




Summary

Safety Investigation Report

Death by electrocution of a private tree trimmer
Quévy - 10/07/2023

REPORT VERSION TABLE

Version number	Subject of revision	Date
1.0	First version	19/07/2024



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

In case of contradiction between certain words and terms, it is necessary to refer to the French version.

SUMMARY

On Monday 10 July, at around 2:05 p.m., a tree trimmer from a private company is working up a tree on private land along line 96 in Quévy (Belgium) near the French-Belgian border.

During this work, a branch falls on a live electric power cable: an electric arc is created between the cable, the branch, and the tree trimmer, who is fatally electrocuted.

An investigator of the RAIU goes to the scene of the accident to make initial findings and gather initial information, following which the RAIU decides to open an investigation into the circumstances and causes of this accident.

This summary synthesizes the facts and elements analysed: for technical and regulatory references, as well as for the details of the analyses, the reader is referred to the investigation report.

One of the first pieces of information gathered concerns the specific electrical situation of line 96 in Quévy.

Line 96 links Brussels to the French station Aulnoye:

- up to Quévy station, the line is supplied with 3 kV direct current;
- at Quévy, there is a neutral zone as regards voltage;
- after that neutral zone, the line is supplied with 25 kV alternating current.

The 25 kV AC supply to the sections located at Quévy station comes from 2 longitudinal overhead cables (known as “feeders”) placed above the catenaries and passes through a switching station which is known as “herse” (116). The 25 kV AC supply to the sections located between Quévy station and the French border comes directly from the frontier point. These feeders are supplied by the French substation Hautmont.

The electrical installations at Quévy are managed jointly by SNCF and Infrabel according to well-defined roles and tasks.

This situation prompted the Investigation Unit to contact its French counterpart, the BEA-TT.

The BEA-TT also opened an investigation into this accident in order to gather the necessary information from the French infrastructure manager.

Documents from the Belgian and French infrastructure managers were collected and analysed, interviews of Belgian and French employees were conducted, and the actions of the players concerned were examined.

The results of the studies conducted by the two investigation units were shared in good cooperation between the RAIU and the BEA-TT and brought together in the investigation report.

On 10 July 2023, at around 2:06 p.m., the upper part of the tree cut by the tree trimmer falls onto the feeder supplied by a voltage of 25 kV AC and the resulting electric arc causes the electrocution of the tree trimmer.

According to the railway policing act of 27/04/2018, vegetation must be maintained, along railway tracks, at a maximum height that is one and a half metres lower than the distance between the foot of it and the nearest rail.

This information is also available on the website of Infrabel:



Given the generally accepted growth rate for the type of tree involved in the accident, the Investigation Unit assumes that the tree exceeded the authorised height for more than a year.

The condition of vegetation belonging to third parties in the vicinity of tracks must be monitored by the landowner. However, the procedures of Infrabel provide for monitoring during running line inspections and during inspections from the driver's cab (twice a year), among others as part of the monitoring of the condition of embankments (detection of instabilities and/or risks of subsidence) and, in particular, of vegetation: trees presenting a risk in the event of fall (encroachment on the gauge), visibility of signals, etc.

No record of the tree involved in the accident was found in the control sheets of Infrabel, and no letter was sent by Infrabel to the owner of the tree.

It seems that the monitoring of vegetation by the owner-lineside resident failed to detect the tree's out-of-tolerance size earlier.

The owner of the trees contacted a professional tree trimmer and, on 21/06/2023, less than a month before the accident, the owner of the trees spontaneously informed the services of Infrabel of the presence of tall trees the branches of which were close to the catenary of line 96 at Quévy.

Following this contact, Infrabel informed the owner and the tree trimmer that the power of the line would be completely switched off on 20/07/2023 and that the tree trimming work could be carried out on that day. Infrabel was due to confirm this possibility on 17/07/2023.

The tree trimmer began working on the morning of 10/07/2023 without Infrabel being informed.

The Investigation Unit assumes that, at around 11:20 a.m., while the tree trimmer was working, a branch probably came close to a live element during its fall, creating an arc. This arc damaged an insulator mounted on a catenary support and caused a cut-out switch to trip. Signalling elements at Quévy station were also damaged.

The Power Dispatcher in Mons (department of Infrabel managing, among other things, the power supply to the catenaries) notices this tripping. Given the specific electrical situation at Quévy, they contact the Lille Flandres central substation regulator (their counterpart at the SNCF): together, they investigate the tripping. Their conclusion is that the tripping is caused by the catenary at Quévy station.

The Power Dispatcher in Mons applies temporary protection and requests an inspection of installations by employees of the "Catenaries" department in order to determine the causes of the tripping observed.

At the same time, the signal cabin in Mons notices two faults at Quévy station with track circuits used to detect trains on track A of line 96. Employees of the "Signalling" department are sent on the premises to check the installations.

On arriving at Quévy station at around 12:00 noon, the employees of the "Signalling" department of Infrabel discover that trimming work is in progress.

