on the expertise of the SNCB Holding, direction Stratégie, Coordination, Sécurité et Environnement [Strategy, Coordination, Safety and Environment division] to carry out investigations on the spot and draw up an investigation report under the supervision of the main investigator.

2.4 Organisation chart



SPF Mobility and Transport			
Chairperson of the Supervisory committee			
Support services		Budget, Management control and Logistics	
Miscellaneous		Information and Communication technology	
		Personnel and Organisation	
Sea transport	Land transport	Air transport	Mobility and Road safety



3 Investigations opened in 2009

Three investigations were opened in 2009.
They are listed in the table below:

Date	Location	Accident / Incident	Number of deaths
23/05/2009	Dinant	Boarding incident	0
15/11/2009	Jemelle	Death of a marshalling worker	1
19/11/2009	Mons	Derailment of a passenger train.	1

4 Investigations closed

During the year, two investigations opened in 2007 and two investigations opened in 2008 were closed.

Date	Location	Accident / Incident	Date of publication
29/11/2007	La Hulpe	Accidental death of two workers hit by a train	04/2009
14/12/2007	Berchem Mortsel	Person hit by a train	04/2009
03/07/2008	Hermalle-sous-Huy	Head-on collision between two trains	10/2009
25/10/2008	Walcourt	Fatal accident concerning an employee	10/2009

5 Descriptions of the investigations closed in 2009

5.1 LA HULPE

At 9.21 a.m. on 29 November 2007, train 4629 (Luxembourg – Brussels-Midi), travelling on the normal track, struck two men working on a maintenance site organised on the tracks in service by the infrastructure managing entity, Infrabel, using personnel from an outside contractor, the Vossloh Company.

The accident occurred at the overall distance marker 20.385 located at La Hulpe station on line 161 (Brussels – Namur).

A member of the infrastructure managing entity's staff and a Vossloh Company employee were killed instantly.



The site was protected by a train arrival detection and warning system based on a human chain of communication. The members of the chain communicated by radio and they had to remain in sight of one another. The system had been implemented by the infrastructure management entity.

The arrival of train 4629 could be detected by the system as set up, at least 47 seconds before its arrival on the site. During that period, the human set-up implemented for the purpose was unable to inform the men working on the site or trigger emergency braking of the train.

The cause of the accident is the incorrect and casual application of the regulations covering safety of work sites on tracks:

- The site foreman failed to ensure strict application of the safety measures to be complied with by the set-up under his responsibility;
- The first lookout failed to display his mobile stop signal (red flag) in good time;
- The second lookout, who was at the site, failed to detect (visually or aurally) the arrival of an 'unannounced' train, and hence did not clear the site under an emergency procedure;
- The second lookout was on track A near the grinder, in an environment too noisy to hear the horn sounded by the train driver, the radio announcement, etc.
- The driver of train E4629 saw the team at a distance of about 500 m; he sounded the horn, but he only started braking at the last moment (50 m before the site).

The investigation also showed that:

- the practical application, in a track configuration such as that at La Hulpe, of circular 36 I / 91 and with other general principles in force, requires a thoughtful and very rigorous approach by all those involved;
- the immediate superiors (assistant heads of sector or engineers) must explain in writing the safety system in place, including the tasks of each person involved, before starting work on the site.

5.2 BERCHEM MORTSEL

On Friday 14 December 2007, at 8.12 p.m., train E2890, providing the interregional link between Leuven and Antwerp, struck a person on track A, not far from the station entrance (distance mark 42.800 on line 27).

At about the same time, the attendant on train E2640, running on the same line between Antwerp and Leuven, noticed that a passenger had used the emergency control system just after leaving Berchem, to open the door leading onto the track and alight from the moving train.



It soon became clear that both cases involved one and the same person.

In the light of the gravity of the accident, in which a passenger was killed, and the unusual nature of the events, the railway accident and incident investigation unit decided to carry out an investigation to determine the circumstances under which an accident of this type could occur.

The investigation showed that the accident can in no way be ascribed to any failure to comply with the regulatory instructions, nor to any technical failures at the level of the rolling stock involved; in this case, they were 'Break' type self-propelled vehicles.

The investigation also was able to reconstruct precisely the events that occurred.

Immediately after the train's destination had been announced by the female attendant, the victim went to the nearest door of the vehicle and turned the emergency control handle.

This action freed the door and it opened immediately. The victim was not prevented in any material way from jumping off the train after it had left the station. At that time, the train was travelling at a speed of between 30 and 50 kph.

The circumstances leading to the victim's presence between the tracks are not very clear. Very shortly afterwards, the victim was struck by a train travelling in the other direction and was killed instantly.

The investigation did not bring to light any reasons for the victim's unusual behaviour.

The explanations given by the driver of the train that hit the person in question, and that person's behaviour, for which it is difficult to find a rational explanation, together with the marginal environment in which the victim lived, could point to suicide. In that case, the behaviour pattern is extremely unusual. Lastly, the victim may have tried, at a very late stage (perhaps as a reaction to the train attendant's announcement?), to get off the train by pressing the emergency control handle to open the door (whether or not the victim was aware that the handle triggered an emergency opening system) and, without any further thought (in a trance?), and without realising that the train had already left Berchem station, the victim jumped (or perhaps fell) from the moving train well after it had left the station.

However that may be, the investigation showed how easy it is to operate the emergency control system and open a door on a moving train and hence encounter situations that place personal safety at risk.

The investigation thus also led to a set of recommendations being put forward, aimed at reducing these risks.

5.3 HERMALLE-SOUS-HUY

At 6.48 a.m. on Thursday 3 July 2008, on line 125 (Namur- Liege), passenger train E2405 was involved in a head-on collision with goods train Z74070 at distance marker 19.215, located in the municipality of Hermalle s/Huy.



Goods train Z74070 was stationary on track A, from Liege to Namur, at signal C10, which was red. The route taking that train to the private Dumont – Wauthier branch line (sets of points 1A and 1B, track B in the 'wrong' direction, set of points 2A) was set up in the Flemalle signal box at about 6.45 a.m. after the permanent route to Hermalle had been deleted. Passenger train E2405 was running on track B towards Liege. Surprised to see signal E10 set to red (to protect the route to the branch line for the goods train), the train driver triggered emergency braking. He was unable to avoid going through the signal, forcing the points 2A open and coming into a head-on collision with the goods train on track A.

The investigation confirmed that the signalling system, at the infrastructure level and concerning the onboard equipment, showed no signs of technical failure, and that the visibility of signals K10 and E10 was satisfactory.

However, analysis of the speed recorder for the passenger train, shows that signal K10, which preceded signal E10 set to red, did not display a double yellow light, as could have been expected.

This finding can be accounted for by a voltage drop that occurred in the electric power supply for the signalling system just before the passenger train reached signal K10, or as it was passing the signal. The voltage drop at that time has been confirmed by TECTEO.

The report shows that under such circumstances, signal K10 goes out briefly or switches to red. Thus its crocodile does not receive the positive voltage of a double yellow signal and the MEMOR system is not activated by friction of the brush on the crocodile as the train goes past.

The collision is thus a direct consequence of the fact that the driver of the passenger train failed to brake as the train approached signal K10.

Normally, the signal should have displayed a double yellow light, but as a result of the voltage drop in the electric power supply, it was either set to red or had gone out.

The accident was made inevitable by the absence of technical equipment to control train operation and automatically trigger emergency braking if a train goes past a signal that requires it to stop or has gone out.

One of the recommendations thus concerns the urgent necessity of implementing an automatic train operation control system and the necessity of executing the current programme on a continuous basis.

Be that as it may, it is nonetheless important for the railway companies to continue to enhance their drivers' awareness concerning the risks of going through signals requiring trains to stop, and ensure that the drivers are not distracted while executing their tasks.

Furthermore, it is necessary for these railway companies and the infrastructure management entity to carry out joint risk analyses concerning the points of the network at which recurrent problems of going through signals are still noted.

A final recommendation stems from the finding that during the switchover, the backup power supply showed the same shortcomings as the normal power supply. It would hence be advisable to check the quality of the backup power supply before making any such switchover during a voltage drop, and cut off all electric power supplies if the backup quality is not satisfactory.

5.4 WALCOURT

At about 8.10 p.m. on Saturday 25 October 2008, on line 132, Charleroi to Couvin, at Walcourt station, a member of Infrabel's staff, the foreman on work train P 811, which was in service to replace the sleepers on track B (Couvin-Charleroi direction), was struck at distance marker (BK - borne kilométrique) 85.350 in the space between the tracks, by a train travelling in the opposite direction on track A (Charleroi-Couvin direction).



The starting time for work on the site had been put forward from 10.50 p.m. to 8.15 p.m., after passenger train Z6169 had gone past, to catch up with the work execution schedule and meet the planned final deadline date.

It had been agreed that during the first few hours of the evening, the safety of the site and of railway operation would be ensured by using the track blocking procedure for the last two trains that were still due to run on track A, using the fixed signals at each end of the site.

This procedure, which involves an exchange of S460 telegrams between the signal box operator and the work team, is authorised by the RGS (référentiel général de sécurité [general safety repository]) fascicule V- titre V- point B.2.1.2.