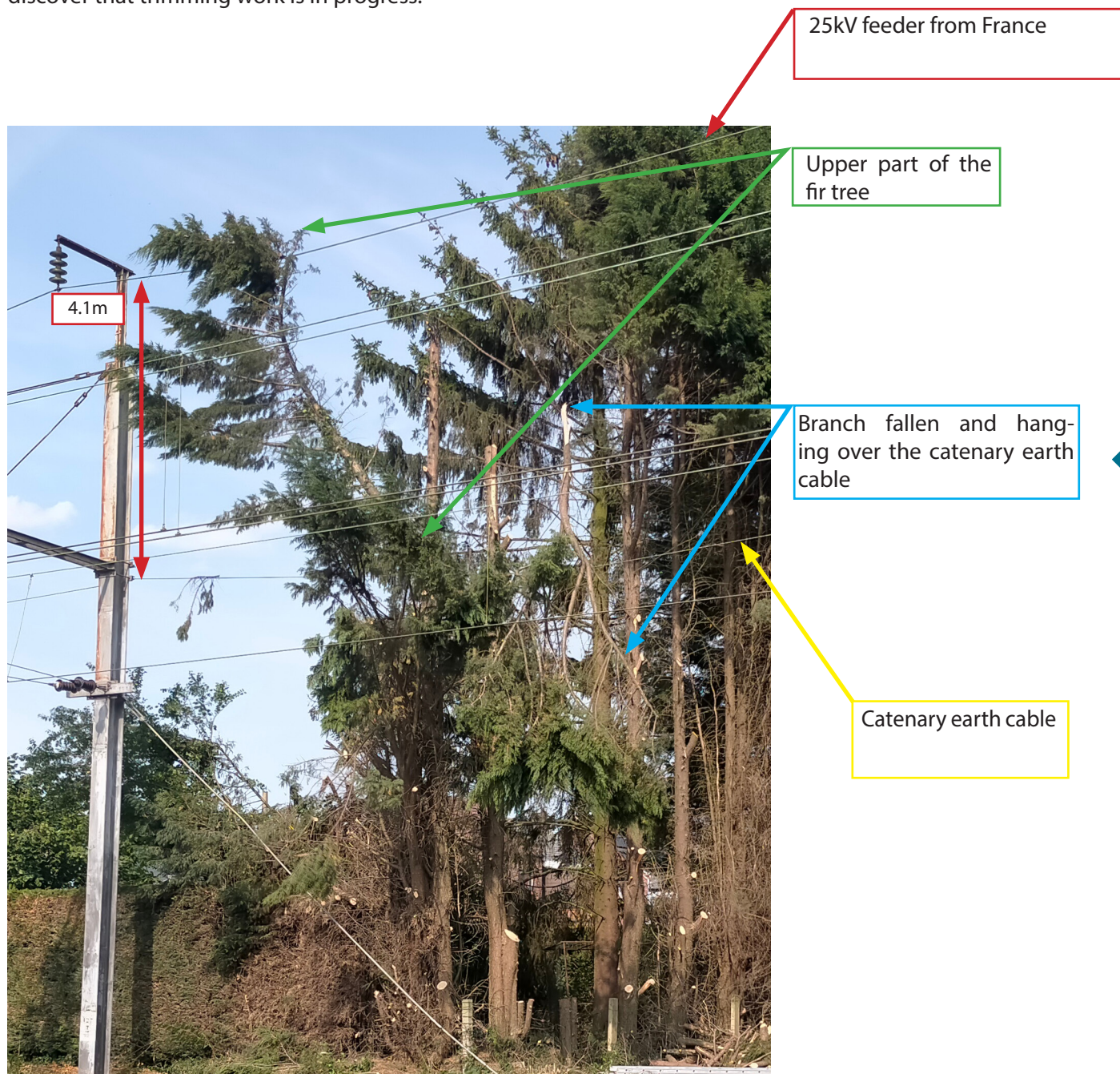


Photo of the site of the accident, taken after the intervention of the emergency services

The website of the Infrastructure Manager states that it is forbidden to enter a zone situated within a 4.5 metre radius of the tracks for vegetation maintenance work.

One member of the “Signalling” department asks the tree trimmer to stop working immediately.

Employees of the “Signalling” department also notice that a branch is hanging over a catenary earth cable.

An employee of the duty office of Infrabel arrives on the premises at around 12:40 p.m. and makes sure that the trimming work remains at a standstill until the employees of the “Catenaries” department arrive, because the safety conditions are not met.

At around 1:10 p.m., the employees of the “Catenaries” department arrive on the premises.

Following the inspection of the site by these employees, it is decided to switch off the section concerned so that:

- electrical safety measures can be taken;
- the tree trimmer is able to remove the branch hanging over the catenary earth cable. The tree trimmer confirms that he is able to remove the branch hanging over the cable himself without having to call upon heavy equipment.

The safety measures put in place are intended to protect the tree trimmer so that he can remove the branch hanging over the catenary earth cable. These measures end at 1:28 p.m.

The employees of Infrabel then position themselves in such a way as not to expose themselves to the risk of the branch falling: they stand on the other side of the tracks, opposite the place where the tree trimmer is working. At around 2:06 p.m., one employee of the “Catenaries” department calls the Power Dispatcher in Mons: the upper part of a tree cut by the trimmer touches the feeder, the tree is smoking and there is still current.