At 8.10 p.m., the three site workers entrusted with the task of ensuring safety were going towards the site, on which preparatory work had already begun.

Following a technical problem on the work train (a reloaded wood sleeper had swung crosswise and was preventing the other sleepers from being lifted), the work foreman went onto a foldaway platform in the space between the tracks.

Once the situation had been sorted out, he jumped off into the space between the tracks and was within the clearance gauge of track A when train Z6169 arrived.

The work foreman of train P811 was struck by the train and killed instantly.

The investigation confirmed that the victim had begun the work before the system that was to ensure safety was operational.

The primary cause of the accident is the victim's presence in the space between the tracks during work begun too early, before the protection system had been implemented.

The underlying causes of the accident are linked to various factors:

- A human factor: the safety measures that are subject to special authorisations, were known to the victim, but the latter failed to apply them.

- An organisational factor: the decision to bring forward the starting time for the work was made orally in the morning of the day on which the accident occurred, without being covered by a written procedure. The personnel had been informed and they were present to start the work just after 8.00 p.m.. The staff on the spot confirmed that they had been informed on the Saturday evening of the particular modalities for starting the work. The work foreman had told them about the changes in the working hours and the safety system implemented.

- A scheduling factor: the site work was slightly behind schedule, due in particular to a broken track on the axle cart the previous night; in order to avoid drift in the overall site schedule and make up for lost time, it had been decided to request an earlier start for the work, in agreement with the persons in charge locally.

The recommendations mainly cover site organisation.

All decisions modifying the usual site work procedures should be set out in a written procedure document providing traceability.

The procedures should be clearly explained at the beginning of work on the site and each time changes are made in the site organisation.

6 Recommendations issued in 2008

😊 : Accepted

☹️ : Rejected

❓ : No response concerning the actions taken

NA: Not Applicable

6.1. LA HULPE

The main recommendations stemming from analysis of the causes of the accident that occurred at La Hulpe on 29 November 2007 are set out below. However, their implementation will be conditional on a corresponding risk analysis for the recommendations for which such analysis is justified, together, where necessary, with prior approval of the competent public authorities.

1. The human factor

- Careful attention to be paid to the abilities and competencies of the safety personnel (workers and other staff involved in site safety).
- Continuation and reinforcement of the regulatory support for the personnel dealing with the safety systems.
- Enhancing awareness among users of the radio equipment with a view to avoiding their placing too much trust in such equipment.

SNCB: NA Infrabel: 😊 SSICF

(Service de Sécurité et d'Interopérabilité des Chemins de Fer [Railway safety and interoperability department]): ❓

2. The technical factor

- Continuing the search for enhanced technical quality in radios and detection of any failures they may show during their operation.
- Recording all safety communications.
- Continued efforts to reduce the noise levels given off by tools with internal combustion engines used in the presence of railway traffic.

- Imposing the use of less noisy equipment by the firms concerned, via technical instructions aimed at setting strict limits on noise levels.
- Finalisation, at the earliest possible date and with the widest possible scope, of development of automatic devices that detect and announce approaching trains.

SNCB: NA Infrabel: 😊 SSICF: ?

3. The organisational factor

- Continuation of the feedback procedure which has been implemented, and which involves the full hierarchical structure and enables the safety processes on the basis of actual field practices to be enhanced and improved.

SNCB: NA Infrabel: 😊 SSICF: ?

4. Monitoring and support from the hierarchical structure

- Reinforcement of site supervision and enhanced level of site control.
- Swift detection of any drift shown that could lead to unacceptable situations concerning safety.
- Providing feedback with a view to completing the cycle aimed at continuous improvement in safety levels and covering all the fundamental aspects (selection, initial and ongoing training, certification, together with technical, organisational, and regulatory aspects, etc.).
- Reinforcement of the traceability of all these operations (archiving the documents and details of the operations carried out).

SNCB: NA Infrabel: 😊 SSICF: ?

6.2 BERCHEM MORTSEL

The accident and conclusions of the investigation lead to the recommendations listed below.

1. It is necessary to make a clear distinction between the system used to open the doors in an emergency situation and the mechanism used to open the doors under normal circumstances to exclude all possibilities of getting mixed up between the systems, even for an occasional passenger. Furthermore, it would be advisable to ensure that information is provided close to all such emergency exits, concerning the actual circumstances in which use of the door opening systems is permitted.

SNCB: ☹️ **Infrabel:** NA **SSICF:** ?

Reason for the rejection:

Inherent to the specifications for passenger rolling stock.

2. Triggering of the emergency door opening procedure should be limited to release of the door in question. It is important for the door opening procedure to require further action, without the door opening automatically.

This would enable us to expect that a person using an emergency door opening system would be more aware of the unusual nature of his or her action and the risks and hazards involved.

It is true that the concept of emergency opening is currently already regulated by the ARGSI (Algemeen Reglement voor het Gebruik van de Spoorweg Infrastructuur/RGUIF, Règlement Général de l'Utilisation de l'Infrastructure Ferroviaire [General regulations for use of the railway infrastructure], but for older rolling stock still in service, including 'Break' type self-propelled vehicles, the regulations still grant waivers to these provisions.

Nonetheless, a concession of this type should not lead to the fact that the recommendation in question is no longer taken into account. On the contrary, every opportunity should be taken to enhance levels of conformity with the existing regulations.

An opportunity of this type is provided by full modernisation of 'Break' type self-propelled vehicles, which is planned for the coming years. It would be advisable, at that time, to bring operation of the emergency opening system into conformity with the ARGSI instructions in the matter.

SNCB: 😞 **Infrabel:** NA **SSICF:** ?

Reason for the rejection:

Inherent to the specifications for passenger rolling stock.

3. The train from which the victim fell showed major irregularities, without the personnel being aware that there were any problems.

The train attendant is only informed that the emergency opening system has been triggered and that a passenger has alighted from the train between stations if another passenger tells the attendant so during a ticket inspection.

The train driver's attention is not drawn to the relatively minor fact that the indicator light goes out, showing that the passenger door has been opened. Furthermore, the driver is not directly called on to check the indicator light.

However, it would be advisable for the train staff, for its part, to carefully check all elements that could have an effect on passenger safety and more particularly, all irregularities concerning opening and closing of the doors. A suitable alarm system, such as an audible signal, should inform the attendant and the driver that a door has been opened while the train is moving.

SNCB: 😞 **Infrabel:** NA **SSICF:** ?

Reason for the rejection:

Inherent to the specifications for passenger rolling stock.

4. On a passenger train, the emergency door opening system provides a possibility of opening the doors and getting off the train at any time.

Regarding the accident that was the object of the investigation, the victim got off the train, after opening the door, on the side facing the other track, while the train was travelling at 30 kph or more.

In this case, it is unlikely that the victim would be able to get off the train unharmed. However that may be, there are always considerable risks for persons on the tracks.

It is not always easy to clearly define the usefulness of any such emergency door opening system. It would be advisable to link door opening to automatic braking and only enable opening of the doors on the side facing the footpath alongside the track, when the train is stationary.

SNCB: 😞 **Infrabel:** NA **SSICF:** ?

Reason for the rejection:

Which side is to be walked on when there are more than two tracks or when a train is running the 'wrong' way along a track?

6.3. HERMALLE-SOUS-HUY

1. It is essential to equip the Belgian railway infrastructure with an automated train speed control system and require the railway companies to bring their rolling stock into conformity with that equipment.

The programmes under way and in particular, the project to equip the network with a TBL1+ system, must be continued with the utmost diligence. Everything possible must be done to avoid the slightest delay in execution of the programme.

SNCB: 😊 **Infrabel:** 😊 **SSICF:** ?

2. The railway companies have to continue their action programmes to avoid going through stop signals. In particular, it is necessary to continue the actions aimed at enhancing train driver vigilance. Moreover, it is important to avoid, wherever possible, having anything in the driving cab that could distract drivers, including, amongst others, the presence of other persons.

In particular, it is recommended that Infrabel and the railway companies draw up joint risk assessments concerning trains going through signals placed at critical locations, in order to take joint actions to avoid trains going past any such signals.

SNCB: 😊 **Infrabel:** 😊 **SSICF:** ?

3. It is essential to meet the quality criteria for the electric power supply.

The investigation showed that a switchover was made from the normal power supply to the backup supply, even though the latter showed the same deterioration as the normal supply.

It is recommended that prior to a switchover between electricity supplies, a technical device should be used to check the quality of the backup power supply and that the electric power supply should be cut off completely if the same shortcomings are noted in the normal and backup power supplies.

SNCB: NA Infrabel: ☹️ SSICF: ?

Reason for the rejection:

A verification operation prior to switchover would involve a delay of about 15 seconds.

6.4 WALCOURT

Reminders of the safety rules.

It is very important to go back over the safety rules during all safety meetings and systematically organise actions that ensure maximum feedback.

Application and reminders of procedures.

It is necessary to hold a briefing meeting before beginning any such work, as well as during any changes made during work on the sites.

Safety procedures should be implemented for each change in working procedures.