The Power Dispatcher in Mons then switches off the power supply immediately by opening a cut-out switch, but the employee of the “Catenaries” department reports that sparks are still visible: the Power Dispatcher in Mons asks his colleague to contact the Lille Flandres central substation regulator.

The Power Dispatcher in Mons calls the Lille Flandres central substation regulator and asks them to switch off the power supply following the fire.

In accordance with the procedure of the SNCF to be followed in the event of a fire, the Lille Flandres central substation regulator says that they would first check the rail traffic.

The employee of the “Catenaries” department calls the Power Dispatcher in Mons again to report that there is still current on the feeder and that the tree trimmer was hit.

The Power Dispatcher in Mons calls the Lille Flandres central substation regulator again and reports that someone has been electrocuted: the Lille Flandres central substation regulator immediately switches off the power supply to the entire zone between Hautmont and Quévy.

According to our analysis, on the day of the accident, it was planned to remove the branch responsible for the tripping, but the cutting of the upper part of the tree by the tree trimmer had not been discussed. The implementation of electrical safety measures and the presence of Infrabel staff may have given the tree trimmer a false sense of security, leading him to believe that there would be no electrical danger.

At the place where the branch was to be removed by the tree trimmer, the distance between the earth cable (over which the branch hanged) and the feeder was 4.1 m.

This distance is greater than the distance delimiting the prohibited zone: according to the regulations of Infrabel on safety distances, the prohibited zone is defined as 1.5 m from a 25 kV AC cable.

Therefore, to remove the branch hanging over the catenary, it was not necessary to switch off the feeder supply. It did not seem necessary to remind the tree trimmer that the feeder was still live. By default, any catenary element that is not declared dead must be considered to be in a state corresponding to the operation of the line, i.e. live.

In addition, according to observations at the site of the accident, it appears that the risks associated with cut-off parts falling were not fully taken into account during the trimming work. Given their training and experience, professional tree trimmers should be aware of the dangers posed by power lines in the course of their work, and know the measures to be taken to mitigate the associated risks (authorisation to be requested, measures to prevent objects falling onto a power line, etc.).

When dismantling a tree, all tree trimmers should, among others, manage the risks associated with branches and pieces of trunk falling: a system of ropes and pulleys held in place by a brake cylinder ensures that this work is carried out with a high safety level.

Once the trunk is exposed, it can be cut into pieces: the size of the cut pieces helps to manage the risk of any impact on the immediate surroundings of the cut tree.

As part of the investigation, various professional federations representing tree trimmers and park and garden maintenance professionals were contacted: it is necessary to draw their attention to the risks associated with situations such as the one encountered in Quévy.

The analysis of the different elements brought to light during the investigation makes it possible to identify the causal and contributing factors to this accident, including systemic factors:

Causal factor

The fall of the tree onto the 25 kV AC feeder created an electric arc, electrocuting the tree trimmer.

Contributing factor No 1: Ambient conditions

The height of the tree contributed to the accident.

Because of the height reached by the tree,

- a professional tree trimmer was called in by the lineside resident, owner of the tree;
- the upper part of the tree, once cut and without anything to hold it back, could reach the feeder.

Contributing factor No 2: Working conditions

The tree trimmer did not carry out his work as prescribed:

- he was supposed to remove a branch that had fallen onto a catenary cable, and not to cut off the upper part of the tree;
- no measures were taken to prevent the upper part of the tree from falling onto the feeder once it was cut.

Contributing factor No 3: Communication

The “Catenaries” department employees put safety measures in place and passed them on to the tree trimmer. The implementation of these measures may have given the tree trimmer a false sense of security, leading him to cut the upper part of the tree quickly.

Systemic factor No 1: Regulations

Article 20 of the railway policing act of 28 April 2018 specifies the maximum height of vegetation along tracks. The height and growth rate of the tree concerned suggest that it exceeded the authorised size for more than a year. It seems that the monitoring of vegetation by the owner-lineside resident failed to detect the out-of-tolerance size earlier.

Systemic factor No 2: Monitoring

The track inspections scheduled twice a year in the procedures of Infrabel include the monitoring of vegetation in the vicinity of tracks. These inspections failed to reveal that the trees concerned along line 96 in Quévy exceeded the authorised size limit.

The RAIU issues 3 recommendations:

- The Investigation Unit recommends the DRSI to ensure that the Infrastructure Manager takes the necessary steps to make sure that the quality and clarity of the information provided in case of emergency limits the risk of misunderstanding.
- The Investigation Unit recommends the DRSI to ensure that the Infrastructure Manager takes the necessary steps to make sure that the monitoring of vegetation in the vicinity of tracks complies with legal and regulatory requirements.
- The Investigation Unit recommends that the professional federations representing tree trimmers and other park and garden maintenance professionals make sure that the risks associated with the presence of railway infrastructure elements in the vicinity of trees on which their members have to work are known, and that their members are informed of these risks and of the necessary contacts.

Rail Accident and Incident Investigation Unit
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