It is also advisable to use written procedures to inform the workers and ensure traceability of the actions:

1. Written coordination

Before deployment on the site, the immediate superior sets out, in a written, traceable format, the reasons for adopting the site protection system to be applied.

In the document explaining his choice, he sets out clearly the following points: how is the adopted protection system to be implemented, in concrete terms? This can be envisaged using:

- a sketch of the situation;
- indications of the exact location of each worker;
- a list showing the names of each person concerned and stating the role of each person, signed and dated by each worker;

SNCB: NA Infrabel: ☺ SSICF: ?

2. Inform all the workers concerned

The presence of workers is prohibited in the danger zone, unless all the workers have been fully informed of:

- the nature of the work;
- the working methods used;
- the risks to which the workers are exposed due to train traffic, the circumstances for execution of the work and the local situation;

- the extent of the danger zone: the limitations as to the space available;
- the refuges and the route to take between the working area and the refuges;
- the protection system used;
- the application of the protection system in the local situation;
- any changes in the protection system and the time of its application;
- any changes in the local situation stemming from progress in the work;
- the best way to exit the danger zone at the end of the work.

This information must be given to the workers for each activity. During the work, the workers must be informed of any changes in the circumstances concerning execution of the work.

SNCB: NA Infrabel: ☺ SSICF: ?

3. Internal and external inspections

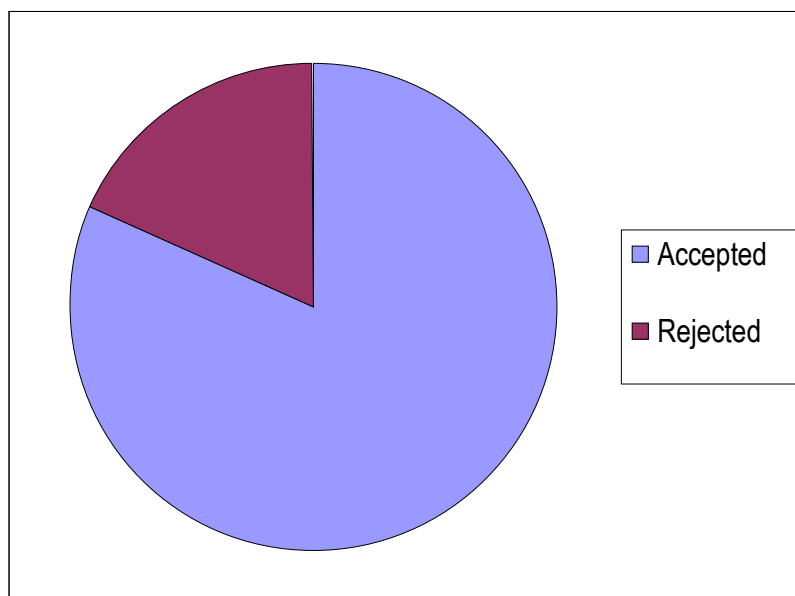
It is recommended that actions should be set out more systematically, by the internal safety manager and the external safety authority alike, concerning the modalities for application of the procedures, to ensure that the work is carried out in complete safety and hence check the practical efficiency of the safety management system.

SNCB: NA Infrabel: ☺ SSICF: ?

7 Monitoring

7.1 Monitoring of issued recommendations

	Quantity	Accepted	Rejected	No reply
Izegem	5	5		
Genk-Goederen	4	4		
Genva	4	4		
Ede	2		2	
La Hulpe	13	13		
Berchem Mortsel	4		4	
Hermalle-sous-Huy	3	2	1	
Walcourt	3	3		
Total	38	31	7	



7.2 Monitoring of the investigations

Year	Number	Date.	Type	Deaths	Status	Date.
2007	1	26/04/07	Collision	0	Closed	02/09/07
	2	19/06/07	Collision	1	Closed	23/07/08
	3	02/09/07	Derailment	0	Closed	08/10/08
	4	29/11/07	Personnel struck	2	Closed	01/04/09
	5	14/12/07	Person struck	1	Closed	27/04/09
	6	17/12/07	Person struck	1	Closed	26/05/08
2008	1	03/03/08	Accident on level crossing	0	Open	
	2	03/07/08	Collision	1	Closed	02/10/09
	3	25/10/08	Personnel struck	1	Closed	02/10/09
	4	14/11/08	Collision	0	Open	
2009	1	23/05/09	Boarding incident	0	Open	
	2	15/11/09	Personnel struck	1	Open	
	3	19/11/09	Derailment	1	Open	

ACCIDENTS			
Collision	Person/employee struck	Derailment	Accident on level crossing
4	5	2	1

INCIDENTS
Boarding incident
1

